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**THIRD  
ANNUAL REPORT**

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**DEPARTMENT OF  
MINERAL RESOURCES**

**STATE OF ARIZONA**

**July 1, 1941 to June 30, 1942**

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**J. S. COUPAL, Director**

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**OFFICIAL FILE**



## DEPARTMENT OF MINERAL RESOURCES

### Board of Governors:

Charles F. Willis, Phoenix, Arizona, chairman  
Dr. N. H. Morrison, Phoenix, Arizona, vice-chairman  
Shelton G. Dowell, Douglas, Arizona  
Loyde C. Edmonson, Globe, Arizona  
L. V. Root, Kingman, Arizona

### Personnel of Department:

#### First Period (July 1, 1941 to April 17, 1942)

J. S. Coupal, Director  
Jess R. Fickas, Secretary  
Jackson Hoagland, Director of Publications

#### Second Period (April 17, 1942 to June 30, 1942)

J. S. Coupal, Director  
W. C. Broadgate, Assistant Director  
W. J. Graham, Assistant to the Director  
Jackson Hoagland, Director of Publications  
Edna B. Montgomerie, Office Secretary  
Lorraine Porter, Secretary

#### Field Engineers

George A. Ballam, Southern District, Tucson, Arizona  
Elgin B. Holt, Western District, Kingman, Arizona  
A. C. Nebeker, Central District, Prescott, Arizona  
Fred H. Perkins, Eastern District, Globe, Arizona

### Offices:

#### Headquarters Office

413 Home Builders Bldg., 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 County Engineers Office, Globe, Arizona

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PRINTED IN ARIZONA





In compliance with Chapter 27, Laws of 1939, creating the Department of Mineral Resources, the following report of the activities of the department for the fiscal year July 1, 1941 to June 30, 1942, is respectfully submitted.

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

Dear Governor Osborn:

In considering this annual report of the Department of Mineral Resources it should be remembered that 9½ months of the period covered was that in which the department was supported on a limited maintenance program by donations of members of the Arizona Small Mine Operators Association, this being made necessary by the veto of the appropriations made for the department during the regular session of the Fifteenth Legislature.

For the last two months of the period the department was on a full war time program made possible by the restoration of appropriations by the Special Session of the Fifteenth Legislature held in April, 1942, and which was permitted to become a law without your signature.

The program then is one in which a full schedule of projects and service were carried over into a period when the most that could be expected was that they be kept alive and only the most urgent and important requisitions for service on the part of the Government and the small mine operators for defense work could be met. This was later expanded into a full program again which fortunately could be done quickly because the department had never been permitted to cease functioning entirely.

The seriousness of the curtailment of the work of the department was accentuated by the impending catastrophe of war and the frantic search for new sources of critical and essential war minerals and metals by the War Production Board for the requirements of the defense program. It was this factor that caused the members of the Arizona Small Mine Operators Association to contribute their dimes and dollars that the state and nation be hurt as little as possible by the failure of Arizona to provide for doing its part. The consensus of opinions regarding the curtailing of the work of the Department of Mineral Resources was not so much one of personal injury in having to lose the services of a department created to help solve their problems, as one of a deep conviction that the welfare of the state and nation was being impaired by depriving the state of that which would allow Arizona to do its full share in providing increased production of strategic and essential metals and minerals called for by the defense and war program.

## PLANS TO CARRY ON MADE

During the closing days of the department functioning under state support, extensive plans were made for the continuance of the work, the expense of which was to be covered by donations where paid services were necessary and by unpaid assistance wherever it could be arranged by functioning through volunteer committees of the A.S.M.O.A. councils and numerous other devices. The program conducted was in no way measurable by the amount of money expended because many thousands of hours of volunteer work was given by a considerable number of people to carry on.

The program, after being fully outlined, was presented to the Board of Governors at their meeting in Phoenix, Arizona, on June 22, 1941 and, after a lengthy discussion of ways and means of conforming and adapting to a new situation, it was unanimously voted to carry on the work of the department without state funds and in conjunction with such funds as might be raised by the Arizona Small Mine Operators Association as voluntary donations, and the chairman of the Board was given authorization to carry it out. It was specifically set up that under no circumstances was the department or the state to be financially obligated.

The proposed plan called for the utmost economy and the maximum of volunteer effort. Salaries were accepted by those who could be retained in the employ of the department at far less than normal. The office of the department with its files and records was moved from the Capitol Building to Room 518, Title and Trust Building. Jess R. Fickas was retained as secretary and the duties assigned were to continue to furnish information on mine subjects from the files and records; to build up the records of metals and minerals available in the state and make such contacts as were possible for mine operators with prospective capital seeking mining property.

Jackson Hoagland was retained on part time as director of publications to do research and to prepare such briefs and reports as were necessary in presenting the problems encountered by the small mine industry in the state in the rapidly changing economic situation brought about by the impending war and the increased demand for production.

J. S. Coupal continued as director of the department, but was in the field practically all of the time, returning to headquarters office only on weekends around the middle and end of each month. In addition to such field work as he might do individually he was able to coordinate the voluntary activities of the A.S.M.O.A. council committees who were assisting in the field work within their own communities.

Charles F. Willis, chairman of the Board of Governors, agreed to devote a large part of his time to supervising the office work, planning projects, attending to all correspondence and calls requiring immediate personal attention. He served without any compensation whatsoever.

## DEPARTMENT OF MINERAL RESOURCES

### Statement of Expenses

April 17, 1942 to June 30, 1942

Allotment .....\$10,170.00

#### ADMINISTRATIVE

Salaries .....	\$1,905.85	
Travel .....	216.34	
Printing & Stationery.....	556.88	
Postage .....	195.00	
Telephone & Telegraph.....	36.87	
Miscellaneous .....	664.69	\$3,575.63

#### Statistical

Salary .....	\$ 285.50	
Engineering & Drafting.....	61.20	346.70

#### Publicity

Salary .....	\$ 100.00	100.00
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#### Special Projects

Salary .....	358.55	
Travel .....	240.33	598.88

Capital Expense .....	\$ 568.75	568.75
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#### FIELD WORK

##### Eastern District—Globe

Salary .....	\$ 377.42	
Travel .....	183.36	\$560.78

##### Southern District—Tucson

Salary .....	\$ 377.42	
Travel .....	113.15	490.57

##### Western District—Kingman

Salary .....	\$ 450.00	
Travel .....	314.41	764.41

##### Northern District—Prescott

Salary .....	\$ 377.42			
Travel .....	123.40	500.82	2,316.58	7,506.54

Returned to State.....				\$2,663.46
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## A.S.M.O.A. DEFENSE FUND

July 1, 1941 to June 30, 1942

<b>Total Receipts .....</b>	<b>\$5,057.64</b>	
 <b>Total Expenditures:</b>		
Salaries .....	\$2,606.42	
Postage .....	89.50	
Printing & Engraving .....	38.45	
Travel .....	1,538.07	
Miscellaneous .....	214.49	4,486.93
 <b>Balance on Hand June 30, 1942.....</b>	<b>\$ 570.71</b>	
 <b>Total number of donations.....</b>	<b>3,071</b>	

The estimated budget to carry out the proposed program was about \$500.00 per month and the response to the appeal for these funds was most gratifying. The records show that there were 3,071 donations in sums ranging from 10 cents to \$25.00. The total donations amounted to \$5,057.64. A statement of the receipts and expenditures made from this fund, known as the A.S.M.O.A. Defense Fund, from July 1, 1941 to June 30, 1942 is made a part of this report. This does not, however, in any way represent the total expenditures as that which was given in time and volunteer service was immeasurably greater than that which was given in money.

Several factors made it possible to carry out this work efficiently despite the fact that it had to be done at a time when money was tight and the outlook far from encouraging. The Federal Government was frantically seeking new sources of critical and essential minerals to offset the deficiency due to lack of ships to import raw materials from foreign sources and to make up the requirements demanded because of the speeding up of the war defense program. The Government had appealed repeatedly to the mining industry to step up production as a patriotic duty. The department had been constantly active in helping to alleviate and remove the difficulties which had been retarding production from the small mine industries of the state.

A carefully conducted poll of members of the Arizona Small Mine Operators Association showed that 97 per cent of them disapproved of the veto of the department's appropriation and indicated their wish and desire that the department continue to function. Under such conditions the donations both of time and money were willingly made, some at real personal sacrifice, and showed the interest and approval of the small mine operators in keeping the department active and bridging over the gap caused by the loss of the state funds until such time as the subject of state support could again come before the attention of the legislature.

It was a period when a failure to function would be a real tragedy, not alone for the small mine operators but for the state and nation. It was a period of terrific expansion of the mining industry to serve the requirements of the defense program and it became little short of a catastrophe after December 8, 1941, when the defense effort became a war program.

During that period the whole program of mining economics, methods of doing business, and conditions under which mining business had to be done were altered and it was a tremendous task to bring about that change among the thousands of small mine operators and permit them to do their part as was demanded of them by the country and which they desired to do if they could be shown the way of getting in step with the new program.

During the year the chairman of the Board of Governors had rendered a monthly report to Governor Osborn of the activities of the department and the many problems that were being worked

upon by the department to increase production. The changing picture was presented in these reports so that the governor was fully informed at all times of the demands upon the state for service to the nation in metal production.

### DEPARTMENT RESTORATION URGED

At a meeting of the state council of the Arizona Small Mine Operators Association in Phoenix on November 22, 1941, a resolution was prepared urging Governor Osborn, in the event he called a special session of the Legislature, to include within the call a provision for the restoration of the department's appropriation.

A special session of the Fifteenth Legislature was called for April 6, 1942, and Item 18 in the call was as follows:

"Transfer of the functions and duties of the Department of Mineral Resources to the Bureau of Mines of the University of Arizona."

Disregarding the recommendation of the Governor the first bill, H. B. No. 1, introduced into the House of Representatives was one to restore the appropriation with no change in the department setup. The bill read as follows:

"Making an appropriation for the department of mineral resources.

Be it enacted by the Legislature of the State of Arizona:

Section 1. **Appropriation.** The sum of fifty thousand eight hundred and fifty dollars is appropriated to the department of mineral resources, ten thousand one hundred and seventy dollars to be available during the thirtieth fiscal year, and forty thousand six hundred eighty dollars during the thirty-first fiscal year.

Section 2. **Purpose.** The purpose of the appropriation made by Section 1 is to enable the department of mineral resources to perform the duties and functions of the department as prescribed by Chapter 27, Session Laws 1939, regular session, and especially to promote the development and utilization of Arizona deposits of strategic war metals essential during the existing national emergency, in the war production program.

Section 3. **Emergency.** To preserve the public peace, health, and safety it is necessary that this Act become immediately operative. It is therefore declared to be an emergency measure, to take effect as provided by law."

H. B. No. 1 was introduced on April 6, 1942 and immediately referred to the Mines and Mining, Appropriations, and Judiciary

### CONCLUSION

The Department of Mineral Resources now has but one program and policy—to do anything and everything which will bring out new production or maintain existing production of the strategic minerals and metals from Arizona mines needed for the war effort. There are no other angles or phases to its work. The only question asked when considering whether or not a project will be undertaken is—What will it contribute in the way of minerals or metals that are needed by the nation and how quickly can it be done?

Thus the department has become a most important link between those in Arizona who have minerals and metals to contribute to the nation's defense and those in Washington whose duty it is to see that the assembly lines are not permitted to stop, or even slow up, because of a lack or shortage of raw materials. All programs are carefully worked out to be in step and in harmony with the government programs.

We are all working for the welfare of the state and nation and the small mine operators and Arizona are now prepared to take their rightful place in the national picture from a mineral production point of view. We have considerable lost time to make up but it is being done as rapidly as possible.

Respectfully submitted,



Director,  
Department of Mineral Resources,  
State of Arizona.

Phoenix, Arizona  
July 15, 1942.



merely the economic research and require technical and scientific research to augment and strengthen the projects recommended.

To the field engineers and to the office staff I want to express my appreciation for their splendid loyal service. The field engineers have a particularly hard and trying job in that they are never through their work yet they are gracious and willing to serve many hours over that which is required of them. We have been fortunate in getting a group of people who get great pleasure from doing things for others. They are what might be termed service minded. No job is too great or no time is too inopportune to render a service for the small mine operator.

As director, and on behalf of the personnel of the department, I wish to express my high appreciation for the helpful and kind consideration shown by the Board of Governors. They give freely of their time and experience without compensation. The plans and policies of the department are discussed at great length and at no time has there been any evidence of selfish or individual considerations. Their work has been of the most constructive nature.

Although entitled under the law to draw expenses incurred in the performance of his duty, Charles F. Willis, chairman of the Board of Governors, has not put in one claim against the department since its work started three years ago. He gives a great deal of his time and experience to the work and keeps intimately in touch with all phases of the department activities. The past year has been an especially grave burden on him because of the added obligations during the period when the department was being operated without state support.

Committees. The committees held hearings and various members of the legislature investigated fully the charges that had been made against the department in the original veto of its appropriations. All of the committees approved H. B. No. 1 unanimously on April 7 and April 8 it was passed without amendment by the House of Representatives and transmitted to the Senate. The vote was 44 to 6.

The Senate referred the bill to similar committees on April 9 and, after the usual hearings by the committees, it was returned to the floor and passed without amendment on April 10 by a vote of 17 to 1. The one vote against it was explained in that the dissenting Senator was back of the department 100 per cent and fully approved of its work, but believed that the appropriation made therefor was somewhat in excess of the amount necessary.

On the afternoon of April 10 H. B. No. 1, the bill to restore the department's appropriation, was transmitted to the Governor and under the law he had five days in which to act upon it. On April 16 he appeared before the House of Representatives and delivered a message in which he announced that he was permitting the bill to become a law without his signature. A portion of the Governor's message is quoted herewith:

"It was suggested in my message to you on the opening day of this session that the functions of the Board of Mineral Resources be transferred to the Bureau of Mines of the University of Arizona. I made this recommendation after careful study of the facts.

"I regret the legislature did not see fit to fully investigate the merits of this proposal before taking action. I am convinced that its soundness would have been apparent to those who have in mind the needs of the boys on Corregidor and elsewhere on the far flung battle fronts. I am convinced that should such investigation have been made, the desirability of favorable action upon my suggestion would have been apparent.

"I am sure that no one will question the ability, training and willingness of the University of Arizona to perform this service. It has the facilities and even more important, it enjoys the prestige and commands the respect of the mining world."

#### BUT LITTLE DISCUSSION

There was comparatively little debate on the floor of either the House of Representatives or the State Senate, as a large majority seemed at the very outset manifestly in favor of the speedy enactment of the legislation as proposed.

Only one discussion of importance took place and that was relating to the Governor's recommendation of the transfer of the activities of the Department of Mineral Resources to the Arizona

Bureau of Mines. A statement made at the request of the Governor by the director of the Bureau of Mines was analyzed, which set forth that the Bureau could make very effective use of an additional appropriation of \$20,000 to expand and extend its research and educational work. In no part of the report was there anything to indicate that it was proposed to take over the functions of the Department of Mineral Resources. It was emphasized several times that the scope of the work of the Bureau of Mines would have to be limited to research and education whereas it was pointed out that the department work was almost exclusively on economic problems.

University of Arizona authorities have stated at various times that, in keeping with the principles and standards of the University, they could not undertake work on the type of economic problems which had been worked upon by the Department of Mineral Resources, irrespective of their value to the industry. The work of the Department of Mineral Resources is distinctly and primarily on the economics of the industry and great care has been taken to see that it did not overlap, duplicate or encroach upon that which has been done by the Bureau of Mines.

Thus the Department of Mineral Resources was restored as a state supported organization on April 17, 1942. Inasmuch as the department was primarily organized for work in solving the economic problems of the small mine operators, it was deemed advisable to secure their advice and counsel as to the program which should be carried out.

In accordance with this policy the A.S.M.O.A. called a state council meeting in Phoenix on April 25, 1942 and invited the Board of Governors of the Department of Mineral Resources to attend. The state council of A.S.M.O.A. consists of the chairman and secretary of each of the 54 individual councils and is the state governing and policy formulating board of the Association. Over 50 members of this group were present at the meeting, representing more than half of the 54 councils and more than two-thirds of the total association membership.

The object of this meeting was that the small mine operators, for whom the department was originally established, should guide the Board of Governors in the setting up of their program. The principal recommendation made by the state council to the Board of Governors was that the immediate future program of the Department of Mineral Resources should be devoted exclusively to the war effort with primary emphasis being placed upon speed and ways and means of cutting red tape so that Arizona's output of essential minerals could be stepped up rapidly to help meet the nation's greatly expanded metal requirements.

## **PUBLICITY**

The publicity work of the department has maintained throughout the year although it has changed materially in its character. Originally it was primarily with the idea of selling the opportunities of Arizona mining to those outside the state. However, with the coming of the defense period it was necessary to sell the thought of patriotic production to mine operators within the state, and more recently the publicity angle has been that of keeping the operators within the state informed on the complexities of the present program and how to keep operating under them.

The publicity department, however, is not alone concerned with the keeping of the public and the small mine operators informed as to the things which are of value to them. This department also has the handling and editing of all department publications which not only include those which are printed but those on which single copies are submitted to Government authorities for their action.

## **FINANCIAL REPORT**

There is herewith attached to this report the financial statement of the expenditures of the Department of Mineral Resources from April 17, 1942 to June 30, 1942, which was the period of renewed state support under appropriations made by the special session of the Fifteenth Legislature. It will be noted that there was \$2,663.46 returned to the general fund. Every possible effort is being made to conduct the affairs of the department in an economical manner and according to good business practice.

The budget as proposed for this next year is laid out to make a saving from the appropriation of approximately \$2,400 and thus making a total of \$5,000 to be returned from the appropriation to the general fund.

## **APPRECIATION**

There is a splendid degree of cooperative effort between the Department of Mineral Resources and the Arizona Bureau of Mines and frequent conferences take place between the directors of the two organizations so that they may work together for the mutual benefit of the state. I want to take this opportunity of expressing my personal appreciation to Dr. Thomas G. Chapman, director of the Arizona Bureau of Mines, for his effort to work in close harmony with us, for his suggestions for the betterment of the department work, and for the way he has answered our suggestions regarding the work of the bureau which he directs.

This cooperation is especially important at the present time when a great many of the problems involve something more than



**Access Road Project No. 5. Alamo Road** In view of the extensive manganese developments in the Bill Williams section, particularly at Artillery Peak, one of the most important roads in the state from an industrial point of view is a crossing at the Alamo and connections out toward Yucca and Aguila. The Alamo crossing is often impassable because of high water and it is a relatively small job as compared to the service which will be rendered. This road likewise has considerable tourist possibilities after the war in bringing the Boulder Dam 100 miles nearer those who may be traveling cross country on the southern route and southern Arizona nearer by 100 miles to those who are traveling the northern routes.

**Access Road Project No. 6. Crown King Road** There is a very fine mining area that can be opened up by a road from Crown King to the White Spar Highway by way of Venezia. Crown King is rather remote from adequate transportation but it is only a short distance as the bird flies. Much new mining country would be opened.

**Access Road Project No. 7. Tia Juana Road** This proposed road is near Patagonia and would be a new road to serve the Tia Juana mining district, which has come into much prominence since selective flotation has made it possible to economically work mixed copper, lead and zinc sulphides.

**Access Road Project No. 8. In Four Peaks Area** To provide a road to the Harrison and Cline tungsten properties which have recently been granted government loans for development.

**Access Road Project No. 9. Road from Superior to Mineral Hill and Florence** This proposed road will make accessible ten or more mines with a good record of production and which have been able to do little because of poor roads.

As previously stated the objective of the present program of the Department of Mineral Resources is to see that Arizona maintains and increases its mineral and metal production for the war effort. While many specific things are mentioned as parts of the program, it is the plan to do any and all things that may be required to get continued or expanded production from the present mines, to bring the marginal mines into action and to find, and get into operation, new mines.

One cannot say exactly just what should be done as every project is a problem in itself. It is true that there are many problems that are common to several mines and which can be worked out together, yet there is much that is individual and which requires special service.

## SMALL MINE OPERATORS PROGRAM

Other recommendations made to the Board of Governors for their consideration included:

1. Maintenance of close contact with federal agencies on behalf of the Arizona Small Mine Operators Association by the appointment of a liaison man to represent their interests in Washington, D. C.
2. Promote improved roads to isolated districts and the construction of new ones where necessary to facilitate production from new areas.
3. Seek a correction of the conditions interfering with the financing of small mine operations and continue to work for a liberalization of government mine loan policies.
4. Cooperate with truckers and other common carriers to provide adequate transportation facilities and strive to relieve a developing shortage of trucks created by greatly increased war demands.
5. Undertake a complete survey of the strategic mineral properties of the state and ascertain the requirements to get them into production.
6. Assist in the marketing of minerals, metals and properties and to do what could be done to interest private capital.
7. Seek a correction of the problems involved in the disposal of scrap metal, particularly high freight rates.
8. Help to obtain full utilization of all idle mining machinery and equipment in Arizona.
9. Continue to campaign for elimination of discriminatory graduated freight rates.
10. Impress upon government officials the need for classifying mining districts in the state as defense areas.
11. Have field engineers of the department attend A.S.M.O.A. council meetings regularly.
12. Compile a catalog of state mining information and make it available to those who might be interested.

Following up the policy to consult and cooperate with and to formulate the program of activities of the department in view of the expressed needs, wishes and requirements of the small mine operators of the state, a meeting of the Board of Governors was held on April 26 and 27, 1942. At this meeting there was a comprehensive discussion of the charges made by the Governor in his

message to the Legislature on April 16, 1942, when he allowed the act appropriating funds for the department to become effective without his signature. The charges, which were primarily criticism of the Board's management of department affairs, were refuted in no uncertain terms.

Following is a quotation from the minutes of the meeting:

"It was moved by Mr. Dowell, seconded by Mr. Edmonson, that the Board insert in the minutes that Chairman Willis be commended for the manner in which he had conducted the affairs of the department, and that the Board express their full confidence in the success of the department under the guiding hand of Mr. Willis during the coming year, and request that he retain his leadership as chairman of the Board. The motion was adopted by a majority of the Board. Dr. Morrison and Mr. Willis failed to vote."

A resolution was offered and unanimously adopted that the Department of Mineral Resources devote its every energy to aid in securing increased production of metals and minerals from Arizona mines; that close and intimate cooperation be established with all Federal departments engaged in the same effort to keep the Arizona program in step with that of Federal authorities; and that the order of importance of projects designed to increase production be worked upon, first, as to the urgency of the demand, and second, upon the number to be served by the individual project.

The recommendations of the state council A.S.M.O.A. were discussed and with the exception of those which were not immediately necessary to the war effort, they were adopted. It was agreed that the war program came first and those objectives which could be deferred should be set aside for later action in view of the more important things to be done now and the inability to do everything which might be beneficial at one time.

It was determined by the Board of Governors that the department could better serve the small mine operators by having the headquarters available to them in downtown Phoenix, thus making it more accessible. Offices were found at 413 to 417 Home Builders Building, 128 North First Avenue. The wisdom of this decision has been shown by the fact that there are not less than 10 times as many personal calls for information and advice as the department had when offices were in the Capitol Building.

### NEW STAFF APPOINTED

During the past two years the department lost through death two of its former engineers. Carl G. Barth, Jr., passed on in November, 1940, and Miles M. Carpenter in March, 1942. The loss of those two men is keenly felt by the department, as both were competent mining engineers, well posted by long years of association in their respective districts and had that unusual qualification that is neces-

Through the efforts of Senator Carl Hayden there was made available recently a fund of \$10,000,000 for access roads, to be spent under the direction and to the order of the War Production Board, designed to speed up production from inaccessible areas. To obtain consideration for the building of such roads it will be necessary to show from where, and how, they will move additional minerals.

Primary surveys for such road projects in Arizona were made during the first two years of the department work and these surveys are being reviewed and enlarged in view of the present emergency and prepared for submission to the proper authorities. This means an engineer's survey of the mineral resources within the section to be served, the economic disadvantages of the present road conditions, the road proposal itself and what its advantages are. The department field engineers will also work with the county engineers in gathering all data required for a sound comprehensive presentation of each project.

The road problem is a serious one at the moment due to the curtailment of truck transportation and the need of speed and lowering of costs in opening up additional metal production. One or more of these access road projects in each of the four districts covered by the engineers are being reviewed and necessary reports made. They are as follows:

**Access Road Project No. 1. Outlet from Aravaipa area to Winkelman** This district is now served by round about roads through Safford and Globe to get to a smelter, whereas a relatively short piece of road, partly in Graham and partly in Pinal County, will bring them to the railroad and smelter at Winkelman.

**Access Road Project No. 2. Oracle Road** There is a considerable mining area around Oracle that can be served by a relatively small amount of new road and which is now almost inaccessible otherwise. The Mount Lemmon road is primarily built for the service of the tourists and did not reach much of the mining area.

**Access Road Project No. 3. Castle Creek Road** This road is planned to serve the area west of Castle Hot Springs which has a very difficult outlet to Morristown. It would open up a large amount of mining country by being routed through Constellation to Wickenburg. It could thus be made to serve in either district and make accessible new mining areas.

**Access Road Project No. 4. Cherry Creek Road** This is to accommodate an asbestos area north of Globe which now is served by a road several times as long. A portion of the asbestos area is only served by hauling through Young to Globe, Arizona, whereas a short stretch would bring the asbestos deposits close to rail transportation.



stations in Prescott, Tucson and Kingman for the purchase of small lots of any metals or minerals which the government is seeking and making provision for prompt payments.

**(6) Asbestos treatment plant** The problems of production and treatment of Arizona asbestos indicate that the answer to the problem of the asbestos producer is a centrally located treatment plant, probably near Globe, where experienced people can produce a properly graded product. This requires a study of the production possibilities as well as manufacturing methods and markets.

Among these specific projects are the following:

**(1) Mill at Dragoon** This is a project to install a 200-ton mill which will serve primarily one mine and increase its production from 30 tons daily to 150 tons and at the same time provide custom milling capacity for the small mines in the neighborhood. The project requires a complete survey of the mining property along with plans of mill construction, where machinery can be found, and so forth.

**(2) Plant at Mammoth** This is a project to erect a milling plant on a mine that is definitely known to have enough ore to justify the plant. The mine is already developed but the project is to get it properly set up for presentation to the War Production Board.

**(3) Mineral Hill mill** There are large quantities of copper ore available at the mine at Mineral Hill which can be taken out profitably at premium price copper provided arrangements can be made to amortize the capital investment necessary on an equitable program in view of the war duration uncertainty. A mill at this point would likewise serve a considerable area from a custom viewpoint, particularly the ore possibilities of the Twin Butte section.

The above samples are given as being typical of many projects being undertaken by the department in general or such projects where a considerable amount of preliminary work which must be done intelligently and completely if action is going to be obtained in Washington. They not only require proper presentation but in order to get the required action it is necessary to personally conduct them through the maze that leads to successful culmination. This is done through our Washington contact and the knowledge which he has acquired of the proper place to go and the proper thing to do.

### MINE TO MARKET ROADS

A study of the mine-to-market roads problem in Arizona has been a continuing project of the department; and the field engineers have been noting those areas which would benefit by such roads and much data has already been compiled as to possibilities.

sary to a field engineer in the Department of Mineral Resources—they were service minded.

From numerous applications a new staff of field engineers was selected, only one of whom had served before. Elgin B. Holt renewed his connection with the department and was assigned to the western district with Kingman as his headquarters. This was the area served by Mr. Holt formerly. A. C. Nebeker was selected as engineer for the central district with headquarters at Prescott; Fred H. Perkins for the eastern district with headquarters at Globe; and George A. Ballam for the southern district with headquarters at Tucson.

Inasmuch as there had been a great many changes in the methods of doing mining business under the war program, the engineers were given a four-day instruction period before starting on field work in their respective areas. During this period numerous government and state officials, as well as officials of the Department of Mineral Resources, met with them to acquaint them with that information which would permit them to render a more complete and reliable service.

The routine was set up to provide prompt information on changes in the government program and the proper procedure to follow on each problem which may come to their attention. During this period mine loans, priorities, government stock piles, ore testing, smelter contracts, defense plants, federal and state laws, allocations, premiums, salvage, and numerous other things were fully discussed, many of which had no part in a previous mining program.

During the past year mining has become so complicated, complex, and beset by so many restrictions and regulations that even the most versatile and astute mining operators are oftentimes stumped as to how to proceed and keep in business, let alone step up their production. The procedure has become so cumbersome and confusing that many of the operators have been tempted to call it a day and quit trying to continue to produce, or refuse to undertake the opening of a new property, and it is believed that it is the most important function of the department to help to smooth their way and keep them active.

Hardly a week passes without one or more advices from Washington on changes or modifications or new rulings. The engineers are equipped with copies of all rulings and regulations, as well as interpretations of them which they can transmit to the small mine operators in less legal language. Thus, there is no reason for Arizona small mine operators to fail to be fully and accurately informed as to the rules and requirements of doing business under the complex war program.

## FIELD WORK ASSIGNED

The first assignment of the field engineers was to visit each and every one of the operating mines in their respective districts to inform them as to the service and Washington connections available to them; to ascertain their problems in which the department may help in solving; to determine whether or not their properties are capable of producing more than their present output; and to find the conditions necessary for increased production. The large copper properties in the state were not included in this survey, as it is felt that they are fully capable of handling their own problems.

The next assignment was to seek out the properties in each district which have ore available and which should, under a war emergency program, be in production and find out why they were not producing and what needs to be done to provide for a regular output. Each property and each producer is being given individual attention and assistance in attempting to solve their problems.

This survey, while it may be augmented from time to time as new producers or new opportunities come to our attention, has now been completed and work is under way on the problems that are common to many. The difficulty is that there are so many problems that it is a problem in itself to determine the order in which economic research will be done to find the proper answers.

If the department were to have four times as many engineers as are available, it could not promptly meet the immediate demands upon it. An accumulated load, of course, has come largely from the fact that there was a 9½ month period in which the problems piled up and the demand existed and but little work on them was possible, due to the lack of funds to maintain any field staff. This situation, however, will gradually straighten itself out as various difficulties are disposed of. Much progress has already been made.

The districting of the mining areas as adopted at the beginning of the department's work was retained. The engineers traveling was scheduled so that it would be possible for them to fulfill the requests of the state council of A.S.M.O.A. and be available at meetings of the various councils on alternate weeks so that once every two months they would cover the entire series of councils within their district.

This program gives the field engineers alternate weeks in which they are free to devote their uninterrupted time to larger special problems in any part of their district, yet at the same time gives them a definite date every other month when they are in a council section where they can be personally contacted by the small mine operators of that district. It is thus made possible for small mine operators to find them readily.

During the council meeting weeks they are available for field work, consultation and personal assistance to small mine operators

It should be mentioned, however, that Mr. Broadgate is not under a state expense account in this work. Such expenses as may be necessary for him are being provided by donations of members of the Arizona Small Mine Operators Association. These donations are entirely voluntary and no one is permitted to pay any fee for any services which we may be able to perform for them.

## SPECIAL PROJECTS

When a project is such that it can be set up as a definite objective on which there is a well defined field of investigation and research, it is termed a special project.

There are several types of projects—general projects which are those involving a district or a particular metal and are designed to serve a considerable number of mine operators. There are likewise specific projects which are those involving a particular service to one mine. They are, however, generally projects in that they are large in scope.

The general projects upon which the department is now working, both locally and with Washington bureaus, are as follows:

(1) **Zinc-lead plant in Mohave County** This is a project to put in either a zinc-lead smelter or a zinc-lead chemical plant at Mohave County to receive and make available for marketing the ores from a great many mines of that county to offset the disadvantages of having to ship lead ores to El Paso and zinc ores to Amarillo, Texas.

(2) **Mohave custom mill** This is a project to provide custom milling facilities to copper, lead and zinc producers in Mohave County. The proposal provides for the conversion of a custom gold plant to selective flotation and the investigation requires a comprehensive survey of the resources of that county.

(3) **Manganese beneficiation plant at Parker** This is a project to set up a plant for the beneficiation of low-grade manganese ores from the central western portion of Arizona and the southeastern portion of California. This is requiring a survey of all possible sources of ore in those areas and an estimate of the capital necessary for development and production.

(4) **Tungsten plants at Tucson, Prescott and Kingman** This is a project to determine the feasibility of small tungsten cleaning plants and markets for tungsten ores at Tucson, Prescott and Kingman. It is requiring a complete survey of all of the tungsten mines of the state and their possibilities of production as well as the financial requirements necessary.

(5) **Ore buying stations** This project is the one mentioned previously as having been requested by the Metals Reserve Company to work up plans and detailed procedure for establishing



created an impossible situation insofar as the mining industry is concerned, as it is essentially a business of a one way haul with the opportunities of a back haul being very limited. Considerable research work was done by the department in preparing a case for presentation to the Office of Defense Transportation and a hearing was obtained in Washington at which time Charles F. Willis and W. C. Broadgate appeared on behalf of the Arizona mining industry.

While it cannot be claimed that their presentation did the job, it undoubtedly was a contributing factor in the changes which were made by the Office of Defense Transportation eliminating the 75 per cent back haul feature and all other parts of the order that were difficult to live up to by those conducting mining operations. Arizona appeared more prominently in this picture than any other state. The work was done, of course, in cooperation and coordination with the officers of the American Mining Congress.

**Washington Contacts** The confusion, delays and complications brought about by premium prices, quotas, priorities, market conditions, defense transportation, mine loans, power permits and purchase contracts, and a thousand and one other things, have made it advisable to keep a man temporarily in Washington representing the small mine operators and having as his particular job the expediting of those Arizona proposals which have to clear through Washington authorities.

Every day that can be saved is a day the production of which has not been lost. It has become so common to do business by personal contact in Washington that it is now almost impossible to do it otherwise, that is, by mail. The delays are tremendous when business with Washington is restricted to mail contacts.

Mr. W. C. Broadgate was appointed assistant director of the Department of Mineral Resources and sent to Washington, D. C. primarily to work upon the mine loan program at the time when it was under consideration, and he has so far been kept there to represent the Department of Mineral Resources and the small mine operators in an endeavor to speed up the handling of the problems which have been holding up production from the small mines. It is also his job to personally conduct applications for various types of federal cooperation from department to department as it is necessary to move them fast.

In the brief time he has been in Washington there have been several dozen special cases in which he has been able to cut the time and routine by from one to six weeks and to put through a great many projects that never could have gotten action by mail solicitation alone. In general, Washington authorities are cooperative when matters can be discussed with them and the project of maintaining a Washington contact for the Arizona small mine operators has already proven its worth in a large way.

in the area served by that council, while in the alternate weeks they are not available for that service but are working primarily on the larger problems. This plan minimizes the travel, not only for the field engineers themselves, but also for the small mine operators who may wish to contact them.

#### DEPARTMENT HEADQUARTERS PERSONNEL

J. S. Coupal was continued on as director of the department, a position which he has held since it was originally established. W. C. Broadgate of Prescott was made assistant director; W. J. Graham of Phoenix, assistant to the director and secretary to the Board of Governors; Edna B. Montgomerie, office secretary; Lorraine Porter, secretary; and Jackson Hoagland, part time director of publications.

The position of research and project engineer had not been filled at the end of the last fiscal year due to the inability to find a man properly qualified for this work which is most important under the present program. It is expected, however, that this man will be available shortly and that the staff will be completed.

#### BOARD OF GOVERNORS

There has been no change in the personnel of the Board of Governors. Shelton G. Dowell of Douglas, whose term of office expired January 31, 1942, had submitted his resignation in December, 1940, just prior to the Governor taking office, the resignation being due to ill health. On the demand of the Governor in his inaugural speech on January 6, 1941, that immediate resignations of all members of state boards, agencies, commissions and departments be tendered, Dr. N. H. Morrison of Phoenix, whose term of office normally expired January 31, 1941, submitted his resignation. Neither of these resignations have been accepted or rejected. They are still in the hands of the Governor and, since the resignations, the terms of office of both of them have been completed.

Inasmuch as their resignations have not been accepted and no successor has been appointed, both Mr. Dowell and Dr. Morrison have continued their services as members of the Board and have faithfully attended meetings and given their advice and counsel.

The present Board of Governors, therefore, is as follows:

Charles F. Willis, Phoenix, chairman, whose term expires on January 31, 1944.

Loyde C. Edmonson, Globe, whose term expires January 31, 1945.

L. V. Root, Kingman, whose term expires January 31, 1943.

Dr. N. H. Morrison, Phoenix, vice-chairman, and Shelton G. Dowell, Douglas, who have submitted resignations and whose terms have expired.

## WASHINGTON RECOGNIZES DEPARTMENT

Charles F. Willis, chairman of the Board of Governors, was appointed consultant for the Metals Reserve Company, a subsidiary of the Reconstruction Finance Corporation. This appointment is not only a recognition of the work of Mr. Willis as a mining authority, but is also taking cognizance of the active part that the Department of Mineral Resources and the Arizona Small Mine Operators Association has been taking in the war metal production program.

As consultant for the Metals Reserve Company it will be his duty to serve as the contact man between Arizona mine operators and the Washington office of that company to receive and investigate criticism, complaints and suggestions regarding the policies of the company and report on how they are working out and what changes may be needed to make them work to better advantage for increased metal production.

This is a most valuable connection for the small mine operators, as it gives a close personal contact between Arizona and Washington on many problems which are facing the industry today. It furthermore gives Arizona an inside track on that which is going on in Washington and makes available much confidential information that can serve as a guide in developing Arizona activities. Through this connection the department is kept posted promptly on all changes in rules and procedures and in turn can keep the mine operators informed.

Mr. Willis also has been appointed to another Washington connection as Executive Secretary of the Arizona Statewide Committee, War Production Board, Bureau of Industrial Conservation, Industrial Salvage Division. This work was undertaken by him because it fitted so perfectly into the Department of Mineral Resources program. The industrial salvage from mining operations is estimated to represent 85 to 90 per cent of the total salvage anticipated from Arizona and it is considered that production from the scrap pile is just as important as production from the ground and in some cases more important in that it means immediate metal.

W. J. Graham, assistant to the director, has been assigned the immediate direction of this work within the department, and more will be said regarding the salvage program as a department activity in later parts of this report.

## DEPARTMENT ACTIVITIES

It would be quite difficult to make any logical sequence or presentation of the department activities, some of which are a carry over from the previous year; some having been done in cooperation with the Arizona Copper Tariff Board during the period in which the department was without state support; some of the program was done in connection with the Industrial Resources

**Industrial Salvage Program** As stated previously in this report, the department has undertaken the work of the Industrial Salvage Program, started by the Industrial Resources Division of the Arizona Civilian Defense Coordinating Council. This work started in January, 1942, and it was a comprehensive program in that it covered both salvage and conservation. It provided for a survey of idle mining machinery which might be put to work. It provided further for the collection of salvage and moving it into the channels for converting it to new equipment.

An important angle, however, on the Arizona program for conservation was that the plan provided for the inventorying of both machinery and scrap that could not be used at the present time because of economic difficulties, but which might, if and when the demand was sufficiently urgent, be made available at a later date.

As a step in this program the Arizona salvage plan provided for the assembling of salvage stock piles in many places in the state where, if the material could not be moved now, it might be picked up later. This has been worked out through the cooperation of councils of the Arizona Small Mine Operators Association.

The industrial Conservation Branch of the War Production Board got into action several months after the Arizona program had started and when they came to check in to what could be done in Arizona they found a program underway. They were so impressed with the completeness of the Arizona plan that it was very promptly adopted by the leaders of that work in Washington to be used in all mining states. This happened in June and since that time there has been a very considerable amplification of the machinery conservation angle, working through the War Production Board both in the Production and Priorities Sections.

No records were collected of the tonnage of salvage material moved by this effort prior to June 1, 1942. When our efforts became tied up with the national program a reporting system was started and regular reports are now being made. It is interesting to note that the tonnage of scrap moved into the usual channels of trade during June, 1942 from Arizona industries totaled 4,241,409 pounds. This is in addition to several times that amount which is known to be available but which has not yet been moved for various reasons.

There is also a long list of machinery available including several complete mills. A machinery conservation angle is less important now than it will be later when the facilities for providing new machinery have lessened but the inventory taken now will militate against a future drag in productive efforts.

**Trucking Problems** Much disturbance of the mining industry has come about because of the orders from the Office of Defense Transportation which required private carriers operating close by their headquarters to cut their mileage 25 per cent and contract and private carriers must have a 75 per cent back haul. This obviously



turn, made a very substantial improvement in state revenues which would not have been obtained otherwise.

**Selective Service Status for Deferment and Labor Shortage Problems** One of the current critical problems of mine operators in Arizona in order to maintain present production is that of labor shortage. The department has compiled a great deal of data for the use of the selective service authorities in Washington in setting up directives for draft boards with a view to retaining men in key positions who cannot be replaced without affecting production.

A study was made of each position with the time necessary to train a man for it and a presentation was made both on paper and personally before the proper authorities in Washington. Various other mining associations had collected data on this same subject and the program has been cleared through the American Mining Congress in Washington. Recent directives issued by the selective service authorities indicate the success of this work.

There is another problem that is equally serious upon which work has been done and that is a labor survey based upon the loss of employees to the draft and to defense industries which have been offering wage attractions that are not possible for mining to offer under ceiling prices. Numerous conferences have been held with various authorities, both in Arizona and in Washington, on this problem and there is considerable hope that it can be worked out satisfactorily. The ways and means for solving it cannot be made public at this time.

**Ore Buying Stations** On the request of officials in the Metals Reserve Company the department is making a survey of possible suitable locations for Government ore buying stations, these stations to buy all such ores and metals as are on the critical list. It is contemplated that such stations would be agents of the Metals Reserve Company and buy for stock pile small lots of all ores excepting manganese and chrome, which are now handled through the stock pile at Phoenix.

There are many problems connected with the making of schedules upon which such a variety of ores should be bought—methods of sampling, procedure of payment and a host of other complications connected with a proposal for a complete set up. Such stations would be of great value to the small mine operators in being able to get a market and receive prompt payment for small lots so that they might have ready cash to meet the expense of taking out additional tonnages of ore.

Probably no problem is more prevalent or important to the small mine operator than that of operating capital. He ordinarily does not have sufficient capital to tide him over from the time of production to the receipt of the check for his products, and anything which can be done to shorten that time is a step toward greater production.

Division, Arizona Civilian Defense Coordinating Council of which P. G. Beckett was chairman and Charles F. Willis, secretary, and they have been carried over into the present department setup.

There is no way to draw a line as to where one started and a breaking point as to where it carried over or what part was done by one organization and what was accomplished under the jurisdiction of another. It is all one continuing program that is related and yet has had its individual parts. It has varied in intensity and completeness in different times depending upon that which was available to carry it out.

Naturally during the period when the operation of the department was dependent upon donations and voluntary service, the accomplishments were restricted and less well done, particularly if they required extensive research and field investigation, the records of which were not already in our files.

Nevada, Montana, Utah, Washington and other western states were able to benefit both themselves and the nation at large in opening up many new sources of production for the war effort, due to their uninterrupted program of research and investigations of resources along economic lines which have resulted in the expenditures of vast sums of Government funds on development and beneficiation plants for the minerals and metals. Arizona was temporarily deprived of the opportunity to do its full share in this new effort despite the fact that its undeveloped mineral resources are the equal of or greater than those of most of the other western states.

There are extensive manganese deposits through many districts of the state, yet we have no manganese plant. There are numerous high grade dolomite deposits from which magnesium could be obtained, yet the magnesium plants have gone to Nevada and Washington. There are alunite and high alumina clays from which aluminum can be economically produced, yet aluminum plants have gone to other western states. There are many other potential areas where tungsten, vanadium, mica, asbestos, molybdenum and practically all of the essential metals and minerals occur in commercial quantities.

To obtain Government aid and production from potential sources of supplies call for field work, research and proper presentation to set up definite projects along economically feasible lines, find responsible organizations to sponsor them and properly present them to Washington authorities. The large operating copper companies in the state have been able to do this for themselves and, as a result, Government funds have been made available in a big way to expand their operations.

The lack of funds due to the veto of the appropriations for the Department of Mineral Resources made it quite impossible to provide the necessary field work and economic research required to investigate and set up new organized production efforts on known

and partially developed resources. The small mine operators are unable to do this work themselves and need economic and engineering help.

A definite statement cannot be made as to what has been lost to the State of Arizona and the nation, but the failure to take a more active part in the production of needed raw mineral products is apparent. Failure to continuously maintain a state supported department to make such economic studies must be accepted as the greatest contributing cause of our not being able to make at least a systematic attempt to get the maximum increase in production.

Through the cooperation of the A.S.M.O.A. councils the listing of the Mine Owners' Reports on the resources of the state has continued throughout the year so that the files now contain a rather complete listing of the available resources. These listings have been made use of and available to the various branches of the War Production Board interested in surveys of possible production in their respective branches.

Numerous reports of mines have been compiled for the use of Government officials directly from department records, either from the viewpoint of the mines within a district, or mines containing certain minerals or metals. A list of mines has also been available and has been constantly used by private investigators seeking new properties from which war production could be obtained.

#### **PUBLICATIONS MADE AVAILABLE**

The department has continued to be a bureau of information as to mining properties available, new sources of less common metals and minerals, assistance in preparation of mine loan applications, a source of information on new governmental orders, and, in general, has served in the same capacity during the period it was without state funds as it did when supported by the state. Many new problems due to changes in government regulations, priorities, premium prices and other orders have been, in most cases, so involved as to terms and conditions that the layman or small mine operator has become confused in his operations.

One of the principal services rendered by the department in the past year has been a study, interpretation and clarification of the steady flow of new orders, rules and regulations. Unless properly construed and conformed to these orders cause confusion and delay in production. Every new order or regulation that is issued results in a steady flow of letters, telephone calls and personal visits to the office of the department to explain just how the operators might function under such orders. This has probably been the most valued service to the small mine operators during the past year when changes have come fast and furiously.

With the resumption of state support this program has been augmented. The system at the present time is that when an order

rules and regulations as to provide for small mine loans, writing into their rulings practically the same wording as was proposed in the small mine loan bill. Mr. Willis was in Washington almost immediately thereafter and had the opportunity of sitting in with Reconstruction Finance Corporation officials when the rules and regulations for the administration of these small mine loans were made and the application forms approved.

Praise is due our senators and representative, as well as Mr. Broadgate, for this accomplishment. The small mine loans will provide capital to make productive many of the properties now idle due to lack of funds. The liberalization of other branches of the loan program now offer a completely rounded out series in which federal money can be made available for almost any mining project that has sufficient merit to justify it.

There is a proposal now being considered for a closer cooperation between the R.F.C. Mine Loan Division and the Arizona Department of Mineral Resources whereby the department will review and make recommendations relative to all preliminary development loans sought for Arizona properties. It is a recognition by the Federal authorities of the facilities of the department.

**Increased Freight Rates** In February, 1942 a hearing before the Arizona Corporation Commission was held on an application by the railroads for a 10 per cent increase in intrastate freight rates on ores, concentrates and fluxes. It was necessary to compile a great deal of data on this case as it was not only required to convince the Arizona Corporation Commission of the injustice of the request of the railroads; but they had to be given the data which, in the event of a decision favorable to us, would be substantiated in view of Section 13 limitations: That this was well done is shown by the fact that Arizona is the only state ruling against the railroads which did not get a Section 13 appeal.

A brief was prepared by the department and presented by the Arizona Small Mine Operators Association which set forth that, with ceiling prices for metals, it was impossible to pass increased costs along to consumers and that further advances in cost must be avoided if the mines are to stay in production. Ceiling prices on the metals were fixed at point of delivery while on other commodities were at point of origin. Practically all of the ores in intrastate railroad movement are copper ores and fluxes to copper smelters and with the ceiling of 12 cents a pound on copper and in the face of rising cost of labor, materials, taxes, and so forth, an advance in freight rates would be highly detrimental to the increased production program of copper so urgently needed in the war program.

The application for an increase in intrastate freight rates for ores, concentrates and fluxes was denied by the Arizona Corporation Commission. It is estimated that this decision meant a saving to the mining industry of Arizona of close to \$500,000 which, in



Here again the problems became so involved that a large number of the mine operators were unable to find the answers and the department has been deluged with a flow of protests and appeals to help out the individual cases. One by one solutions have been worked out and the answers adopted by Washington. Many complications still exist but the program has smoothed out tremendously in recent weeks. This service of the department has been of real value to the small mine operators and also to the war program in an increase in production.

**Small Mine Loans** The liberalization of the federal mine loan program and the fight for small mine loans has been exclusively an Arizona project although it has had support from all of the western states. It has been the particular "pet" project of the Yavapai County Council of the Arizona Small Mine Operators Association and has had the support and cooperation of the department, particularly in the research work necessary to support the claims made for it.

Mining is fundamentally hazardous, especially in the early stages and among small mines. For this reason the incentive of large profits must exist or the risks will not be taken. The excess profits tax, high income taxes, the often mentioned suggestion that profits be limited to 6, 8 or 10 per cent of the invested capital, and numerous other causes such as high cost of labor, supplies, priorities, and so forth have all contributed to keeping private capital out of new mining ventures. Most of the large mines are and have been producing at capacity; and the needed increase in production must to a large degree come from new mines or marginal mines which are now idle and which can and should be reopened.

Preliminary development money is necessary to open up new or dormant mines; and private money is for obvious reasons no longer interested in venture projects. Solving of the mine loan program was, then, a direct obligation of the department, if it was to carry out its objective.

An opportunity presented itself in May, 1942 when, through the joint efforts of Senators Carl Hayden and Ernest McFarland, Representative John Murdock, a number of other western senators, and as a result of the persistent efforts of the A.S.M.O.A. and the department over several years, a hearing was called to discuss proposed small mine loan legislation before the Banking and Currency Committee of the Senate.

W. C. Broadgate, who had put in three years of intensive work on mine loan problems and the small mine loan bill, had just been appointed assistant director of the Department of Mineral Resources. No one was better fitted or equipped to assist in Washington to get such a bill passed and, therefore, Mr. Broadgate was promptly dispatched to that city to help it along.

The bill, as presented, did not need to go to Congress for action as the Reconstruction Finance Corporation so revised their

is issued out of Washington it comes from our connection in that city by airmail along with a practical interpretation of the order obtained by personal interview with the head of the department issuing the order.

The procedure varies somewhat with the importance of the order and the number of people affected. If it is something that should get immediately into the field a press release is prepared and sent to the newspapers, but in any event the order is reproduced on the mimeograph, copies being sent to the field engineers and to each and every one of the small mine operators within the state who are known to be interested in that particular subject.

Additional copies are available for distribution as it is necessary to inform small mine operators on that particular subject; and, in order that all mine operators may know of the situation, a brief and non-technical presentation is made through "Pay Dirt", the publication of the Arizona Small Mine Operators Association.

It is believed that speed in presenting information to those who are producing essential war materials is of vital importance. Every day's delay may mean a day's production lost; and, therefore, anything which can be done to expedite production efforts and avoid confusion is likewise increasing production.

Following is a partial list of mimeographed reports that are now available at the Department of Mineral Resources for those who may be interested. These bulletins include descriptive material as to various orders, as well as applications to do business under them.

#### **Priorities**

Preference Rating Order No. 100  
Preference Rating Order P-56 Amend to 3/2/42  
PD-1A Forms and Application for Preference Rating  
Application for Serial Number under P-56

#### **\*Mine Loans**

Circular No. 14 Revised Describing Mine Loan Program  
Circular No. 23 Describing Mining Loans under the Business Loan Program  
Information Regarding Class B RFC Mine Development Loans  
Information Regarding Preliminary Development Loans  
Policies Regarding the Government Mine Loan Program

\*Copies of application forms for mine loans are only available from Mine Loan Division offices, but copies are available at the department office for study, conference and assistance in obtaining the proper data with which to fill them.

### **Premium Prices**

Copper, Lead and Zinc Premium Price Rules and Regulations

Copper, Lead and Zinc Premium Price Procedure for Small Producers and Ore Buying Agencies

Ore Buying Agencies Affidavit of Purchase of Copper, Lead or Zinc

Application Form for Quota for Premium Price Payments

Producers Affidavit Form of Deliveries of Copper, Lead or Zinc

### **Mineral or Metal Purchasing**

Domestic Manganese Ore Purchasing Schedule

Small Lot Manganese and Chrome Ore Purchase Schedule

Tungsten Ore and Concentrate Purchase Schedule

Purchase of Manganese from Mexico

Purchase of Tungsten from Mexico

Application Form for Contract to Sell Manganese Ore to Metals Reserve Company

Application to Metals Reserve Company for Guaranteed Tungsten Price

Mica Conservation Order

Antimony Conservation Order

Quicksilver Conservation Order

Tungsten Conservation Order

Purchase of Domestic Tungsten

Purchase of Domestic Mercury

### **Miscellaneous**

Regulations for Control of Explosives and the Administration of the Federal Control Act

List of Arizona Explosive Licensing Agents

Industrial Salvage Objectives and Activities

The Arizona Plan of an Industrial Salvage Program

Law Suspending Assessment Work on Unpatented Mining Claims

Form for Notice of Intention to Hold Mining Claims Without Assessment Work

A detailed analysis and brief covering the effect of this order on the mines of Arizona was prepared by the department and submitted to Washington authorities. From the combined efforts of Arizona and other western mining states and mining associations the interpretation of the order was immediately broadened and modifications and amendments made shortly thereafter which changed the offending clause.

**Premium Prices on Copper, Lead and Zinc** With rapid broadening of the war defense program many pleas have been made by the Office of Production Management to step up production. This was done in many instances as far as the mining industry was concerned, but this increase did not meet the ever expanding demand. From the statistics which have been gathered by the department, analyses were made supporting suggestions that the increased production could be had only by an increase in price.

From a production viewpoint it is axiomatic that a given price will furnish a given tonnage of metal. Raise the price and lower grade ores or those more costly to obtain will be mined and an increase in production will result. Lower the price and the marginal mines will shut down and production decrease.

After months of correspondence, editorials, publicity, organized pressure, and other methods to obtain consideration for better prices, the country became actually engaged in war and the defense program changed into a war program. Production plans were more than doubled and the shortage of metals became far more critical.

In January, 1942 the Metals Reserve Company established bonus prices to be paid to new or increased production of 5 cents per pound on copper, 2-3/4 cents on lead and 2-3/4 cents on zinc. This sounded very simple but, in working out the details of putting it into effect, the complications were tremendous. Even though it is more than six months since the plan was announced, there are still many points to work out to make it run smoothly.

The department has been involved in a great many problems relating to premium prices, methods of operating through sampling plants and custom mills, how to fix quotas on remote portions of large mines and numerous other angles. Each one called for a considerable amount of investigation and work with Washington, the mine operators, smelters, custom mills, sampling plants, and those attempting to open up new mines.

The small mine operators of the state have likewise regarded the department as their bureau of information as it was one of the objectives in its creation. On each trip to Washington Mr. Willis has been able to discuss and obtain correction on phases of the premium payment plan which were working a hardship on the small mine industry of Arizona and which were serving to hinder instead of aid increased production.



priorities. Surveys had indicated a critical shortage of production possibilities to keep both war defense industries and non-essential industries supplied so they could operate at maximum capacities. To cover the entire nation was a stupendous undertaking.

At the outset the mining industry was not given a rating on priorities commensurate with its importance to the defense program. The complexities and complications involved in obtaining supplies with which to maintain production were such that (particularly the small producers) the mines were faced with a curtailment of production due to the delay in getting needed supplies. The forms, rules and regulations were too much for the ordinary mine operators.

The department maintained a close contact with and study of all priority regulations, and worked constantly for simplification and elimination of red tape. By keeping posted on the procedure and methods which were in a constant state of flux, the department has been able to render invaluable help to the small mine operators. Even today, after a year's experience with priority measures in force, it is surprising to find a large number of otherwise seasoned operating mining men who are stumped as soon as they find need to purchase supplies and equipment on which priorities are effective.

One of the most important services the department has been able to render in the past year is the assistance to mine operators in straightening them out on priority regulations so that they can obtain supplies and equipment to keep regular production coming out of the mines.

The situation seemed cleared up after months of complications when a bombshell was dropped on the industry by the so-called 30-70 amendment to the P-56 priority order. While this amendment was a tremendous advance in priority rating for the mining industry as a whole, the advantages were obscured by certain detrimental phases. It cancelled the high priority rating of all mines having more than 30 per cent of their combined dollar values in gold and silver.

W. J. Graham, president of the Arizona Small Mine Operators Association, went to a hearing in Reno, Nevada, where Dr. Wilbur Nelson, chief of the Mining Branch, W.P.B., discussed the order with numerous mining men. Charles F. Willis, chairman of the Board of Governors of the department, went to Denver, Colorado where Dr. Nelson held a hearing for those in the Rocky Mountain states. Mr. Willis was called to Washington, D.C., the week following the Denver meeting to attend another meeting on the subject.

It was a critical period for the small mine operators and particularly for Arizona, as the copper smelters are dependent upon fluxes for smelting copper concentrates and most of the fluxing ores available are those high in silica and carry their major values in gold and silver.

Mine Access Road Program Including Application Form for Project

Technological Data Required by Metals Branches, WPB, for Government Aid of Mining Projects

Occupational Deferment Application Forms

Rights of Public Land Claimants under Soldiers and Sailors Civil Relief Act

State Land Mineral Leasing Act

## NEW MINING OPERATIONS AND INVESTIGATIONS

Many new mining operations in the state have been started through contacts made or information which originated through the office of the department or by field contacts by the director and field engineers. Many services which may have seemed of minor importance when rendered have made it possible for prospective operators to get started along sound lines which have resulted in new production being undertaken. It is possible to mention only a few of the major contacts.

**Asbestos** Near the close of the last fiscal year a request was made by New York interests for a report from the department on the potential asbestos production from a group of 4 or 5 properties north of Globe. This report from the department was required in presentation of a project for Government financing to bring these properties under a single management into production. As the field engineers were no longer available, the examination and report was made by the director and afterwards checked by Government engineers.

The production possibilities were accepted as reported, but financing of the operation bogged down on account of the question as to markets available. As a result of the publicity given this investigation, however, numerous inquiries came to the office for purchase of asbestos and asbestos products and contacts were made with owners and operators which resulted in much increased sale of their products.

**Manganese** The publicity given to the shortage of manganese and the need of this metal in the war program has resulted in an active search for mines which could produce. The early specifications were high and the unit price low so that little or no production came from the early efforts. There were a number of brokers in evidence buying manganese at prices far below the published quotations. Freight rates to consuming centers were high; and, although a great many manganese operations were started, very few of them were able to continue and meet costs.

Considerable work was done by the department on the manganese economic situation in Arizona. While the department does not claim credit for all that was accomplished, its activities were

instrumental in assisting. The price of manganese was raised and specifications lowered. A stock pile was established in Phoenix for government buying and was later expanded for small lot buying.

Interest in manganese revived tremendously and a number of new operations started. Some 60 different manganese deposits have been listed with the department and during the past year practically all of these have been examined by the 50 or more prospective purchasers or operators who have been referred to these properties from the department files. Several properties have been started as a result of these contacts.

A preliminary survey of the manganese properties in the west central part of the state has been completed. This survey was for the purpose of determining the feasibility of a centrally located manganese beneficiation plant to serve a number of mines. Many of the ores are too low grade to ship directly to stock piles. The particular project being considered is the erection of a plant at some such point as Parker, Arizona.

Cooperating with the department in this work is the Manganese Division of the Mining Association of the Southwest which is interested in providing an outlet for low grade manganese mines in the southeastern portion of California and, of course, the economics of the situation are greatly improved as the area being served increases.

**Alunite** There has been developed a process for the production of aluminum from alunite. There are two known deposits of that mineral in Arizona, one at Quartzsite owned by the Ropp Brothers, and the other in Graham County. Data regarding both of these properties has been gathered and submitted to those using the process. The production of aluminum from alunite is still in the semi-experimental stage in that only pilot plants are being erected, but both properties have now been examined by those who will select sources of supply when further expansion of alunite operations is in order.

**Kyanite** A discovery of high grade kyanite, a highly refractory mineral used in spark plug manufacturing, was made near Quartzsite by Harry L. Duty. This was referred to the department and after an investigation of the cost and possibilities of use of the material a contact was made with Charles Taylor & Sons, Cincinnati, Ohio, which resulted in their taking over the property and starting operations on it.

**Perlite** Perlite is one of the volcanic glasses which, it was discovered, expands under heat and makes an excellent insulator. This was determined by L. Lee Boyer of Superior and, with the cooperation of the department, a great deal of work has been done to make it a marketable product. Laboratory tests were necessary to determine the insulating values and arrangements were made for such tests to be made by the Arizona Bureau of Mines.

**Revenue Bill of 1941** As chairman of the Board of Governors of the Department of Mineral Resources and as executive secretary of the Arizona Small Mine Operators Association, Charles F. Willis appeared before the Senate Finance Committee in Washington, D. C. in August, 1941, to present the mining problems involved in the Revenue Bill of 1941. The principal feature discussed was the application of the excess profits tax on strategic and critical mineral production on which Arizona and many other parts of the country were just getting under way.

Adverse legislation, it was claimed, would ruin these new industries, while cooperative legislation would make them. The future of the state in the production of manganese, tungsten, quicksilver, and other strategic metals was declared to be largely dependent upon the action taken.

**Revenue Bill of 1942** Mr. Willis also appeared before the Ways and Means Committee of the House of Representatives in March, 1942 in connection with mining matters relating to the Revenue Bill of 1942. In addition to further discussion of the excess profits tax on strategic and critical minerals the subject was covered from a viewpoint which would tend toward elimination of the factors which are keeping private capital from going into the mining business. Provisions for appeal under special circumstances, depletion allowances, unit costs and several other angles of the revenue bill were discussed.

**Ore Purchasing Plants** Chairman Willis has made three trips to Washington during the past year to represent the small mine industry of the state and the Department of Mineral Resources. None of these trips were made at the expense of the department or the small mine operators, although the results to them have been highly beneficial.

On one of these trips Mr. Willis was able to discuss with officials of the Metals Reserve Company details for the operation of local buying plants for strategic minerals under the plan originally suggested by Senator James E. Murray of Montana and on which Senator Carl Hayden had done a lot of work.

Such ore buying stations would be extremely valuable for small mine operators in the state and would make it possible for them to market ores at a profit on which there was no possibility formerly. An ore buying station for large and small lots of manganese and chrome has been established at Phoenix. The station for buying of low grade manganese is closely available at Deming, New Mexico and plans are under way for the future establishment of stations in several parts of the state which will buy any of the minerals and metals that the government is seeking.

**Priorities** A tremendous increase in demand of metallic products by the war defense industries necessitated some method of control of the supplies and machinery available by allocation or



One article was on the United States mining law outlining the basic rules for discovery, location and patenting claims on all United States public lands. Another was the review of the Grazing Laws and their relation to mining. Rules for mining on water power sites and regulations covering operations on wild life refuges were also outlined, as was mining on reclamation areas.

One of the important branches of service of the department has been the work on individual cases of land conflict problems. This work required an intimate study of the legal phases. They will be simplified and possibly the number of conflicts lessened when the situation is better understood.

**Arizona Copper Possibilities** In cooperation with the Arizona Copper Tariff Board, the department has done a great deal of work in connection with the copper price question, excess profits taxes, production possibilities of marginal copper mines, copper costs and so forth.

Among these projects were the study and publication of the production possibilities of the marginal copper mines in Arizona already mentioned. This report was submitted the latter part of July, 1941, and has been used as the basis for discussions relative to an increase in copper price. An advance in the price of copper would be of great benefit to the State of Arizona in wages, income, taxes; and to the nation in increasing the output of copper for war purposes.

**Waiving of Excise Taxes** Another request carried out in cooperation with the Arizona Copper Tariff Board was the preparation of a brief opposing the Doughton bill which provided for the waiving of excise taxes on commodities used for defense. Extensive work was done in compiling the material for the brief and in making the results of the work available to congressmen, financial papers, Arizona organizations, chambers of commerce, and other interested parties. The enactment of this bill, it is believed, would have been detrimental to the mining and other industries of the western states; and, after reconsideration, one of the sponsors declared himself against the passage and the other stated that if it were to be enacted, major revisions would be necessary.

**Pegged Price of Copper** Another project relating to copper was a survey to show the difference in cost of production in September, 1941, as against a year before at which time the price of copper was pegged at 12 cents a pound. This required considerable investigation, both in the field and in the office, as it not only involved the cost of various supplies used in mining but also an analysis of the increased cost of living, which in turn caused the necessity for higher wages. The study was made and the report completed and it was undoubtedly one of the factors which aided in obtaining a better price for copper for new producers.

The results were so promising that a semi-commercial plant was erected for demonstration purposes in Superior and later a commercial plant of 100 ton daily capacity in Phoenix. This promises to be an important industry in the future but inasmuch as its market is largely dependent upon the status of civilian housing, it has been temporarily stymied and set aside for the duration of the war. It promises to become an important Arizona industry in the future.

**Vanadium** Two different vanadium companies have been busily seeking sources of this material. The U. S. Vanadium Company, serving as agent of the Metals Reserve Company, and the Vanadium Refining Corporation, acting independently, have been furnished by the department with complete lists of operators, locations, properties, estimates of tonnage, probable production, and so forth of all of the vanadium possibilities listed. A most important program is under way as there is a critical shortage of this material. The operators acting for the government are making almost any kind of deal including leasing, purchase of ore in the ground, financial help, constructing of small plants, or, in fact, anything reasonable which will get the ore out.

**Tungsten** A special study has been made of the tungsten properties and districts in the state with a view to recommending sites for one or more concentrating or cleaning plants for handling low grade ores or dirty concentrates. The survey has the possibilities of each tungsten mine determined as to capital investment necessary, when production could be obtained, how much production, and the probable cost.

When the survey is completed and plant possibilities analyzed, a proposal will be set up and submitted to the proper production board in Washington for consideration. The department has been definitely assured that a W.P.B. engineer will be promptly assigned for checking and action.

**Cement Plant** Two separate inquiries have been made of the department for a source of supply of limestone and clays for establishing a cement plant in Arizona. Reports on the various available deposits were submitted to both groups and options were obtained from the owners. The two groups were working independently of each other and as the survey seemed to indicate that there was room for but one cement plant, the two groups were brought together by the department and negotiations started which should result in an Arizona cement industry.

**Cherry Custom Mill** As a direct result of a survey by the department on the feasibility of a custom mill for gold ores in the Cherry District, a California syndicate undertook leases on several groups of claims in the area and started development work to open up enough ore to warrant the erection of the mill. A cooperative plan was worked out whereby small operators would be assisted in opening up their properties so as to provide sufficient tonnage

to keep a 100 ton mill in steady operation. Progress on this has been temporarily slowed up because of the lack of the importance of gold in the war effort.

**Arizona Quicksilver Mine** This property has been in operation off and on for the past several years but it has failed to show a profit. The department field engineers have been called upon several times for advice. Capital to carry development work in advance of ore extraction was lacking most of the time and the property finally shut down. The department called this fact to the attention of a representative of Shirley D. Parker of Yakima, Washington, after learning that he was looking for a quicksilver property. A cash deal was made to take over the property and an intensive development and operating plan under seasoned mining operators is now under way which should result in a marked increase in Arizona production of mercury.

**Copper Properties** A report on the production possibilities of the marginal copper mines in Arizona was compiled for Mr. Leon Henderson, director of the Office of Price Administration. The work was done by the department cooperating with the Arizona Copper Tariff Board and received a large amount of publicity on the subject of increased price and production possibilities. This publication contained a listing and description of a considerable number of copper properties which have ore available but which were idle and which could not produce at a profit on 12 cent metal.

The report was published before the bonus price of copper was established and called attention to a number of properties which could be put into production under the premium price offered. As a result, either direct or indirect, eight of the properties mentioned have started production and several others are now being examined and negotiations pending which may also put them into production.

**Other Resource Surveys** As a result of the publication on the marginal copper properties, the Office of Production Management asked the department to compile similar data and reports on beryllium, tungsten and mercury in Arizona. Prior to July 1, 1941, when state funds were available and four engineers were in the field, such a request could have been complied with. With the limited staff and funds available the work could not be undertaken when requested except in a superficial manner which would have had comparatively little value. The immediate need of this report on beryllium and mercury was past when the department might have taken it up. It has, however, undertaken the tungsten project.

**Arizona Development Company** Mr. Harry Culver of Phoenix became interested in the formation of a comprehensive small mine development plan which was designed to prepare worthy partially developed mines for sale or financing. The department cooperated closely with him and a large number of properties were submitted

and examined and resulted in his taking over the Wein tungsten property in the Dragoon district which he is now operating.

**Bouse Iron Deposits** Mr. Vic L. Smith of Parker called the attention of the department to a large body of high grade iron ore (hematite) on which he had done considerable development and research work. A contact was made for him through the department with substantial eastern capital interested in electric smelting of iron ore and, according to recent reports, the project to make a commercial installation appears to be definitely settled.

**R.F.C. Mine Loans** A great majority of the inquiries coming into the department office have been for properties on which production of ore could be started immediately. There are very few of these as most of the idle properties require development work and the department has given much advice and assistance in making application for Reconstruction Finance Corporation development loans. A considerable number of loans in which the department participated in the application have resulted and some very important developments are in process which it is believed will beneficially affect the future of this state.

**Information Service on Mines Available** The files and records of the department have been constantly used by engineers, operators and mining interests seeking preliminary mining information on various individual properties and on districts on which we can suggest a more intensive personal examination and investigation. From these mine owners' reports, field engineers' reports and other information available it has been possible to select those properties and districts which were of special interest. Numerous examinations have thus in an indirect manner originated through the department and operations started as a result of contacts thus made.

**Organ Pipe Cactus Monument** In excess of 300,000 acres of land south of Ajo had been withdrawn from mining entry to form the Organ Pipe Cactus National Monument. The Ajo Council of the A.S.M.O.A. undertook the difficult task of having the entry for mining restored. A survey was requested by the council to be made by the Department of Mineral Resources and the field engineer covering that district was assigned to the work. Senators Carl Hayden and Ernest McFarland and Representative John Murdock have given their full support to the restoration of mining entry in this monument and their efforts resulted in the passage of a bill restoring the mineral rights.

**Mining on Various Types of Lands** There are 28 different classifications of lands in Arizona and there are different rules and regulations for mining on each of them. A series of articles has been prepared by the department on the mining rules and regulations on the various types of land within the state. Some of them have already been published through "Pay Dirt" and it is the intention ultimately to put them all into booklet form.