A Survey of Power and Industrial Facilities In Southern Nevada

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INTRODUCTION

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The primary purpose of the Bureau is to assist citizens and officials in obtaining effective State government at a reasonable cost. The plan is to search out facts about government and to render unbiased interpretations of them. Its aim is to cooperate with public officials and to be helpful rather than critical. Your suggestions, comments, and criticisms will greatly aid in accomplishing the object for which we are all working—the promotion of the welfare of the State of Nevada.

A SURVEY OF POWER AND INDUSTRIAL FACILITIES IN SOUTHERN NEVADA

CHAPTER I

Electro-Chemical Operations at Henderson, Nevada

The construction of the plant at Basic Magnesium Incorporated, at Henderson, Nevada, cost the taxpayers of the United States approximately $140,000,000, but it was a necessary expenditure in order to win the war. There are tons of magnesium stored at this project awaiting the call of the manufacturer and processor to fabricate it into peacetime materials.

Construction began in August 1941, and the project was in readiness for operation in April 1942. During the peak of construction some 12,000 men were employed by the contractors and their agents; and during operation of Basic Magnesium Incorporated, under the Anaconda Company as agents for the Defense Plant Corporation, some 7,000 were steadily at work.

During the peak production period, the electric load at the Basic Project was some 295,000 kilowatts, with an annual consumption of about one and one-third billion kilowatt-hours of energy annually. The maximum water used in the plant and in the town of Henderson, during the peak, was some 667 millions of gallons during the month of August 1943. This amount would cover 2,045 acres a foot deep with Lake Mead water, pumped through the system that cost about five millions of dollars to build.

The electric system alone, for the operation of the processes involved, cost about 12½ millions, and was considered the largest single electrical installation in the history of industrial construction. Some 23 millions of dollars worth of silver was used in the electrolysis buildings. Two 230 KV transmission lines were built from Boulder Plant to Basic. Eighty miles of copper bar and twenty-two miles of glass pipe were installed. This was the largest chlorine plant built at one time in the world, with eighty chlorinators and 880 electrolytic cells. This was the largest refractory brick job in the world, and some 20 million bricks were laid; 30 million feet of lumber was used in forms and buildings. The largest plumbing job in the history of man was done here at Henderson Plant. Air ducts for the ventilating system required four million pounds of sheet metal and the system conducts 20,000,000 cubic feet of air a minute through the system for air-conditioning, cooling, and ventilating. Five hundred thousand control points were established in the survey job; 20,000 blueprints were handled through the engineering departments; and 8 million cubic yards of dirt removed. One thousand carloads of steel were used in the construction of buildings, tracks, ramps, runways, etc.; and in all 16,000 carloads of freight were brought in by rail. And not the least, a town of permanency for housing 8,000 people was built to take care of the workers and personnel of this great industry.

At the conclusion of actual warfare, the Defense Plant Corporation

turned this industry back to the Reconstruction Finance Corporation and this has since been referred to the War Assets Administration for disposal or lease. On February 1, 1947, the Guy F. Atkinson Company succeeded the J. M. Montgomery Company as operating agents for the War Assets Administration. The Stauffer Chemical Company, New York-Ohio Company, Hardesty Chemical Company, Western Electro-Chemical Company, Mitchell Gem Company, Allied Productions and U. S. Vanadium are operating or rebuilding for operation.

On May 21, 1945, the Stauffer Chemical Company leased the caustic and chlorine plant from the Reconstruction Finance Corporation, and has continued operation to the present time. The chlorine and caustic plant is a unit in itself, and produces chlorine, caustic soda and hydrogen, which are basic products in the chemical industry and other manufacturing. It is the nucleus, therefore, of most of the industries that are being developed at the Basic Magnesium Project, which may well become the center of a great Nevada industry. For example, the Hardesty Chemical Company will take from the Stauffer Chemical Company, chlorine to manufacture numerous chlorinated products; caustics for processing others, and chlorine and hydrogen for producing muriatic acid. This latter in turn will be used by the United States Vanadium Company here at Henderson in the treatment of tungsten ores. Each new product attracts new users, so that with the cooperation of Federal, State, and other agencies, we may expect a real inter-related industry at the Basic Project.

The Stauffer Company alone consumes approximately 10 million kilowatt-hours of electric energy monthly, costing between $26,000 and $32,500 in the operations of the electrolytic cells and operation of scores of motors and incidental equipment; it consumes 25 to 30 million gallons of water monthly, and employs about 150 persons.

In November 1945 the New York-Ohio Corporation, a Stauffer associate, started operation. This plant is a consumer of chlorine and aluminum metal. It produces aluminum chloride, used for many purposes, particularly for oil refining and the manufacture of synthetic rubber.

The Western Electro-Chemical Company, producing sodium chlorate, potassium chlorate, and potassium perchlorate, consumes about 8 million kilowatt-hours a month, and employs about 125 persons with a monthly pay roll of approximately $18,000.

The Hardesty Chemical Company, with approximately 100 men on its pay roll, produces synthetic organic chemicals, most of which are shipped to other chemical houses for further processing and conversion to commercial and marketable products. The Stauffer Company supplies the caustics and chlorine.

The United States Vanadium Corporation has leased facilities to house a chemical tungsten refining operation. Limestone, used in the processing, is secured locally from nearby sources in Clark County, and the reagents used are acquired from the Stauffer Company. The company employs about 100 men with a pay roll of about $50,000.

The private industrial development of the Government-owned facilities at Hendreson depends upon a combination of many factors: low-cost power, availability of suitable production buildings, and the

possibility of coordinating and integrating the activities of the various operators at the project. Availability of skilled labor and accommodations for them and their families is of prime importance, and a major necessity.

CHAPTER II

Nevada in the Electric Power Business

One of the greatest possessions of the State of Nevada is its fixed allotment of 18 percent of the firm power generated at Boulder Dam. This can never be taken away from Nevada. How much power is this? Roughly, it is about 750,000,000 kilowatt-hours per year. It is 17 percent of 4,240,000,000 kilowatt-hours per year, which total is reduced 8,760,000 kilowatt-hours per year due to increasing upstream water use and reservoir silting. This power is Nevada's for all time. If we do not use it, other allottees may do so, but any time we want it we may take it back, provided only that we give the advance time notice required by the general regulations and reimburse the users for property made idle to them by our withdrawal, if any property is rendered idle. We must also have acquired the necessary machinery for generating the power.

The only way in which Nevada can lose any part of this power right will be by nonuse of our total allotment for 20 years. In that case Arizona only can withdraw from our allotment and permanently retain a block equal to 4 percent of the total of Boulder Dam firm power which would be about 165,000,000 kilowatt-hours per year. Such a loss could only be to Arizona, which State has not yet used any part of its original 18 percent allotment, so such a loss to Nevada is a very remote possibility. As the proposition is reversible, nonuse by Arizona will make this 165,000,000 kilowatt-hours additional power available to Nevada after 20 years, if our own uses should increase so much as to make it necessary or desirable. It is the grave responsibility of the State to make this power available to the public at the lowest reasonable rates. It is the lowest-priced power available to industry anywhere in the United States, and the climate of southern Nevada permits all-year operation at the highest efficiency.

Nevada Boulder Dam power is sold at cost. As the cost factors vary with the exception of two fixed components (falling water charge and State charge) we cannot set down an exact figure. The contractor's power factor influences his cost. If his fluctuating load gives him a 50 percent load factor, he will need twice as much machinery to generate his definite number of kilowatt-hours as he would if he had a 100 percent load factor, so his amortization and replacement annuities will vary accordingly. Operation and maintenance costs vary and are adjusted annually, and credits or charges are made to contractors accordingly. Private power corporations make their fixed rates high enough to cover such fluctuations and also pay them a profit. At the present time, the falling water charge is 1.22 mills per kilowatt-hour, and the State of Nevada charges .1 mill per kilowatt-hour to cover the operating costs of the Colorado River Commission. During the operating year 1945–1946 the additional costs allotted to amortization, replacement, operation, and maintenance averaged .71 mills per kilowatt-hour, making a total charge cost of 1.93 mills per kilowatt-hour to the State of Nevada.

The general regulations for the operation of Boulder Dam power plant were prepared by agreement between the various allottees and the Secretary of the Interior, in accordance with the Boulder Canyon Project Adjustment Act. The allottees are required to enter into contracts with the Federal Government for the payment of their machinery over a period of years. Nevada, being without any large present or prospective power demands, and whose use at that time was far less than half of the capacity of one of the 82,500 KW generators, could not contract to pay two or three million dollars for machinery that the State might not use for many years, if ever, in the form of one generator and transformers.

A way out of this dilemma was found by writing into Nevada's contract with the Government a provision acquiesced in by the City of Los Angeles, which permits Arizona and Nevada to draw upon unused capacity of the City's generators in what is known as "Section G-3," composed of Generators A-1 and A-2, up to a combined demand of 44,000 kilowatts. As Arizona does not use any energy from Boulder Dam, and gave assurance that they do not contemplate such use for some years, if ever, the contract gives Nevada generating capacity up to 44,000 kilowatts. For this use the State pays its proportionate charge for amortization and replacements, operation and maintenance. The economy in having to pay only for generating capacity used, instead of paying for a complete generator is at once apparent, and effects a saving of about $50,000 per year over what the State would be obliged to pay if it installed its own generator merely to meet the present power demand of permanent Nevada users. The City of Los Angeles also derives much benefit from the arrangement, for it is relieved from charges on much of the unused capacity of its group of six generators.

The great problem has been to secure stand-by power and demand horsepower under the terms of the general regulations of the Boulder Canyon Adjustment Act of 1940. Up to 1946 the power withdrawals of the Southern Nevada Power Company and Basic Magnesium, Inc., were fairly constant and could be accurately estimated in advance. But if various contractors and industries are to operate at Henderson, it will be necessary for them to obtain power when they are ready for it, and increase the load when necessary. If this is to be done, either the regulations under the Boulder Canyon Adjustment Act must be changed or else contractual arrangements must be made with California allottees. Obviously, the first alternative would require an Act of Congress, and would probably take so long as to not be practical. The regulations set up for the protection of Los Angeles and the other Southern California contractors are so drastic that Nevada cannot obtain and sell power on anything like a parity with Southern California. Here are the legal conditions and regulations under which power from Nevada's allotment can be withdrawn and used:

(1) Formal application to the Commission for a definite amount of energy in kilowatt-hours per year, and the maximum demand in horsepower.

(2) Determination by the Commission of the financial standing of the applicant, and the fixing of a bond to be supplied to make the State whole in case of default or sudden termination of applicant's

operations. This is required by Section 7 of Chapter 71, Statutes of Nevada 1935.

(3) Notice served by the Commission upon the Secretary of the Interior, the Director of Power at Boulder City, and to each of the allottees of the amount of energy to be withdrawn, and the effective date of withdrawal (6 months to 3 years, depending on the quantity) of energy according to a schedule in the Federal General Regulations for Generation and Sale of Power at Boulder Dam Plant. Following is the mandatory schedule:

A notice which together with all prior notices given by the same State within 12 consecutive months—

Exceeds in maximum demand horsepower	And does not exceed in maximum demand horsepower	Period of notice, months
0	5,000	6
5,000	12,500	12
12,500	20,000	18
20,000	40,000	24
40,000		36

These regulations are more elastic and liberal than those of the original Boulder Canyon Project Act, but, nevertheless, are obstacles to immediate or demand use of Nevada power. The regulations are not difficult if loads are fairly constant without rapid fluctuation, and the contractors are able to anticipate needs and order power in advance to meet their requirements. If a new industry will not require too much power, and a six months' or one year notice of power withdrawal will cover their needs, it would seem that they could build and equip a plant while the power notice is running. But in actual practice, a variety of factors prevents such estimates by the inter-related industries at Henderson. It would appear that demand power can only be obtained by contractual agreements with California allottees until Nevada can install a generator of its own at Boulder Dam, and then the contractors will still be subject to the withdrawal and turn-back regulations. They were written into the original Boulder Canyon Project Act, but some modification was obtained in the Boulder Canyon Project Adjustment Act. And that means additional cost for the time being to the industries at Henderson, because a considerable amount of the energy used in California is generated by steam power, and the cost of such generation has been rising due to the constantly increasing cost of fuel oil.

"Maximum demand," as written in the contracts, probably means registered or measured maximum demand, based on a varying load factor. This will have the effect of decreasing the total annual power obtainable under a request for horsepower as used in the regulations, if the load factor is less than 100 percent. Beneficial recourse in this case is to keep the load factor high, if possible. The best that may be expected is a 50 or 60 percent load factor. When we say "5,000 horsepower, maximum demand, 50 percent load factor," it means that at times our load will be 5,000 horsepower, but that we will average only half of 5,000 horsepower, or 2,500 in continuous use. Generator and transformer capacity have to be provided for a 5,000 horsepower load,

however. Los Angeles is said to have computed its own requirements at a 50 percent load factor.

Private power companies usually sell power under conditions to meet the varying load of the industry served and with a considerable range between minimum and maximum loads. They also provide variable rate schedules decreasing the unit cost as power consumption increases. We think that our industries, particularly mining operations, must have some flexibility or variation schedule in daily and seasonal load. In order to properly build up and grow they must also have leeway to increase their power consumption under contract as they need it. They should be allowed to pay for what power they use, and not be compelled to contract and pay for more than a predetermined minimum charge.

Nevada failed to take all of her allotment of 18 percent (about 119,000 horsepower) within three years after the Secretary of the Interior declared that firm power was ready for delivery at the dam, and the total cost of subsequent withdrawals may be somewhat increased. This will be due to property rendered idle to Los Angeles, and may be explained as follows:

If we do not use our power allotment, then Los Angeles must take it. That is her contract with "Uncle Sam." After firm power was ready, Los Angeles had three years in which to absorb all unused power allotted to both Nevada and Arizona, if these States had not by that time withdrawn their combined proportion of 36 percent. In order to use this power, Los Angeles built another transmission line into the southland costing about $10,000,000. They had two lines, built at a cost of $22,000,000, but the two lines were not large enough to transmit all of the Boulder Dam power. Now, if we wanted all of our power, and withdrew it, we might have to pay Los Angeles for the new third line rendered idle, or such proportion of it as we render idle by taking out power at that date. This provision is written into the contracts between the Government and the City. It may be necessary for the States (or for Nevada alone if Arizona should not use any of the power) to indemnify Los Angeles for a large part of the cost of a $10,000,000 transmission line from the dam to Los Angeles. The Los Angeles municipalities were obligated to take 55 percent of the firm power the first year, 70 percent the second, 85 percent the third, and 100 percent the fourth and all subsequent years. Arizona will be in the same boat if she elects to use power at a late date and will be charged for a proportion of the line rendered idle, which would help us out. Our obligation might be several million dollars, and too much for the State to assume. A charge of $5,000,000 would increase the power cost about 1.5 mills per kilowatt-hour, if we allow ten years in which to pay for the idle line. Our State probably would prefer to abandon further withdrawals of power rather than assume such a debt.

Nevada contends that there will be no "property rendered idle," because the third transmission line to Los Angeles is absolutely necessary for their peak loads, and their periodic high loads, and never would be "idle." When Nevada and Arizona withdraw all their energy, the third line will still be used for Davis Dam, Bridge Canyon, and Glen Canyon power when these projects are built. It seems that Los Angeles is about ready to write off "property rendered idle," except

for trading purposes. The City has made an attempt to fix it at .5 mill in drafts of stand-by contracts.

The Boulder Dam generators are the largest in the world. To install one requires about three years and each will cost approximately $4,000,000. The government has estimated the cost of machinery for generation at $40 per kilowatt installed, and each generator will have a capacity of 82,500 kva. If it should be necessary to install one for our exclusive use, the Bureau would have to charge it to us under amortization of machinery, and we would be obligated to pay for it over a fifty-year period. It would be necessary for us to sell all of our 119,000 horsepower at an increased cost of about .3 of one mill per kilowatt-hour to pay for the generator during the fifty-year period. If we did not sell all of our total power allotment, the cost per kilowatt-hour would be increased proportionately. Also, the amortization cost would be increased proportionately if the amortization period was ten or twenty years. Four percent interest must be paid, and, obviously, interest would be saved if the amortization period is short. The Bureau of Reclamation has estimated that the cost of generation will be .6 mill per kilowatt-hour, which includes operation and maintenance of power plant .13, depreciation of machinery .12, and amortization of machinery .35. This figure appears to have been based on amortization of generating machinery and operating costs spread over 50 years, which is the estimated life of the project.

The cost of generation, including amortization of machinery, will be about 1.5 mills per kilowatt-hour for the first five years according to a circular issued by Los Angeles Bureau of Light and Power in 1935, and by the same circular, the cost to Los Angeles for power at the dam site will average 4.22 mills for the first five years, because of the smaller amount of power during the three-year absorption period, and a ten-year amortization. However, it seems that this figure is far too high, as the City gets secondary energy also. A more accurate estimate of 2.23 mills was made by the Bureau of Reclamation, based on a fifty-year spread. At least it seems to be more accurate, in view of the figures given in the following table, which are the average generating charges to the State of Nevada for the year 1946. There are a great many uncertain factors present, and it is possible that with a new generator our firm-power cost may be as much as one-half cent per kilowatt-hour at the dam, at least for a number of years. Power for industrial use can be obtained for this price or less at several places in the United States, without the restrictions. Here is an estimate of the several items which may compose the cost of the power to Nevada with our own generator:

MILLS PER KILOWATT-HOUR

Falling water charge	1.220
Operation and maintenance component	.323
Replacement component	.089
Amortization component	.294
State charge	.100
Total, first three years	2.026
Indemnity after three years	1.500
Probable total after three years	3.526

Some idea of the purchase price, amortization charges, and maintenance and replacement costs, if the State of Nevada purchased a new generator, may be obtained by comparison with similar charges on generator N-7 and its appurtenant transformers and switches (designated Secs. G-7 and T-7). The Bureau of Reclamation estimates that the present investment in generating section G-7, which includes generator, turbine, and appurtenant generating equipment, is $2,959,700. The annual amortization charge for the next operating year will be $115,013, and the replacement annuity will be $36,990. In addition, each generating section pays a pro-rate share of the common facilities, which in the case of G-7 amounts to an annuity of $7,629. Finally, the operation and maintenance charges for the next operating year is estimated to be $65,600.

The Bureau of Reclamation estimates that the present investment in transformer section T-7 is $733,022. The annual amortization charge for the next operating year will be $28,491, the replacement annuity will be $9,162, the share of the common facilities will be $7,480, and the operation and maintenance charges will be $33,400.

COMBINED TOTALS OF SECTIONS G-7 AND T-7

Present investment	$3,692,722
Amortization component	143,504
Replacement component	46,152
Common facilities component	15,109
Operation and maintenance component	99,000

CHAPTER III

THE STORY OF GENERATOR N-7

The operation of the BMI Magnesium Plant at Henderson was a war-time emergency procedure. While that plant was under construction, Defense Plant Corporation called upon each of the Boulder power allottees to supply all power each could spare for its operation. All allottees unhesitatingly complied. Nevada contracted to supply 147,000,000 kilowatt-hours for two years for the period ending May 31, 1945, plus an additional 82,000,000 kilowatt-hours during the second year ending May 31, 1945, as the government rates for generation and sale of firm energy, plus a charge of five hundredths of one mill per kilowatt-hour to the State. That war-time obligation expired on June 1, 1945, and neither BMI, or its successors RFC or WAA, had requested any further withdrawal or use of energy from Nevada's allotment. The share Nevada supplied had been only about one-tenth of the total power used at BMI, the balance being furnished by the California allottees.

DPC lost some money under its contract with Nevada for energy, for BMI failed to use all the energy contracted for, and for which we had to pay the Government, and for which in turn they had to pay Nevada. The Commission made an effort to have RFC renew the contract, but DPC refused to enter into a new contract for a fixed amount of energy, and Nevada can legally contract on no other basis.

Generator N-7 and appurtenant transformers and switches (designated Secs. G-7 and T-7 by the Bureau of Reclamation) had been

installed under emergency conditions at the order of Defense Plant Corporation to meet the imperative war-time need for more generating equipment at Boulder to supply the BMI plant. In 1945 the Nevada Commission offered to take one-half of this generator, for which Southern Nevada Power Company offered to underwrite the charges. As there would be Nevada use for all of this capacity, there would have been but little or no risk involved.

The City and Edison did not favor Nevada securing any part of Generator N-7, for the reason that the City wanted one-half of N-7 capacity as stand-by, figuring that one generator in the plant would always be shut down half the time for repairs. Edison said if it could have the other half of N-7 they would use it to generate Metropolitan Water District's unused energy, and buy and use it. Metropolitan Water District of Southern California is obligated to the Government for a large amount of energy which it must pay for annually whether or not it is generated or used. E. A. Stansfield, sent from Washington to Los Angeles to represent RFC favored this procedure as it helps out Metropolitan Water District and its many taxpayers.

Nevada considered asking for the entire N-7 generator, as the State also had a public to serve, but could see no way in which to finance it on a fixed charge of probably $385,000 per year, unless a definite market could be found for the surplus energy it could produce. Without contracts for this surplus the Commission could not obligate the State for all of N-7 unless it should be authorized by Act of the Legislature. The California allottees declined to contract to take and pay for the surplus energy in N-7 under these conditions.

The Nevada Commission decided that it would keep out of N-7 but ask that the contract proposed to the Californians be short term, not to exceed the official duration of the war and six months thereafter, or at most not more than two years, at the end of which time N-7 would again be open for sale, or use, subject to Metropolitan Water District's prior claim to it. At the time this machine was installed Metropolitan Water District had been given the right to obtain it on two years' advance notice.

Nevada's desire to obtain the use of N-7 was prompted by the fact that it was already installed and in operation, and could be made available at once, while it will require about three years to install a new major unit at Boulder plant after it has been authorized.

The State's present contract with the City of Los Angeles for generating capacity was made in Washington, D. C., at the time the Boulder Canyon Project Adjustment Act was passed. Under this agreement up to 44,000 kilowatts of capacity are available to Nevada from the City's A-1 and A-2 generators. When this capacity has been exhausted by withdrawals, additional generating capacity must be secured elsewhere.

That is the situation today. Nevada contractors, notably the Southern Nevada Power Co., the Lincoln County Power District, the Searchlight-Nelson Power District, and the Overton Power District, are using an amount of power approaching the total of 44,000 kilowatt-hours allowed to Nevada under the terms of the contract with the City of Los Angeles. Until the time that Nevada may see fit to install a

generator of its own the lessees at Henderson must secure their power by contract with California allottees and the War Assets Administration. Nevada has been unable to reach an agreement with California allottees on N-7 at the time of this writing, but negotiations have been reopened, and the results will be contained in a future report.

CHAPTER IV

Negotiations With California Allottees

Nevada's right to Boulder Dam power is subject to rigid withdrawal restrictions. Under the Boulder Canyon Project Act, notice of from six months up to 3 years must be given in advance of withdrawal to the Bureau of Reclamation and to other allottees, the length of time depending upon the amount of energy, before it can be taken away from the California allottees, who are obligated by the Government to take and use it all the time Nevada does not. The State must also give similar advance notices when it desires to turn back any power.

Sufficient power to supply the indicated BMI needs, although they were not definitely stated, are sufficiently large to require two or three years' time before it could be made available under these Federal regulations. Most of the lessees at BMI require almost immediate service on demand. At present these operators are offered only three- or five-year leases by War Assets Administration, which is no more than the time it will require to obtain Nevada power in a large block under withdrawal rules.

The California allottees, who had made firm contracts to take and pay for all Boulder energy, prior to the construction of the dam, are, of course, the only agencies capable of supplying demand energy at Henderson. The Commission requested them to submit terms.

Here was the Edison Company proposal to supply demand energy made in January 1946:

1. Edison and City are willing to make Boulder energy available to the State of Nevada or Southern Nevada Power Company solely for use at the Basic Magnesium Project and operations incidental thereto.

2. The rate for such energy delivered at Boulder Power Plant shall be 50¢ per month per kw of 30 minute maximum demand up to 35,000 kw, with a minimum payment of $12,500 per month, plus 2.50 mills per kw-hr. For all demands in excess of 35,000 kw the charge shall be $1 per month per kw of 30 minute maximum demand; provided, however, there shall be no obligation to supply over 35,000 kw.

3. Because it is estimated that it will be necessary for Edison and the City to replace with steam-generated energy, approximately one-half of the Boulder energy to be delivered under this proposal, the rate per kw-hr for one-half of the energy delivered shall be further subject to an oil clause providing for adjustment of the rate on the basis of 0.2 mills per kw-hr for each 10¢ per barrel increase or decrease in the posted price for fuel oil in the Los Angeles Basin as compared with the present price of $1.10 per barrel, exclusive of sales tax, said fuel adjustment being computed to the nearest .01 mill per kw-hr.

4. The above rates and charges are based on the maintenance by the purchaser of a weighted average monthly power factor of not less than .85. If such power factor is less than .85 then the charges per kw

and per kw-hr set forth in (2) above shall be increased by the ratio of .85 to the actual weighted monthly average power factor.

5. The contract for service to be for five years with the above minimum monthly payment guaranteed for the term of the contract.

6. Nothing in this proposal shall require Edison and/or the City to impair service to their other customers in order to deliver energy hereunder, and Edison and the City reserve the right to reduce or discontinue service under this contract without penalty other than a pro rata reduction in the monthly demand payments when such reduction or discontinuance of service is required in order to maintain service to Edison and/or the City's other customers.

Part 5 of the proposal provides for a five-year contract but has no provision for cancellation. This was discussed briefly during the meeting of December 12, 1945, but nothing definite agreed upon. It is suggested part 5 be amended to read as follows:

5. The contract for service to be for five years with the above minimum monthly payment guaranteed for a minimum period of two years with cancellation of the contract permitted upon six months' written notice to Edison and City.

At a conference on March 15, 1946, the State requested that the energy rate be reduced to 2.25 mills, the contract be made for three years instead of five, and that the "oil clause" (Sec. 3) be omitted.

The City objected to each of these changes, and furthermore indicated that the contract should be made contingent upon or subsequent to clearing up the issues of "property rendered idle" and "stand-by service," as yet unsettled with the State.

Edison Company did not refuse to make the desired modifications, but said they wished to restudy the problem if a three-year contract is desired, instead of the five-year contract, saying their proposal was based upon a five-year contract and made allowance for a low-water year in Lake Mead storage.

In May 1946, the Los Angeles Department of Water and Power indicated to the Nevada Colorado River Commission that even though the price of oil had increased from $1.10 a barrel to $1.25 a barrel, the total rate to the State of Nevada would be 3.25 mills per kilowatt-hour up to 30,000 kilowatts for energy delivered at the high voltage bus at Boulder power plant. The load at BMI varies from 20,000 to 60,000 kilowatts. Some of the prospective customers had complained that power was cheaper in Los Angeles than at Henderson, but rate schedules submitted by the City proved that the reverse was true with an average rate of 3.7 mills to 4.09 mills. The California allottees use all of the power that they can obtain from Boulder Dam, as it is lower in cost than steam-generated energy. But they still must have steam plants readily available for stand-by power in case of breakdown at the Boulder plant and to meet variable load factors. When Nevada buys power from them, they must replace by steam power, a part or all of the power released to us, and Nevada must pay the excess cost. The stand-by service and transmission expenses also increase the cost.

The working out of the contracts were delayed for one reason or another for a full year between May 1946 and the present month of May 1947. There was considerable dispute as to the interpretation of

Nevada's withdrawal notices and whether they were in accord with the regulations, as well as the issues of "property rendered idle" and stand-by service.

A plan, entitled "Suggested Elements of Possible Understanding with Nevada," which came about through discussions between representatives of Nevada and the City of Los Angeles, was favored by the Colorado River Commission except for its "property rendered idle" clause. Under this plan the cost of power would be approximately 3.5 mills per kilowatt hour, exclusive of the "property rendered idle" charge, and assumes a 45,000 kilowatt load and 149,000,000 kilowatt-hours annually, with a stand-by of 40,000 kilowatts. But the major dispute arose over interpretation of Nevada's withdrawal notices; the dispute involving the relationship of kilowatts, kilowatt-hours, horsepower, and load factors; all highly technical.

And then near the end of 1946 information arrived to the effect that the War Assets Administration was going to take over the Administration of BMI for the Reconstruction Finance Corporation. The WAA is primarily a liquidating agency, and fears arose that they would liquidate all holdings at BMI. Contracts for power had to be executed between the WAA, the California allottees, and the State of Nevada right at the time when one Federal agency was taking over from another. The RFC had retained the J. M. Montgomery Co. as managing agents to arrange leases, rentals, power supply, and the facilities and utilities necessary to keep BMI operating as a "multi-tenancy" unit. WAA was given the authority to continue operations at BMI, and in arranging for the transfer from RFC to WAA, the RFC called for bids for the operation of the facilities. The Guy F. Atkinson Co., of San Francisco, was low bidder, and took over the active management of the facilities as agents for the WAA on February 1, 1947. The Montgomery Co. remained to take inventory only, a job requiring six to eight months.

During this transitional period no lessee at BMI had a signed lease, with the exception of the Mitchell Gem Company. All others had "letters of intent" which were due to expire on May 31, 1947, and the lessees were "living in suitcases" because of no power contracts and no leases.

The power contract had been drawn, and supposedly provides for up to 35,000 kilowatts at a demand charge of 50¢; over 35,000, the price was to be 75¢, but the City of Los Angeles was not obligated to furnish over 35,000 kilowatts unless it could do so without material injury to them. The contracts are between the Edison Company, the City of Los Angeles and the WAA, and the State of Nevada only participates to the extent that it agrees *not* to make power of its own available for the duration of the contracts. Approximately one-half of the power would be furnished by steam generators and the cost of the one-half would vary with the price of oil in Los Angeles—the disputed "oil clause." The power contracts became "lost" in the Washington offices of the WAA, and then the WAA transferred the control of its real properties in Nevada to its San Francisco office, and the power contracts were sent there. Rumor had it that they would be signed by the end of the year 1946, but there was further delay, and

then the WAA issued "letters of intent" in lieu of power contracts to the industries at Henderson. No one seems to have seen even one of the "letters of intent" and they are supposed to expire on May 31, 1947. In other words, the industries have been getting power on a "hit or miss" basis for a year, and the Colorado River Commission and Nevada's representatives in Washington are striving to push power contracts to a successful conclusion before May 31, 1947. The industries at BMI cannot go on forever without power contracts and leases.

CHAPTER V

The General Situation at BMI From May 1946, to May 1947

The industries at BMI have been "living in suitcases" for a year. The material facilities are at BMI for a large interrelated series of industries to function. Six or seven industries *are* there and functioning, but there has been no assurance that they could continue to work because they had no firm leases. At any time the order might be given to junk the plant and sell it as surplus property. When the WAA appeared on the scene, such a contingency appeared even more probable.

There was no assurance that power would continue to be available. Nevada's share of the G-3 section was practically all contracted for by previous Nevada contractors, *i. e.*, the Southern Nevada Power Company, the Lincoln Power District, and the Overton Power District, a share of generator N-7 could not be worked out without delay, and it would take several years to build a new generator. That meant that a power contract had to be worked out with California allottees, and that has involved much dispute and long delays.

There has been no certainty that power would be available at a low enough figure and thus enable the industries at BMI to continue to operate. It was originally estimated that power would cost three to three and one-half mills per kilowatt-hour, but when everything is added in, including the rising cost of oil fuel for steam generating plants, various transmission costs, etc. the cost will probably be just under five mills.

Nevada's interest in the whole thing is to steer all parties through the negotiations, bring them to successful conclusions, and thus enable a number of large electro-chemical industries to take root at Henderson. Shortly after the WAA obtained control of BMI on February 1, 1947, rumor had it that the plant was going to be liquidated and sold to the highest bidder, piecemeal or otherwise. The question immediately arose as to whether the State of Nevada could step into the picture and save the plant for the use of the various industries. The Legislature enacted into law a measure which allowed the Colorado River Commission, with the approval of the Board of Control, to negotiate for the purchase, lease, or use of the BMI plant. It will be noted that the authority to negotiate was given, but it was not made mandatory that the Commission do so. Not long after the adjournment of the Legislature it became apparent that if the State of Nevada acquired the BMI plant it might lose its shirt in short order.

As explained previously, power contracts and leases have not been negotiated. The industries are hanging on through "letters of intent."

Suppose the WAA decided to junk the plant, or even give it away. It is agreed by all parties that the WAA, and the prior RFC, were and are operating the BMI plant at a loss. There would be good reason to just abandon the plant, or give it away, merely to relieve the Federal taxpayers of an operation that was losing a large sum annually. The sixty-four dollar question was: "How much was the annual loss?" It seems to be generally agreed that the RFC and WAA lost approximately $1,500,000 a year at BMI. The Legislative Counsel expects to have accurate data on this matter before too long, but so far he has had no success. Prying the material out of a Federal agency scattered from the Pacific to the Atlantic, tied up tight by very red tape, on a project the size of BMI, is like trying to move a mountain with a teaspoon. The expenses of operation all come out of the WAA fund, but all the income of the BMI enterprise goes into the general fund of the U. S. Treasury, and the WAA itself is uncertain where it stands. The J. M. Montgomery Company probably has the figures, but will not release them without proper authority from Washington. The Colorado River Commission has been trying to get this information for months, but the buck-passing has every one stymied.

If the State of Nevada stepped into the position of the WAA, she would lose a large annual sum also. Perhaps good business-like management would trim the loss to $500,000 a year, but the State cannot stand such a burden. How are these maintenance expenses incurred? BMI is a huge plant, and painting and repairing alone runs into a huge sum. There is a nineteen-man crew just to repair and maintain the electrical system. There must be men and equipment to maintain the fire department, police department, and the water and sewage facilities. *And* power, water, and sewage facilities must be maintained for the town of Henderson and the neighboring communities of Victory Village and Carver Park. It has been estimated that the public utilities for the three towns gross $137,489 a year.

Conditions would have to be just right if the State of Nevada were to take over from the WAA and avoid loss. Within a very few days after the transfer, the following items would have to be complete:

(1) Power contracts with California allottees agreed upon by all parties.

(2) Five- or ten-year leases of property and contracts to purchase power with appropriate bond to make the State whole in case of default.

(3) The immediate formation of a management corporation by the lessees, to oversee and maintain the plant, and the utilities serving the neighboring communities.

It is almost impossible to bring these three items to a swift conclusion because of the very size of the BMI plant and the large amount of property involved (it takes six to eight months to inventory the plant) and numerous groups involved. And a business depression, or labor troubles in Las Vegas, would leave the State of Nevada holding the bag, unable to let go without large losses. For Nevada to come through safely, the towns and the lessees would have to use almost all of the power and water capacity *immediately*, and continue to do so for some years.

If WAA would not give the plant to Nevada, extremely favorable terms would be absolutely necessary. After proper appraisal, a fixed

price should be agreed upon, with no down payment, and a long period of time to amortize the cost of the plant. But such a deal is predicated upon the proposition that the cost of maintenance and protection must be reduced to a figure less than the income from rentals, leases, etc. There is no denying the great industrial importance of BMI; every effort should be made to enable the industries to continue because of increased employment for Nevada people and increased assessed valuation for tax purposes, but, there must be no loss incurred by the State. Acquisition of the power lines and water system servicing BMI and the surrounding communities, must be considered in the same light. Such acquisition, if accomplished, would put the State in the driver's seat as far as the industries are concerned, it would aid in meeting future water needs of the city of Las Vegas, and would increase the strength of Nevada's position in future power negotiations with California allottees. But, *there must be no loss to the State of Nevada.*

However, at the time of this writing it appears that the WAA is going to continue the operation of the BMI plant, regardless of the loss. Nevada's congressional representatives have apparently induced the WAA to hang on, as the WAA has announced that it is going to spend $75,000 to survey the whole situation, and power contracts with California allottees are finally ready to be signed by all parties. This means that Nevada may not have to step into the gap for a time anyway; the added time increasing the possibility of arrangements eventually being made whereby the lessees can function and maintain the plant for an extended period.

The Colorado River Commission has always thought that it should not request the installation of a major generator at Boulder Dam plant until full use of it is assured by Nevada and other allottees. The cost of such machinery and its installation will be approximately $4,000,000, a large sum for Nevada, and the Commission has no authority to speculate upon future use of energy to defray it. California allottees have never in the past agreed to contract with Nevada for use of the excess capacity, or for excess kilowatt-hours. It appears now, from recent conferences, that a satisfactory agreement will be worked out whereby Nevada will install generating machinery and Los Angeles will use our excess generating capacity and also provide stand-by service. As this is written, plans and negotiations are in progress, and the prospect of solution of the problem is good. Three different diagrams of schemes for installation of two major units, one by Nevada and one by Los Angeles, are being studied by the Bureau of Reclamation, Division of Power, at Boulder City. The outlook for general acceptance of one of these plans is very favorable.

CHAPTER VI

Other Power and Industrial Problems

Bonneville Power Project

A danger to Nevada's full benefit and use of Boulder energy lies in competition with lower-priced Government-subsidized power at Bonneville, where a rate of as low as 2 mills per kilowatt-hour might be offered under certain conditions. This may cause some industries now contemplating establishment in the Las Vegas area to go to Bonneville

instead. Nevada may not be able to successfully compete with power subsidized by the Government at Bonneville or elsewhere, if it should be offered to the public at prices lower than possible at Boulder, where there is no subsidy and contracts had to be made for repayment of construction before the dam was built. But it seems likely that the differential will be very small, and there is a "rachet" clause in the Bonneville contracts which compels companies using Bonneville energy to purchase additional power from private power companies at the prevalent or existing commercial rates when Bonneville power is short, or is needed for other purposes. A slightly higher rate may be offset by other advantages to be had in Nevada, such as better climate, lower taxes, better labor and transportation factors. The warm climate of southern Nevada is conducive to continuous all-year operations and attractive living conditions.

Freight Rates at BMI

Complaint has been made at one time or another of the high freight rates at BMI, and this has been given as one of the difficulties facing lessees at BMI. Prospective lessees have made the point that the Union Pacific Railroad was taking full advantage of the remote location and lack of competition at Henderson, that terminal rates and water transportation in Los Angeles and at eastern points were more favorable, and that once industries located at Henderson there would be a large tonnage of freight necessary for their operations. However, there are approximately half a dozen lessees in operation at BMI at the time of this writing, and it appears that they will continue operations regardless of the freight rates, if adequate power at a reasonable rate is provided.

The Water System at BMI

A huge water system with pumping plants was built to serve the needs of BMI and the town of Henderson, at a war-time cost of approximately $5,167,000. A report compiled by Art Loforth, an engineer in the Department of Highways, and A. J. Shaver, Resident Engineer of the Colorado River Commission, indicates that the present-day value of the system is between $3,500,000 and $4,000,000. The system is absolutely necessary to operations at BMI, and could be of great value as supplemental supply to the artesian system now supplying Las Vegas and the surrounding valley. In 1944 the Colorado River Commission indicated to the RFC and the Department of Commerce the State's interest in the matter. The general opinion seemed to be that the system should not be allowed to fall into private hands or be salvaged as surplus property. Also, in 1944, the RFC indicated that the system would be retained in stand-by condition, and proposals for its disposition would not be accepted until the plant had been declared surplus to war requirements, at which time they would be glad to negotiate with Nevada. The WAA will continue to maintain the pipe lines and pumping system as long as it maintains the plant at BMI; it is doubtful if the plant and water system would be separated unless the whole plant was declared surplus property. The water system provides water for the city of Henderson and neighboring communities, and may eventually be a necessary supplement to the present supply of water for Las Vegas. It seems to be generally

agreed that the cities could maintain the water system if they acquired the facilities at a low enough figure. At any rate, the water system is vital to the welfare of Las Vegas, Henderson, and the surrounding valley.

Nevada's Participation in Surplus Profits of Boulder Dam

The Boulder Canyon Project Act contemplated that if earnings from the Boulder Project exceeded the requirements of amortization, replacements, operation and maintenance, 18¾ percent of such surplus should be paid to Nevada, and a like amount to Arizona. This was to be compensation for taxes lost to the State in surrendering the damsite to Uncle Sam. As the power rates were originally fixed by the Act it was estimated that they would return between $600,000 and $800,000 a year to each of the States. However, there were two catches to this roseate set-up. The first was that the rates are readjusted at five-year intervals, and the Bureau of Reclamation was under no obligation to fix them high enough to earn a surplus for Nevada and Arizona. The second catch was that the United States Attorney General had rendered an opinion that no such surpluses need be paid until the project had been completely amortized.

Arizona and Nevada very soon saw that there was nothing in this but a nebulous nothing, unless it was recognition of the principle in the Act that they were entitled to revenue in lieu of taxes lost, in some amount.

When the Adjustment Act was proposed, which was to effect lower rates by elimination of flood control charges and interest reduction, representatives from Nevada and Arizona went to Washington to insist on definite fixed revenue, and also better withdrawal regulations. The definite fixed revenue plan was vigorously opposed by California and also the upstream States, New Mexico, Utah, Colorado, and Wyoming. They knew well enough that as the law stood Nevada and Arizona would get nothing. We won the support of the upstream States by allowing them to bite $500,000 a year out of the project under the guise of a "Colorado River Development Fund," and we coerced California into consenting to $300,000 per year fixed revenue to get our support for the Adjustment Act.

Therefore, under the Adjustment Act, the rates are fixed annually to return $300,000 to Nevada and $300,000 to Arizona, which is no part of surplus earnings—if there are any surplus earnings.

Boulder Power for Northern Nevada

Various agencies and companies at one time or another have considered the possibility of northern Nevada participating in the benefits of energy generated at Boulder. The Sierra Pacific Power Company of Northern Nevada made inquiry into the possibility of withdrawing a block of power from Nevada's Boulder Dam allotment for interchange with California Electric Power Co.; that is, the California Electric Power Co. would receive Boulder Dam power, and in return would deliver power from their system into northern Nevada. If such an arrangement could be made it would tend to give northern Nevada the advantages of low-cost power. At present, the amount of power available in northern California is limited, and even if power could be

supplied from Boulder Dam *without* an increase of present Northern California rates (due to the expense of switching, stand-by charges, etc.), it would mean *additional* power for Northern Nevada. Any interchange would probably involve the facilities of the Pacific Gas and Electric and the Edison Co., as well, and require rather complicated arrangements. One of the items that would considerably increase the cost of interchange power to the users in Northern Nevada would be the necessity of maintaining two different sets of stand-by, one for Boulder energy at one end, and the other for the interchange power at the other end. It seems to be agreed that it is impossible to build a transmission line from Boulder into Northern Nevada and make it pay. And it seems to be agreed that the power is available at Boulder in spite of the increasing need in the south. Nevada is allotted 750 million kilowatt-hours, and the greatest southern use in sight is 400 million kilowatt-hours. And energy from Davis Dam will be available in two or three years, also.

Application for Davis Dam Power

In 1944, the Colorado River Commission filed a blanket application for power from Davis Dam, now under construction, in order to establish a priority. In 1946, the Commission decided to request a definite quantity of energy and generating capacity from Davis Dam, and requested 45,000 kilowatts of generating capacity (which equals that of one of the units to be installed), and for energy in approximately the amount of 200,000,000 kilowatt-hours per year. The Bureau of Reclamation indicated that the application established Nevada's priority over private agencies. The Commission is of the opinion that securing generating capacity at Davis Dam will be beneficial, for although Davis energy may cost more than energy does at Boulder, Davis energy would be free from the restrictive withdrawal regulations which hamper our use of Boulder Dam power. No special legislative Act will be necessary to secure this capacity at Davis, for it will be allotted to the State by the Bureau of Reclamation and be paid for by the State out of proceeds from the energy as it is sold.

Davis Dam, 67 miles downstream from Boulder Dam, is under construction and will have an installed capacity of 225,000 kilowatts and supply 800,000,000 kilowatt-hours of firm energy. The Davis reservoir will have a capacity of 1,600,000 acre-feet.

Other Hydro-Electric Projects on the Colorado River

Other large hydro-electric installations on the Colorado River near Boulder Dam will eventually be constructed and afford new energy which Nevada may buy at low rates. Bridge Canyon Dam and plant, to be of 650,000 kilowatts installed capacity, and just above Boulder Dam, will probably be built next, and will be followed by the Kanab Creek project with 1,250,000 kilowatts of installed capacity, located about 120 miles airline distance northeast of Boulder Dam. These new systems will be interconnected with the Boulder Dam transmission lines and should tend to keep the energy rates low.