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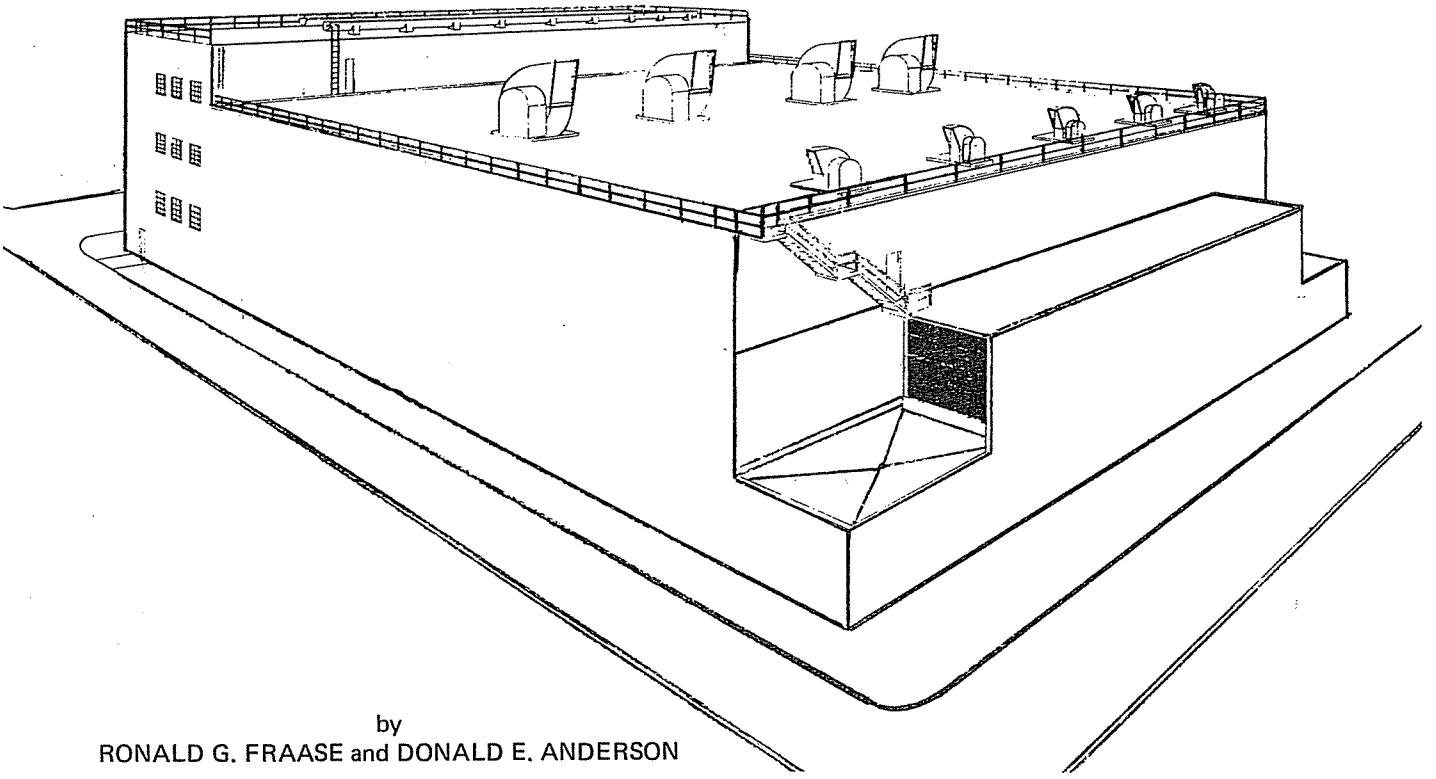
IN NORTH DAKOTA



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A SUPPLEMENT TO
AN ANALYSIS OF THE FEASIBILITY OF ESTABLISHING MALT PLANTS IN NORTH DAKOTA

By Ronald G. Fraase and Donald E. Anderson

This study was accomplished by professional consultants under contract with the Economic Development Administration. The statements, findings, conclusions, recommendations, and other data in this report are solely those of the Contractor and do not necessarily reflect the views of the Economic Development Administration.

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A SUPPLEMENT TO AN ANALYSIS OF THE FEASIBILITY OF ESTABLISHING MALT PLANTS IN NORTH DAKOTA

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INTRODUCTION

This supplement is designed to augment and update information contained in "An Analysis of the Feasibility of Establishing Malt Plants in North Dakota" published by the Department of Agricultural Economics, North Dakota Agricultural Experiment Station, North Dakota State University, Fargo, North Dakota, in cooperation with the Economic Development Administration of the United States Department of Commerce, Bulletin 487.

Since the publication of the original study in 1970, considerable interest has been exhibited by the malting and brewing industry in North Dakota as a potential site for firm expansion. This continued interest, plus new data which has been brought to the authors' attention, demonstrated the need for this supplement.

CURRENT DEVELOPMENTS IN THE BARLEY, MALT, AND BREWING INDUSTRIES

In recent years, the malting barley, malt, and brewing industries have continued trends outlined in the 1970 feasibility study. The recent trends for each segment of the industry are summarized in this report.

Malting Barley

Malting barley remains an important cash crop for farmers in North Dakota. This is evidenced by the increases in production and acreage planted of this crop in recent years (Table 1). The statistics in Table 1 are for all barley grown in North Dakota. Historically, nearly 100 percent of the varieties grown in the state have been malting varieties.

The supply of high quality malting barley from North Dakota appears to be more than adequate to support malting facilities. There does not appear to be any danger at present that malting barley will be replaced in North Dakota cropping patterns by competing crops. Both production and acreage planted fluctuated during the time period covered in Table 1, but this was partially due to stocks on hand and responses to government programs.

Malting and Brewing Industries

The demand for malt in the brewing process has been steadily increasing in recent years. The brewing industry in 1972 reached record barrel sales for

TABLE 1. NORTH DAKOTA PRODUCTION AND ACRES PLANTED OF BARLEY, 1966-1973

Year	Production in Bushels	Acres Planted
	(000)	(000)
1966	92,288	2,990
1967	87,549	2,751
1968	106,353	2,696
1969	94,858	2,265
1970	68,705	2,039
1971	99,810	2,284
1972	104,680	2,695
1973	95,540[a]	2,910[a]

[a]Preliminary estimates.

SOURCE: Taylor, Fred R., Statistics of North Dakota Agriculture, Bulletin 408 (Revised), Department of Agricultural Economics, North Dakota Experiment Station, North Dakota State University, Fargo, North Dakota, September, 1972, p. 16.

the fourteenth year in a row.[1] Total tax paid withdrawals reached a record of 131,900,000 barrels in 1972 (Table 2). Industry economists are predicting brewing industry sales in 1975 of close to 150 million barrels.[2] This prediction and the record sales in the years since the original feasibility study were published points out the conservative nature of the projections therein. It is becoming apparent in the malting industry that capacity will have to be expanded to meet this demand. Indeed, in the past three to four years, several firms have modernized and/or expanded their malt production facilities.

Several brewing firms contacted by the authors of this supplement have indicated concern about future availability of brewers malt. The malting industry also recognizes the potential problem of adequate supplies and is analyzing the situation within their corporate structure.

The developments described above and their implications for plant expansion or new construction make it imperative that attention is once again called to areas of potential new plant locations.

CURRENT CAPITAL AND OPERATING ESTIMATES FOR MALTING FACILITIES

Costs of constructing and operating a malting facility have been on the increase along with the cost of most other goods and services in the economy.

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[1]Katz, Philip C., "The State of the Industry," The Brewers Digest, Siebel Publishing Company, Chicago, Illinois, February, 1973, p. 50.

[2]Ibid.

TABLE 2. INCREASE IN TAX PAID WITHDRAWALS OF MALT BEVERAGES FROM BREWERIES IN BARRELS, 1966-1972[a]

Year	Total Tax Paid Withdrawals	Percent Increase From Previous Year
1966	104,262,000	3.8%
1967	107,000,000	2.6%
1968	111,400,000	4.2%
1969	116,300,000	4.4%
1970	121,650,000	4.6%
1971	127,397,000	4.4%
1972[b]	131,900,000	3.5%

[a]Percentage increases may not work out exactly because of rounding.

[b]Estimated.

SOURCE: Treasury Department, Internal Revenue Service, Alcohol and Tobacco Tax Division and Philip C. Katz, "The State of the Industry," The Brewers Digest, March, 1971, p. 44, March, 1972, p.26, and February, 1973, p. 50.

The data below reflect estimates made by malting industry personnel and malting machinery and equipment suppliers in December of 1972 and January of 1973. They are, therefore, slightly outdated even at this point in time as inflation and price increases continue to affect costs.

The capital and operating cost estimates in Tables 3 through 6 are presented first for a barley and malt cleaning and storage facility and subsequently for the malting plant.

Barley and Malt Cleaning and Storage Facility

Table 3 summarizes cost estimates for the construction of a 1.5 million bushel elevator facility with the capability of receiving barley both by rail and truck. It is assumed that this storage capacity would be adequate to service a three million bushel malthouse if that malthouse were to be located adjacent to or in the barley producing area.

Estimates obtained in this study on the construction of a barley-malt elevator and cleaning facility have shown considerable variations among the data sources contacted. It is believed that this cost variation stems from different designs used, variations in storage tank sizes, different machinery requirements, etc. The capital requirement figures in Table 3 are a composite of estimates received.

Table 4 lists estimates of fixed and variable costs for the operation of the 1.5 million bushel cleaning and storage facility. These estimates are on an annual basis.

TABLE 3. CAPITAL INVESTMENT REQUIREMENTS FOR ELEVATOR AND CLEANING FACILITY, NORTH DAKOTA LOCATION, 1973

Item	Current Estimate
Storage (concrete tanks)	$1,500,000
Head House (basic structure)	400,000
Connecting Conveyers (to malthouse)	100,000
Head House Equipment (elevator legs and vertical equipment)	150,000
Head House Electrical Equipment	100,000
Spouting	50,000
Storage Conveyers	150,000
Malt Cleaning Line	60,000
Barley Cleaning Line	175,000
Track Shed and Rail Unloading Facility	150,000
Truck Receiving Facility	125,000
Dust Control Equipment	150,000
TOTAL ELEVATOR AND STORAGE FACILITY	$3,110,000

TABLE 4. ANNUAL OPERATING AND FIXED COSTS OF ELEVATOR AND STORAGE FACILITY, NORTH DAKOTA LOCATION, 1973

Item	Current Estimate (annual basis)	
Operating Costs		
Elevator Electrical Power	$ 20,000	
Labor Costs (elevator)	100,000	
Repair and Maintenance	20,000	
Total Operating Costs		$140,000
Fixed Costs		
North Dakota State and Local Taxes[a]	$ 27,990	
Insurance	11,000	
Annual Depreciation[b]	155,000	
Total Fixed Costs		193,990
TOTAL OPERATING AND FIXED COSTS		$333,990

[a]State and local taxes apply only after a potential five-year tax exemption period. See pages 33 and 56 of the "Malt Plant Feasibility Study."

[b]Depreciation is computed for a 20-year period on the total cost of the elevator and storage facility (Table 3).

Cost Estimates for a Malting Facility

Individuals within the malting industry have expressed the opinion that if they were to construct a malting facility in North Dakota, it would be of the conventional design. Therefore, the cost estimates in Tables 5 and 6 are based upon a three million bushel conventional compartment malthouse. It is further assumed that this malthouse would have a two-floor kiln and produce malt on a five-day cycle.

The capital cost estimates presented in Table 5 are based upon what the authors, with the advice of industry personnel, consider to be an average plant. Plant construction costs can vary to a considerable degree, depending upon the design used and types of materials utilized. Factors, such as type of steep tanks used, degree of automation built in, type of compartment unloading system, and amount of refrigeration and air recirculation, among others, have a great deal of influence upon the ultimate cost of the facility.

TABLE 5. CONVENTIONAL COMPARTMENT MALTHOUSE INVESTMENT REQUIREMENTS, NORTH DAKOTA LOCATION, 1973

Item		Current Cost Estimate
Malthouse Structure		$2,200,000
Air, Heating, and Refrigeration Equipment	$520,000	
Steep Tanks and In-Plant Conveying Equipment	305,000	
Turning Machines and Other Mechanical Equipment	700,000	
Electrical Equipment and Automation Controls	525,000	
Total Machinery and Equipment		2,050,000
TOTAL COST OF MALTHOUSE		$4,250,000
Auxiliary Facilities		
Offices	$ 75,000	
Maintenance Shop	70,000	
Lab Facilities	55,000	
TOTAL COST OF AUXILIARY FACILITIES		200,000
LAND FOR PLANT AND LAGOONS, WELLS, SITE WORK, AND ENGINEERING		350,000
TOTAL COST OF MALTHOUSE AND AUXILIARY FACILITIES		$4,800,000

The original feasibility study presented cost estimates for a "flexi-malt" system. Costs for that system have, of course, also increased. It is estimated that the current cost of constructing a three million bushel "flexi-malt" house would be $3,800,000 without the auxiliary facilities listed in Table 5.

The fixed and operating costs in Table 6 compare favorably with those published in the original "Malt Plant Feasibility Study." They are generally higher, however, due to a generally rising price level in the economy.

TABLE 6. OPERATING AND FIXED COSTS FOR CONVENTIONAL MALTHOUSE, NORTH DAKOTA LOCATION, 1973

Item	Current Estimate		Cost Per Bushel Production
	(annual basis)		
Operating Costs			
Malthouse Electrical Power	$ 65,000		$.022
Malthouse Natural Gas	110,000		
Propane Standby Costs (3 months)	45,000		.052
Labor Cost (including malthouse, lab, and maintenance labor)	150,000		.050
Repair and Maintenance	30,000		.010
Cost of Necessary Working Capital (credit line or cash necessary for inventory and accounts receivable financing)[a]	160,000		.053
TOTAL ANNUAL OPERATING COSTS		$560,000	$.187
Fixed Costs			
North Dakota State and Local Taxes[b]	$ 43,200		$.014
Administrative Salaries and Benefits	75,000		.025
Insurance (inventories, fire, and casualty)	12,000		.004
Annual Depreciation[c]	240,000		.080
TOTAL ANNUAL FIXED COSTS		$370,200	$.123
TOTAL ANNUAL OPERATING AND FIXED COSTS		$930,200	$.31

[a]Working capital needs are estimated to be $2 million at a rate of 8 percent.

[b]State and local taxes apply only after a potential five-year tax exemption period. See pages 33 and 56 of "Malt Plant Feasibility Study."

[c]Depreciation is computed over a 20-year period on the total cost of the malthouse and auxiliary facilities (Table 5).

Table 7 summarizes the cost data from Tables 3, 4, 5, and 6. This summary table indicates a total project cost of $7,910,000. These costs represent estimates for the construction of a 3 million bushel conventional malthouse and auxiliary facilities, and a 1.5 million bushel storage and cleaning elevator.

TABLE 7. SUMMARY OF CAPITAL INVESTMENT, OPERATING AND FIXED COSTS, CONVENTIONAL MALTHOUSE AND ELEVATOR, AND CLEANING FACILITY, NORTH DAKOTA LOCATION, 1973

Item	Current Estimate	Cost Per Bu. Malt Production
Capital Investment Requirement		
3 Million Bushel Capacity Conventional Malthouse and Auxiliary Facilities	$4,800,000	$1.60
1.5 Million Bushel Elevator, Cleaning, and Storage Facility	3,110,000	1.04
Total Capital Cost of Facility	$7,910,000	$2.64
Fixed and Operating Costs		
Conventional Malthouse:		
Total Operating Costs	$ 560,000	$ .187
Total Fixed Costs	370,200	.123
Total Operating and Fixed Costs	$ 930,200	$ .310
Elevator and Cleaning Facility:		
Total Operating Costs	$ 140,000	$ .047
Total Fixed Costs	193,990	.065
Total Operating and Fixed Costs	333,990	$ .111
TOTAL OPERATING AND FIXED COSTS FOR ELEVATOR AND MALTHOUSE	$1,264,190	$ .421

Total fixed and operating costs for the malthouse are $930,200 annually. Annual fixed and operating costs for the elevator facility are estimated at $330,990. The total annual cost estimates for the combined complex are $1,264,190. Fixed and operating costs amount to approximately 42.1 cents per bushel of malt produced.

SUMMARY AND CONCLUSIONS

Increasing costs in the construction industry, general rise in the price levels in our economy, new data, a new surge of interest by the malting industry in North Dakota, and other factors pointed out a need for an update of the 1970 malt plant feasibility study.

Malting barley appears to be holding its place in the cropping patterns of North Dakota agriculture. Production has varied somewhat over the years, but the current trend is toward increasing production on an increasing amount of acreage devoted to barley (Table 1).

The consumption of malting barley by the brewing industry has demonstrated a steady growth pattern. Record production by the brewing industry indicates a strong demand for barley malt (Table 2). From the number of malting plant expansions and modernizations which have taken place recently or are in the planning stages, it appears that any usable excess capacity which may have existed in the industry is being exhausted. New construction and/or further plant expansions on existing sites can be expected even sooner than forecast in the original study.

North Dakota, as the prime malting barley producing state in the nation, should receive some attention from expansion-minded firms in the malting industry. The capital and operating costs contained within this supplement are presented as rough estimates to aid individuals considering alternative plant sites in their preliminary planning. Further details concerning potential North Dakota plant locations can be found in the original feasibility study for North Dakota as cited in the introduction of this supplement.

SELECTED REFERENCES

1. Fraase, Ronald G., and Donald E. Anderson, An Analysis of the Feasibility of Establishing Malt Plants in North Dakota, Bulletin No. 487, Department of Agricultural Economics, North Dakota Agricultural Experiment Station, North Dakota State University of Agriculture and Applied Science, Fargo North Dakota, November, 1970.

2. Katz, Philip C., "The Stage of the Industry," The Brewers Digest, Siebel Publishing Company, Chicago, Illinois, March, 1971, March, 1972, February, 1973.

3. Taylor, Fred R., Statistics of North Dakota Agriculture, Bulletin 408 (Revised), Department of Agricultural Economics, North Dakota Experiment Station, North Dakota State University of Agriculture and Applied Science, Fargo, North Dakota, September, 1972.