

SUMMARY OF REPORT ON PILE COVERING

By: Dr. George E. Rush

As a result of unusually favorable growing weather during September and most of October, in addition to a substantial increase in acreage, The Amalgamated Sugar Company was faced with the task of receiving and processing considerably more beets in the 1963-64 campaign than had been anticipated. This situation required the extension of campaign until mid-March, which caused concern for the beets which would have to be held in storage until the later part of campaign. Primary concern was centered around the possibility of heavy losses that could result from alternate freezing and thawing of these beets late in campaign.

Faced with this decision, the company decided to attempt to protect all beets that would be in storage after February 1, 1964, from freezing and thawing by covering them with polyethylene plastic film. In this attempt, great reliance was placed upon the experience and advice of people in this area (Michigan) who had undertaken small scale research studies in the feasibility of covering piles to protect them from freezing and thawing.

Something of the scope and magnitude of this initial pile covering program can be realized from an examination of the data shown in Table I.

Table I. Distribution and Estimated Tonnage of Beets Covered in the 1963-64 Campaign

<u>District</u>	<u>No. of Piles</u>	<u>Tonnage Covered</u>
Nyssa	9	269,000
Nampa	9	225,000
Twin Falls	5	175,000
Burley	<u>3</u>	<u>125,000</u>
Total	26	794,000

Nearly 800,000 tons of beets amounting to a total 64.5 acres of exposed pile surfaces were covered. The beets involved in this program were in storage an average of 114 days and were under cover an average of 97 days.

Actual covering of the piles started during the last week of November in the Burley-Rupert area and finished in the Nyssa-Nampa area during the second week of December. The main procedure employed in all areas was to cover the sides and ends of piles with 6 mil. black polyethylene plastic film over which was blown a mixture of straw and asphalt emulsion to hold the plastic in place. The straw was applied at an average thickness of approximately 2-3" with 300 gallons of SS-1 grade asphalt emulsion

per acre. As an alternate procedure, a few piles were covered with plastic which was held in place with war surplus army camouflage nets and old automobile tires. One pile was covered with plastic held in place with tires only. The tops of the piles were partially covered with plastic held in place with automobile tires and beets.

Temperature tubes were placed in the tops of all covered piles and pile temperatures were recorded on alternate days throughout the storage period. A weekly summary report of pile temperatures was compiled each week and distributed to supervisory personnel involved. Close supervision and observation of the covered piles was maintained throughout the storage period.

The cost of the pile covering program in the 1963-64 campaign is summarized in Table II.

Table II. Cost of Pile Covering (1963-64 Campaign)

A. Materials	
1. Plastic (992 rolls 28' x 100')	\$23,500.00
2. Contract Spraying	12,996.99
3. Used Automobile Tires	3,744.56
4. Asphalt, Straw, Nets, Etc.	<u>8,349.78</u>
Total	\$48,591.33
B. Labor	
1. To Cover and Maintain Piles	\$15,941.54
2. To Discard Rotten Beets	<u>27,551.23</u>
Total	<u>\$43,492.77</u>
Total Cost of Program	<u>\$92,084.10</u>

In general, the results of the pile covering program were successful in that the main objective was accomplished and at a reasonable cost. Storage losses were relatively small and factory operations were able to continue at satisfactory levels during the final weeks of campaign. In view of the prolonged and relatively cold winter that prevailed, there is no doubt that substantial losses would have occurred had this program not been put into effect.

Pile temperatures averaged 40.8° F. throughout the storage period while the average individual pile temperatures varied between 35.8° and 48.2° F. One of the most striking effects of covering the piles in this manner was the almost complete elimination of dehydration on the exposed surfaces of piles. Beets on the sides and ends of piles immediately under the plastic covering remained unfrozen, firm and crisp throughout the storage period.

Data obtained from actual factory operations on beets stored for roughly 97 days under plastic covers, showed a marked increase in invert and a marked reduction in raffinose. The general decline in extraction and pounds of sugar sacked per ton of beets sliced showed no significant change from the normal decline associated with length of campaign.

The major problem encountered in the entire program resulted from late and/or ineffective covering of the tops of the piles. This permitted small localized areas in the tops of the covered piles to become frozen, which thawed out toward the end of campaign causing complete spoilage of approximately 5,000 tons of beets. These beets were discarded by hand and represented the greatest single cost of the entire program.

Whenever warm air was trapped in the covered piles -- such as along the shoulders where the plastic used to cover the sides was overlapped on the top of the piles, excessive top growth developed. Also, whenever snow and ice accumulated at the base of covered piles, particularly on the north sides, difficulty was experienced in removing the covers during reloading operations.

In spite of these difficulties, the pile covering program conducted in the 1963-64 campaign was considered to be successful and was adopted for the 1964-65 campaign, although on a somewhat smaller scale owing to the reduction in the size of the 1964 crop. Table III shows the extent of the pile covering program being conducted at the present time.

TABLE III. Distribution and Estimated Tonnage of Beets Covered in the 1964-65 Campaign

<u>District</u>	<u>No. of Piles</u>	<u>Tonnage Covered</u>
Nyssa	3	70,000
Nampa	4	48,000
Twin Falls	4	81,000
Burley	<u>2</u>	<u>84,000</u>
Total	13	283,000

Since army camouflage nets were purchased for use in covering the tops of piles for substantially more beet piles than were finally covered as a result of sharply reduced yields in all districts, these were used to hold the plastic in place on the sides of all covered piles in the 1964-65 campaign. In an attempt to better protect the tops of covered piles from freezing and thawing, rollers were built out of used automobile tires and rough 1 x 4" lumber to which the top covers were attached. The rollers provide a more efficient means of opening and closing the tops of the piles as weather and pile temperatures dictate. At this time, it appears that the covered piles are again keeping well, but that more study and effort is required to work out satisfactory practical procedures for covering and uncovering the tops of the piles.