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Treatment of Joplin tailings

Preston King Horner

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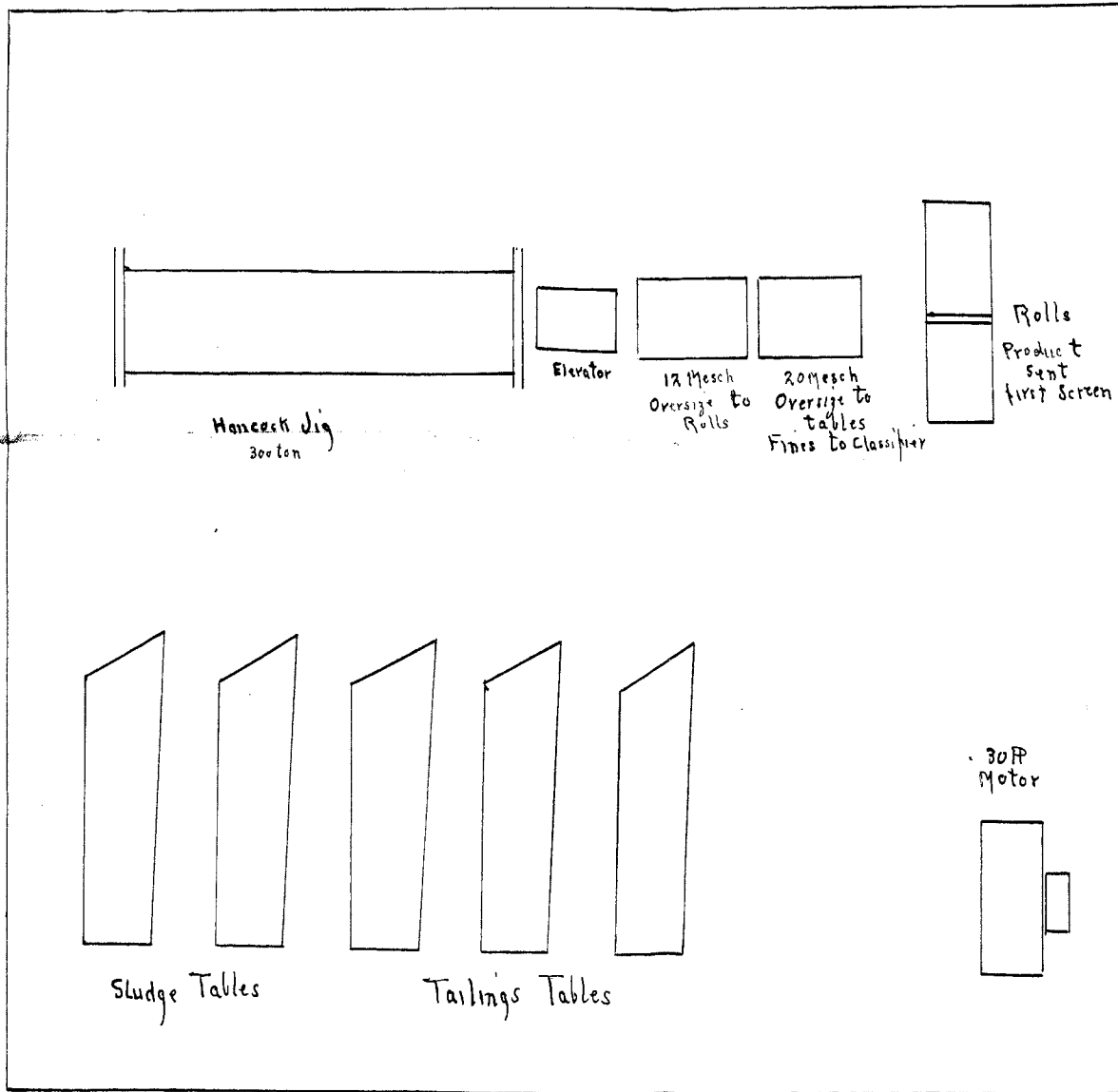
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Frame Mill Building 84'x50'

Treat 200 tons tails
30 tons Sludge
per day

M. Warner

MSM
HISTORICAL
COLLECTION

T 191

THESIS

FOR THE

Degree of Bachelor of Science

IN

MINE ENGINEERING.

♪♪

SUBJECT:

“Treatment of Joplin Tailings.”

P. K. HORNER.

JUNE, 1906.

8285
MSM
HISTORICAL
COLLECTION

-TREATMENT OF JOPLIN TAILINGS-

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In the Joplin region are enormous piles of tailings, that for waste material, run very high in blende. This is due mainly to the temporary character of the mills which are built with more regard to low first cost than to receiving a high percentage of extraction. As a result we have some piles of tailings containing from 200,000 to 300,000 tons of material that will average from about 2 to 3% zinc, and all crushed so as to pass through about #2 mesh.

In addition to tailings piles, we have sludge ponds that can be drained and gauged to plant, which will run from 5 to 6% zinc. These ponds are the settlings from water running off the tailings dump, so consequently the material is of a size very suitable for working on a Wilfley table.

Analysis of samples from six sludge ponds gave the following results.

| No. | Size Material. | % Moisture. | % Zinc. |
|-----|-----------------|-------------|---------|
| 1 | Through 16 mesh | 5.7 | 4.6 |
| 2 | " " " | 13.0 | 3.6 |
| 3 | " " " | 35.0 | 4.1 |
| 4 | " " " | 16.0 | 3.8 |
| 5 | " " " | 18.0 | 3.9 |
| 6 | " " " | 25.0 | 4.0 |

A plant erected at any central point would probably be within easy haulage distance of enough ponds to furnish about 30 tons per day for about one year.

Tailings obtained from two piles near Joplin showed the following results on being screened, analyzed and tested on Wilfley table.

No. 1.

Original Assay = 1.9 % of zinc.

Sized gave following results :-

| | % Material | % Zinc. |
|--------------|------------|---------|
| On 4 mesh | 30.0 | 2.3 |
| " 8 " | 35.0 | 1.1 |
| " 20 " | 18.0 | 1.4 |
| Through 20 " | 17 | 2.5 |

Table run showed No.1 to be poor concentrating proposition and results are not considered.

No. 2.

Original Assay = 2.4

Sized gave following results:-

| | % Material | % Zinc. |
|-----------------|------------|---------|
| On 4 mesh | 28.0 | 2.1 |
| " 8 " | 32.0 | 1.3 |
| " 20 " | 20.0 | 2.5 |
| Through 20 Mesh | 20.00 | 3.0 |

After classifying fines to remove dirt and slimes the material on 20 mesh and through 20 mesh was run separately over Wilfley table and showed that with intelligent

labor and modern tables a good saving might be made, - 6.0 pounds of concentrates being obtained which ran 15% zinc, a saving of about 50% which is remarkable with the crude apparatus used.

Tests on a one hundred pound sample from tailings near Granby were next run and showed that a small plant might be profitably located here to treat tailings and sludge.

Original Assay = 2.5% Zinc.

| | % Material. | % Zinc. |
|--------------|-------------|---------|
| On #4 mesh | 35.3 | 1.5 |
| " 8 " | 32.2 | 2.0 |
| " 25 " | 21.2 | 3.0 |
| Through 25 " | 11.8 | 2.1 |

Careful panning of fine material obtained six pounds of concentrates running 18% zinc.

In conclusion will say, that there is no reason why a small plant equipped with Wilfley tables and modern slime tables and classifiers, should not be a profitable investment, as tailings can be worked for a small royalty in most places.

From observation in the region, I would say, that the lack of success of present tailing mills is the excessive amount of hand labor employed and the unskilled labor running the tables.

Attached are suggestions for the design of a small plant.