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February 9, 1954

Mr. R. C. Boyer
Superior Steel Corporation
Carnegie, Pennsylvania

Dear Mr. Boyer:

This letter will confirm the decisions reached at the meeting on February 4 with representatives from this office, du Pont and National Lead Company of Ohio. It is requested that 52 slabs be rolled on the 15th of February, and if necessary, the 16th, in the following groups:

1. 35 conditioned (surface machined) slabs to fulfill the du Pont request for additional plate material and to provide this office with 5 ingot equivalents of strip for fuel element development work at Metals & Controls Corporation. These slabs should be rolled to a base gage of 0.183", holding the closest tolerances possible on gage. It is suggested that these slabs be rolled after all other pieces to insure accuracy of mill setup.

2. A group of slabs, the exact number to be determined after running one or two trial pieces, to determine the feasibility of rolling material to 0.118" and 0.236" gage for the AWR (Westinghouse) requirement. It is felt that approximately 5 slabs total would constitute a satisfactory trial run. It is requested that if at all possible these pieces should be run before any other material so that Westinghouse representatives may have an opportunity to study the results.

3. Several ingots will be rolled to a base gage of 0.183" for setup and for the determination of median temperatures and the effect of bath temperature on finishing temperature.

AIR MAIL - SPECIAL DELIVERY

[redacted]

Metallurgical Dev.Br.,Production
Delagi:smh Kaulbach

ORO 62302

Classification Cancelled
[redacted] Changed To ______
By Authority Of J. Patton
By C. Young Date 9/12/84

Use of Trial Billets

Of the trial billets, it is planned to roll three to establish the temperature encountered out of the roughing mill employing a bath temperature reduced to 1150oF. These pieces will be rolled to the same reduction with the same number of pieces as the 30 billets for the du Pont requirement. On each of these, temperature will be measured at the entrance to the roughing mill and at the exit from the roughing mill. Since the pieces must be held up for the latter temperature measurement, the finishing temperatures will not be representative and therefore would not be measured. Three more trial pieces will be run next. On these pieces, the temperatures entering the roughing mill and the final finishing temperatures are the only ones to be measured. On these pieces, two finishing temperatures will be recorded using two separate radiamatics spaced about 2 feet apart. One radiamatic will be placed in a position on the plate so that it measures the temperature at finish on the oxidized or oxide covered surface. The other radiamatic reading will be made on a surface which has been freshly coated, just prior to measurement, with fresh salt. These readings will serve to establish a finishing temperature bracket. It is felt that the highest emissivity encountered occurs on a freshly oxidized or oxidizing surface (i.e. the discontinuities in the salt coating where bare metal is exposed to the effects of the atmosphere). It is also known that a freshly applied, even coating of molten salt will provide the specimen with a surface of known emissivity. The emissivity of the salt-coated surface is lower than that of the oxidized surface. Thus we have measured both a higher than actual and a lower than actual finishing temperature and it may safely be assumed that the actual finishing temperature lies within this bracket, its position being determined visually by the character of the strip surface exiting from the finishing stand. Some of the strip rolled from these trial billets will be used to provide material for the remaining Argonne National Laboratory - Phil Project now underway at Metals & Controls Corporation.

Temperature Measurement

On the "production" run of the conditioned material only the bath temperature (automatically recorded on Micro Max recorder controls), the entrance to roughing temperature, and the out of finishing temperature will be measured. Phil Merrill spoke of an ultra-high speed response head with which he has been experimenting and suggests that it be permanently affixed to one of the finishing stands so that average strip temperatures at an intermediate stage might be obtained without in any way interfering with the progress of the strip. This head, containing a "narrow" radiation pyrometer, peaks cold to hot in 0.1 second and is capable of 120 looks per second. Phil feels that such an instrument would give both an average temperature at the point of measurement and an indication, at least qualitatively, of the presence of hot spots or varying temperature zones.

The measurement of time at the August rolling was carried out by supplying a stop watch to each member of the observer team. Each watch was synchronized at the start of the rolling and each man recorded differential times for the operations under his observation. This method worked out fairly well except that by the end of the rolling the gain-or-lose deviation had become appreciable and thus clock to times could not accurately be calculated from the recorded data nor could the time of processes which involve more than one observer be established with sufficient accuracy. It was decided that for this rolling Phil Merrill would set up a single instrument to measure the time for each operation and record this as a trace on a strip chart. The event marker will consist of a rapid chart travel multi-point recorder and several push buttons with solenoid switches. Each observer will have one of the switches in his hand and measure the times by depressing the switch at the instant of each event. Each switch depression will be recorded as a trace on the chart and thus the elapsed time between steps or differential times of particular operations can be accurately calculated by measuring the distance on the chart between successive traces.

We understand that provisions are being made to attempt to eliminate the problem of wet rolls and water drip on the strip during rolling. You are familiar with the importance of this problem and it is felt that if the rolls and tables are dry, a finer product and closer dimensional tolerances will result. It must also be emphasized that the less handling of the strip after it has cooled, the better from a standpoint of maintaining flatness, assuring freedom from cold work and the possibility of cracking. The plans that you outlined regarding the running of strip through the boilers and on to a flat surface after shearing to a handable size were very good and du Pont representatives have agreed that this method should also assure a better product than has been previously produced.

Disposition of Material

Of the 30 ingots rolled for du Pont, it is requested that these be cropped back at both ends to uniform face and width, sheared into 16' lengths; then the 16' lengths shall be split lengthwise down the center, using multiple cuts if required. Heat treatment of the pieces will be carried out at a site yet to be determined and shipping instructions will be supplied you as soon as this question has been decided.

The five plates for Metals & Controls Corporation should be handled in the same manner, and for the present, may be considered a part of the du Pont requirement.

The trial billets will be reserved for use at various projects in the near future. Four strips, however, are required for use at Metals & Controls

Corporation in connection with a cold rolling job for Argonne National Laboratory. It is thus requested that four strips be cropped back at ends to uniform width and gage, split in half after cutting into 6' lengths and trimming edges, and sent to Metals Controls Corporation, Attleboro, Massachusetts, Attention Mr. A. F. Carr, as soon as possible. This material is urgently required to complete a high priority order.

Please do not hesitate to contact Mr. Delagi if there are any questions on either procedure or disposition of material.

Very truly yours,

E. H. Kaulbach, Acting Chief
Metallurgical Development Branch
Production Division

Enclosure:
SF Shipping Form

cc: Mr. W. L. Keene
Superior Steel Corporation

G.Bate,Production Div.
R.Delagi, " "