

November 16, 1940

Dr. J. U. Buchanan
Republic Steel Corporation
Youngstown, Ohio

Dear Doctor Buchanan:

We are sending herewith the analytical report on the four samples you sent us.

As Dr. Kehoe is out of the laboratory and will not return for some time, I am commenting on the results of the analyses and stipple cell counts and am leaving this letter for him in the event that he wishes to enlarge upon the following observations.

The stipple cell counts were as follows:

- (1) [REDACTED] - 4 per 50 fields
- (2) [REDACTED] - 8 per 50 fields
- (3) [REDACTED] - 0 per 50 fields
- (4) [REDACTED] - no smear

As Dr. Kehoe has probably pointed out in his discussions with you, stipple cell counts find their chief value as an index of exposure only when used for large groups of men and as a continuous frequent record on an individual. In other words, a single stippled cell count on an individual at one time does not furnish the accurate information that can be gotten from study of the excretion. The variability from count to count in an single man or in a group is high and it is only by consideration of the mean values for groups that the effects of this variability can be eliminated. Again, while subsequent counts on a single individual may vary, a progressive rise or tendency to increase, would be indicative over a period of time of greater and greater exposure. It follows therefore as a consequence of the high variability of stipple cell counts, that correlation between them and urine analyses would only be feasible if a large number (sufficiently large to eliminate variability in counts) were obtained. In a small group, variability would obscure any contingency or correlation that might otherwise be present. The experience with large groups with varying lead exposure with its effect upon stipple cell counts and means for the group is included in Dr. Kehoe's recent publications, copies of which you may have. If not, the collected papers of the

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National Battery Manufacturers Association meeting in Chicago, in 1939, cover this subject well.

Spot urine analyses, since they are carried out on small samples, are more variable than large 24-hour samples, but if there is no forced or abnormal diuresis or concentration of urine, they check well with the large samples, and have proven extremely useful. Much greater care is necessary in their collection, of course, since very small contaminations will greatly influence the results. Because of the possibility of contamination, large samples taken at periodic intervals to measure the exposure of groups, have in the long run been freer from conflicting incidence and susceptible to more accurate interpretation. These need not of course be collected at the plant, but may be taken at the time the workman is at home and the jugs left in his possession until a 2 or 3 liter sample has been collected in the off hours. In our experience with adequate instruction and reasonable care, large samples can be collected repeatedly without contamination.

In the light of what has been said above, the interpretation of the stipple cell counts and the urine results will become somewhat clearer. In so far as the counts are concerned, these are no higher than those seen in non-exposed individuals and should be interpreted in terms of previous counts on these men and counts on other workmen with similar exposure.

In the case of the urine results, only one, namely, that on [REDACTED] is at a level which indicates significant exposure. In large groups of men having a mean urinary excretion of this value, only occasional cases of intoxication appear and this level itself is not of an order of magnitude which is associated with intoxication in a given individual.

The value of 0.06 for [REDACTED] and 0.085 for [REDACTED] are higher than those encountered in normal individuals and suggest recent moderate exposure, which may or may not have been industrial in origin. In the case of none of the samples, however, is the magnitude of excretion of such order as to suggest serious exposure.

With best regards, I am

Very truly yours,

Willard Machle, M. D.

RE 0018655

EXPOSURE OF MEN TO UMA TREATED STEEL

Month & year	Heats UMA made	Total turns to make UMA	Average hrs. per turn	Total hours worked per month on days that that UMA treated steel was being made	ck.No. 2001	1991	1954	2020	2000
June 1938	59	6	9.8	17.8	14.3	15.7	0	14.2	
July 1938	213	13	16.0	24.0	32.9	36.8	19	32.9	
Aug. 1938	218	15	14.5	44.1	50.3	44.0	20	34.5	
Sept. 1938	270	16	18.0	93.7	67.2	53.7	56	52.5	
Oct. 1938	633	36	19.0	105.3	93.6	106.3	12.2	81.6	
Nov. 1938	456	35	13.0	102.8	100.5	128.4	96	96.6	
Dec. 1938	135	13	10.4	31.6	26.7	28.9	8	26.7	
Jan. 1939	51	10	5.0	35.0	15.3	30.0	0	16.0	
Feb. 1939	92	15	6.0	46.4	43.8	63.0	39	51.8	
Mar. 1939	164	20	8.2	68.3	70.0	95.7	72	79.7	
Apr. 1939	191	23	8.3	62.6	57.0	71.0	48	74.7	
May 1939	103	15	6.9	34.8	42.0	61.3	16	58.0	
June 1939	239	29	10.0	121.2	73.4	107.1	82	43.9	

The above is all the record that is available on the men whose check number is given. As there is three turns to a full 24 hours of operation the above record is very inaccurate as it now stands. An approximate amount of exposure time can be calculated by dividing the hours worked each month by three, assuming that the UMA was divided equally among the three turns and that the time also was equally divided. If this is done the time should then be multiplied by the degree of exposure according to the kind of position the man fills. This degree of exposure has been estimated by the superintendent of the Bessemer and is given below with the mens names and positions.

ck.No.	Name	Position	Degree of exposure
2001	[REDACTED]	Pouring floor	1.0
1991	[REDACTED]	Steel pourer	0.9
1954	[REDACTED]	Vessel man	0.3
2020	[REDACTED]	Labor	0.3
2000	[REDACTED]	Pouring floor	1.0

Note: An exposure of 1.0 means that the man gets the full exposure to the fumes. Any less amounts meaning a decrease in the exposure to fumes due to the mans position.

The men listed below have not been exposed to UMA treated steel since Sept. 1939. No record of prior exposure is available.

ck.No.	Name	Position
5818	[REDACTED]	Scarfer
6179	[REDACTED]	Scarfer
6300	[REDACTED]	Scarfer

The men listed below are from the Bessemer converter and finishing mill and no record is available on them prior to July 1st. 1939

ck.No.	Name	Position
1886	[REDACTED]	Bottom maker
1920	[REDACTED]	Scrap wheeler
6300	[REDACTED]	Guide setter

RE 0018656

N19711.01

Below is a report covering the months of July, August, September 1939 on exposure of the men listed to UMA treated steel. This report was compiled by A. D. Bachtel Superintendent of the Bessemer.

Ok.No.	Name	Position	No. of turns to make UMA	Total estimated fume time per turn	Average fume time per turn	Degree of exposure	Est. total exposure
1886	[REDACTED]	Bloom maker	32	52.0 hrs	1.6 hrs.	0.0	0 hrs.
1920	[REDACTED]	Scrap man	28	50.8 "	1.8 "	0.6	30.5 "
1954	[REDACTED]	Vessel man	33	34.3 "	1.0 "	1.0	34.3 "
1991	[REDACTED]	Steel pourer	35	34.0 "	0.9 "	0.9	30.6 "
2000	[REDACTED]	Pouring floor	32	33.3 "	1.0 "	1.0	33.3 "
2001	[REDACTED]	Pouring floor	28	28.0 "	1.0 "	1.0	28.0 "
2020	[REDACTED]	Laborer	8	9.3 "	1.1 "	0.3	2.8 "
2348	[REDACTED]	Guide setter	15	20.6 "	1.3 "	0.5	10.3 "

*Last worked Aug. 25, 1939. Off thereafter due to vacation and sickness.

Note: Exhaust system was put into operation December 12, 1938
Lead added to moulds beginning March 8, 1939.

H. J. Elliott
Medical Technician

KE 0018657

Examinations of Employees of Republic Steel Corporation,
Bess Hospital, Youngstown, Ohio

<u>Name</u>	<u>Analysis Number</u>	<u>URINE</u>	
		<u>Mgs Pb Found</u>	<u>Mgs Pb/Liter</u>
[REDACTED] #1954	39A-2547	0.05	0.02 0
[REDACTED] #5818	39A-2543	0.13	0.04 + 3
[REDACTED] #2000	39A-2542	0.21	0.08 + 0
[REDACTED] #2001	39A-2544	0.52	0.14 11
[REDACTED] #1991	39A-2549	0.28	0.09 1
[REDACTED] #6300	39A-2545	0.15	0.05 6
[REDACTED] #1920	39A-2550	0.11	0.06 0
[REDACTED] #2348	39A-2548	0.17	0.06 6
[REDACTED] #2020	39A-2541	0.06	0.02 + 14
[REDACTED] #6179	39A-2546	0.18	0.05 + 8

Reported: August 14, 1939

KE 0018658

N19711.02

#1886

Sample of urine submitted by Republic Steel
Corporation, Youngstown, Ohio.

Urine

Date Received: 7-20-1939

Stippling

Analysis No. 39A-2647

Volume - 1780 cc

Mgs Pb/
Liter - 0.03

2

Reported: 7-22-1939

KE 0018659

N19711.03

STIPPLED CELL COUNTS

ON

SMEARS FROM REPUBLIC STEEL CORPORATION

Received: 7-19-1939

[REDACTED] # 6300	6
[REDACTED] #2020	19
[REDACTED] #1991	1
[REDACTED] #1920	0
[REDACTED] #2000	0
[REDACTED] #2348	6
[REDACTED] #1754	0
[REDACTED]	2

KE 0018660

N19711.04

Stippled Cell Counts
on
Smears from Employees of Republic Steel

[REDACTED] #5818	3
[REDACTED] #6179	8
#2001 [REDACTED]	11

These results are well within normal limits.

Robert A. Kehoe, M.D.

KE 0018661