

PLANT INVESTIGATIONS

SUMMARY OF CERTAIN PLANT INVESTIGATIONS, WORLD
WAR I, WOMEN IN INDUSTRY SERVICES

I MASSACHUSETTS

1. Gray and Davis, Cambridge July 2, 1918

From: Clara M. Tead, Women's Branch, Boston District
Ordnance Office.

To: Mary Van Kleeck, Women's Branch, Industrial Service
Section

To advise management as to use of women (plant request)
(Report, wages, hours, jobs).

2. New Home Sewing Machine Mfg. Co., Orange August 29, 1918

From: Suzanne A. Wunder, Women's Branch, Industrial Service
Section, Boston District Ordnance Office.

To: Women's Branch (etc.) Boston

Plant request. Converting to ordnance. About 10 women,
on inspection.

Recommends - Jobs women could do; tryouts before putting on;
training; watching to select one to supervise and
instruct; a matron with first-aid experience; a repre-
sentative of Women's Branch assigned to cooperate.

3. Amer. Steam Gauge and Valve Co. Roxbury November 16, 1918

From: Mrs. Lois B. Rantoul, Div. ^WWomen in Industry Section,
Boston District Ordnance Office

To: Lt. Col. Lyford, Prod. Mgr. Women's Branch has kept
in touch about 2 months with the plant, as there was
high turnover, poor space, poor work quality.

Recommends - Wage raise, attendance bonus, more inspection
space, more inspectors, a woman in charge of women's
employment, backs to chairs. All these were done but
the last. Production was up $2\frac{1}{2}$ times or more.

4. US Cartridge Co. Lowell December 27, 1918

From: Lois B. Rantoul

To: Clara M. Tead, Div. Women's Branch, Industrial Service
Section, Ordnance Department, Washington

Report on postwar releases

Before armistice, 4,592, women employed in total labor force
of about 14,000. Dec. 24, there were 4,249 women in about
10,000 total, and 565 women absent (expected to return).

5. Worcester Mch. Shops. Dec. 31, 1918

Report on no. of women released from 15 shops (separately for each shop). Two shops employed 600 or more women at peak, one 300. The remainder only 29 to 150 each.

The 15 shops employed 2,628 women at peak production, and by 7 weeks after the armistice had laid off 1,279 (almost half). Two small plants had laid off none, and had hired a few more. Those of them expected to employ no women when their contracts finished. As far as could be ascertained the proportion discharged is greater among women than men. The plants expect to employ veterans.

6. Blake and Knowles Pump. Cambridge May 20, 1919

From: Miss Mabel Farmer, spokesman for women in the plant before War Labor Board. (70 women employed)

To: Miss Ethel Smith, Women's Trade Union League, who gave it to Miss Van Kleeck

(The Board ruled the revised rates they ordered apply to women)

II PENNSYLVANIA

1. Midvale Steel Micetown Sept.-Oct. 1918

Requested permission for night work

Investigated by Lois B. Rantoul, Women's Branch, Indus. Service Section, Ordnance

Report to chief, Major B. H. Gitchell. Sept. 9

Recommends - 8-hour day with 30 min. lunch; health and safety provisions approved by State Labor Dept; canteens ~~and to~~ provide hot drinks and other food be installed for both men and women; proper supervision in rest rooms and shops both day and night; adequate transport for each shift; repr. of Women's Branch to assist.

Later - Memo, Van Kleeck to Maj. F. W. Tully, Ordnance, Sept. 24, stating Pa. law does not give Commission power for exceptions, so special War Dept. permit would be necessary. As Navy also interested, postpone action until Navy can determine course and until procedure plan agreed. (Sent also to Louis McHenry ~~Home~~, Asst. to Asst. Sec. Navy, by May Allinson, Indus. Expert, Women in Industry ~~of~~ Service).

2. Schuylkill Arsenal Phila. Aug. 1, 1918

From: Mary Anderson. Asst. Div. Women's Bureau

To: W. B. Wilson, Sec. of Labor

Investigator: Agnes L. Peterson, Industrial Expert,
Women's Bureau. Visited July 28-29. (By request to Labor
Dept. from Newton D. Baker, Sec. of War.)

Recommends. Provision of seats, adjustment of their height,
furnishing foot rests, since work tables are very high;
the Welfare Secretary and forewomen, (and not a military
man unacquainted ^{with} standards and policies recommended
by government) determine such arrangements for women
as changes in lighting, adequate toilet facilities,
placing foot rests, use of chairs, etc. Also that
swinging doors be provided for men's toilets so doors
cannot be left open.

3. John Dunlap Co. Carnegie Nov. 26, 1918

From: Mary Gibson, Supv. Women's Branch, Indus. Serv. Div.
Ordnance. Washington

Visited because Col. Hunt of Ptb. dist. reported bad
conditions for women's work. 90 pc government work.

"Made many recommendations" but low wage and inefficient
management cause bad conditions, idle machines, turnover.

4. Zaratakes Bros. Confectionery. Phila. Feb 15, 1919

From: Alice F. Mueller, Inspector

To: Miss Mary Van Kleeck

Conditions in this small plant reported, apparently from a
questionnaire. Made in a cellar that one has to stoop to
enter. One toilet for store girls, men, and candy ^{dipper},
reached from cellar by going outside then inside. ^{Dipper's}
pay \$12 week. Works seated all day on stool without back.

III NEW JERSEY

Hercules Powder Union Plant at Parlin (Near New Brunswick) Nov. 8, 1918

From: Isabelle Stevenson, Indus. Service Section, Women
in Ind. Branch, Phila. (Oct. 26, 1918) Edith
Dudley (Ibid). Report of investigation, Oct. 25. May
Allinson, Women in Industry Service, Nov. 8

To: Clara M. Tead.

The Supt, Mr. A. P. Van Gelder, Gen. Supt., requested survey
of the Parlin plant. Had appointed at the Kendall plant Miss
Hutchinson, graduate of the emplt. mgt. course at Harvard.
Referred Parlin plant to Miss Van Kleeck, as it was engaged
largely on Navy work. May Allinson followed with Dudley's ^{work}
work.

Edith Dudley's survey, Oct. 22nd, found lack of organization and care of women employees. Women on the job were lifting 160 pounds. Danger of flash from powder. Physical exam of men only. Restaurant, but most women carry lunch. Many Italian women. 300 women, 2,200 men. Plant isolated, buildings scattered, lighting poor in buildings and grounds.

IV NEW YORK

1. New York Air Brake Co. Aug 23, 1918

From: Ordnance (War Dept.)

To: Women in Industry (Labor Dept.)

Will investigate as requested

2. King Sewing Mch. Buffalo Nov. 9, 1918

From: Edna Thuner for Clara M. Tead

To: Mary Van Kleeck

Notice of this plant's application for permission to employ women on grinding mchs.

V ILLINOIS (Had a consistent report schedule showing plant organization; contracts; hours, wages, and other employment conditions; occupations, recommendations were discussed with management).

1. Pullman Co. Pullman Nov. 5, 1918

From: Amy Hewes, Women's Branch, Ind. Serv. Section. (Ill.)
(who investigated, with Ruth E. Knowlton, Inspector)

To: Clara M. Tead

Recomends: Install heating; lunch room (for which there is space)

2. D. M. Goodwillie Co. Chicago Nov. 15, 1918

From: Amy Hewes

To; Clara M. Tead

Recommends. Safe water supply needed; toilet room in women's work shop is planned. Legal requirements for toilet and washing facilities sent at plant's request.

3. Curtain Supply Co. Chicago Nov. 18, 1918

From: Amy Hewes. Inspected by Gertrude Bruyn

To: Clara M. Tead

Recommends. Cloak room with lockers; lunch room, offered assistance of Women's Branch

4. Ganedy-Otto Mfg. Co. Chicago Hts. Nov. 19, 1918

From: Amy Hewes (Gertrude Bruyn Inspector)

To: Clara M. Tead

Recommends. Improvements in toilet and wash facilities and installation of a sprinkler

5. Frank E. Cook Co. Zion City Nov. 23, 1918

From: Amy Hewes (Ruth E. Knowlton, Inspector)

To: Clara M. Tead

Made automatic screw mchs. for Brown and Sharpe.

Recomends. Protection from oil for workers on tapering mch, by khaki uniforms and rubber apron, with wooden racks to stand on. Mch. operators should wear uniforms, a woman supervisor should be appointed. The woman's dressing room should be kept clean.

6. Rock Island Arsenal Dec. 12, 1918

From: Helen Bryan. In charge employment and conditions of work for women, Rock Island Arsenal.

To: Commanding Officer of the Arsenal

Reports womens' jobs (all employed directly to replace men, wages, hours, problems of training, of employment methods, of absenteeism, of hazards, of union attitude, of lunch.

Recommends. Separation of Employment Dept. from Civil service. Complete records, separately for women. Supervision by a woman since womens' employment and supervision problems differ greatly from men's. Heads of both women's and men's branch of Employment Dept. to be mems. Bd. of Efficiency. System and rates of pay should be understandable by employees and explained when hired.

Dec. 28, 1918. Miss Gladys Strickland, who has assisted Miss Helen Bryan, has been made mgr. Women's Employment Bureau, following transfer of Miss Bryan to Wash. Materials to be sent Miss Blanche E. Clough in Wash., soon to become employment mgr. for Seamen Co. St. Louis.

Apr. 16, 1919 Miss Strickland asks Miss Van Kleeck for definite information on attitude to women. Reply is that efficiency ratings should be the same and used as basis to dismiss. Says Miss Bryan now detailed to her for special work with arsenals, asks about caps as causing headache and falling hair.

July 1, 1919 Letter from Helen Bryan informs commandant of Rock Island, Col. Harry B. Jordan, of inequalities in office classifications of men and women, and unequal pay.

June 1919 Investigation by Helen Bryan reported to Mary Van Kleeck. Very full report, including hours, wages, inequalities in office appointment, conditions of work and insurance, housing, lay offs.

Recomends on representation of women in work organization, employment methods, hours, efficiency records, transportation, demobilization (lay-offs should be in same proportion)

Feb. 21, 1920 Col. Jordan requests WB exhibit, (sent by Mary N. Winslow, special Agent Apr. 1, after requested definitely)

VI WISCONSIN

1. Northwestern Ordnance. Milwaukee Oct. 30, 1918

From: Amy Hewes (based on visit by Avis Ring, Supervisor employment mgt.)

To: Clara M. Tead

A detailed report on training course for girls and for men.

2. Federal Pressed Steel. Milwaukee Oct. 31, 1918

From: Amy Hewes (inspected by Gertrude Bruyn)

To: Clara M. Tead

(Report organized by system of Ill. reports).

Recomends. Study of course of high turnover of men and feasibility of employing women. Equipment for first aid. Running hot water.

3. Milwaukee Brush Co. Nov. 6, 1918

From: Amy Hewes (Inspector, Gertrude Bruyn)

To: Clara M. Tead

Visit by request of a Govt. inspector in the District.

Recomends. Reorganization of employment methods. Comfortable rest room, Improvement of ventilation in work shop. New fully-equipped toilet and wash-room is needed.

4. Hummel and Downing. Milwaukee Nov. 7, 1918

From: Amy Hewes (Inspector, Gertrude Bruyn)

To: Clara M. Tead

Visit advised by a Gov't Inspector.

Recomends. Permanent guards onstaying or stitching mchs.
(Though there seems to be few accidents). Scientific
method of first aid. Product is fibreboard items.

VII INDIANA

1. Homework on Army shirts in Jeffersonville, Ind.

May 14, 1918. An organized Manuscript, 44 pages, prepared
by May Allinson, Exec. Sec. Com. on Women in Industry.
(Mrs. J. Borden Harriman,) Sent Mary Van Kleeck, and to
be discussed with Mr. Hopkins and Mr. Gompers.

Recomends.

- a. Homework on army shirts should be abolished. Constant supervision and countless incidental economies of *time* and effort are not possible. Mistakes in distribution, long distances and slow returns.
- b. Should be made in clothing centers, now suffering unemployment.
- c. Present policy of awarding according to need is not a Federal function and problems should be in hands of local relief agencies.
- d. Jeffersonville factory should be discontinued. Only loss results from using unskilled workers here when skilled workers in other centers are unemployed.
- e. If discontinuance inexpedient, manufacture should be vcompletely reorganized, the pay basis revised, and rest rooms and toilets provided.

2. U. S. Metals Refining Co. E. Chicago, Ind. Oct. 17-22, 1918

Investigated Oct. 17-22, 1918

By: Marvin D. Shie U S P H (Scientific Assistant)
Edw. W. Riley Ordnance Dept. (Indust. Expert)
Mrs. Lola B. Ralston, Spec. Agt, Women in Ind. Serv.
U.S. Dept of Labor

Recommends. In^{is} advisable to employ women with but few exceptions, as the plant presents serious health hazards from lead, even more dangerous to women than men. All places where there is molten metal or metallic dust (melting kettles, moulds, slag runs, crushers, etc. should have hoods and exhausts. More artificial ventilation in acid plant. Better janitorial supervision to decrease fire hazards and improve appearance. Install sanitary toilets to prevent typhoid, now frequent in the area. Before employing women, provide necessary facilities, such as wash room, locker room, food service, toilets.

Dec. 17. William Thum's letter delayed and referred to Van Kleeck, who wrote him of the ills of lead poisoning especially women, and that she was asking Miss Mary Allinson to visit him and asking U S P H to send Allinson copy the report of investigation.

Dec. 19. Thum sends thanks for her courtesy. Does not want to employ women in positions unsuited to health, but wants them in Electrolytic refining where their "keener sense of observation and their careful execution of the work will make them more useful and desirable than men."

Again visited Jan. 18 by Mary Anderson Ast. Div, Women in Ind. Service, and Mrs. Cox, spec. agt. Indus. Bd., Ind. Mr. Thum thought he had no lead hazard but they pointed to his moveable lead pots without hoods, causing fumes. He desired especially the job analysis, and was told it had been made but was not applicable to peace time since it only applied to emergencies. The U S P H could send a fume engineer to assist him.

VIII IOWA

Farley and Loetscher. Dubuque Nov. 8, 1918

From: Amy Hewes (inspector Ruth E. Knowlton)

To: Mrs. Tead

Save form used for Illinois reporting

Recomends. More effective exhaust on point spraying mch. Time and output study to determine effective rest periods and relieve choke points of production. Partitions in toilets in old building.

IX TENNESSEE

Du Pont. Nashville Nov. 6, 1918

From: Maj. F. W. Tully, Ordnance USA, detailed to Sec. War

To: Miss Van Kleeck

Letter from a workman to Gov. of Okla. The plant hires women for box plant, then tells them no jobs and puts them in powder plant under dangerous conditions without instruction on machines. Also long detailed statement by a woman worker, (July 30, 1918) referred by Louis F. Post, Asst. Sec. to Clara M. Tead.

On Nov. 23, 1918 Miss Van Kleeck referred Major Tully's enclosure to Clara M. Tead. On Dec. 6 the latter returned it to Miss Van Kleeck, since the Women's Branch of Ordnance was instructed to undertake no new work after Nov. 15.

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To: Miss Ethel Smith, Women's Trade Union League, who gave it to Miss Van Kleeck

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To: Miss Van Kleeck

Letter from a workman to Gov. of Okla. The plant hires women for box plant, then tells them no jobs and puts them in powder plant under dangerous conditions without instruction on machines. Also long detailed statement by a woman worker, (July 30, 1918) referred by Louis F. Post, Asst. Sec. to Clara M. Tead.

On Nov. 23, 1918 Miss Van Kleeck referred Major Tully's enclosure to Clara M. Tead. On Dec. 6 the latter returned it to Miss Van Kleeck, since the Women's Branch of Ordnance was instructed to undertake no new work after Nov. 15.

378/383

(1)

REPORT OF INVESTIGATION OF THE
U. S. METALS REFINING COMPANY, KENNEDY AVE.
EAST CHICAGO, INDIANA.

Date of Investigation - October 17th -22nd, 1918.

Investigators - Marvin D. Shie, M. D., Scientific Assistant, U. S. P. H. S.
Edw. N. Riley, Industrial Expert, Ordnance Dept., U.S.A.
Mrs. Lala B. Ralston, Special Agent, Women in Industry Service,
U. S. Department of Labor.

I. INTRODUCTION

The U. S. Metals Refining Company, Kennedy Ave., East Chicago, Ind.

Superintendent - Mr. Wm. Thum.

Vice President & General Manager - Mr. F. Y. Robertson, 120 Broadway,
New York City, N. Y.

Products - Refined lead, Antimony lead, Bismuth. Dore metals-silver and gold,
Copper motte, Hydrofluoric acid and Hydrofluorsilicia acid,
Lead Fluorsilicate solution, $Pb SiF_6$.

Nationalities -	According to Citizenship	Place of Birth
Americans	52	30
Hungarians	41	46
Austrians	24	26
Germans	2	12
Polish	5	5
Italians	3	3
Russians	3	3
Greeks	15	15
Norwegians	1	2
Bulgarians	1	1
Mexicans	12	12
French	1	2
Bohemians	1	2
Spaniards	1	1
Swedish	0	2

Processes -

I. REFINING METALS

- A. Electrolysis of lead bullion (anodes), deposition of lead on cathodes.
Melting and further refining of cathodes (lead deposit).
Casting of refined lead.
Weighing and shipping.

- B. Auxiliary processes to recover the by-product metals contained in the lead bullion.

Collection, filtration and drying of anodal slimes.

Scorification of slime - differential oxidation of metals and production of oxide slags.

Furnacing and reduction of slags.

- (a) Recovery of Sb₂ in oxide slag by means of blast furnace reduction to Antimony lead.
- (b) Recovery of Bi and Cn, by scorification reduction and sulphurizing methods, resulting in Bi and Cn matte.

C. Final recovery of Au and Ag by scorification of base metals under A and B, resulting in Dore' silver bars.

Casting of metals.

Weighing and shipping.

II. ACID MANUFACTURE

Loading of retorts with CaF₂ and H₂SO₄.

Distillation of HF.

Packing of HF for shipment.

Manufacture of ~~H₂SiF₆~~ H₂SiF₆ by percolation, of HF thru Si sand.

Packing of H₂SiF₆ for shipment.

Manufacture of Pb SiF₆ by addition of Pb to H₂SiF₆.

I. REFINING OF METALS.

The lead bullion is received in the form of anodes from the Company's smelter in the West and is first refined by electrolysis. The cathodes, very thin sheets of pure lead, the electrolytic fluid, compound of 12% of H₂SiF₆ and 10.5% Pb, are made at this plant. Each cell is a compound of an asphalt lined tank which contains the electrolytic fluid and a number of electrodes. The tanks are connected in multiple and the current, low in voltage, high in amperage, runs thru the entire number, traveling from anode to cathode, taking metallic lead from the anode and depositing it upon the cathode. The anodes remain in the solution eight days, but the cathodes remain only four days. Every four days, therefore, the cathodes are removed, washed, and melted in large kettles. A current of air is forced thru the molten lead. This further refines the lead by oxidizing Sb and produces lead and antimony dross. This dross is skimmed off and heated in a reduction furnace with charcoal. The metallic lead is returned to the melting kettle. The antimony litharge that remains is sent to the blast furnaces. The refined lead, 99.99% pure, is drawn from the melting kettle by means of a centrifugal pump, and cast into moulds. The lead pigs are then loaded on to small cars, weighed, loaded into box cars and shipped.

As the metallic lead leaves the anode, which is composed of lead bullion, it leaves behind certain metals which exist in the bullion as impurities. These metals, silver, gold, bismuth, copper, antimony, arsenic and tellurium, remain on the anode as slime. At the end of every eight days therefore, when lead is no longer leaving the anode at a paying rate, the anodes are removed from the electrolytic solution, cleaned of their slime between revolving brushes and remelted. The dross containing silver is skimmed off and sent to the silver refinery. The lead is again cast into anodes, about three of the melted used anodes, thus making one new anode.

The slime is passed thru filter presses, dried and sent to the silver refinery, where it is dried still further in the flues. It is then loaded in oil blast furnaces and scorified. A current of air is passed thru it which (a) first oxidizes Sb and Pb, producing Sb and Pb slag. This slag is drawn off, mixed with flue dust from the furnaces, coal and other reducing agents and de-silverized in a reverberatory furnace. A small amount of metal, Au, Ag, and Pb is reduced and runs to the bottom of the furnace. This is drawn off and returned to the slime furnace. The Sb slag is drawn off the top, mixed with old lead scrap and sent to the blast furnace where Sb lead is made.

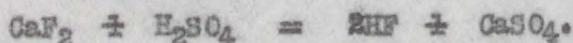
(b) As more air is forced thru the molten material in the Slime furnace, Cu and Bi oxide slag is produced. Sodium Sulphate and a reducing agent are added to this slag and it is again heated. Metallic bismuth and copper matte are formed. The copper matte is sold as such and the metallic bismuth is cast in the form of anodes and returned to the electrolytic department. Here it is placed in an electrolytic fluid composed of HCl and Bi. A Bi basket covered with muslin and cheesecloth serves as a filter. After the current is turned on, Metallic Bi goes from the anode thru the filter to the cathode, leaving Au or Ag impurities in the filter. These impurities are returned to the Slime furnace. The Bi which gathers at the cathode is washed with water, melted in Bi kettles, cast into bats, weighed and shipped.

(c) Nitre is then added to the remaining molten materials in the slime furnace and Cu and Te oxides are produced. These are drawn off leaving pure Dore' metal - Au and Ag in the furnace. This is drawn off, cast into bars and shipped to the Eastern plant to be further refined. The Cu and Te oxides are leached in a large tank and the Te is discarded. The Cu residue is put back into the slime furnace. Steps are now being taken however, in an experimental way to refine Tellurium also.

The oxides of volatile metals are recovered by condensation of the furnace gases and by their filtration thru woolen bags. The resulting oxides of Pb and Sb are returned to the slime furnaces and again scorified.

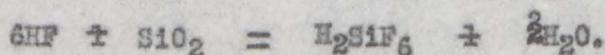
III. MANUFACTURE OF ACID PRODUCTS

The raw materials received are Fluorspar, CaF_2 , and H_2SO_4 . Proper amounts of these are fed into a small mixer at the top of the stills which thoroughly mixes them. The still is then closed and heated for four days, the temperature increasing from 500°F on the 1st day to 1050°F on the fourth day. The reaction takes place as follows:



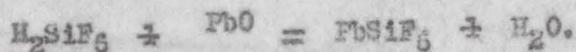
The Hf condenses into a water condenser and is syphoned off into carboys for shipment, or into storage tanks. The Gypsum, CaSO_4 is discarded. It is somewhat discolored and as such ~~is not~~ is unsalable.

For the manufacture of H_2SiF_6 , HF is forced up thru a large tank of Silica sand. When percolation is complete, H_2SiF_6 is formed according to the formula-



This is packed in barrels, lined with asphalt, for shipment.

For the manufacture of PbSiF_6 , which is used in shell plating, PbO is added to the H_2SiF_6 . Lead silicofluoride is formed according to the formula -



The various operations in these processes will be described in detail ~~in~~ in the job analyses.

No. of Employees -----

Department	Men	% Women	Total	Day work hours	Shift work Hrs.
Office	15	5	20	20 - 8	
Laboratory	9	1	10	10 - 8	
<u>PLANT</u>					
Power House	6	0	6		6-12 hrs 6-6
Mechanical	12	0	12	12 - 10*	
Tank House	33	0	33	27 - 10	2-12 " 3-3
Bismuth Plant	2	0	2	2 - 10	
Casting	35	0	35	35 - 10*	
Yard	25	0	25	25 - 10*	
Construction	13	0	13	13 - 10*	
Acid plant	11	0	11	11 - 10*	2-12 " 6-6
Silver refining	15	0	15		2-12 " 7-7
Blast furnace	16	0	16		2-12 " 8-8
Miscellaneous	7	0	7	7 @ 10*	
Total	199	6	205		

*All 10 hour work is as follows: 7 to 12; 12:30 to 4:45. Paid for 10 hours.

B. NATURE AND CONSTRUCTION OF BUILDINGS

The buildings are arranged and designated as on the accompanying blueprint. The majority are of steel, brick and concrete construction. The acid plant and some of the smaller buildings are of wooden construction. Fire hose, taps and extinguishers are located at convenient points. There is ample room throughout.

2. PLANT HOUSEKEEPING

~~Fair. Sanitation~~ There is more or less debris however, throughout all the buildings which in some instances clutter up passage ways. There should be more adequate janitorial supervision. Drainage in Casting house and 1st floor of Power house is inadequate. Water is standing in pools in some places and in many places in the Casting and tank house, the floors and stairs are wet, muddy and slippery.

2. HEATING

Casting house, refinery and Blast furnaces depend on heat from furnaces and kettles, elsewhere there is hot air and steam heat.

3. VENTILATION

(a) Natural - Thru windows, cupolas, roof-stacks, etc. Cubic air space and air exchange adequate.

(b) Artificial - Hot air system of heating assists in air exchange in the tank house. In the summer, cool air is forced in thru the same pipes. Large portable fans blow the cool air over workers in casting house in the summer. Slime furnace, de-silverizing (slag) furnaces and lead and antimony furnaces are equipped with hoods and exhausts over doors and port holes.

Hoods over moulds into which silver slag is run, carries off antimony and arsenic fumes. In the acid house there is an exhaust behind each still. This is connected with the still loading pot whenever the stills are loaded and carries off H_2SO_4 and HF fumes.

4. GENERAL ILLUMINATION

(a) Natural - Factory swinging ventilating windows on nearly all buildings. Frosted panes. Large sky angle. No glare. Majority of buildings are equipped with cupolas.

(b) Artificial - By means of over head electric system. High power lamps, high up, well shaded, every 26-30 feet. Illumination adequate.

C. HEALTH HAZARDS

1. DUSTS

Sodium Sulphate dust arises from the Bi mixture when it is loaded into the furnaces. This is irritating to the respiratory mucous membrane. The men wear cloth respirators.

Bismuth dust arises when the Bi slag is crushed. Crusher is not equipped with any exhaust. There is considerable lead oxide dust when the old lead scrap is loaded in the buggies, and when it is mixed with Sb slag. The men doing this work wear cloth respirators. They complain of dust however, and state that it causes considerable absenteeism. There is some dust from the Fluorspar in the Fluorspar storage shed but there has been no ill effects from the same. Flue dust- When the bag house is cleaned out, the workmen are exposed to the dust which contains As and Fe. They wear respirators and special suits.

2. FUMES AND GASES (See also under B3)

Tank house - Fumes of H_2SiF_6 from electrolytic tanks, sometimes causes nausea in men employees. No other ill effects. Men here are subject to lead fumes from casting house.

Casting house- lead fumes from lead melting kettles, lead moulds and anode making apparatus. Molten lead reaches temperature of $1050^{\circ}F.$

Bismuth plant - HCl and H fumes from electrolytic plants. Bi fumes from melting pots.

Silver refining - Bi fumes from melting pots and moulds. Bi reaches temperature of 1200° F.

Tellurium fumes from Fe plant cause suppression of sweat function and dry skin.

Blast furnace - Pb and Sb fumes from melting kettles and moulds.

Slag furnace - Arsenic and Sb fumes. These are carried off by hood and exhaust.

Acid plant - HF fumes from the stills. Exfoliation of skin of new employees and irritation of respiratory mucous membranes with resulting bronchitis.

Lead burners shed - Lead burners making and repairing lead carboys are subjected to lead fumes. Respirators are supplied by the Company.

3. POISONS

There is considerable lead poisoning in this plant and there has probably been some cases of Bi, As and Sb poisoning, altho there are no records of such. Tellurium effects - suppression of sweat, dry skin and garlic odor to breath and alvine ~~muscular~~ discharges are also experienced.

The hazards from metallic poisoning is now being reduced by separate dining room, changing of clothes when entering and leaving plant, washing before meals, in hot and cold running water, showers in the evening before going home, tooth brushes and educational campaign, etc.

Men working in the tank house are subject to acid sores. These begin as a painful molecule and go thru the stages of papule and pustule until a small core forms. This is lifted out and the sore heals. These sores are due to the constant irritation of the acid and are usually on the feet or lower limbs. Rubber boots supplied by the Company do much to mitigate this hazard.

4. FATIGUE - No apparent undue fatigue in any operation.

5. IN FERTIONS

An infectious process seems to follow the acid sores noted above. Whether this is really an infection which develops on the site of the acid sore or is really a slough of dead tissue killed by the acid has not been determined.

Flue dust sores - An infectious process arising on the site of irritation produced by flue dust which contains As and Fe.

6. HEAT AND COLD

Considerable heat around blast furnaces when slag is drawn off, and around the moulds when the metal is run into them. Portable fans help to diminish the heat in the summer.

7. HEMIDITY

Humidity increased in the Casting room where water is turned on the hot lead in the moulds to cool them, thus producing considerable steam.

9. EXCESSIVE NOISE

Considerable noise in the tank house from the traveling crane. There is no means of obviating this and no records of any ill effects.

10. ODORS

Tankhouse - Odors of H_2SiF_6 from electrolytic tanks sometimes produces nausea.
Asphalt shed - odor of molten asphalt.
Refinery - Garlic odor from Ti and Bi .
See also under fumes and gases.

D. PERSONAL FACILITIES

1. WASHING, TOILET AND LOCKER ACCOMODATIONS

A comfort station equipped with showers, enameled troughs with hot and cold water, steel ventilating lockers, toilets and dining room, serves the whole plant. In addition to this there are two other lavatories and toilets near the silver refining. Facilities are ample and rooms are light and well ventilated and fairly clean.

All men in the silver refinery change their clothes in their locker room when they begin and when they quit work. They also take a shower in the evening before donning their street clothes.

2. EATING, DRINKING AND REST ROOM FACILITIES

Eating and rest room facilities are in the comfort building mentioned above. All employees are supposed to eat in the dining room except those in the Silver refinery, and to wash before eating. This is the 1st step in the prevention of lead poisoning. They bring their own lunch and may buy hot coffee, etc., at the dining room.

Sanitary drinking devices are located at convenient points throughout the plant. These are supplied with ice cooled, boiled water.

E. MEDICAL AND SURGICAL RELIEF

1. FIRST AID - DISPENSARY

This is a small well equipped dispensary in the comfort building in charge of the welfare director. There are also five first aid kits located at convenient points throughout the plant. First aid is administered by the welfare director and the watchman who have had some first aid instruction from the doctor and nurse.

A part time physician is employed who visits the plant twice a week and when otherwise needed. A nurse is employed by the Manufacturers Association. She visits the sick in their homes, assists the Doctor in his work and conducts first aid classes. The number of accidents is not large - 23 for the month of September, none of which were serious. An accident report is appended. The welfare director looks after the working conditions in the plant.

2. PHYSICAL EXAMINATION OF THE EMPLOYEES - None.

3. EDUCATION IN PERSONAL HYGIENE AND ACCIDENT PREVENTION

The nurse gives instructions in hygiene and first aid to men chosen for each department by the foremen. When one group of these men is trained another group is given instruction. There is an extensive safety bulleting service throughout the plant.

Moving picture shows are to be given twice a week during the winter in the Comfort building during the noon hour. These movies will cover accident and occupation diseases prevention and some comedy mixed in to hold the attention of the men.

The Company physician sometimes gives talks and demonstrations to the men on some particular subject, e. g. influenza.

The Company paper, published twice a month, sometimes carries articles on prevention of disease, such as lead poisoning.

The Company furnishes respirators, goggles, rubber gloves, rubber boots, tooth brushes, etc., to the men in the various departments, with instructions as to their use.

F. TRANSPORTATION FACILITIES

In the past transportation facilities have been poor, especially in the winter. This has been one of the biggest factors in the production of the labor turnover. The employees have been compelled to walk from 3/4 to 2 miles to their work. A new train service has been announced however, on the Belt line which has a stop - Grasselli - directly in front of the plant. Train from the North will arrive at 7:08 am and from the south at 6:30 a m. Trains will leave for the North at 5:58 p m and for the south at 6:23 p m. This schedule will greatly increase transportation facilities.

G. TRADE WASTES

Gypsum, CaSO_4 , a by-product of HF manufacture is the chief trade waste. It is discolored and hence unsalable and is used to fill in low ground. Some slag from the blast furnaces is waste and is also used to fill in low ground.

H. ABSENTEEISM AND LABOR TURNOVER

Good records are kept of absenteeism but no systematic efforts are made to ascertain the causes. If it is found that the man or some member of his family is sick, the nurse or doctor is sent to visit them. Typical absentee reports are appended. Labor turnover for September was 33.51%. Efforts are made to obtain the reason for every "quit" and labor turnover records are carefully kept. Typical records are appended.

I. BARRACKS AND DORMITORIES

In order to decrease labor turnover and to cope with the housing situation, the Company has erected three small barracks in a grove on the river bank behind the plant. These barracks have their own kitchen. A privy on the river bank, without vault, is used, and is not protected against flies. It might easily become a factor in an epidemic of typhoid fever.

As yet the barracks are not crowded. In addition to these barracks the Company has rented an old shoon nearby, which is to be fitted up as a dormitory and dining room. This dining room is to serve the men there and those in the barracks also. It is not yet in operation.

CONCLUSIONS AND RECOMMENDATIONS

1. The health hazards in this plant from metallic poisoning, especially lead, is considerable. Inasmuch as this hazard is greater for women than for men, due to physiologic differences, it is inadvisable, under existing circumstances, to recommend the replacing of men in this plant by women, except in rare instances.
2. It is necessary for the avoidance of Metallic poisoning that workmen every where should be protected from metallic fumes and dusts. All the melting kettles, moulds, slag runs, crushers, etc., in short all places where there is molten metal or slag, or metallic dust, should therefore be equipped with suitable hoods and exhausts, under the direct supervision of an expert fume line engineer.
3. There is need of more adequate artificial ventilation in the acid plant, in order that more of the HF fume may be carried off.
4. There should be more adequate janitorial supervision throughout the entire plant. In addition to decreasing accident and fire risk, it would improve considerably, the general appearances of the plant.
5. The privy now in use at the barracks is without vault and is not protected against flies. It might therefore easily become a large factor in ~~a~~ typhoid epidemics, which are rather frequent in this region. The privy should be made fly proof by the addition of suitable seats and covers and a fly proof vault or by some one of the other accepted methods described in any book on hygiene and sanitation.
6. Before any women are employed in this plant the necessary personal service facilities such as toilets, locker rooms, dining room, wash room, rest rooms, etc. should be installed and properly equipped.

JOB ANALYSISCASTING TANK AND ACID ROOM

1. SHODE MEN - unload lead bullion (464#) from freight car to trucks which run on narrow gauge tracks. The anodes are lifted by electric hoist and placed on a truck which is pushed on tracks across the yards. The bullion is stacked together for use. These anodes are treated twice. The first time they are worn down to about one third of the original size. They are then recast to be used again. In the latter process the men are exposed to the heat and fumes during the re-casting. Removing the castings from molds requires much strength. Too heavy for women. Semi-skilled labor.
2. STARTER SHEET MEN - The cathode sheet is started on an inclined table which is placed near a kettle of molten lead. One man dips out a ladle of lead (weighing 20#), and pours it into an oblong pan at the raised end of the table. The second man turns this molten lead over the table where the lead solidifies instantaneously. The second and third men stand at the lower end of the table, place a 5# bar of copper near the end of the sheet of lead and turn the ends over the bar. One man smoothes down the overturned ends and the other welds them together. The third man then lifts the completed sheet (12#) up on a rack at his side. They work at great speed as it is piece work. Women should not do this work because of the health hazard of lead poisoning.

3. REFINED LEAD MEN - Four men do relay work in casting refined lead into bars. All of the skim of the top or dross of big kettles (12' in diam.) with perforated ladles (3#). The empty molds are laid near the kettles. The pipeman allows the molten lead to flow out of the kettle thru an adjustable pipe into the molds. With small asbestos plates another man skims off any dross that comes to the top of the pigs. With a scraper the third man cleans the edges so that the ingot or pig will be perfect. He also cools the pigs by turning water over them. The fourth man loosens the solidified pigs (94#) with a hook and sees that they are stacked in a pile. Women should not do this because of the health hazard connected with it.
4. PIRSMEN AND HELPERS - care for the "fire bar" kettle, anode kettle and dross furnace. Coal is shoveled into low furnaces. Ashes are wheeled away by wheel barrows. These furnaces are side by side. No floor separates the furnace from the fuming kettle which must be kept at a constant temperature 24 hours a day. Women should not do this work because of the health hazard of lead poisoning.
5. CRANEMAN AND HELPER - Two overhead cranes are kept busy - one each in the casting room and tank room. The former carries the rack of cathode starters to the storing section, transfers trucks of pigs and does every necessary lifting in the casting room. The crane in the tank room handles all cathodes and anodes. Each crane has two followers who attach, load, ~~assist~~ and steer and unfasten it if necessary. Unskilled labor. Constant standing (in case of helpers). Cranemen should have knowledge of machinery, steady hand and level head. Although women can operate these cranes they should not be allowed to do so since the gases and fumes are probably accumulated so near the ceiling. One night crane man does what work there is at night, keeps watch over water and electrolytic tanks. Two followers serve the crane man and do general utility work.
6. ROD SHINER - The 5# copper connecting rods used in the tanking room are kept clean and bright by being wiped with cloth or sand paper. The work requires a great deal of stooping and bending, since all the rods lie on the floor, which is the top of the tanks. A woman can do this if her health is guarded from lead poisoning.
7. WEIGHERS - Everything in the work is expensive and must be weighed. Two sets of platform scales, side by side, are used in giving weight and check weight. Two men do this routine weighing but this does not require all of their time. One is assistant to the general foreman; the other is the foreman in the Acid plant. He also does the clerical work for this plant and crates the Bismuth which is too heavy for women to handle. Every other Sunday he acts as foreman in the Tank and Casting rooms. It is not practicable for women to do this work.
8. FOREMAN - Three men. One described in Job 7 one oversees the work in the Tank room and casting and bismuth rooms; the other is night foreman over all three rooms. Impracticable for women to do this work.
9. TANK CLEANER - Cleans out the electrolyte tanks with broom and wooden shovel. He shovels the slime into a bucket which when filled is removed by crane. The acid soaked lime necessitates him wearing rubber boots. He also assists with lifting and caring for hose in acid tank room. Much stooping and lifting. Women might do later.

10. SCRAP WASHERS - Each anode comes from the electrolyte tanks covered with shine. The washer by an "electric lift" guides these sheets between two mechanically driven brushes which remove the shine. Unskilled work. Requires standing. Can be done by a woman.
11. HOT SHEET MEN - Sees that contact is perfect and that no sheet is using more current than it needs; The anodes weigh about 494 pounds, the cathodes vary as they grow. This requires much stooping and lifting and when a cathode has become uneven or hot, it has to be lifted entirely out of the bath and hammered smooth on a rack. The gangways are very damp. The work is too heavy for women. Semi-skilled work.
12. INSPECTOR - carries with him a volt meter (1 $\frac{1}{2}$) and tests the current of the electrodes to see that none are too hot. This acts as a check on the above job. It requires constant walking from tank to tank and some stooping but no special skill - just common school education is needed. A woman can do this.
13. CIRCULATOR - The day circulator keeps constant watch over the electrolyte to see that the filling tanks are being properly filled and discharged. (An oversight in the filling room would check operations in the entire operation. This necessitates his being on his feet continuously). This man has the care of the hose used for filling these tanks. This necessitates his lifting and pulling a great deal of weight at times. He also takes the thermometer readings for the day. Most of this work can be done by a woman but the moral hazard of isolation makes it inadvisable for a woman to do it.
14. BAR SHINER - The triangular copper bar or rod (about 10 $\frac{1}{2}$) used in making the contact in the electrolyte bath is polished and kept clean by the use of a cloth and sand. This man also paints (black) the capping boards (5" x 8") used on the electrolyte tanks. This requires much stooping and lifting of not more than 10 or 15 pounds at once. The worker can sit about half the time. Unskilled work. A woman can do this.
15. CHILIAN MAN - looks after leaking tanks, cleans up solution on floor and helps tighten up the filter press. He also inspects the general condition of the tanks. This necessitates much stooping and bending and ability to do repair work. It is a wet, isolated job. A woman might do this work later.
16. HANDYMAN - does the work of the pipe fitter, plumber and mechanic in this department. Work is self-explanatory. This requires the training of the trade and much climbing and stooping. A trained woman might do this later.
17. ASPHALT MEN (1 man and 2 helpers) - These men line tanks-repair the cellar floor, and make from asphalt, all hard rubber connections for tanks. The helpers carry the hot heavy buckets (50 $\frac{1}{2}$) of asphalt as well as fire the kettle for it. They assist the asphalt man who must be experienced in asphalt work. The work is heavy but woman might later on be used for it.
18. SHINER - All cross copper rods (5 $\frac{1}{2}$) must be kept clean and bright and if the "shiner" does not accomplish this by hand, then the rods are polished on a sand buffing wheel. Little experience is needed and little effort is expended as the wheel is electrically driven. A woman can do this. Unskilled work.

19. UTILITY MEN - Two men in tank house do odd laboring jobs - helping with heavy loads, keeping surroundings clean or assisting in general. Two other men help in casting house by carting ashes to dump grounds and breaking up litharge and trucking (on four wheel truck, run on tracks) to blast furnace. Heavy work but part of it could be done by women.
20. LOADING GANG - handles all refined lead pigs (95#) each). These are loaded on trucks, pushed by hand along the steel tracks and taken either to the store house or to the freight cars. Piece work. They usually handle about 100 tons a day. Too heavy for the same number of women but it might be arranged so that these three men could later be replaced by women.
21. STARTING CURRENT MANAGER AND HELPER - place the anodes (464 #) and cathodes (37#) in the electrolyte and see that the circuit is complete for the electrolytical depositing of lead. One woman might replace one man but this would be impracticable.
22. CATHODE WASHERS - cleans the cathodes after they have grown for four days (they then weight about 200#). The cathode is mechanically handled so that all the washer has to do is brush them off with a large tooth brush shaped broom (12#). Standing, constant brushing and rather wet work but women could do this.
- ACID ROOM
23. RETORT DIGGERS - cement the door of the retorts by applying the cement to the groove into which the door fits. After the heat has been applied to the mixture of fluorspar and Sulphuric acid, and the acid driven off, the residue (gypsum) cakes in the retort and is then broken and dug out and trucked (on tracks) to dumping ground. The retorts weigh several thousand pounds. The work is laborious and too heavy for women. Unskilled. Piece work.
24. CHARGER - This man shovels the pulverized fluorspar (about 15# or 20# to a shovel) into screw conveyor, which carries it over to the retorts. He charges (by opening the doors of the elevators) and closes the retorts; sweeps and keeps the retort rooms clean; and also weighs the acid for the carboys. The work is very dusty, requiring the use of a respirator. A woman could later do this if other women were used in the same room, thus guarding against the moral hazard of isolation. Unskilled work. Common education.
25. ACID FOREMAN - or head syphoner has the responsibility of working the acid into the correct strengths. He looks after the condenser and oversees the work in general. He also syphons off all acid from condenser to tank and then into carboys (220#) and barrels (420-520#) for shipments. Although a woman might do this work it would be impracticable, since most of the work in this department is done by men who would refuse to work under a woman.
26. SAND MAN - passes the acid thru the sand to make H_2SiF_6 . He brings in the sand (100 to 300# lifts) and has the responsibility of mixing the sand with the acid. Semi-skilled. Too heavy for women.
27. CARBOY WASHERS - clean with water the lead carboys (112#) and test with air pressure for leaks. They also stencil number and box the carboys for shipment. Women could do part of this work but under the present output it would be impracticable to divide the work.
28. LEAD BURNER - One man and helper makes all lead carboys used in the plant for shipping acid. This necessitates the handling of heavy pieces of lead (110#) and fusing or burying it into carboy shapes. These men mend all leaks in other carboys and repair all pipes in the plant. Because of the weights lifted and the health hazard due to the fumes, the work cannot be done by women.

29. LABORER - One man is general utility man in this department. He sweeps and cleans up, helps with heavy lifting and trucking. All pieces handled here are very heavy. A woman cannot do this work.
30. COOPER AND HELPER - repairs barrels and lines all barrels with hot asphalt. The hot asphalt is poured in, the barrel plugged, and then the helpers jostle the barrels (150#), rolling and turning it so as to entirely cover it with asphalt. The work is too heavy for women.
31. One night man looks after retorts and brings in bags and barrels of powdered fluorspar. Too heavy and isolated for women.
32. One man has charge of the Bismuth electrolytic tank room. He cleans and stripes the cathodes (90#) and filters the slimes thru layers of cheese cloth and muslin. This requires some lifting but it could be arranged so that a woman could later take this work.
33. WASHER - One man washes Bismuth cathodes (90#), melts them and casts them into moulds. He also melts up the scrap anodes and recasts into anodes. A trained woman might later do this.
34. FURNACE MAN - takes care of a small bismuth coal furnace, takes care of ashes and assists in this section. Rather heavy but a woman could do this later if necessary.

SILVER REFINING AND BLAST FURNACES

35. SAMPLERS - These two men obtain samples of all outgoing and incoming lead, silver and bismuth. The samples are then mechanically crushed and divided so to have representative lots and are then sent to the assayer. In many cases the samples from the dross, and matte weight 50# H.S. Training, good judgement and care are necessary. Women could do this.
36. FURNACE MEN - These men have charge of all oil furnaces used in treating silver, gold and bismuth. They have to regulate the temperature, charge with slimes, tap when ready, besides preparing the mix (bismuth and reactionary agent). They handle all molten material. They have charge of the dust collector and shake the dust bags which have accumulated the by-products. Since these men do relay work - most of which is heavy and dusty, it does not seem advisable for women to do the work.

BLAST FURNACE ROOM

37. BUGGY MEN wheel in heavy iron, two wheeled carts, the charges from the outside sheds to the weighing platform where they see that the proper amount is loaded and they then charge the furnaces. The work is much too heavy for women.
38. TAPPEERS - with a long iron rod these men have to open the tap hole about every 5 minutes and tap off the slag into a big pot placed on wheels. They prepare their clay plugs for the tap holes. They are on their feet most of the time around the furnaces. If the moral hazard of isolation were controlled, the women might later do this work.
39. POTS MAN - draws off the molten slag from the big kettle (used in the above job) into smaller ones. The latter (500#) are also on wheels and are pulled into the dumping grounds where they are upset. The cooled slag is then broken by sledge hammer - separating the matte from the slag. This requires muscular work and is a man's job.
40. KETTLEMEN - skim the antimony lead kettles with perforated iron paddles (8#) to remove the dross. They also arrange molds in convenient order, tap and pour the molten metal and remove the pigs (94#) when cool. This is intermittent work and could be done by women if the health hazard of lead fumes were guarded against.

41. FURNACE MEN - cares for the small furnaces used to heat the above kettles the name is self-explanatory. A woman might later do this if the moral hazard of isolation were guarded against.

CONSTRUCTION AND YARD DEPARTMENT

42. LABORERS - break up slag and truck to dumping ground, shovel slimes, unload coal or scrap and assist with any yard work. Unskilled muscular work. A few women might be used on this job if the moral hazard of isolation were supervised.
43. WATCHMEN (6) - Self explanatory. Not practical for women to do this altho' men can. Besides general guarding it is necessary to search all people, mostly men working in the Silver department as they leave.
44. BRICK LAYER AND HELPER (2); Tinsmith; blacksmith, 1 pipe fitter and helper. four carpenters. Self explanatory. Impracticable for women to do this work here.
45. JANITORS (2) - General clean up work in offices and comfort station for men. One woman does the former. A woman should not do the latter.
46. MACHINE SHOP (4 men) - These men do general repair work for the plant. It might be possible for one or two women to do the lighter work throughout in the shop but the work throughout is rather heavy.
47. ELECTRICAL REPAIR MEN (3) - General electrical repair work. A girl might be used for winding armatures.
48. OILERS (3) - Oil machinery - self explanatory. Women might later do this.
49. CHIEF ENGINEER AND (3) OTHER ENGINEERS - take care of all machines that supply power - heat, steam and air - to the plant. Similar to all power houses. Requires thorough knowledge of machinery. Women with training might later replace two of these men.
50. FIREMEN - oversee the automatically stoked furnace but must be able in case of a breakdown to connect two hand stoked units. Work similar to any other furnace room. One woman might do the day shift when engineers are about the plant to take care of a breakdown.
51. STORE ROOM
51. STORE KEEPER AND TWO ASSISTANTS - have general care of the storeroom; receive and issue all stock, keep records of requisitions. Much of the stock is very heavy - barrels, sacks and kegs of crude oil materials. It might be possible for one woman to do the clerical work and handle the lighter stock and this replace one man.
52. PURCHASING AGENT - Self-explanatory. A trained woman could do this.
53. OFFICE FORCE - (a) Administrative head - manager (1); General superintendents (four); (b) Technical - 7 chemists, 2 assayers; 1 traffic man, 1 service man. (c) Clerical - 3 stenographers, 2 bookkeepers, 2 metal accountants. 1 time keeper, three clerks.

REPLACEMENT OF MEN BY WOMEN

JOB NO.	MEN EMPLOYED	WOMEN EMPLOYED	MEN NOW REPLACEABLE BY WOMEN	MEN LATER REPLACEABLE BY WOMEN	MEN NOT REPLACEABLE
1	9 - 10 hrs.	0	0	0	9
2	3 - 8 "	0	0	0	3
3	4 - 8 "	0	0	0	4
4a	2 - 12 " shift	0	0	0	2
b	2 - 9 $\frac{1}{2}$ " "	0	0	0	2
5	9 - 12 " "	0	0	0	9
6	1 - 10 " "	0	1	0	0
7	2 - 9 $\frac{1}{2}$ " "	0	0	0	2
8a	2 @ 9 $\frac{1}{2}$ " "	0	0	0	2
b	1 shift 8 hr.	0	0	0	1
9	1 - 10 Hr. shift	0	0	1	0
10	2 - 9 " "	0	2	0	0
11	6 day 4 ni-9 $\frac{1}{2}$ hr.	0	0	0	10
12	2 -	0	2	0	0
13	1 @ 12 Hr.	0	0	0	1
14	1 - 10 "	0	2	0	0
15	1 @ 10 "	0	0	1	0
16	1 - 10 "	0	0	1	0
17	3 - 20 "	0	0	5	0
18	1 - 8 "	0	1	0	0
19	2 - 10 "	0	0	2	0
20	3 - 8 "	0	0	0	3
21	3 - 10 "	0	0	0	3
22	2 - 9 $\frac{1}{2}$ "	0	2	0	0
23	2 - 9 "	0	0	0	2
24	1 - 10 "	0	0	1	0
25	1 - 10 "	0	0	0	1
26	1 - 10 "	0	0	0	2
27	2 - 10 "	0	0	0	3
28	3 - 10 "	0	0	0	1
29	1 @ 10 "	0	0	0	2
30	2 - 10 "	0	0	0	1
31	1 - 10 "	0	0	0	1
32	1 - 10 "	0	0	1	0
33	1 - 10 "	0	0	1	0
34	1 - 10 "	0	0	1	0
35	2 - 10 "	0	2	0	0
36	13 - 10 " 3 (overlapping shifts)	0	0	0	13
37	6 - 12 "	0	0	0	6
38	2 - 12 "	0	0	2	0
39	2 - 12 "	0	0	0	2
40	4 - 12 "	0	4	0	0
41	2 - 12 "	0	0	2	0
42	12 - 10 "	0	2	0	10
43	9 - 10 "	0	0	0	9
44	6 - shift	0	0	0	6
45	1 - 8 " E-4 hours	0	0	0	1
46	4 - 10 "	0	0	1	3
47	3 - 10 "	0	1	0	2
48	3 - 10 "	0	0	3	0
49	4 - 10 " "	0	0	2	2
50	2 - 12 " "	0	1	0	1

CONT'D

JOB NO.	MEN EMPLOYED	WOMEN EMPLOYED	MEN NOW REPLACEABLE BY WOMEN	WOMEN LATER TO REPLACE MEN	MEN NOT REPLACEABLE
51	3 - 9 Hr.	0	1	0	2
52	1 - 9 "	0	1	0	0
53-a-	4	0	0	0	4
b	10	1	3	0	7
c	6	5	3	0	3

Signed

 Scientific Assistant, U. S. P. H. S.

 Industrial Expert, Ord. Dept., U. S. A.

 Special Agent, Women in Industry,
 U. S. Dept. of Labor.

HR

378 382

January 13, 1919.

MEMORANDUM.

FROM: Mary Anderson, Assistant Director, Women in Industry Service.

TO: Dr. A. J. Lanza, Chief Division of Industrial Hygiene and Medicine,
Public Health Service.

SUBJECT: United States Metal Refining Company, East Chicago, Report:

Visited this company Monday, January 6, in company with Mrs. Cox, Special Agent for the Industrial Board of the State of Indiana. Interviewed the superintendent, -- Mr. William Thum, and one of the managers, Mr. Nichols.

The products manufactured are Refined Lead, Antimony, Bismuth, Dore metals--silver and gold, Copper matte, Hydrofluoric acid and Hydrofluorsilicic acid, Lead Fluorsilicate solution, $Pb SiF_6$.

We delivered the report as rendered by the investigators of the Public Health Service and discussed it at length. Mr. Thum took special exceptions to the recommendations in the first paragraph, where it says that metallic poisoning, especially lead, is considerable. He did not think that that was his plant, because he had the wet process. He thought that this had been mixed up with the International Lead Company, East Chicago, another concern that is using the dry process. We told him, however, that we were positive that it was not so as the Public Health Service had a report on this company. We pointed out to him that he had movable lead pots that had no hoods, and that the fumes from these pots were considerable. Mr. Thum told us that he wanted the job analysis particularly. We told him the job analysis had been made for emergencies during the war, and could not apply under peace conditions; that women were more susceptible to lead poisoning than men, and under those circumstances women could not be employed in lead refining only under greatest emergency, such as the war might have occasioned.

He said then that the reasons he wanted the job analysis were that he might some time have labor troubles, and if he did, he wanted to go over the report very carefully, and wherever the Government had said that women could be substituted for men, he would then put them in.

Another recommendation was that the Public Health Service would send out a fume line engineer to help them to put in an extensive hood system to carry off the fumes and the dust. Mr. Thum stated that in his concep-

tion of the plant they had made the plant safe, as he felt, anyone could make it, but if the Public Health Service would send out a fume line engineer, that he could probably teach him something and maybe this man could teach them something. We gave him the name and address of Dr. Lanza, and said he would write and ask for advice.

There are three plants very close together that handle lead to a considerable extent. This plant, the International Lead Company and the Grasselli Chemical Company. While we did not visit the International Lead Company, it was described to us by Mr. Thum as a very hazardous plant. The Grasselli Chemical Company we did visit and this company was not inspected by the Public Health Service inspectors. This is the one plant that has women employees. They are making bug powder and bug paste, which they told us contained lead. The women filled the containers, thereby handling the paste and the powder, working right next to the lead grinding room. There was no partition between this grinding room and the room where the women worked on the second floor where the dust was thickest.

Mary Anderson, Assistant Director,
Women in Industry Service.

MA/LGB

DIVISION OF INDUSTRIAL
HYGIENE AND MEDICINE.



OFFICE OF
FIELD INVESTIGATIONS
INDUSTRIAL HYGIENE

TREASURY DEPARTMENT

UNITED STATES
PUBLIC HEALTH SERVICE

~~PITTSBURGH, PA.~~

December 17th, 1918.

*Miss Mary Van Kleeck
referred to Miss Anderson*

TO: Miss Mary Allison,
Hotel Claypool,
Indianapolis, Ind.

FROM: Bernard J. Newman, Consultant.

SUBJECT: U.S. Metals Refining Company Report.

1. At the request of Miss Mary Van Kleeck, I am enclosing a copy of the joint report made on the U.S. Metals Refining Company, with job analysis omitted.

2. Miss Van Kleeck stated that you would be willing to take this report in person to the Metals Refining Company, calling their attention to the fact that it was made at the time when the replacement of men by women workers was contemplated as a war emergency, therefore, the conclusions and recommendations are of a minimum essential, in order to raise the plant to a safe standard. This office would appreciate a statement from you relative to the attitude of the plant towards the recommendations as determined by your interview with the plant officials.

3. We contemplate opening a Chicago office within a fortnight. The district Director will be Mr. Chauncey Hobart. When he reaches Chicago, and opens our district office, he will communicate with you. I trust you may work out together a joint plan for completing the service in the East Chicago district.

By direction of Passed Assistant Surgeon A. J. Lanza,
medical officer in Charge.

Bernard J. Newman
Bernard J. Newman, Consultant.
U. S. P. H. S.

CONCLUSIONS AND RECOMMENDATIONS

1. The health hazards in this plant from metallic poisoning, especially lead, is considerable. Inasmuch as this hazard is greater for women than for men, due to physiologic differences, it is inadvisable, under existing circumstances to recommend the replacing of men in this plant by women, except in rare instances.
2. It is necessary for the avoidance of metallic poisoning that workmen every wheres should be protected from metallic fumes and dusts. All the melting kettles, moulds, slagruns, crushers, etc., in short all places where there is melten metal or slag, or metallic dust should therefore be equipped with suitable hoods and exhausts, under the direct supervision of an expert fume line engineer.
3. There is need of more adequate artificial ventilation in the acid plant, in order that more of the H. F. fume may be carried off.
4. There should be more adequate janitorial supervision throughout the entire plant. In addition to decreasing accident and fire risk, it would improve considerably the general appearances of the plant.
5. The privy now in use at the barracks is without vault and is not protected against flies. It might therefore easily become a large factor in typhoid epidemics, which are rather frequent in this region. The privy should be made fly proof by the addition of suitable seats and covers and a fly proof vault or by some one of the other accepted methods described in any book on hygiene and sanitation.

(1)

REPORT OF INVESTIGATION OF THE
U. S. METALS REFINING COMPANY, KENNEDY AVE.
EAST CHICAGO, INDIANA

Date of investigation - October 17th - 22nd, 1918.

Investigators - Marvin D. Shie, M. D., Scientific Assistant U.S.P.H.S.
Edw. N. Riley, Industrial Expert, Ordnance Dept., U.S.A
Mrs. Lala B. Ralston, Special Agent, Women in Industry
Service, U. S. Department of Labor.

1. INTRODUCTION

The U. S. Metals Refining Company, Kennedy Ave., East Chicago, Ind.

Superintendent - Mr. Wm. Thum.

Vice President & General Manager - Mr. F. Y. Robertson, 120 Broadway,
New York City, N. Y.

Products - Refined lead, Antimony lead, Bismuth, Dore metals-silver
and gold, Copper matte, Hydrofluoric acid and Hydro-
fluorsilicia acid, Lead Fluorsilicate solution, $Pb SiF_6$.

C ONCLUSIONS AND RECOMMENDATIONS

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2. It is necessary for the avoidance of metallic poisoning that workmen everywhere should be protected from metallic fumes and dusts. All the melting kettles, moulds, slag runs, crushers, etc., in short all places where there is molten metal or slag, or metallic dust should therefore be equipped with suitable hoods and exhausts, under the direct supervision of an expert fume line engineer.
3. There is need of more adequate artificial ventilation in the acid plant, in order that more of the H.F. fume may be carried off.
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5. The privy now in use at the barracks is without vault and is not protected against flies. It might therefore easily become a large factor in typhoid epidemics, which are rather frequent in this region. The privy should be made fly proof by the addition of suitable seats and covers and a fly proof vault or by some one of the other accepted methods described in any book on hygiene and sanitation.
6. Before any women are employed in this plant the necessary personal service facilities such as toilets, locker rooms, dining room, wash room, rest rooms, etc. should be installed and properly equipped.

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EAST CHICAGO, INDIANA

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fluorsilicia acid, Lead Fluorsilicate solution, $Pb SiF_6$.

December 28, 1918.

Mr. William Thum, Superintendent
U. S. Metals Refining Company,
East Chicago, Indiana.

My dear Mr. Thum:

Since my letter to you the Woman in Industry Service has suffered a great loss in the death of Miss May Allinson in the midst of her work as director of the survey which we are making in Indiana.

There will therefore, be delay in arranging for a visit to your plant. Another representative of our Service will be in Indiana early in January and I hope that she may then arrange with Mrs. Cox of the Industrial Board of Indiana, to talk with you.

The report of the Public Health Service does not include recommendations regarding the employment of women now that the immediate necessity for their introduction during the war has passed.

I am sorry that it has been necessary for us to delay visiting your plant.

Sincerely yours,

Mary Van Kleeck, Director,
Woman in Industry Service.

MVK/L

Dictated by Miss Van Kleeck
but signed in her absence.

383378

TELEGRAPH AND EXPRESS OFFICE
GRASSLETT, IND.

LEAD PLANT AT EAST CHICAGO
COPPER PLANT AT CHROME, N. J.

DEC 24 1918

UNITED STATES METALS REFINING CO.
EAST CHICAGO PLANT

F. Y. ROBERTSON
VICE-PRESIDENT AND GEN. MGR.

TELEPHONES { EAST CHICAGO 26
 " " 25

WM. THUM,
SUPERINTENDENT.

EAST CHICAGO, INDIANA.

Dec. 19th, 1918.

Mrs. Mary Van Kleeck, Director,
Woman in Industry Service,
U.S. Department of Labor,
Washington, D.C.

Dear Madam:-

We have your letter of Dec. 17th and in reply wish to state that while the discontinuance of the war will certainly modify to a great extent the employment of woman who has taken man's place during the war, the Company is interested as to the possibility of employing woman in some departments of our Electrolytic Refining Industry where the keener sense of observation and their careful execution of the work will make them more useful and desirable than the men.

Since this matter has had the attention of Government experts we are naturally desirous of obtaining their opinion as a guide in order that woman would not be placed in a position unsuited to her health or physique.

We thank you for the courtesy in sending Miss Allison to us to assist us in these matters and assure you that we are awaiting her visit with a feeling that preparedness on our part will expedite matters.

Sincerely yours,

Wm Thum
Wm Thum
Superintendent

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U. S. DEPARTMENT OF LABOR
WOMAN IN INDUSTRY SERVICE
WASHINGTON

December 17, 1918.

Miss May Allinson,
Hotel Claypool,
Indianapolis, Indiana.

My dear Miss Allinson:

The enclosed letter from the U. S. Metals Refining Company in East Chicago to Miss Marie W. Lambin was sent by Miss Lambin to Mrs. Ralston, and was therefore very much delayed in reaching us. We have asked the Public Health Service to send you a copy of their report on this plant, omitting from it the job analysis in which detailed recommendations are made for the employment of women. We are at the same time writing to the plant a letter of which a copy is enclosed. As this plant is manufacturing lead products, and as the reports seems to indicate that in other respects the conditions would be undesirable for women, it will probably be best not to encourage their introduction. I think, however, that it is very desirable for you to visit the plant as promptly as possible and perhaps to ask Dr. Alice Hamilton to go with you. You can reach her at Hull House.

Mr. Chauncy Hobart is to have charge of the Chicago District Office of the Public Health Service and plans to continue the work on plants in East Chicago. He will get in touch with you when he knows his office address in Chicago.

Sincerely yours,

Mary Van Kleeck

Mary Van Kleeck, Director,
Woman in Industry Service.

MVK:P

copy of manuscript...
I have to...
of...
-...

December 17, 1918;

Mr. William Thum, Superintendent,
U. S. Metals Refining Company,
East Chicago,
Indiana.

Dear Sir:

Your letter of November 23rd addressed to Miss Marie W. Lambin of the Ordnance Department has finally reached this office after being forwarded to several different persons. As the investigation in East Chicago by the Public Health Service was made before the signing of the armistice the recommendations which they would have formulated regarding the employment of women were based on the assumption that with the increasing withdrawal of men for military service it would be necessary greatly to extend the employment of women. With the changed conditions these recommendations would probably be altered.

We have several representatives of our office now in Indianapolis carrying on an investigation of women's work at the request of the Governor and the Industrial Board. I am writing in this mail to Miss May Allinson, asking her to visit your plant at her earliest convenience to give you such assistance as is possible regarding the problem of employment of women. We are also asking the Public Health Service to send to Miss Allinson at once a copy of their report on your plant so that she may discuss it with you when she visits your factory.

I might add that because lead poisoning has been demonstrated to have a more serious racial effect upon women than upon men we are urging that women should not be employed in occupations involving exposure to lead poisoning. As you doubtless know, there is ample evidence that lead poisoning of women affects the offspring. Lead poisoned women are more likely to be sterile or to suffer miscarriages or to lose their children in the first year of life. For the welfare of the race, therefore, to expose women to lead poisoning is clearly unwise.

There may, however, be other processes in your plant in which it would be possible to employ women. I am sure that Miss Allinson could be of more use to you in a discussion of these matters than I can be through correspondence.

Sincerely yours,

Mary Van Kleeck, Director,
Woman in Industry Service.

MVK:P

Your letter of November 30th was received at this office and the Director has been advised of the same. The Director has also been advised of the fact that you are interested in the employment of women in your plant. The Director has also been advised of the fact that you are interested in the employment of women in your plant. The Director has also been advised of the fact that you are interested in the employment of women in your plant.

We have several representatives in our office who are interested in the employment of women in your plant. We have several representatives in our office who are interested in the employment of women in your plant. We have several representatives in our office who are interested in the employment of women in your plant.

I think that it is possible that you are interested in the employment of women in your plant. I think that it is possible that you are interested in the employment of women in your plant. I think that it is possible that you are interested in the employment of women in your plant.

378 353

December 17, 1918.

Mrs. Lala B. Ralston,
312 Ferry Avenue,
Niagara Falls, New York.

My dear Mrs. Ralston:

At Miss Van Kleeck's request I am writing to acknowledge your letter of December eighth. Miss Van Kleeck has written to the U. S. Metals Refining Company today and is also writing to Miss Allinson asking her to visit the plant to give such assistance as is possible regarding the problem of employment of women.

Miss Van Kleeck has no information concerning the work for women in the manufacture of electric light bulbs, and asked me to suggest that you write to the Working Conditions Service in regard to this.

Sincerely yours,

P

Secretary to Miss Van Kleeck.

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December 16, 1918.

Dr. A. J. Lanza,
Working Conditions Service,
Ouray Building,
Washington, D. C.

My dear Dr. Lanza:

I wish to acknowledge receipt of the copy of the
report of investigation made at the U. S. Metals Refining
Company, East Chicago, Indiana.

Very truly yours,

P

Secretary to Miss Van Kleeck.

DEC 16 1918

U. S. DEPARTMENT OF LABOR
 WORKING CONDITIONS SERVICE
 DIVISION OF INDUSTRIAL HYGIENE AND MEDICINE
 (PERSONNEL DETAILED FROM U. S. PUBLIC HEALTH SERVICE)
 WASHINGTON

378

Dec.14,1918

Miss Mary Van Kleek, Director,
 Women-in-Industry Service,
 Department of Labor,
 Washington, D.C.

My dear Miss Van Kleek,

At the request of Dr. Lanza I am forwarding the enclosed copy of the report of the joint investigation made at the U.S. Metals Refining Co., East Chicago, Indiana. For convenience in our records, kindly acknowledge receipt.

Respectfully ,

Bernard J. Newman
 BERNARD J. NEWMAN
 Consultant, U.S.P.H.S.

DEC 11 1918

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312 Ferry Ave.,
Niagara Falls, N.Y.
December 8-'18

Miss Mary Van Kleeck,
Director of the Woman in Industry Service,
Washington, D.C.

My dear Miss Van Kleeck, - I am enclosing a letter from Mr. Thum of the U.S. Metals Refining Co. asking for a report of our investigation. I have written him saying that I have referred his letter to you.

Another letter has also come to my attention asking for information concerning the work for women in the manufacture of electric lights bulbs. I am not familiar with this work. Can you tell me what ~~the~~ hazards are connected with this particular kind of plant work or refer me to some source of information? Anything that you can do for me in this way will be appreciated.

Work at the Carborundum is progressing nicely considering the short time I have been with them. As you know there are many problems to be solved and I cannot hope to solve them in a presto-change way. ----- The dust in Lathe room number one is decreased I think but there is still room for improvement. Just now I am working on the toilet and locker problem.

I was sorry to hear that your meeting with the Employment Association of Niagara Falls had to be postponed because of the epidemic.

Thanking you for any information that you can give me in regard to the employment of women in the manufacture of electric light bulbs, I am

Most sincerely,

Lela B. Paterson

All communications should be accompanied by carbon copy and addressed to

DEC 11 1918

3 P. clock

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~~378~~

WAR DEPARTMENT
OFFICE OF THE CHIEF OF ORDNANCE
PRODUCTION DIVISION
WASHINGTON

To insure prompt attention,
in replying refer to

No. _____
Attention of _____

(COPY)

East Chicago, Ind. Nov. 23, 1918.

03-5845

WT-4050

Miss Marie W. Lambin,
Supervisor Work for Women,
Community Organization Branch,
Ordnance Dept.
Washington, D. C.

Dear Madam:

On or about October 15th to 18th, we had in our plant several Government investigations - Lieutenant Dr. W. D. Shie and Mrs. Lala B. Ralston, Special Agent Women's Industry, Department of Labor, who made an extensive job analysis of our plant operations with a view to advise us which jobs could be operated by women.

As it will be the policy of the Company even after cessation of the war to substitute some of the men's work by women, we are anxious to receive the reports of the Government investigators, so as to be guided by their suggestions.

Kindly advise us regarding this matter.

Yours very truly,

U. S. Metals Refining Co.

Wm. Thum,
Superintendent.

WT*S
CC Mr. Robertson, VP&GM.

All communications should be accompanied by carbon copy and addressed to

DEC 11 1918

WAR DEPARTMENT
OFFICE OF THE CHIEF OF ORDNANCE
PRODUCTION DIVISION
WASHINGTON

To insure prompt attention,
in replying refer to

No. _____
Attention of _____

Charleston, W. Va., Nov. 30, 1918.

CS-2845

FROM: Maria Lambin, Supervisors in Community Organization Branch
Industrial Service Section, Ordnance Dept.

TO: Mrs. Lala B. Ralston, Women in Industry Department of Labor,
Washington, D. C.

SUBJECT: Investigation in East Chicago.

I enclose a copy of a letter which I have received from the United States Metals Refining Co., asking for a report of the Government investigation made by the United States Public Health Service, at their plant.

I have written Mr. Thum that I am referring his letter to you for answer.

Very truly yours,

Supervisor of Welfare and Recreation for Women.