

THE AEROSPACE CORPORATION



Suite 4000, 955 L'Enfant Plaza, S.W., Washington, D.C. 20024, Telephone: (202) 488-6000

7005.82.aw.35  
21 July 1982

Mr. Arthur J. Whitman  
Public Safety Division  
Office of Operational Safety, (EP-323)  
U.S. Department of Energy  
Germantown, Maryland 20585

Dear Mr. Whitman:

UNIVERSAL CYCLOPS (VULCAN CRUCIBLE) SITE

Enclosed are copies of AEC contracts and letters regarding the clean-up of the subject site. With a copy of this letter I am sending Mr. Steve Miller copies of the enclosed records.

Aerospace is scheduled to review the Final Argonne survey report in order to determine the need for and priority of a remedial action at this site. This will be done using the PSD procedure for assigning priorities. Aerospace will begin this review as soon as other priorities permit.

Sincerely,

Andrew Wallo III, Project Engineer  
Environmental Controls and  
Analysis Directorate  
Eastern Technical Division

AW:sj

Enclosure

cc: S. Miller (GC)  
J. Jennings (w/o)

THIS CONTRACT, entered into as of the 16th day of August, 1946, by and between the UNITED STATES OF AMERICA (hereinafter referred to as the "Government") and VULCAN CRUCIBLE STEEL COMPANY (hereinafter referred to as the "Contractor"), a corporation duly organized and existing under the laws of the State of Pennsylvania.

WITNESSETH, THAT:

WHEREAS, the Government desires to have the Contractor roll certain uranium billets into rods, and, incidentally thereto, to perform other services, all as hereinafter provided; and

WHEREAS, this contract is authorized by and has been negotiated under the Atomic Energy Act of 1946;

NOW, THEREFORE, the parties hereto mutually agree as follows:

ARTICLE I - THE WORK

1 a. In accordance with the directions of the Commission, and under the supervision of such individuals as the Commission may designate for the purpose from time to time, the Contractor shall roll into rods the uranium billets mentioned in paragraph 2 (said material being hereinafter collectively referred to as the "billets").

b. In connection with its performance of said undertaking, and as a part thereof, the Contractor shall:

(1) Comply with such technical specifications as the Commission or the aforementioned supervising individuals may furnish the Contractor from time to time, and with the technical directions of said supervising individuals.

(2) Unload, at its plant site at Aliquippa, Pennsylvania, and weigh and store, the billets for purposes of (3) next following.

(3) Perform all work incidental to the accomplishment of, and accomplish, said rolling operation, which operation shall be effected in its twelve (12) inch mill at its aforementioned plant. ✓

(4) Quench, stamp, weigh, and, as particularly specified or directed, hot shear, bind and bundle the resulting rods.

(5) Prepare the finished material for loading, and load same on box cars (or on such other non-Contractor owned vehicles as the Commission may designate) at its aforementioned plant site.

(6) Furnish such personnel, and supplies, and utilize such of its facilities and equipment as of the date hereof first above written located in its said twelve (12) inch mill (or in or about its aforementioned plant site and normally required for the proper operation of said mill), as are necessary for the proper performance of the work referred to in this Article, provided, however, that the Contractor shall utilize its own rolls only until such time as replacements therefor are obtained and installed pursuant to (7)(i) next following.

(7) Procure (i) such rolls as are necessary for the proper performance of the work, and utilize said rolls in lieu of its own rolls as soon as practicable, (ii) rolls, to replace such of its own rolls as may have been broken or damaged, while utilized for the work, prior to their being replaced pursuant to (i), and (iii) such rolls as, from time to time in the course of the work, are necessary to replace the rolls procured pursuant to (i).

(8) Procure such items of equipment, other than equipment referred to above, as the Commission directs or approves (and the Government, at the election of the Commission does not furnish).

(9) Ship, by its truck and driver, resulting scrap, whenever and to the extent so mutually agreed upon in writing by the Contractor and the Commission (whether or not in the form of formal modifications to this contract).

(10) Be prepared to accomplish the actual rolling work (roughing and finishing) at least two consecutive weeks out of every five consecutive weeks, unless the Commission at any time or times temporarily authorizes in writing a lesser minimum period; for the purpose of this sentence, a week shall be deemed to consist of six (consecutive) nine-hour days, Monday through Saturday.

(11) To the extent required by the Commission, (i) provide exhaust ventilation of a type or types mutually agreed upon by the Contractor and the Commission, (ii) provide a central vacuum cleaner, of a type mutually agreed upon by the Contractor and the Commission, (iii) provide suitable dust collectors, of type mutually agreed upon by the Contractor and the Commission, for its ventilation system, (iv) provide means, as mutually agreed upon by the Contractor and the Commission, for preventing the spread of dust on its mill floor, (v) cleanse its mill floor and the equipment utilized hereunder, in manner mutually agreeable to the Contractor and the Commission, during and between rolling operations, (vi) render such cooperation as is necessary to enable the Commission to take air analyses samples and to make radiation surveys during rolling operations, including surveys of equipment to be scrapped, (vii) provide a system, of a type mutually agreed upon by the Contractor and the Commission, to carry furnace exhaust gases out of doors, (viii) apply a coating, of type mutually agreeable to the Contractor and the Commission, to finished rods to prevent scale, (ix) assure that its personnel wear shirts, trousers, footwear, and leather palm gloves, of types approved by the Commission, while engaged in the work hereunder, that said gloves are burned after each rolling period provided for in (10) above, that items of said footwear are not worn outside the mill, and that said shirts and trousers are turned over to the Commission for laundering after each rolling period provided for in (10) above, (x) assure that its personnel submit to pre-employment physical examinations of the type specified by the Commission, and have its personnel submit to such other physical examinations as the Commission may specify, and (xi) provide such other facilities and take such other measures, for health or safety reasons, as are mutually agreed upon by the Contractor and the Commission in writing (whether or not in the form of formal modifications to this contract).

(12) Maintain such guard forces and protective devices, and take such other security action, as the Commission directs or approves in writing.

2. The Government will cause to be delivered to the Contractor, f.o.b. its aforementioned plant site, from time to time, such uranium billets as the Commission desires to have rolled into rods hereunder. The Contractor shall promptly accept such deliveries and proceed with the performance of its work hereunder.

ARTICLE II - THE PERIOD OF PERFORMANCE

Subject to the provisions of Article V, the period of performance by the Contractor of the work hereunder shall end on August 15, 1949.

ARTICLE III - THE CONSIDERATION

1 a. In full consideration for the performance of the work hereunder, the Contractor shall be paid by the Government:

(1) At the rate of One Hundred Thirty-Two Dollars (\$132.00) per mill hour of performance under this contract. As used in the preceding sentence, the term "mill hour of performance" shall mean performance by the Contractor (with at least a 12-man crew, and pursuant to the provisions of Article 1), for one hour, of actual rolling work (whether roughing or finishing or both) in its aforementioned twelve (12) inch mill; as used in the preceding sentence, the term "mill hour of performance" shall also mean performance by the Contractor (with such of its personnel as are necessary to perform such work efficiently), for one hour, of roll-change work; as used in this sentence the term "roll-change work" shall mean (i) the actual removal of rolls under this contract at the end of each operating period provided for in 1(b)10 of Article I, and replacement of other rolls not connected with the work under this contract, (ii) the removal of rolls not connected with the work under this contract and the actual replacement of rolls under this contract, at the beginning of each such operating period, and/or (iii) the actual removal and/or replacement of rolls under this contract when breakage of rolls occurs in the course of the work hereunder.

(2) Such sums as the Contractor and the Commission mutually agree in writing (whether or not in the form of formal modifications to this contract) represent (i) the actual cost (including overhead but without profit) incurred by the Contractor solely and in direct consequence of its compliance with the provisions of 1 b (11) and/or (12) of Article I, (excluding, however, with respect to guards under 1b(12), overhead apportioned on time other than that spent by the guards in performing actual guard work hereunder), and (ii) the actual delivered cost to the Contractor for all the replacement rolls referred to in 1 b (7) of Article I, and for the equipment

procured by the Contractor in accordance with 1 b (8) of Article I, plus the Contractor's overhead for the procurement of said equipment (but not of said rolls), and (iii) the Contractor's actual cost (without overhead or profit) for labor and materials necessary to place the procured rolls, and all items of equipment referred to in 1 b (8) of Article I, in condition for actual use thereof. Any failure to agree with respect to any item of cost referred to in this subdivision shall be resolved in accordance with the provisions of Article VI.

(3) Such sum as the Contractor and the Commission mutually agree in writing (whether or not in the form of formal modifications to this contract) represents, with respect to each shipment of scrap pursuant to 1 b (9) of Article I, (i) the Contractor's actual cost (without overhead or profit) for the labor directly involved in such shipment, plus (ii) ten cents (\$.10) per mile actually travelled by the Contractor's truck (including return to the Contractor's aforementioned plant site) for the purpose of effecting such shipment. Any failure to agree with respect to any item of cost or any mileage referred to in this subdivision shall be resolved in accordance with the provision of Article VI.

b. At the written request of either the Contractor or the Commission, mailed or delivered to the other party at any time prior to March 1, 1949, the Contractor and Commission shall promptly confer to discuss the consideration provided for in a above and any changes therein that may be proposed by either or both of said parties. To the extent that it is mutually agreed by said parties that certain definitive changes in the consideration should be made, in the light of the Contractor's actual cost and other experience under this contract, and a modification to this contract, setting forth such agreement of said parties, is duly executed by the Government and the Contractor, such changes shall thereupon be considered effectuated. In the event said parties are unable to agree upon whether or not any such proposed change should be made, or upon the extent of a proposed change, the matter shall be resolved in accordance with the provisions of Article VI, and no written modification shall be necessary to effectuate any changes so resolved. If written request hereunder is made prior to March 1, 1949, any resulting changes in the consideration, whether by initial agreement or as a result of the application of the provisions of Article VI, shall be effective as of March 1, 1949.

Whether or not such written request is made prior to March 1, 1949, or, if made, whether or not changes result, at the written request of either the Contractor or the Commission, mailed or delivered to the other party prior to June 1, 1949, the Contractor and the Commission shall confer, as above provided, in regard to the consideration then in effect and proposed changes therein, and the foregoing provisions shall apply with respect to changes in said consideration; any changes resulting after such request, whether by initial agreement or as a result of the application of the provisions of Article VI, shall be effective as of June 1, 1949.

2. Anything in this contract to the contrary notwithstanding, it is understood that if and when the total of amounts paid and then payable to the Contractor hereunder equals One Hundred and Thirty-Four Thousand Dollars (\$134,000.00), the Contractor shall not be expected to incur further expenses reimbursable hereunder or to perform further hereunder, unless the Government, in the discretion of the Commission, agrees in writing to increase such limiting amount by such sum as it stipulates in said writing. In the event of any such increase or increases, the provisions of the preceding sentence shall apply with respect to the increased limiting amount. In any event, the limiting amount specified in the first sentence of this paragraph, as same may be increased as provided for in said sentence, shall represent the limit of total payments by the Government under this contract. The Contractor shall promptly notify the Commission in writing whenever it believes that said limiting amount will be insufficient for purposes of the work hereunder.

3. The Government will make payments to the Contractor monthly, or in the discretion of the Commission more frequently, based upon the work performed and the consideration provided for above. Such payments will be made after the submittal by the Contractor of duly certified invoices or vouchers, satisfactory to the Commission, and such other supporting statements or data as the Commission may require.

#### ARTICLE IV - GOVERNMENT PROPERTY

1. All items of property furnished by the Government to the Contractor hereunder shall remain the property of the Government.

2. All rolls procured pursuant to 1 b (7)(i) and (iii) of Article I, all items of equipment procured by the Contractor in accordance with 1 b (8) of Article I, and all items of property procured or otherwise furnished by the Contractor in direct consequence of 1 b (11) and/or (12) of Article I, shall be and remain the property of the Government, title thereto to pass to the Government simultaneously with the vendor's delivery thereof to the Contractor (or at such other time as the Commission may specify in writing from time to time).

3. All technical data furnished by the Contractor pursuant to or developed in connection with the work hereunder shall be and remain the property of the Government.

4. All items of property referred to in paragraphs 1 and 2 above (including resulting products, residues, salvage and scrap, and including work in process), and all items of property referred to in paragraph 3 above, are collectively referred to in this contract as "Government property". The Contractor shall promptly notify the Commission of any loss or destruction of or damage to Government property (but not of any consumption as a part of the performance of the work, nor of any lost, destroyed or damaged technical data which are worthless from monetary, practical and security standpoints). Unless the Commission otherwise consents in writing, Government property shall not be utilized for any work or purpose other than the work under this contract.

5. To the extent mutually agreed upon in writing by the Contractor and the Commission at any time or times (whether or not in the form of formal modifications to this contract), the Contractor may dispose of items of Government property. Such disposals shall only be made upon such terms and conditions, and to such parties (including the Contractor) as the Commission approves in writing. The proceeds of all such disposals shall be paid (or otherwise credited) to the Government in such manner as the Commission directs.

#### ARTICLE V - TERMINATION

1. The provisions of this Article shall apply with respect to termination of performance of the work under this contract for reasons other than the default of the party to whom a notice of termination is given as provided for below; this Article does not purport to cover any termination for default.

2. The performance of the work under this contract may be terminated:

- a. by the Government, at any time, whenever the Commission, in its discretion, considers such termination to be in the best interest of the Government and mails or delivers a notice of termination to the Contractor stating that



Contract No. AT(30-1)-407  
Supplemental Agreement No. 2

SUPPLEMENTAL AGREEMENT

THIS SUPPLEMENTAL AGREEMENT, entered into the 21st day of April, 1949, by and between the UNITED STATES OF AMERICA (hereinafter referred to as the "Government"), and VULCAN CRUCIBLE STEEL COMPANY (hereinafter referred to as the "Contractor");

WITNESSETH, THAT;

WHEREAS, as of the 16th day of August, 1948, the Government and the Contractor entered into Contract No. AT(30-1)-407, for the rolling of uranium billets into rods; and

WHEREAS, it is advantageous to the Government to modify said contract, as hereinafter provided; and

WHEREAS, this Supplemental Agreement is authorized by and has been negotiated under the Atomic Energy Act of 1946;

2. Paragraph 5 of Article V is deleted and the following new paragraph 5 is substituted therefor:

"5. Upon termination of the performance of the work under this Article, the Contractor (i) shall be paid by the Government all sums due it (pursuant to the provisions of Article III) for the work performed up to and including the effective date of termination and not theretofore paid for, (ii) shall take such steps to protect and return Government property in its possession or custody under this contract as the Commission requires or approves, (iii) shall take such health and safety measures as the Commission requires or approves, and (IV) shall be paid for the close-out steps and measures referred to in (ii) and (iii) such lump-sum as the Contractor and the Commission mutually agree in writing represents the actual cost (including overhead, but no profit) to the Contractor for the taking of such steps and measures; failure to agree upon such amount shall be resolved in accordance with the provisions of Article VI."

PU:HR

September 12, 1949

Mr. J. D. Flower  
Vulcan Crucible Steel Company  
Aliquippa, Pennsylvania

Subject: CLEAN-UP AND PROPERTY DISPOSAL

Gentlemen:

Reference is made to the visit to your plant of our Messrs. Blatz, Moren and Reichard on July 21, 1949 during which radiation and air-borne dust measurements were made and Government-owned property disposition discussed.

It was concluded that the following degree of clean-up had been achieved:

1. Radiation from the steel plant floor had been reduced to a satisfactory level.
2. Radiation from certain brick floor portions, a small dirt floor section, the pits under the rolls, the furnace top, the steel furnace plates, and roll guide plates had not been reduced to satisfactory levels.
3. Residual radiation from the five (5) Government-owned rolls was measurable.
4. The outer scale pile and the water and sludge from the mill cooling water sump showed no significant radiation.
5. Air-borne dust samples were all well under the preferred level of uranium content except the one taken during sweeping.

Authorization is hereby given for you to perform the following property disposal work as agreed on July 21, 1949 and subsequent conversations:

1. The vacuum cleaner including the producer, collector, piping, hoses, floor tools, switch box-controller, and guard railing will be dismantled and crated, if necessary, and prepared for shipment to a location to be specified by us in the near future.
2. The "Vaneaxial" Fan and motor including the flanged duct section into which they were incorporated, and the switch box-controllers will be dismantled and shipped to the Vitro Manufacturing Company, Canonsburg, Pennsylvania, Attention: Mr. H. Fleck.

cc: Dr. Wolf  
J. S. Quidor  
R. W. Kirkman

Audit (2)  
Fiscal Accounting  
Legal Division

Property Division

3. The aluminum hoods and telescoping aluminum duct sections will also be removed and shipped without crushing to the Vitro Company as above.
4. The floor grating section will be shipped with the aluminum hoods to Vitro.
5. It being understood that you have verbally agreed to such abandonment (which we would like you to confirm in writing), the Commission elects to abandon the following Government-owned equipment and transfer title to same from the Government to the Vulcan Crucible Steel Company at no cost to either party:
  - a. Corrugated steel partitions enclosing the weighing and loading room.
  - b. The fixed sheet steel portion of the ventilation ductwork extending from about six feet above the mill frame through and above the roof.

You are hereby requested and authorized to take the following steps toward completing decontamination of mill:

1. Burn two remaining benches and ship ashes to Vitro together with drums of residues already collected.
2. Ship the oxide pans and furnace plates to Vitro.
3. Vacuum clean furnace tops and floor areas designated as still contaminated and ship collected dust to Vitro.
4. Replace the brick floor in the area used as a rest space by the workers in the winter season. Good bricks should be turned upside down and relaid. Broken bricks should be replaced with new bricks. Place discarded bricks and the dirt between the bricks in a container and ship to Vitro.
5. Clean mill guide plates in the same manner as the steel floor plates.
6. Clean pits underneath mill as thoroughly as possible, removing all grease from the corners. Place material cleaned up in a container and ship to Vitro.

Following completion of the above work, our Medical Division may wish to make further measurements.

In regard to disposal of the five (5) rolls, we are, of course, interested in the disposal method which is to the best interest of the Commission. In order to help this office ascertain which method is to the best interest of the Commission, it is requested that you furnish the following estimates:

1. Cost of necessary packing, crating and freight charges of the equipment, as is, to Buffalo, New York.

Vulcan Crucible Steel Company  
September 17, 1949

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2. Costs of decontaminating by heating until scaling occurs and then scraping until clean and selling as scrap metal to public.

3. Estimates of the cost of machining the roll surface for use in steel rolling and of the value of the rolls if so machined and offered for sale.

If you have any questions on the above matters, please communicate with us. We wish to thank you again for cooperating in carrying out the subject work.

Very truly yours,

F. M. Belmore, Authorized Representative,  
U. S. Atomic Energy Commission

VULCAN  
CRUCIBLE  
STEEL

W. M. Bolmore, Director, Production Division

January 12, 1950

Merril Eisenbud, Director, Health and Safety Division

CONTAMINATION AT VULCAN FOLLOWING FIRST CLEANUP



REFER TO  
SYMBOL: BH:ARF

On December 30, 1949, Mr. Piccot of our Radiation Branch visited the Vulcan Crucible Steel Co. for the purpose of checking the residual contamination left in the mill after efforts had been made at plant cleanup.

In general, the cleanup was done fairly well considering the fact that the Vulcan personnel had no detection instruments to use as a guide. The rolls have been dressed by machining and the contamination has been reduced to an insignificant level (none detectable except on the necks). The sections of brick floor which Mr. Blatz recommended were to be removed have been relaid with new bricks. The vacuum cleaner and its equipment; the "Vanoaxial" fan and its equipment; the aluminum hoods, floor gratings, oxide pans and furnace plates and contaminated benches have all been shipped to Vitro.

Some parts of the building and equipment have still not been reduced to a satisfactory level of contamination. In particular, the pits under the rolls still indicate high radiation levels from uranium embedded in the grease and remote crevices and corners. Various guide plates also indicated high contamination and should be cleaned. Sections on top of the furnaces still appear to have visible oxide dust present and should be vacuumed as well as the doors on the furnaces and the floor under the doors.

The writer believes that the above cleaning should be done by Vulcan before making another survey. After this has been done, Mr. Piccot could probably return to Vulcan with instruments and direct the cleaning and vacuuming of a few sections of floor which are still contaminated. If a vacuum cleaner is not available for this work, one should be secured for temporary use or a domestic cleaner purchased for the purpose.

January 19, 1950

Mr. J. O. Flower  
 Vulcan Crucible Steel Company  
 Aliquippa, Pennsylvania

Subject: CLEAN UP AND PROPERTY DISPOSAL

Dear Mr. Flower:

Reference is made to your letter of January 11, 1950 and your subsequent discussions with our Messrs. Blatz, Picoot and Reichard.

It was agreed that the major portion of clean up had been finished. The remainder of the work involves apparently some local hand brushing, scraping, scrubbing and vacuum cleaning. We are awaiting your advice as to what period in the next few weeks you will be able to fit in this clean up work. It was the consensus that the Health and Safety Division representative would be present to take readings during the latter part of the clean-up work and remain there until all parts of the mill were at an acceptable radiation level. It was understood that you would start some of the clean-up work in the pits in advance of the Health and Safety Division representative's visit. The time period of Contract AT(30-1)-407 will be extended to February 25 to cover this final cleaning operation.

As approved by our Health and Safety Division, title to the three roughing rolls and two finishing rolls is hereby transferred to Vulcan Crucible Steel Company as provided in Settlement #4 of our letter of October 17, 1949, reference AM:JHM-R & S 4782.

Mr. E. Smith of our Audit Branch was in telephone contact with your Mr. W. Campbell in an effort to make a final settlement of the three 1948 invoices upon which you claim payment. It is believed that this matter can be settled to our mutual satisfaction after a brief checking of records which is now being done.

Very truly yours,

F. M. Belmore  
 Authorized Representative of the  
 U. S. Atomic Energy Commission

cc: M. Eisenbud, Health & Safety Div. ✓  
 Audit (2)  
 Fiscal Acctg.  
 Contract Control

PG:MER

September 13, 1949

Mr. J. O. Flower  
Vulcan Crucible Steel Company  
Aliquippa, Pennsylvania

Subject: CLEAN-UP AND PROPERTY DISPOSAL

Gentlemen:

Reference is made to the visit to your plant of our Messrs. Blatz, Horen and Raichard on July 21, 1949 during which radiation and air-borne dust measurements were made and Government-owned property disposition discussed.

It was concluded that the following degree of clean-up had been achieved:

1. Radiation from the steel plant floor had been reduced to a satisfactory level.
2. Radiation from certain brick floor portions, a small dirt floor section, the pits under the rolls, the furnace top, the steel furnace plates, and roll guide plates had not been reduced to satisfactory levels.
3. Residual radiation from the five (5) Government-owned rolls was measurable.
4. The outer scale pile and the water and sludge from the mill cooling water sump showed no significant radiation.
5. Air-borne dust samples were all well under the preferred level of uranium content except the one taken during sweeping.

Authorization is hereby given for you to perform the following property disposal work as agreed on July 21, 1949 and subsequent conversations:

1. The vacuum cleaner including the producer, collector, piping, hoses, floor tools, switch box-controller, and guard railing will be dismantled and crated, if necessary, and prepared for shipment to a location to be specified by us in the near future.
2. The "Vaneaxial" Fan and motor including the flanged duct section into which they were incorporated, and the switch box-controllers will be dismantled and shipped to the Vitro Manufacturing Company, Canonsburg, Pennsylvania, Attention: Mr. H. Fleck.

cc: Dr. Wolf  
J. S. Quidor  
R. W. Kirkman

Audit (2)  
Fiscal Accounting  
Legal Division

Property Division

3. The aluminum hoods and telescoping aluminum duct sections will also be removed and shipped without crushing to the Vitro Company as above.
4. The floor grating section will be shipped with the aluminum hoods to Vitro.
5. It being understood that you have verbally agreed to such abandonment (which we would like you to confirm in writing), the Commission elects to abandon the following Government-owned equipment and transfer title to same from the Government to the Vulcan Crucible Steel Company at no cost to either party:
  - a. Corrugated steel partitions enclosing the weighing and loading room.
  - b. The fixed sheet steel portion of the ventilation ductwork extending from about six feet above the mill frame through and above the roof.

You are hereby requested and authorized to take the following steps toward completing decontamination of mill:

1. Burn two remaining benches and ship ashes to Vitro together with drums of residues already collected.
2. Ship the oxide pans and furnace plates to Vitro.
3. Vacuum clean furnace tops and floor areas designated as still contaminated and ship collected dust to Vitro.
4. Replace the brick floor in the area used as a rest space by the workers in the winter season. Good bricks should be turned upside down and relaid. Broken bricks should be replaced with new bricks. Place discarded bricks and the dirt between the bricks in a container and ship to Vitro.
5. Clean mill guide plates in the same manner as the steel floor plates.
6. Clean pits underneath mill as thoroughly as possible, removing all grease from the corners. Place material cleaned up in a container and ship to Vitro.

Following completion of the above work, our Medical Division may wish to make further measurements.

In regard to disposal of the five (5) rolls, we are, of course, interested in the disposal method which is to the best interest of the Commission. In order to help this office ascertain which method is to the best interest of the Commission, it is requested that you furnish the following estimates:

1. Cost of necessary packing, crating and freight charges of the equipment, as is, to Buffalo, New York.



Vulcan Crucible Steel Company  
September 17, 1949

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2. Costs of decontaminating by heating until scaling occurs and then scraping until clean and selling as scrap metal to public.
3. Estimates of the cost of machining the roll surface for use in steel rolling and of the value of the rolls if so machined and offered for sale.

If you have any questions on the above matters, please communicate with us. We wish to thank you again for cooperating in carrying out the subject work.

Very truly yours,

F. M. Belmore, Authorized Representative,  
U. S. Atomic Energy Commission

*ALLIANCE, Pa.*  
VULCAN CRUCIBLE STEEL CO.

OCCUPATIONAL EXPOSURE TO RADIOACTIVE DUST

VISIT OF FEBRUARY 15-16, 1949

PURPOSE

During the period of February 15-16, 1949, dust samples were collected by Messrs. Paul B. Klevin and Alfred J. Breslin, NYOO. This survey was planned bearing in mind the following objectives:

- 1) To estimate the cumulative exposure to personnel employed on the A.E.C. Project.
- 2) To provide a basis for future control designs and procedures.
- 3) To provide evidence for justification of future radioactive dust control recommendations.

RESULTS OF STUDY

It is apparent from the data that the entire group of employees is exposed to concentrations of alpha emitting dust which are above the preferred level. Of the 26 plant employees considered, 20 are exposed to over 10 times this level. The plant personnel exposures can be broken down as follows:

- 1) Our data indicate that 4 men (16%) are exposed to alpha emitting material in concentrations approaching 5000 times the preferred level. It was noted during the sampling that relatively large flakes of scale were being thrown from the rods at this operation. The above concentration may therefore represent some number of large, non-respirable particles, and not be a true indication of exposure.
- 2) Two men (8%) are exposed to concentrations of 23.7 times the preferred level.
- 3) Fourteen men (56%) are exposed to 10.1-16.0 times the preferred level.
- 4) The remaining 5 employees (20%) are exposed to 2.7-5.8 times the preferred level.

From the exposures listed above, the present survey indicates the urgent need for improved control measures. In order to reduce the exposure of the employees to these toxic materials, the following control recommendations were made to Vulcan Crucible Steel Co. on November 16, 1949:

- 1) Exhaust ventilation be provided over each of the operating rolls with a minimum air velocity of 500 feet per minute inward to the face of each hood.

- 2) A central industrial vacuum cleaner be installed which would allow rapid and efficient cleaning of the entire rolling area.

To date the vacuum cleaner is in satisfactory operating condition but the ventilation over the rolls is inadequate.

Because of a long delivery delay which held up installation of the recommended exhaust equipment, temporary ventilation over the rollers was provided for this rolling by the installation of an old King Scruplex Fan. Measurements made on the above sampling dates showed that there was an air velocity of only 200-300 linear feet per minute through the face of both hoods as compared with the recommended 500 linear feet.

#### METHOD OF STUDY

The radioactive dust samples were collected on 1-1/8" diameter Whatman #41 filter discs, using a standard Fisher pump employed by the Medical Division, NYOO, a Wilson pump, and a small, light, air compressor with a Universal motor. The rate of flow found to be most suitable for collection purposes at the concentrations sampled was 0.0175 cubic meters per minute. The collection period varied from 30 seconds to 45 minutes, depending upon conditions of operation and dust loading. All dust samples collected were counted on a flat plate alpha counter at the New York Health Instruments Laboratory. Attached to this report are the dust sample records, containing both general air and breathing zone samples which have been used in all calculations to evaluate the employees' exposure to radioactive dust.

#### I Operational Process at the Mill

- A. The billets of uranium metal are heated in the furnace to a suitable rolling temperature.
- B. The billets are taken out of the furnace by the drag-down operator, who conveys the billets (by means of a buggy) to the north side of the roughing roll.
- C. The billets are passed through the roughing roll twice and lengthened into rods of rough dimensions.
- D. The rough rods are then passed through a finishing roll.
- E. The rods are dragged to shears, cut in two and then dragged back to a quenching area for marking and descaling.
- F. The rods are conveyed to the receiving and shipping room and are weighed and recorded and are then stored in box cars.

II. The complete job location and breakdown of personnel whose exposures are being evaluated are simple enough to be included on the Job Analysis Sheets.

### III Job Analysis Sheets - Purpose

The Job Analysis Sheets give a detailed analysis of the operational time relationship of each employee at the rolling mill. This consists of a statement of total time spent on a particular job with an additional breakdown as to the number of minutes and the number of times each task is performed each shift. In addition, the average alpha concentration, as obtained from the Sample Record Sheets, is recorded. The average alpha concentration, multiplied by the total time, is depicted in the last column. The average alpha concentration per 9-hour work day is determined by dividing alpha concentration by total time by the number of hours (minutes) per shift.

Finally, assuming that the average man inhales 10 cubic meters of air per day, the daily alpha inhalation can be determined by multiplying the average alpha concentration by 10 cubic meters.

The intensity of the beta activity of radioactive dust was noted. However, these dusts present a minor hygienic hazard as compared with the alpha emitting dust.

### DISCUSSION

The information contained in the Job Analysis Sheets is summarized in Table I below. It should be recognized that in evaluating the quantity of dust inhaled we estimate the relationship of any given sample to the worker's total exposure time. We have endeavored to obtain complete job analysis for all operations, but it is understood that errors in judgment and irregularities of operation are likely to produce deviations of more or less importance. However, we are of the opinion that the data as summarized represent a fair estimate of the levels to which employees are exposed. The preferred alpha level of 70 disintegrations per minute per cubic meter for alpha emitting dust is based on animal studies. To date there has been insufficient industrial experience with uranium to make it possible for us to state to what extent this level affords a margin of safety for the workers.