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Benedict

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REPORT NO. ✓
KZ 2661

October 11, 1944
KB:1b

OFFICE OF J. H. ARNOLD
Noted *JAC*

MEMORANDUM OF MEETING
October 10, 1944

A.M. 7:30 P.M. 10:15

VENTILATION AND DECONTAMINATION
OF COLD TRAP ROOMS

KZ 2661
KZ 2661

...information affecting the national
...the meaning of the
...transmission of

PRESENT

- Kellogg Corporation
- Dr. R. Rosen
- Mr. H. W. Evans
- Mr. A. J. Fruit
- Mr. J. Keranen
- Dr. M. Benedict

Carbide & Carbon
Dr. A. S. Parker

1944

Mr. Evans described the ventilating system presently planned for sections -2, -1, 1, 2a and 2b. Three ventilating fans are specified, one providing 8 changes of air per hour, and each of the other two providing 15 changes per hour. The smaller fan runs quietly, but each of the larger fans makes considerable noise. The cold trap room should be run at pressure slightly below atmospheric to prevent leakage of the contents of the room into the adjacent basement area or into ventilating ducts passing through the room, both of which are also below atmospheric pressure.

Dr. Parker stated that Carbide preferred not to discharge gases or dust containing X outside of the building through the ventilating system. All present were agreed that even at the highest ventilating rates it was not certain that all of the X leaking into the room from cold traps would be picked up by the ventilating system and that special decontamination would be necessary. The high noise level of the high speed fans was considered objectionable. To overcome some of these objections to the present ventilating system, and to provide a definite basis for the ventilating system in other sections of the plant, the following conclusions were reached:

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for Arvin J. Z... 4/19/66
Technical Information Officer Date
Oak Ridge K-25 Site

Carbide and Carbon Chemicals Corporation, Operating Contractor for the U.S. Atomic Energy Commission.

U-MT 11/17/44

U082 3/28/54

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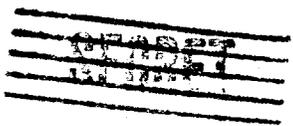
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Debra Smith 1-2-90
(Person making change) (date)

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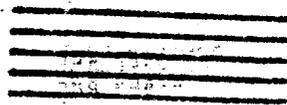
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1. One fan providing 8 changes of air per hour is to be installed in each cold trap room.
2. Filters are to be installed in each ventilating system, suitable for the rates of air flow corresponding to 8 changes per hour, and of sufficient area to pick up the following weights of KO_2F_2 .

<u>Section</u>	<u>Total Pounds KO_2F_2</u>
-3	100
-2	256
-1 & 1	458
2a	256
2a Purge	216
2b	154
2b Purge	250
3a	60.8
3b	41
4	13.6
K-312	13.6

It was definitely agreed that these filters should be installed in sections 3a, 3b and 4, and the K-312 series of buildings, and that it would be very desirable to install them in the other sections of the plant, if at all practicable. Mr. Evans agreed to select filters, tentatively, for this service, and to give them to Dr. Rosen and Dr. Benedict for test of efficiency on KO_2F_2 . Dr. Rosen and Dr. Benedict were to work out means for recovering X from the filters and protecting them against explosion hazards.



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3. Because of the relatively small weights of process gas which would escape into the cold trap rooms, complicated piping and wiring in these rooms, the difficulty of installing floor drains at the present stage of construction, and the hazard associated with the use of water in these rooms, it was decided not to use water washing or to provide floor drains in any of the cold trap rooms in Section 300.
4. Dr. Rosen agreed to arrange a series of experiments with the S.A.M. laboratory to determine the relative advantages of vacuum sweeping or blowing with air in removing XO_2F_2 deposited in cold trap rooms.
5. Dr. Parker agreed to outline to Dr. Rosen the kind of experiments of this type that Carbide would like to see carried out.
6. Dr. Benedict agreed to draft a letter for transmittal to Dr. Teller inquiring if an explosion hazard existed in the event of leakage from the cold traps into the cold trap rooms. For this purpose, the dimensions of the room were to be taken as 38' X 27' X 18'.

Mr. Keranen agreed to provide Dr. Benedict with the length and diameter of the principal water mains running through the rooms.

WB:AO

cc:

Mr. J. H. Arnold
 Mr. A. L. Baker
 Dr. M. Benedict
 Mr. R. G. Edmonds
 Mr. H. W. Evans
 Mr. A. J. Fruit
 Mr. P. C. Keith
 Mr. J. Keranen
 Mr. H. D. Kinsey
 Dr. A. S. Parker
 Dr. R. Rosen
 Mr. C. N. Rucker

M. Benedict
 M. Benedict

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REPORT NO.
KZ 2905

October 16, 1944

MEMORANDUM OF MEETING

VENTILATION OF COLD TRAP ROOMS

Plant Records Form	
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KZ 2905 4 A



A meeting was held in Dr. Benedict's office at 2 PM, Wednesday, October 17, 1944, to discuss ventilation of cold trap rooms in Section 300.

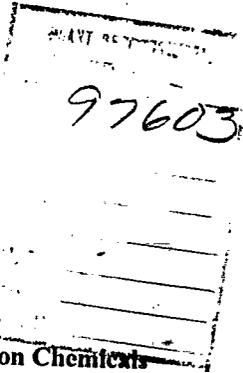
Those present were:

- | | |
|-----------------------|--------------------|
| <u>Kellex</u> | <u>Carbide</u> |
| Dr. M. Benedict | Mr. R. G. Edmonds |
| Mr. H. W. Evans | Dr. A. S. Parker ✓ |
| Mr. K. Van Valkenburg | |

At a previous meeting on the same subject Mr. Evans had agreed to investigate the use of filters to remove dust formed by hydrolysis of C-616 from the air discharged by the ventilating systems. C-616 would be present in the air if cold trap equipment operating above atmospheric pressure were to spring a leak. Mr. Evans reported that he had found that filters would not remove dust particles in the expected size range under 10 microns, and that he was proposing the use of Cottrell electrostatic precipitators, instead. The principal purpose of this meeting was to determine if Cottrell precipitators should be used on the air from all cold trap rooms, or if the air from some of the rooms, notably those of Case I, might not be discharged without removal of X-bearing dust.

Mr. Evans described the installation required to treat the air from all cold trap rooms. Four systems, each consisting of one Cottrell precipitator and four fans would take air at a rate of approximately 3000 CFM from each cold trap room in the following groups of buildings:

System	Buildings
#1	K-311-1 K-310-1,2,3 K-309-1,2,3 K-301-1 to 5 K-302-1 to 5 Product system K-302-5
#2	K-303-1 to 10 Product system K-310-10
#3	K-304-1 to 5 Carbide and Carbon Chemicals Corporation, Operating Contractor for the U.S. Atomic Energy Commission.
#4	K-305-1 to 12 K-306-1 to 7 K-312-1 to 3



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Technical Information Officer
Oak Ridge K-25 Site

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James W. Healy 4/15/96
All other ADD signatures (with review) / Date
J. W. Healy 4/16/96
All signatures (with review)

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by authority of: JD McGaugh Jr (K-25/LMES)
Classification Specialist

(CG-PGD-4) 4/16/96

(Authorized Classifier's name and organization)

J. D. McGaugh Jr

(Person making change)

4/17/96

(date)

J. S. Barton

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It was estimated that each Cottrell installation would cost \$25,000 - \$50,000 more than individual fan installations without Cottrells. Delivery is promised in six months but may be improved to possibly three months. Individual fans as an alternate were estimated to be obtainable in about 18 weeks.

The engineering for individual fan installations is substantially complete. Engineering time required for design of an outside duct system for the Cottrell installation was estimated to require a week or so. Each Cottrell is approximately 20 feet in diameter by 30 feet high, and would require a stack and small building in conjunction with it.

Two possible reasons for adoption of the Cottrell installations were examined:

- (1) Physiological -- to eliminate possible hazard in discharging X to the plant environment.
- (2) Economic -- to recover valuable enriched X.

Divergent views were held concerning the gravity of the physiological hazard. Dr. Parker and Mr. Edmonds pointed out that in the event of a serious break in a cold trap in a K-301 building, 400 pounds of X-bearing dust might be discharged from the cold trap room. When diluted to a concentration of 150 milligrams per cubic meter, a thousand times the safe concentration for chronic exposure, this would form a cloud 36 feet deep over a 1,000,000 square foot area. Dr. Parker stated that Carbide would be unwilling to expose operating personnel to a hazard of this nature.

The Kellex view was that the hazard attendant on discharge of 400 pounds of C-616 was not serious enough to warrant installation of Cottrell precipitators to remove X-bearing dust. Dr. Benedict pointed out that the problem had been presented to the Army Medical Section by Dr. Rosen, and that Colonel Warren had replied in a letter dated June 26, 1944, as follows:

"Reference your verbal request of 13 June 1944 for recommendations on practices to be followed in the event of leakage of C-616 into the cold trap room.

"It is understood that amounts of 13 to 458 pounds conceivably could leak into the room. It is considered unlikely that frequent leaks will occur. Dr. M. Benedict has pointed out that only in an exceptional case would any great amount be lost into the room before the leak could be controlled.

"It is understood, further, that the cold trap rooms are being provided with the exhaust ventilation capable of producing 25 to 30 air changes per hour.

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"If leakage occurs in an amount great enough to exceed the capacity of the exhaust system, all persons should leave the room at once, and not re-enter until the C-616 has been exhausted. Any person who has to re-enter the room before all the material has been removed should be outfitted with the safety equipment designated in Safety Committee Bulletin SM-1.

"It seems advisable to have the ventilating system in continuous operation. However, it might be wise to determine whether or not that practice increases the dustiness of the room under normal operating conditions by making analysis of the concentration of the dust in the air while the fans are not running and with them in use:

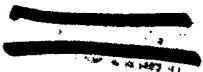
"At the start the exhaust systems should be operated without dust collectors unless it is economically unwise, in a particular area, to let any dust escape. No hazard is anticipated, from a medical standpoint, in operating the exhausts without collectors."

In view of Colonel Warren's recommendations, Kellex did not favor installation of precipitators except where economically justified.

To determine where Cottrells would be economically justified, Dr. Benedict presented data on the probable value of material lost from cold traps. It was assumed that, on the average, 4.7% of the inventory of one cold trap in each building would escape into the cold trap room and be carried off through the ventilating ducts, per year. The value of enriched C-616 was taken as \$142,000 per pound, on the assumption that 1,400 pounds of enriched C-616 would be produced during a life of one year for a plant costing \$200,000,000. On these bases, a reasonable cost of equipment to recover C-616 from each cold trap room is as follows:

<u>Building</u>	<u>Maximum Trap Inventory, Pounds C-616</u>	<u>Average Mol Fraction 25</u>	<u>Dollar Value of Probable Loss of C-616</u>
** K-311-1	100	0.0050	--
* K-310-1,2, or 3	256	0.0057	--
K-309-1,2, or 3	458	0.0066	--
K-301-1,2,3,4, or 5	458	0.0078	2,130
* K-302-1,2,3,4, or 5	256	0.0099	4,820
* K-302-5 (Purge)	216	0.0119	6,960
All above buildings	--	--	41,710
** K-303-1	154	0.011	4,200
** K-303-2	154	0.012	5,050
** K-303-3	154	0.013	6,150
** K-303-4	154	0.0145	7,650
** K-303-5	154	0.0158	9,100
** K-303-6	154	0.0172	10,500
** K-303-7	154	0.0190	12,400

* = Case I
** = Case II



(Cont'd)

<u>Building</u>	<u>Maximum Trap Inventory, Pounds C-616</u>	<u>Average Mol Fraction 25</u>	<u>Dollar Value of Probable Loss of C-616</u>
K-303-1 through 7	—		55,050
K-303-8	154	0.0208	14,200
K-303-9	154	0.0228	16,200
K-303-10 (Purge)	250	0.0279	36,400
K-304-1,2,3,4, or 5	61	0.0346	11,400
K-305-1,2,..., or 12	41	0.072	17,900
K-306, 1,2,..., or 7	13.6	0.229	20,300
K-312-1,2, or 3	13.6	0.366	33,000

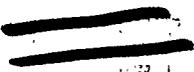
From these data, it was concluded that it would not be necessary, from the economic standpoint, to recover X from the air leaving cold trap rooms in buildings from K-311-1 to K-303-7. In the remaining buildings, comprising the north and west sides of Section 300, recovery by two Cottrell systems was considered economically justified, as shown in the following tabulation:

<u>Buildings</u>	<u>Dollar Value of Probable Loss</u>
K-303-8,9,10 and 10 (Purge))	267,600
K-304-1 to 5)	
K-305-1 to 7)	
K-305-8 to 12)	300,000
K-306-1 to 7)	
K-312-1 to 3)	

Kellex favored the installation of precipitators for these two groups of buildings and individual ventilating fans, without precipitators, for the remaining buildings, the east side of Section 300. It was impossible to reconcile this view with Carbide's preference for four Cottrell precipitators treating all buildings of Section 300. The matter was therefore referred to Mr. Keith and Dr. Felbeck for decision.

K. Van Valkenburg
K. Van Valkenburg

cc: Messrs. J. H. Arnold P. C. Keith
M. Benedict A. S. Parker
R. G. Edmonds R. Rosen
H. W. Evans K. Van Valkenburg
G. T. Felbeck
A. J. Fruit



ChemRisk/Shonka Research Associates, Inc., Document Request Form

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H. Van Valkenburg

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7 13
October 26, 1944

MINUTES OF MEETING
VENTILATION OF COLD TRAP ROOMS

REPORT NO. ✓
KZ 2907

A meeting was held in the 11th floor conference room, 233 Broadway, N. Y. C., Wednesday, October 25th, 1944, to discuss factors to be taken into consideration in designing proper methods of ventilating the cold trap rooms, based on Captain Ware's experience with similar problems at other locations.

Those present were:

- Capt. Ware - U. S. Engineers
- Dr. H. Benedict - Kellogg
- Dr. T. W. DeWitt - S. A. M.
- Mr. H. W. Evans - Kellogg
- Mr. A. J. Fruit - Kellogg
- Mr. J. Keranen - Kellogg
- Dr. R. Landau - Kellogg
- Dr. A. S. Parker - Carbide
- Mr. K. Van Valkenburg - Kellogg

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Serial	
File No.	

After a discussion of the general dimensions and layout of the cold trap rooms and their relationship to the balance of the buildings and the general building ventilation system, the following tentative recommendations were developed, to be subject to more detailed check:

1. Each cold trap room should be separated from the rest of the building by means of an air lock chamber which is maintained at a pressure approximately 0.25" w.g. higher than that in the cold trap room or in the surrounding building by means of suitable fans.
2. Each cold trap room should be ventilated with the minimum number of air changes representing comfort levels, air being drawn for this purpose from the surrounding air lock chamber. Operating personnel will work inside the cold trap rooms, except when a leak occurs.
3. An instrument should be developed which will indicate an increase of the amount of C-616 in the air beyond one part per hundred million. When this occurs, all persons in the room should leave.
4. After all persons have left the room, the circulation of air through the room will be restricted, to reduce loss of valuable material and to prevent contamination of plant surroundings with X dust.

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Thomas W. Selby 4/15/96
John G. Quinn 4/16/96
 Approved (Name, Title, Date)
 Approved (Name, Title, Date)

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by authority of: JD McLaugh Jr (K-25/LMES)
Classification Specialist

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to the public by *John G. Quinn 4/19/96*
 Technical Information Officer Date
 Oak Ridge K-25 Site

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5. After a bad leak or equipment failure, it will be necessary for operators in properly protective clothing to enter the room and clean it by means of vacuum cleaners or other suitable equipment.

Mr. Fruit agreed to study these proposals in detail and obtain executive approval for them.

Dr. Landau agreed to discuss with Dr. Rosen experiments to be carried on by S.A.M. designed to determine how C-616 material will act under various emergency conditions approximating those expected in the cold trap rooms.

Dr. Benedict agreed to present the problem of developing the C-616 indicator to the Instrument Department.

K Van Valkenburg
K. Van Valkenburg

KVV:thb

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