U.S. ATOMIC ENERGY COMMISSION

DIRECTORATE OF REGULATORY OPERATIONS

REGION I

RO Inspection Report No: 74-01 Docket No: 40-86

Licensee: W. R. Grace License No: STA-422

Davidson Chemical Division Priority: III

P. O. Box 188 Category: E

Location: Pompton Plains, New Jersey 07444

Type of Licensee:

Type of Inspection: Special Closeout

Dates of Inspection: July 31, August 1, 2, 1974 and September 20, 1974

Dates of Previous Inspection:

Reporting Inspector: Robert O McClintock for Oct 8, 1974
E. Epstein, Radiation Specialist Date

Accompanying Inspectors: Date

Date

Date

Date

Other Accompanying Personnel: Date

Reviewed By: Robert O McClintock Oct 8 1974
R. McClintock, Senior Radiation Specialist Date

SUMMARY OF FINDINGS

Enforcement Action

None

Scope of Inspection

A. A special inspection was conducted on July 31, August 1, 2, 1974, at the licensee's facility at Pomptom Plains, New Jersey to review the licensee's submittal to Materials Licensing requesting termination of License No. STA-422.

B. A second inspection was conducted on September 20, 1974, to review the licensee's revised submittal to Materials Licensing and to resurvey those areas that were above guideline levels during the August inspection.

REPORT DETAILS

1. Personnel Contacted

Mr. B. L. Mobley, Supervisor, Environmental Control, W. R. Grace Company
Mr. Paul B. Klevin, Consultant to the licensee
Mr. Robert Gallegar, President of Applied Health Physics, Bethel Park, Pennsylvania
Mr. R. Russo, State of New Jersey on September 20, 1974

2. Initial Survey

a. The inspector learned that a decontamination effort was performed by personnel from W. R. Grace and personnel from Applied Health Physics. The decontamination job took from March 11, 1974 to July 18, 1974.

b. During the initial visit, the inspector made 67 readings using an Eberline Model PAC 15A Scintillation alpha counter calibrated July 8, 1974, by BNL. The surveys were to determine the total alpha activity on floors and surfaces throughout the facility. Beta-gamma measurements were taken in similar areas using an Eberline model E-120 GM remote probe with a 1.4 mg/cm^2 window thickened to 7.2 mg/cm^2 by the addition of 3 layers of saran wrap. This instrument was calibrated by BNL on July 14, 1974.

c. Forty-six swipes were taken of 100 cm^2 areas and later counted at RO:I for removable alpha and beta gamma activity using an Eberline PAC-4 scintillation scaler and an Eberline RD-14 beta probe in conjunction with an LCS-1 Eberline counting system. Two air samples were taken with an air sampler and were similarly counted.

d. Two water samples were taken, one from Sheffield Brook at the licensee's property line, and one from the licensee's sump. Silt from a drain from this sump and four soil samples from the licensee's burial area were also taken. These samples were sent on August 5, 1974 to AEC, Idaho Falls for analyses. Results are attached as Appendix A.

3. Results of Initial Survey

a. The results of alpha and beta-gamma measurements taken indicate that the guideline for "Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct Source or Special Nuclear Material" USAEC April 22, 1970 are exceeded.

b. The average of 67 readings showed alpha activity of 18,911 dpm/100 cm^2.

Average for the following areas:

1 -	Office Area 1-D	9,550 dpm/100 cm^2
2 -	Lab Area 1-B	32,500 dpm/100 cm^2
3 -	Catwalk Bldg. 1	26,500 dpm/100 cm^2
4 -	Floor Sulfonation Room	21,000 dpm/100 cm^2
5 -	Wall of Sulfonation Room	25,083 dpm/100 cm^2
6 -	End Storage Room	6,000 dpm/100 cm^2
7 -	Third Floor Lab.	6,000 dpm/100 cm^2
8 -	Third Floor Library	2,000 dpm/100 cm^2
9 -	Kettle Area	7,833 dpm/100 cm^2
10 -	Garrett Storage Area	74,055 dpm/100 cm^2
11 -	Ball Mill Bldg.	9,500 dpm/100 cm^2
12 -	Grinding Bldg.	13,300 dpm/100 cm^2
13 -	Old Compressor Bldg.	11,250 dpm/100 cm^2

c. Beta-gamma readings exceeded 0.8 mrem/hr when observed at 1 cm distance with detectors having absorbers of at least 7 mg/cm^2.

d. A drain duct which runs underneath the licensee's property between Buildings 2 and 3 and under Building No. 1 and which drains into Sheffield Brook was easily traced with the Eberline GM end window probe. This drain line is, according to Mobley, located under four feet of earth and two inches of blacktop. Radiation reading of 0.8 to 1.0 mrad/hr were noted at one cm above the road surface at the drain line.

e. At one centimeter from the surface of the plywood floor in the attic, an area of 12' x 8' had radiation readings ranging from 0.5 to 2.0 mrad/hr (beta-gamma).

f. At one centimeter from wooden pallets on which a compressor and pump was resting, beta-gamma readings of 1.2 - 1.4 mrad/hr were noted.

g. At one centimeter distance from the concrete apron entrance to the Old Maintenance Building beta-gamma readings of 0.8 mrad/hr were noted.

h. In non-use areas, radiation readings of 0.1 to 0.2 mrad/hr were noted. In areas of former use, beta-gamma readings of 0.2 - 0.6 mrad/hr were noted.

i. The entire open area in the rear of the site as well as the open areas on the sides were used for burial, according to Mobley. Inspection history indicates that during production for a period of 17 years, large amounts of thorium phosphate was buried in huge pits. This waste consisted of waste concentrated sludge from a waste treatment operation. Radiation readings at one centimeter from the surface of the earth had from 0.4 - 0.5 mrad/hr in burial areas. Readings were from 0.3 - 0.35 mrad/hr at the ground surface near the drainage ditch and from 0.1 - 0.2 mrad/hr at the surface of the former sludge dumps.

j. Air concentrations in Building No. 1, the main process building, did not exceed 7.25×10^{-13} µCi/ml air alpha activity and 2.1×10^{-12} µCi/ml air beta-gamma activity according to samples counted 104 hours after collection.

k. The results of water and soil sampling as analyzed for natural uranium and thorium show that water discharged from the plant to unrestricted streams did not exceed thorium or uranium concentrations of 6×10^{-8} µCi/ml. Soil samples did not exceed an activity of 9×10^{-6} µCi/gm uranium and 4×10^{-4} µCi/gm thorium.

l. The water and air samples (see Appendix A) meet the limits expressed in Appendix B Table II for release to unrestricted areas. The uranium soil samples were below 0.05% uranium in the soil. The natural thorium, however, exceeded 0.05% in soil samples.

4. Final Survey

a. After the initial survey, the licensee made a second decontamination effort and resubmitted a revised report to Licensing. A final closeout survey was made on September 20, 1974, to review the revised submittal and to resurvey the problem areas.

5. Results of Final Survey

a. The inspector took smears of all the problem areas noted during the inspection of July 31, August 1 and 2, 1974. These smears were later counted at Region I for alpha and beta gamma activity and showed no more than 30 dpm/100 cm^2 alpha removable activity and no more than 100 dpm/100 cm^2 beta-gamma removable activity. Fixed activity did not exceed 1500 dpm/100 cm^2 alpha activity.

b. The inspector noted that the licensee had removed all previously contaminated surfaces from the catwalk, the garrett storage area and the sulfonation room and the machine shop as well as removing the contaminated supports for the compressors and pumps. Licensee's records indicated these items were buried on the licensee's property and the burial entered on the deed describing the property.

c. The results of the final survey showed agreement with the licensee's revised submittal for surface contamination levels in buildings and on equipment, and for air and water concentrations. Contaminated drains and ducts were removed.

d. The licensee's submittal does not speak to the extent of the waste products buried on the property. Appendix B includes excerpts from several past inspection reports that highlight this area. Licensee has bulldozed 6 inches of dirt over the areas and is planting grass and trees to prevent erosion.

ID-104
(REV. 9-61)

U.S. ATOMIC ENERGY COMMISSION
IDAHO OPERATIONS OFFICE
ANALYTICAL CHEMISTRY BRANCH

REFERENCE: HEALTH SERVICES LABORATORY

ROUTINE ___ SPECIAL ___

SAMPLE RECORD SHEET

SERIAL NO. _____

SAMPLE FROM: _____

COLLECTED BY: _____

DATE SUBMITTED: _____

SAMPLES RECEIVED: _____

ANALYSIS COMPLETED: _____

ANALYZED BY: _____

SAMPLE NO.	SAMPLE DATE	SAMPLE HOUR	SAMPLE DESCRIPTION	ANAL. FOR	INST. USED	QUANT. USED	TIME CNTD.	COUNT TIME	TOTAL COUNT	GROSS COUNT C/	BKGD. C/	NET COUNT C/		RESULTS D/

NOTIFIED: _____ TIME: _____ RESAMPLING RECOMMENDED: YES _____ NO _____

APPROVED: _____
SECTION CHIEF

ID – 104
(REV. 8 – 66)

U.S. ATOMIC ENERGY COMMISSION
IDAHO OPERATIONS OFFICE
ANALYTICAL CHEMISTRY BRANCH
SAMPLE RECORD SHEET

REFERENCE: HEALTH SERVICES LABORATORY

ROUTINE ___ SPECIAL ___

SERIAL NO: _____

SAMPLE FROM: _____

COLLECTED BY: _____

DATE SUBMITTED: _____

SAMPLES RECEIVED: _____

ANALYSIS COMPLETED: _____

ANALYZED BY: _____

SAMPLE NO.	SAMPLE DATE	SAMPLE HOUR	SAMPLE DESCRIPTION	ANAL. FOR	INST. USED	QUANT. USED	TIME CNTD.	COUNT TIME	TOTAL COUNT	GROSS COUNT C/	BKGD. C/	NET COUNT C/		RESULTS D/

NOTIFIED: _____ TIME: _____ RESAMPLING RECOMMENDED: YES _____ NO _____

APPROVED: _____
SECTION CHIEF

ID – 104
(REV. 8 – 66)

U.S. ATOMIC ENERGY COMMISSION
IDAHO OPERATIONS OFFICE
ANALYTICAL CHEMISTRY BRANCH
SAMPLE RECORD SHEET

REFERENCE: HEALTH SERVICES LABORATORY

ROUTINE ___ SPECIAL ___

SERIAL NO. _____

SAMPLE FROM: _____

COLLECTED BY: _____

DATE SUBMITTED: _____

SAMPLES RECEIVED: _____

ANALYSIS COMPLETED: _____

ANALYZED BY: _____

SAMPLE NO.	SAMPLE DATE	SAMPLE HOUR	SAMPLE DESCRIPTION	ANAL. FOR	INST. USED	QUANT. USED	TIME CNTD.	COUNT-TIME	TOTAL COUNT	GROSS COUNT C/	BKGD. C/	NET COUNT C/		RESULTS D/
										3				

NOTIFIED: _____ TIME: _____ RESAMPLING RECOMMENDED: YES _____ NO _____

APPROVED: _____
SECTION CHIEF

ID-104A
(REV. 5-66)

U.S. ATOMIC ENERGY COMMISSION
IDAHO OPERATIONS OFFICE
ANALYTICAL CHEMISTRY BRANCH

REFERENCE: HEALTH SERVICES LABORATORY

ROUTINE ___ SPECIAL ___

SAMPLE RECORD SHEET

SERIAL NO. ____________

SAMPLE FROM: [illegible]
COLLECTED BY: A. Eugene Epstein
DATE SUBMITTED: 7/5/74

SAMPLES RECEIVED: 8/12/74
ANALYSIS COMPLETED: 9/9/74
ANALYZED BY: KB TF

NO.	DATE	HOUR	SAMPLE DESCRIPTION	ANAL. FOR	INST. USED	QUANT. USED g	TIME CNTD.	COUNT TIME	TOTAL COUNT	GROSS COUNT C/	BKGD. C/	NET COUNT C/		RESULTS (µCi/g)
			Soil, Burial Ground	nat U		1.2	2 hr	1.3 × 10[illegible] µg		1.0	0.4	0.6		9.2 × 10⁻⁷ (±25%)
			No. 1	nat Th		0.5 (1:25)	[illegible]	6.49 × 10[illegible] µg/s		85.8	18.8	67.0		~~[illegible]~~ ~~2.4±0.1 × 10⁻⁵~~
17			Soil, Burial Ground	nat U		1.1				3.4	0.4	3.0		1.2 × 10⁻⁶ (±10%)
			No. 2	nat Th		0.5 (1:25)				78.8	18.8	60.0		1.8 ± 0.1 × 10⁻⁵
18			Soil, Burial Ground	Nat U		1.1				32.0	0.4	31.6		1.3 × 10⁻⁵ (±10%)
			No. 3	nat Th		0.5 (1:25)				26.0	18.8	7.2		6.1 ± 0.4 × 10⁻[illegible]
			Soil, Burial Ground	Nat U		1.3				3.0	0.4	2.6		9.3 × 10⁻⁷ (±10%)
			No. 4	nat Th		0.5 (1:25)				88.0	18.8	69.2		2.5 ± 0.1 × 10⁻⁵
20			Soil, Burial Ground	Nat U		1.1				23.0	0.4	22.6		9.0 × 10⁻⁶ (±10%)
			No. 5	nat Th		0.5 (1:25)				44.2	18.8	25.4		2.0 ± 0.1 × 10⁻[illegible]

[illegible] Analysis on all 5 Samples- See 5562-1 (Cancel) [illegible]

[illegible] present in samples. Bottle for No. 5 was broken but sample recovered. DP 8/12/74

NOTIFIED: E. Epstein TIME: 1115, 9/10/74 DP
RESAMPLING RECOMMENDED: YES ____ NO ____

Not ... 1 × 10[illegible] µCi/g ... Not ... ard ... 3.0 × 10[illegible] ... d/s

APPROVED: D. P. Percival
SECTION CHIEF

ID-164A
(REV. 6-66)

U.S. ATOMIC ENERGY COMMISSION
IDAHO OPERATIONS OFFICE
ANALYTICAL CHEMISTRY BRANCH

REFERENCE: HEALTH SERVICES LABORATORY

ROUTINE ✓ SPECIAL ____

SAMPLE RECORD SHEET

SERIAL NO. [illegible]

SAMPLE FROM: [illegible]
COLLECTED BY: [illegible]
DATE SUBMITTED: [illegible]

SAMPLES RECEIVED: [illegible]
ANALYSIS COMPLETED: 9/9/74

ANALYZED BY: RB, TF

SAMPLE NO.	SAMPLE DATE	SAMPLE HOUR	SAMPLE DESCRIPTION	ANAL. FOR	INST. USED	QUANT. USED ml	TIME CNTD.	COUNT TIME	TOTAL COUNT	GROSS COUNT C/	BKGD. C/	NET COUNT C/		RESULTS µCi/ml
	[illegible]		Water, outside plant	nat U		0.1	[illegible]	-1.32×1.5	$3\times10/50$	3.5	0.4	3.1		2.8×10^{-8}
			sump. No. 2	nat Th		0.05	[illegible]	1.09×10 µg/1		20.2	20.2	0.0		~~$<2.5\times10^{-8}$~~
													→	$< 3\times10^{-8}$

Curie Unit = 3.7×10^{10} d/s.

$^{nat}Th = 1.11\times10^{-7}$ µCi/µg

NOTIFIED: [illegible] TIME: 1115, 9/10/74 RESAMPLING RECOMMENDED: YES ____ NO ____

APPROVED: D.R. [illegible]
SECTION CHIEF

ID-1044? (Rev. ?)

U.S. ATOMIC ENERGY COMMISSION
IDAHO OPERATIONS OFFICE
ANALYTICAL CHEMISTRY BRANCH

REFERENCE: HEALTH SERVICES LABORATORY

ROUTINE ____ SPECIAL ____

SAMPLE RECORD SHEET

SERIAL NO. [illegible]

SAMPLE FROM: Eugene [illegible]

COLLECTED BY: [illegible]

DATE SUBMITTED: [illegible]

SAMPLES RECEIVED: [illegible]

ANALYSIS COMPLETED: 9/9/74

ANALYZED BY: RB, JF

SAMPLE NO.	DATE	HOUR	SAMPLE DESCRIPTION	ANAL. FOR	INST. USED	QUANT. USED ml	TIME CNTD.	COUNT TIME	TOTAL COUNT	GROSS COUNT C/	BKGD. C/	NET COUNT C/ S.D.		RESULTS µCi/ml
	[illegible]		Water, Stream	nat U		0.1	U nat = 1.32 x 10^3 µg			4.0	0.4	3.6		3.2×10^{-8} (±10%)
			(W.R. Grace)	nat Th		0.05	Th = 6.01 x 10^? µg			20.2	20.2	0.0	→	~~$<2.5 \times 10^{-8}$~~
			[illegible] No. 1											$<3 \times 10^{-8}$
			Plant processes U and Th ores.											

1 curie U nat = 3.7×10^{10} d/s [illegible]

nat Th 1.11×10^{-7} µCi/µg

NOTIFIED: [illegible] TIME: 1115, 9/13/74 RESAMPLING RECOMMENDED: YES ____ NO ____

APPROVED: D.R. [illegible] SECTION CHIEF

January 12, 1960

DAVISON CHEMICAL COMPANY
DIV. OF W. R. GRACE & CO.
BOX 488
POMPTON PLAINS, NEW JERSEY

THORIUM CONTENT OF SLUDGES STORED ON PROPERTY

	Tons Residue	Contained ThO_2 Pounds	Area
Ore tailings (gangue	230	8,200	G
Yttrium sludges	200	3,000	H
Reworked sludges	137	2,750	I
Waste treatment cake	105	1,300	J
In process silica sludge	30	2,700	H
In process thorium carbonate	31	3,100	L
In process thorium hydroxide	15	10,500	K
Refined yttrium concentrate	20	2,700	M

DIV. OF W. R. GRACE & CO.
BOX 488
POMPTON PLAINS, NEW JERSEY

January 12, 1960

WASTE TREATMENT PLANT

The waste treatment plant treats all liquid wastes issuing from the plant. The waste involved consists of wash water, floor washings and surface run-off from the adjacent plant property.

The process involves the use of an average of 35,000 gallons of water per day. All of the washes are discharged into a common 1000 gallon sump equipped with two automatically controlled force pumps which pump the waste to a retention tank. Each pump has capacity to handle the peak load and is installed so that the second pump starts in case of extreme demand or failure of the first. Signals are installed in a control house to indicate the proper function of the pumps.

The retention tank has a capacity of 50,000 gallons which provides 24 hours average retention of the wastes. In addition to the purpose of acting as a reservoir, or constant head installation, the tank provides means of diluting effluents of widely varying pH so that the automatic pH controlling equipment may function more efficiently. The incoming wastes flow through a distributing channel in the tank and effluent, after initial settling, is removed from the midpoint of the tank and flows by gravity to a mixing tank. A draw-off is provided at the bottom of the tank to pump accumulated solids to the sludge filter press.

An 8000 gallon mixing tank, equipped with a gate agitator receives effluent from the retention tank at its midpoint. a pH electrode assembly is in circuit with the mixing tank and electrically connected to a mechanically operated diaphragm valve. Two storage tanks are provided to feed either

50% sulphuric acid or 50% caustic soda solution through the automatic diaphragm valve to the mixing tank as called for by the pH controller. Again, signals are provided to indicate proper functioning of the valve and chemical supply tanks as well as a recording chart which indicates the pH of the mixing tank. The mixing tank effluent is piped to a 2000 gallon Hardinge thickener at pH 5.8-6.2.

The Hardinge thickener provides a clear overflow to a final clarification tank and adjusted to give a 20% solids underflow which is pumped to a sludge filter press in the control house.

The final clarification tank of 50,000 gallon capacity provides an average 24 hours of retention time for the effluent before discharge from the system. The main function of this tank is to provude sufficient time for post precipitation of solids after pH adjustment. A draw off is provided at the bottom of the tank to pump accumulated solids to the sludge filter press.

The sludge filter is of the plate and frame type with a capacity of 6 cubic ft. of cake. Approximately 60 cubic feet of sludges, or 3500 lbs, are removed weekly. These sludges are hauled to a dump on the property.

The system was designed to operate automatically. Twelve man hours per day are devoted to the maintenance, cleaning and control of the operation. The entire operation is under the supervision of the plant chemist who checks the performance of the equipment, and samples prepared by the shift operator.

A log is maintained which indicates satisfactory operation of the system for pH and turbidity control. Wet chemical analyses of samples of effluent meeting the turbidity standards of the Department of Health indicate

thorium levels below our limit of detection. The pH of the effluent is maintained between 5.0 and 8.0 according to the permit granted by the New Jersey State Department of Health who have approved the design and mode of operation of the system. We have found through experience that the system operates more satisfactorily at lower pH values since the precipitate formed by neutralization settles more rapidly assuring a clearer effluent.

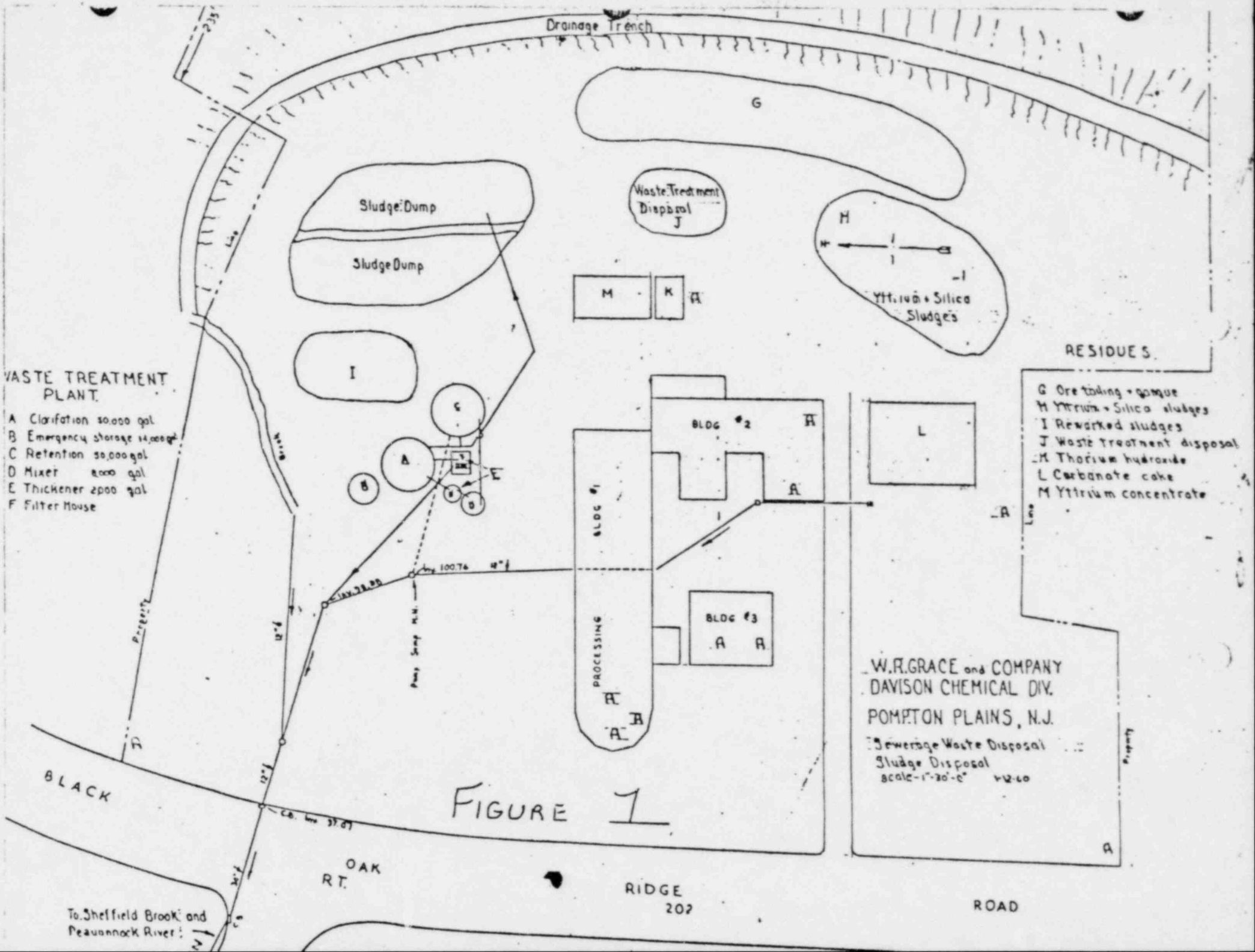
Drainage Trench
G
Sludge Dump
Sludge Dump
Waste Treatment Disposal J
H
Yttrium + Silica Sludges
M
K
A
I
C
A
B
D
E
BLDG #2
BLDG #1
BLDG #3
PROCESSING
L
RESIDUES
G Ore tailing + gangue
H Yttrium + Silica sludges
I Reworked sludges
J Waste treatment disposal
M Thorium hydroxide
L Carbonate cake
M Yttrium concentrate
WASTE TREATMENT PLANT
A Clarifation 50,000 gal
B Emergency storage 14,000 gal
C Retention 50,000 gal
D Mixer 8000 gal
E Thickener 2900 gal
F Filter House
W.R.GRACE and COMPANY
DAVISON CHEMICAL DIV.
POMPTON PLAINS, N.J.
Sewerage Waste Disposal
Sludge Disposal
Scale-1"-20'-0"
BLACK
OAK RIDGE
RT. 202
ROAD
To Sheffield Brook and Pequannock River

FIGURE 1

BUREAU OF EXPLOSIVES
ASSOCIATION OF AMERICAN RAILROADS
63 VESEY STREET
NEW YORK, N. Y. 10007

T. C. GEORGE, DIRECTOR AND CHIEF INSPECTOR

FILE NUMBER

25-3 §73.392(c)

WFB-M

January 12, 1967

Davison Chemical Company
W. R. Grace & Company
Pompton Plains, New Jersey

Gentlemen: Attention: Mr. Peter J. Garino

This letter confirms the decisions reached during my recent visit to your facility.

It is our opinion that thorium phosphate sludge consisting of approximately 10% thorium with a high acid content is "low specific activity material" as defined by §73.391(c)(1) of the Interstate Commerce Commission Regulations.

Further, the shipment of this material in 55 gallon used open head steel drums with new ICC Specification 2U-55 gallon drum liners and/or new 55 gallon open head fiber drums with new ICC Specification 2U-55 gallon drum liners is, in our opinion, authorized under the provisions of §73.392(c) of the Interstate Commerce Commission Regulations. You are reminded that this paragraph of the Regulations specifically requires that the gamma radiation, or equivalent, not exceed 2 milliroentgens per hour in any normally occupied position in the tractor cab. Further, the vehicle must be placarded in accordance with §77.823 of the Interstate Commerce Commission Regulations.

It is our understanding that shipments shall be made utilizing vehicles which are operated under the control and direction of the Davison Chemical Company and shipments will be made from your facility in truckload lots.

For your information, I am attaching a copy of the pertinent sections of the Regulations.

It was indeed a pleasure to visit your facility and

JAN 13

μc/ml, which is approximately 20% the MPC of 1 x 10^{-6} μc/ml for natural thorium.

Solids

24. Garino stated that all other waste is either disposed of by burial on the licensee's property or is held in storage until it can be transferred to a disposal site. According to Garino and as indicated in disposal records, the licensee buries 992 pounds of thorium phosphate per month. Garino stated that a pit is dug and the waste is dumped into the pit. He stated that earth is mixed with the waste as the pit is being filled and that a minimum of six feet of earth fill covers the pit. Garino stated that, according to 10 CFR 20.5(c)(1) and 10 CFR 20.304(a), they are permitted to bury in one location only 1,000 pounds or 50,000 μc natural thorium. He stated that their processes produce approximately 1500 pounds of thorium (natural) per month. He stated that they currently have 9,392 pounds of this thorium sludge in a storage pit in the back of the property. Garino stated that he is in the process of investigating possible disposal sites for this waste and in all probability it will be shipped to either Grace's Chattanooga, Tennessee plant or Nuclear Fuel Services, West Valley, New York, a Grace subsidiary. Records were noted to be maintained showing the location, date of burial, and quantity buried monthly since the period of the last inspection.

Instrumentation and Calibration

25. The licensee had on hand an Anton Model No. 5 GM survey meter with a range of 0 - 100 mr/hr. He also had a Nucor gas flow proportional counter and an RIBL scaler. Garino stated that the GM survey meter is used for all direct survey measurements and that all smears and/or water samples are counted in the gas

23. Waste acids from acidification process containing phosphates is treated with silica to destry fluorides and the residual is sent to the Agricultural Chemical Corp., Amenia, New York as fertilizer. Garino aamples and counts all liquid before transfer. The records of these assays show no activity over background.

Solids

24. Garino stated that all other waste is disposed of by burial on the licensee's property at the top of the hill. Garino stated that thorium cake as phosphate and thorium fluoride sludge is buried in pits from 12 to 15 feet deep and from 6 to 10 feet wide.

25. Garino stated that each pit contains waste from 3 to 4 weeks of processing. He stated a pit is dug and waste as it accumulates is dumped into the pit. He stated that earth is mixed with the waste as the pit is being filled and that a minimum of 6' of earth fill covers earth pit. Garine stated that four pits were dug and filled in 1963 and that a total of 11,654 pounds total of natural thorium was dumped into the four pits. He stated and

records show that from 2900-3000 pounds of thorium (natural) was buried in each pit. According to 10 CFR 20.5(c)(1) 2900 pounds of thorium (natural) is equivalent to 146,000 uc. 10 CFR 20.304(a) permits the burial in one location of 50,000 uc natural thorium. The records also show that during 1964 a total of 7003 poundsof natural thorium have been buried in three pits with 2300 to 2400 pounds of thorium per location. This quantity per pit also exceedsthe limits imposed by 10 CFR 20.304 for one location. Records were noted to be maintained showing the location,date of burial and quantity buried.

Effluents to the Atmosphere

26. Garino stated that effluent from the furnace is sent through a water scrubber which removes particulate. He stated all release is as insoluble thorium particulate. He stated, however, that the scrubber cannot be used on all phases of the furnace operation because a concrete like substance would form which would ruin all equipment. He stated that since the entire rear of the building is open and ventilation is mainly by natural convection, he has taken air surveys using the high volume Staplex Sampler, and has never detected concentrations in air greater than 1.9×10^{-12} uc/Th nat/ml air, at the top of the furnace during operations. He stated the scrubber would reduce this value still further.

Storage of Material

An 8000 gallon mixing tank, equipped with a gate agitator, receives effluent from the retention tank at is midpoint. A pH electrode assembly is in circuit with the mixing tank, and is electrically connected to a mechanically operated diaphragm valve. Two storage tanks are provided to feed either 50% sulphuric acid or 50% caustic soda solution through the automatic diaphragm valve to the mixing tank, as called for by the pH controller. Again, signals are provided to indicate proper functioning of the valve and chemical supply tanks as well as a recording chart which indicates the pH of the mixing tank. The mixing tank effluent is piped to a 2000 gallon Hardinge thickener at pH 5.8 - 6.2.

Mandle stated that no liquid effluent samples were checked by his company to determine the thorium concentration of the liquid effluent discharged to the storm sewer. He said the State had made some checks and that he was going to make arrangements with the State to analyze some water samples for him. No approval to dump liquid effluents into a storm sewer by the AEC was reported to be given his company.

The Hardinge thickener provides a clear overflow to a final clarification tank and adjusted to give a 20% solids underflow which is pumped to a sludge filter press in the control house.

The final clarification tank of 50,000 gallon capacity, provides an average 24 hours of retention time for the effluent before discharge from the system. The main function of this tank is to provide sufficient time for post precipitation of solids after pH adjustment. A draw-off is provided at the bottom of the tank to pump accumulated solids to the sludge filter press.

The sludge filter is of the plate and frame type, with a capacity of 6 cubic ft. of cake. Approximately 60 cubic feet of sludges, or 3500 lbs., are removed weekly. These sludges are hauled to a dump on the property.

The system was designed to operate automatically. Twelve man hours per day are devoted to the maintenance, cleaning and control of the operation. The entire operation is under the supervision of the plant chemist who checks the performance of the equipment, and samples prepared by the shift operator.

Mandle stated, and it was noted during the inspection, that a drainage ditch was under construction to collect run-off water from the hill surrounding the upper end of the licensee's grounds. Another drainage ditch is being constructed between the piles of sludge and the production and waste treatment plant. This, according to Mandle, would prevent run-off to the street.

Mandle said that on several occasions due to the fluxuation in pH, there were slug discharges to the storm sewer. This discharge consisted of both soluble and insoluble wastes (milky white dispersion noted in item 9 of report details).