March 31, 1966

Mr. H. W. Rathman
Director of Process Research
Vanadium Corporation of America
Cambridge, Ohio

Dear Mr. Rathman:

Enclosed are two copies of the Report of Radiological Surveys. As noted in the summary, the operation appears to be quite good as far as radioactive contamination is concerned.

I suggest that you request an amendment to your AEC license to authorize production processing. I believe simply a letter would do, referencing your AEC license number, your initial license application and supporting documents and photographs, and your first amendment application. Also include copies of our report as supporting material. It would be best to specify that quarterly surveys will be performed by your health physics consultant.

The letter should be addressed to the following and submitted in quadruplicate:

Mr. Don F. Harmon
Source and Special Nuclear Materials Branch
Division of Materials Licensing
U. S. Atomic Energy Commission
Washington, D. C. 20545

If further questions arise, Mr. Robert Gallagher, President of Applied Health Physics, will be back in the office around April 18, and will be able to assist you.

Sincerely,

APPLIED HEALTH PHYSICS, Inc.

R. J. Augustine, Ph.D.
Technical Director

RJA/jl

Enclosure - Report (2 copies)

March 31, 1966

Mr. H. W. Rathman
Director of Process Research
Vanadium Corporation of America
Cambridge, Ohio

SUBJECT: Report of Radiological Surveys

Dear Mr. Rathman:

The results of the radiological surveys conducted during various phases of processing tin slag show that all operations are below permissible levels of airborne and surface contamination and external radiations. Specifically, the analytical results are as follow:

September 28, 1965

A. Instrument Survey

	Location	Alpha DPM/100 cm^2	B- mr/hr.
1.	Slag in bucket #32	621	0.1 indide, Bkgd outside
2.	Slag in bucket #111	-	0.3 inside, 0.05 outside
3.	Slag in bucket #118	1480	background
4.	Scull	-	0.3 maximum
5.	Loading hopper	96	background
6.	Loading hopper	239	background
7.	Mixing floor	-	0.3
8.	Top floor of silo	1050	Background

B. Smear Survey

	Location	Alpha dpm/100 cm^2
1.	Slag bucket #32 - exterior	N.D.
2.	Slag bucket #32 - exterior	N.D.
3.	Slag bucket #32 - exterior	28
4.	Slag bucket #32 - exterior	26
5.	Slag bucket #111- exterior	227
6.	Slag bucket #111- exterior	N.D.
7.	Slag bucket #111- exterior	84
8.	Loading bin level	N.D.
9.	Loading bin level	55
10.	Loading bin level	N.D.
11.	Loading bin level	N.D.

Note: N.D. means none detectable

November 29, 1965 - Carbiding Phase

A. Beta-Gamma Survey (Tbyac-II)

1. Loading bucket 0.3 - 0.5 mr/hr.
2. Scull - at contact 0.3 - 0.8 mr/hr.

B. Alpha Meter Survey (PAC-3G) and Smears Survey

Location	PAC-3G (max.) Alpha dpm/100 cm^2	Smear Alpha dpm/100 cm^2
1. Loading Platform		
a. Left Side - near furnace	656 max	N.D.
b. Left Side - Rail	328 max	74
c. Inside hood - rear of furnace	1312 max	37
d. Right side - side rail	328 max	N.D.
e. Right side - floor	985 max	185
f. Right side - furnace loading chute	1600 max	74
g. Right side - small mixer platform	328 max	N.D.
h. Right side - front rail	656 max	37
2. Weighing Room		
a. Barrel	328 max	N.D.
b. Loading chute to mixer	N.D.	296
c. Small scale	N.D.	37
d. Weighing and mixing controls	N.D.	37
e. Pallet	N.D.	N.D.
f. Crane access window	164 max	74
g. Top of mixer - dust accumulation	1970 max	--
3. Mixing Area		
a. Top of furnace loading hopper	328 max	74
b. Right mixer support	N.D.	148
c. Ladder, back of mixer	985 max	N.D.
d. Left mixer support	328 max	111
e. Fork lift - top	656 max	37
4. Plant Floor		
a. Slag pot	--	37
b. Slag pot	--	N.D.
c. Slag pot	--	37
d. Slag pot	--	37
e. Slag pot	--	N.D.
f. Slag pot	--	N.D.
g. Slag pot	--	N.D.
h. Slag pot	--	111

i.	Storage hopper-furnace lining, crushed	3280 max	37
j.			202
k.			112
l.	Storage hoppers-crushed scull, contaminated		74
m.	with slag	3280 max	N.D.
n.			N.D.
o.			37

Note: N. D. means none detectable

C. Air Particulate Sampling

	Location	Alpha uc/ml (after 7 days decay)
1.	Loading platform - left side	N.D.
2.	Outside hood door - open	N.D.
3.	Top of loading hopper	N.D.
4.	Loading platform - right	2.25×10^{-13}
5.	Main floor during pouring - about 20 feet from furnace	N.D.
6.	Main floor during pouring - about 10 feet from furnace	N.D.
7.	Weighing level during mixing	N.D.
8.	Mixing area during mixing	1.55×10^{-13}
9.	Loading platform - left side	5.95×10^{-13}
10.	Stack plume - left side facing plant	N.D.
11.	Stack plume - center	N.D.
12.	Stack plume - right side facing plant	N.D.
13.	Background air - 1/2 mile upwind of plant	3.33×10^{-12}

Notes: All samples were taken at the time that the most dusting hazard existed. Unless otherwise indicated samples were taken when the furnace was in full operation and the crucible being loaded.

N.D. means none detectable.

November 30, 1965 - January 7, 1966 (Crushing and Separation of Carbide Scull)

A. Air Particulate Sampling

	Operation/Location	Alpha uc/ml
1.	Primary crusher platform during crushing	2.4×10^{-12}
2.	Adjacent to furnace shell during digout	1.2×10^{-12}
3.	Bottom of Telsmith crusher during crushing	1.9×10^{-12}
4.	Telsmith crusher hopper during loading	9×10^{-12}

5.	Bottom of Telsmith crushed	1.1×10^{-11}
6.	Telsmith crusher hopper during crushing	4.9×10^{-12}
7.	Side of Bauer Mill	3×10^{-12}
8.	10' from Magnetic separator during separation	5.7×10^{-12}
9.	" "	2.8×10^{-12}
10.	" "	4.1×10^{-12}
11.	" "	2.8×10^{-12}
12.	" "	N.D.
13.	" "	3.7×10^{-12}
14.	" "	5.3×10^{-12}
15.	" "	1.6×10^{-12}
16.	" "	1.2×10^{-12}
17.	" "	1.3×10^{-11}
18.	" "	4.9×10^{-12}
19.	" "	2.01×10^{-12}
20.	" "	1.21×10^{-12}

Note: N.D. means none detectable

Summary

As mentioned previously, the results of the radiological surveys show that air and surface contamination levels are below the maximum permissible. When allowances are made for time of occupancy by personnel and the working schedule for these particular operations, the average air contamination levels are even less than those measured during the operations.

Based upon these results, it is recommended that you apply for an amendment to your AEC license to permit production processing of these materials. It is further recommended that routine radiological surveys be performed on a quarterly basis to assure that permissible levels of contamination are not exceeded.

Sincerely,

APPLIED HEALTH PHYSICS, Inc.

R. J. Augustine, Ph.D.
Technical Director

RJA/jl