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RECEIVED**MAY 12 1997**

May 8, 1997

ENVIRONMENTAL

Mr. C. Scott Eves
Shieldalloy Metallurgical Corporation
Post Office Box 768
Newfield, New Jersey 08344

Re: General Population Dose Estimates from Atmospheric Emissions

Dear Mr. Eves:

On March 13, 1997, I forwarded to you Integrated Environmental Management, Inc. (IEM) Report No. 94005/G-6131, "Radiation Dose Estimates from Atmospheric Emissions from the Newfield Facility". In that report, estimates of maximally exposed individual dose, as well as a dose estimate for the resident that is closest to the D-111 emission points were given. An addendum to that report was forwarded to you on March 27, 1997, wherein discrepancies in the distance from the emission points to off-site receptors were resolved.

Subsequent to those submissions, the issue of bag integrity with respect to the AAF baghouse was raised.¹ More specifically, you inquired as to whether the off-site population dose from an undetected bag rupture that decreased the collection efficiency of the AAF to 90% of its rated capacity would exceed 10 millirem CEDE per year.² The answer to that question is no.

To arrive at the "no" answer, the CAP88-PC (Clean Air Act Assessment Package-1988) computer model was used to assess the maximally exposed individual dose, assuming the annual emissions from the AAF baghouse are greater than what was measured during the 1996 stack testing campaign.³ For this assessment, the following parameters were used as input to the code:

- Wind data from Wilmington, Delaware (Wilmington International Airport) were deemed applicable to conditions at Newfield.

¹ The AAF baghouse is the Model No. 3177 AMERTerm system, installed in 1966.

² Unlike the AAF baghouse, the Flex-Kleen baghouse has an optical sensor to detect elevated dust levels outside of the bags. Therefore, the issue in question issue pertains to the AAF baghouse collection efficiency only.

³ The CAP88-PC computer code, described in "User's Guide for CAP88-PC, Version 1.0" (Barry S. Parks, U. S. Environmental Protection Agency, Report No. 402-B-92-001, Office of Radiation Programs, March, 1992) was also used to assess off-site population doses in Report No. 94005/G-6131 and in its addendum.

- The annual average rainfall amount is 111.8 cm per year.⁴
- The annual average temperature is 12°C.⁵
- The Flex-Kleen and the AAF systems operate in tandem during operations using source material.
- The height and diameter of the Flex-Kleen stack are 9.1 and 2.4 meters, respectively.⁶
- The height and equivalent diameter of the AAF are 18.3 and 9.8 meters, respectively, however a ground-level release height was assumed to account for building wake effects from the ridge vent of the AAF.⁷
- A momentum plume rise was assumed, with a stack emission rate of 17.01 and 3.2 meters per second, respectively, for the Flex-Kleen and the AAF.
- Agricultural usage was assumed to fit an "Urban" scenario, wherein over 90% of the milk, meat, and vegetables consumed are from the assessment area.
- Tears or ruptures in one or more of the bags in the AAF baghouse reduces its efficiency to 90% of that exhibited during the 1996 stack test.⁸
- The radionuclide release rates are as shown in the last two columns of the following table, which is adapted from the 1996 stack test results shown in the second and third columns, normalized over a 2,000-hour production year, and adjusted for a 10% reduction in AAF collection efficiency.

⁴ IT Corporation, Applicant's Environmental Report for the Newfield, New Jersey Facility", by C. D. Berger, A. Chance, and B. Kelly, IT Corporation Report No. IT NS-92-118.

⁵ IT Corporation, Applicant's Environmental Report for the Newfield, New Jersey Facility", by C. D. Berger, A. Chance, and B. Kelly, IT Corporation Report No. IT NS-92-118.

⁶ Kozak, M., Williard, Inc., personal communication to D. Jarvis, Integrated Environmental Management, August 19, 1996.

⁷ Kozak, M., Williard, Inc., personal communication to D. Jarvis, Integrated Environmental Management, August 19, 1996.

⁸ Immediately prior to the 1996 stack test, the AAF and the Flex-Kleen baghouses were confirmed to be fully operational, with no torn bags. Consequently, the measured emissions are indicative of both bag houses operating at 100% of its maximum efficiency.

Radionuclide	Release Rate (Ci/yr)				
	450 hrs/yr and 100% efficiency		2000 hrs/yr and 100% efficiency		90% efficiency
	AAF	Flex-Kleen	AAF	Flex-Kleen	AAF
U-238	6.82e-05	1.82e-04	3.03e-04	8.09e-04	3.03e-03
Th-234	6.82e-05	1.82e-04	3.03e-04	8.09e-04	3.03e-03
Pa-234	6.82e-05	1.82e-04	3.03e-04	8.09e-04	3.03e-03
U-234	1.67e-05	4.11e-05	7.42e-05	1.83e-04	7.42e-04
Th-230	6.56e-06	1.85e-05	2.92e-05	8.22e-05	2.92e-04
Ra-226	6.56e-06	1.85e-05	2.92e-05	8.22e-05	2.92e-04
Rn-220	6.56e-06	1.85e-05	2.92e-05	8.22e-05	2.92e-04
Po-218	6.56e-06	1.85e-05	2.92e-05	8.22e-05	2.92e-04
Pb-214	6.56e-06	1.85e-05	2.92e-05	8.22e-05	2.92e-04
Bi-214	6.56e-06	1.85e-05	2.92e-05	8.22e-05	2.92e-04
Po-214	6.56e-06	1.85e-05	2.92e-05	8.22e-05	2.92e-04
Pb-210	6.56e-06	1.85e-05	2.92e-05	8.22e-05	2.92e-04
Bi-210	6.56e-06	1.85e-05	2.92e-05	8.22e-05	2.92e-04
Po-210	6.56e-06	1.85e-05	2.92e-05	8.22e-05	2.92e-04
Th-232	2.22e-06	4.42e-06	9.87e-06	1.96e-05	9.87e-05
Ra-228	2.22e-06	4.42e-06	9.87e-06	1.96e-05	9.87e-05
Ac-228	2.22e-06	4.42e-06	9.87e-06	1.96e-05	9.87e-05
Th-228	1.62e-06	2.29e-06	7.20e-06	1.02e-05	7.20e-05
Ra-224	1.62e-06	2.29e-06	7.20e-06	1.02e-05	7.20e-05
Rn-220	1.62e-06	2.29e-06	7.20e-06	1.02e-05	7.20e-05
Po-216	1.62e-06	2.29e-06	7.20e-06	1.02e-05	7.20e-05
Pb-212	1.62e-06	2.29e-06	7.20e-06	1.02e-05	7.20e-05
Bi-212	1.62e-06	2.29e-06	7.20e-06	1.02e-05	7.20e-05
Tl-208	1.62e-06	2.29e-06	7.20e-06	1.02e-05	7.20e-05
U-235	2.32e-06	3.39e-06	1.03e-05	1.51e-05	1.03e-04

The results of this assessment indicate the maximally-exposed member of the general public might incur an annual radiation dose of 5.35 millirem from Flex-Kleen and AAF baghouse emissions for a 2,000 hour operating year if the AAF baghouse efficiency remained at only 90% of its

optimum value. The computer code indicates this individual would be located 100 meters East Southeast of the release points. The CAP88-PC Synopsis Report for this assessment is included herein as Attachment 1.

I hope this information answers your questions. However, if elaboration or additional information is necessary, please call me at (301) 762-0502. Thank you for permitting us to assist you on this interesting project. I am looking forward to speaking with you again soon.

Sincerely,

A handwritten signature in cursive script, appearing to read "Carol D. Berger".

Carol D. Berger, C.H.P.

cc: G. Comfort - USNRC
File 94005.06

ATTACHMENT 1

RADIONUCLIDE EMISSIONS DURING THE YEAR 1996

Nuclide	Class	Size	Source #1 Ci/y	Source #2 Ci/y	TOTAL Ci/y
U-238	Y	1.00	8.1E-04	3.0E-03	3.8E-03
TH-234	Y	1.00	8.1E-04	3.0E-03	3.8E-03
PA-234	Y	1.00	8.1E-04	3.0E-03	3.8E-03
U-234	Y	1.00	1.8E-04	7.4E-04	9.3E-04
TH-230	Y	1.00	8.2E-05	2.9E-04	3.7E-04
RA-226	W	1.00	8.2E-05	2.9E-04	3.7E-04
RN-222	*	0.00	8.2E-05	2.9E-04	3.7E-04
PO-218	W	1.00	8.2E-05	2.9E-04	3.7E-04
PB-214	D	1.00	8.2E-05	2.9E-04	3.7E-04
BI-214	W	1.00	8.2E-05	2.9E-04	3.7E-04
PO-214	W	1.00	8.2E-05	2.9E-04	3.7E-04
PB-210	D	1.00	8.2E-05	2.9E-04	3.7E-04
BI-210	W	1.00	8.2E-05	2.9E-04	3.7E-04
PO-210	W	1.00	8.2E-05	2.9E-04	3.7E-04
TH-232	Y	1.00	2.0E-05	9.9E-05	1.2E-04
RA-228	W	1.00	2.0E-05	9.9E-05	1.2E-04
AC-228	Y	1.00	2.0E-05	9.9E-05	1.2E-04
TH-228	Y	1.00	1.0E-05	7.2E-05	8.2E-05
RA-224	W	1.00	1.0E-05	7.2E-05	8.2E-05
RN-220	*	0.00	1.0E-05	7.2E-05	8.2E-05
PO-216	W	1.00	1.0E-05	7.2E-05	8.2E-05
PB-212	D	1.00	1.0E-05	7.2E-05	8.2E-05
BI-212	W	1.00	1.0E-05	7.2E-05	8.2E-05
TL-208	D	1.00	1.0E-05	7.2E-05	8.2E-05
U-235	Y	1.00	1.5E-05	1.0E-04	1.2E-04

SITE INFORMATION

Temperature: 12 degrees C
Precipitation: 112 cm/y
Mixing Height: 1000 m

ceiling height

SOURCE INFORMATION

Source Number:	1	2
	<hr/>	<hr/>
Stack Height (m):	9.10	0.00
Diameter (m):	2.40	9.80
Plume Rise		
Momentum (m/s):	1.70E+01	3.15E+00
(Exit Velocity)		

AGRICULTURAL DATA

	Vegetable	Milk	Meat
	<hr/>	<hr/>	<hr/>
Fraction Home Produced:	0.076	0.000	0.008
Fraction From Assessment Area:	0.924	1.000	0.992
Fraction Imported:	0.000	0.000	0.000

Food Arrays were not generated for this run.
Default Values used.

DISTANCES USED FOR MAXIMUM INDIVIDUAL ASSESSMENT

20	50	100	150	200	250	300	350	400	500
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