

TO W. C. Champion AT Flemington DATE November 7, 1974
FROM P. M. Reed AT Pasadena COPY TO Mr. D. R. Keck
SUBJECT Analytical Capability @ Shin-Etsu's
Kichima Plant for Detecting VCM in Air

Summary

The G. C. equipment employed at Kishima is equivalent to that used at Pasadena. The operator, Mr. Hashimoto, used a syringe for injection with excellent reproducibility. The attenuator was checked and found to be very linear. However, the electrometer is slightly non-linear in the range used for 1 ppm. The deviation will cause the results to be high by up to 16% of the amount reported. This can be negated by the use of standards in the appropriate range.

Shin-Etsu also employs a color change tube for the detection of VCM in low ppm range. This is a "Gastech" tube similar to the MSA tubes. It is distributed in the U.S. by the Environmental Control Division of the Bendix Co. The system employs two tubes. The first catalytically decomposes the VCM releasing HCl while the second detects the HCl. Shin-Etsu reports the data as generated, however, lab tests indicate the "Gastech" value is 40-65% of the true value. The tubes must be kept refrigerated until used and then warmed up. The temperature of the tube may affect the catalytic efficiency.

Shin-Etsu is limited to a single standard gas containing 46.2 ppm VCM in pure air. Based on this standard the following relationship exists between our Pasadena lab and their Kishima lab:

<u>Cylinder</u>	<u>Pasadena</u>	<u>Kishima</u>
#1	1.7 ppm	1.2 ppm
#5	5.0 ppm	4.7 ppm

This agreement is good between laboratories and will be better if Kishima can obtain low standards. There is only one supplier of standard gases in Japan according to Mr. Ogowa and they claim low range VCM standards are unstable. I explained how the cylinder must be pre-treated for this service but he did not feel he could get his supplier to pre-treat the cylinder.

The "content" test for LE was discussed. Shin-Etsu does not run the test and the supplier admitted it is difficult to get reproducible results. He supplied a few ideas which will be pursued.

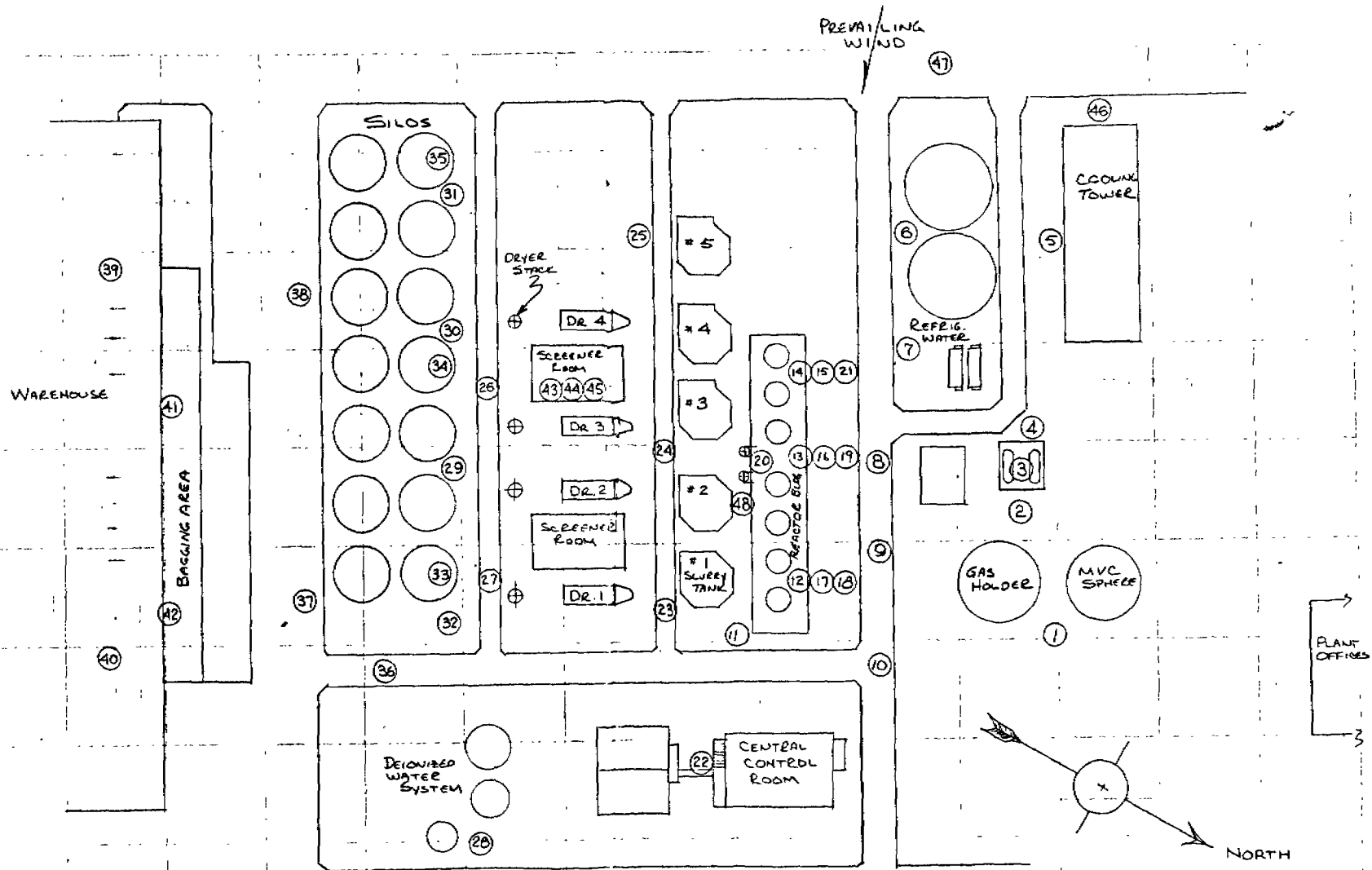
The Century Analyzer OVA employed at Kishima has the same limitations as those used in the U.S. Since the Shin-Etsu plant is on the up-wind side of the complex the background is very low. Agreement between this unit and the GC will be summarized elsewhere but looks very reasonable.

Mr. Ogowa reported he had purchased a gas sampling valve for the VCM in air G.C. I discussed our method of equalizing the pressure in the loop to insure reproducibility.

The Kishima laboratory is capable of determining VCM in air at low levels with the same precision as our laboratories.

PMR/az
Attachment

COLORITE 013248



LAYOUT OF KASHIMA PVC PLANT
KEY TO MONITORING POINTS
PLATE 1

JWP
11/15/74

TABLE I

PROGRAM FOR EVALUATING VCM LEVELS IN THE AIR AT THE KASHIMA PVC PLANT

I. GAS CHROMATOGRAPHIC TESTING

A. Average VCM Levels - 8-Hour Charcoal Tube

Locate tubes and pumps in following areas:

1. bagging area (spot sample with plastic bag also)
2. screening building (spot sample with plastic bag also)
3. control room (spot sample with plastic bag also)
4. yard area downwind from dryer stacks
5. recovery area

B. Spot Samples for GC with Glass Bulbs

All points 1 to 26, three samples each.

C. Personnel Monitoring - 10-Minute Charcoal Tube

1. Operators:

- a. upper floor operator - when opening the reactor
- b. lower floor operator - when transferring wet screening and sampling slurry

2. Recovery and Utility:

- a. sample during solution make-up
- b. sample when draining water condensate
- c. sample - water wash column draining, column bottoms draining

3. Dryer Operator:

- a. during dryer clean-out
- b. during dryer sampling

4. Bagger

5. Fork Lift Operator

D. Schedule

1. Wednesday Morning: October 30th:
 - a. Mr. Reed to work with GC and establish chromatographs with 1 ppm and 5 ppm test gas.
 - b. Mr. Poarch to work with OVA monitoring taking glass bulb samples.
2. Wednesday Morning:
 - a. Mr. Poarch to make second OVA tour and collect more glass bulb samples.
 - b. Start 10-minute charcoal tube personnel monitoring:
 - (1) reactor deck operator
 - (a) opening reactor
 - (b) washing reactor
 - (2) dryer operator
 - (3) recovery operator
 - (4) bagger (we carry pump)
 - (5) fork lift operator
3. Full monitoring Thursday and Friday day and evening shifts:
Begin 8-hour charcoal tube tests

II. OVERALL OBJECTIVE

- A. Two sets of five 8-hour charcoal tubes (100 tubes) (duplicate sets - two sets Shin-Etsu, two sets Tenneco)
- B. Three sets 26-glass bulb samples.
- C. Five sets each job type (5 x 12) - duplicates for Shin-Etsu and Tenneco.

PROGRAM WHILE IN KASHIMA LABORATORY

1. Determine 95% confidence level of GC method used at 1 ppm and 5 ppm (minimum of 10 analyses). If deviation is greater than $\pm 25\%$, do ten more analyses. If still greater, determine reason.
2. Determine relationship of Shin-Etsu standards to Tenneco standards.
3. Repeat 1. above for Gastec method.

J.W. Poarch/P.M. Reed
10/29/74

COLORITE 013250

SHIN-ETSU MONITORING DATA KASHIMA PVC PLANT

TABLE II

NOTE: ALL DATA OVA, CORRECTED FOR BACKGROUND EXCEPT N. IS GASTEC

DATE (24 HOUR BAND)		10/3 1450~1530 CLOUDY 68 88% WIND DIRECTION, NW	10/4 1230~1400 CLOUDY 73 87% W 6	10/5 1500~1040 CLEAR 75% W 6	10/7 1525~1400 CLEAR 73 70% E 6	10/8 1150~1150 RAIN 70 90% SW to W 6	10/9 1335~1410 CLOUDY 79 76% SW to W 6	10/11 0930~1035 CLOUDY 69 71% N to NE, 8	10/12 1100~1200 RAIN 70 90% N to NE, 8	10/14 1050~1140 CLOUDY 70 73% N 8	10/15 1555~1630 CLOUDY 68 78% E to SE 4	10/16 1430~1520 CLOUDY 68 70% NE 6	10/17 0830~0930 CLOUDY 73 75% W 8	10/17 1515~1500 CLEAR 63 62% N 2	NO. OF TIMES EXCEEDING 1 PPM OUT OF 13 TIMES	NO. OF TIMES EXCEEDING 15 PPM OUT OF 13 TIMES	AVERAGE OF READINGS PPM
POINT NO	POINT DESCRIPTION																
1	GASHOLDER, NORTH, G.L.	0.7	0.1	0.5	0	9	0	0.6	1.7	0	1.7~4.5	0	0	0	3	0	1
2	VC COMPRESSOR, NORTH, G. L.	0.5	0.4	0.5	1	13	15~55	0.2	9~14	0	3.7	3	0.6	1.2	7	0	3
3	VC COMPRESSOR, CENTER, G. L.	5~7	1~2	0.5	1.2	7	1	0	1.7	14~34	2	1	0.7~2.0	0.2	9	1	3.5
4	VC COMPRESSOR, WEST, G. L.	0.6	6~11	6~11	2	15	0	14~24	1.7	10~15	14~35	10~24	0.3	1.2~3.2	10	5	2.5
5	COOLING TOWER, SOUTH, G. L.	0.5	5~12	1	0.3	0	0	2~3	1.2	0.7	2	2~5	1.5	0.3	0	5	1.5
6	REFRIGERATOR WATER TANK, G.L.	0.3	1	6	0.2	0	0	2	5.7	0.5	1.2	0	0	0	5	0	1.3
7	REFRIGERATOR COMPRESSOR, G. L.	0.8	1	1~3	0.2	0	0	0.3	3~6	0.7	1.2	0	0	0	4	0	0.8
8	RECOVERY SECTION, SOUTH, G.L.	0.6	0.5	3	0.5 (5mm)	12	0	0.3	2~9	1~2	1.5~8.3	0	0.3	0.3	6	1	2
9	RECOVERY BLOWER, G. L.	2	0.5	0.5	1	6	0.5	0.3	0.7	1	1.5	0	0	0.3	5	0	1
10	VC. HEATING TANK, G. L.	2	0.2	0.5	0	5	0	0.3	0.7	0.5	1.2	0	0	0.3	3	0	0.8
11	OVER THE SOWER, NSCH	1	1	1~3	0	7	0.5	1.0	2.7	1.0	2.2	10	7	7	11	0	3
12	POLY BUILDING EAST 2ND FL	0.5	0.3	2	0	5	0	0	0.7	0.7	0.7	0	0	0.3	2	0	0.8
13	POLY BUILDING CENTER 2ND FL	1~7	0.3	0.5	0	4	0	0	0.7	0.7	0	0	0	0.3	2	0	0.7
14	POLY BUILDING WEST 2ND FL	0.7	0.2	0.5	0	1.3	0	2	0.7	1.2	0	0	0	0.3	2	0	0.5
15	POLY BUILDING WEST 1ST FL	0.4	9	1	1.8	2.0	0.5	2	1.5	1.2	0	3~5	0	2.0	9	1	5
16	POLY BUILDING CENTER 4TH FL	3	1~3	0.5	0	1.0	1	3	2	0.7	0	5~15	5	12 (100)	8	1	3.5
17	POLY BUILDING EAST 4TH FL	1.5	0.5	2	0	3	0	0.5	0.7	0	0.7	2.5~4.5	0	0.7	4	0	1
18	POLY BUILDING EAST ROOF	0.4	0	3~6	0	1.5	8.5	0.3	0	1~2	1~2 (20)	0	0	9~14	6	1	2
19	POLY BUILDING CENTER ROOF	1	0	6~31	0 (100mm)	1.5	1.5	0	0	0.7	2 (50)	0	0	2~4	7	3	3.5
20	POLY BLD ROOF, NEAR EXH BLOWER	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
21	POLY BLD WEST ROOF	1.5~2	0.2	4	5~15 (30)	0	0	0	0	0.7	10~15	0	0 (100)	5	3	2.8	
22	CENTRAL CONTROL ROOM, 2ND FL	1.2	0.4	2	0	11	1	0	0	1~2	28~34	0	0	0	6	1	3.5
23	VACUUM PUMP, G. L.	0.5	0.5	6~21	0	12	0	0	0.5	1.2	1.8	0	0	0	4	1	2
24	NO. 3 SLURRY TANK, G. L.	1.0	0	0	0	0	0	0	1	0.7	1	0	0	0	3	0	0.3
25	NO. 5 SLURRY TANK, G. L.	0.3	0	0	0.2	0	0	0.5	1	1	0	0	0	0.2	2	0	0.2
26	NO. 3 DRYER, G. L.	0.5	0	0	0	0	0	0	0	1.7	0	0	0.3	0	1	0	0.2
27	NO. 1 DRYER, G. L.	0.5	0	0	0	0.3	0	0	0	1.7	0	0	0	0	1	0	0.2
28	DM WATER FACILITY, G. L.	0.4	0	1.5	0	0.5	0.5	0	0	0	0	0	0	0	1	0	0.2
29	SILLO EAST, G. L.	1.0	0	0	0	0	0	0	0	0.7	0	0	0	0	1	0	0.1
30	SILLO CENTER, G. L.	1.2	0	0	0	0	0	0	0	0.5	0	0	0	0	1	0	0.1
31	SILLO WEST, G. L.	1.0	0.2	0	0	0	0	0	0	1.2	0	0	0.4	0	2	0	0.2
32	SILLO WEST, MID STAIRS	—	0	0	0	0	0	0	—	0.5	0	0	0	0	0	0	0
33	SILLO EAST, TOP	1~12	0	0	0	0.4	0.5	0	—	0.5	0	0	0	0	1	0	0.2
34	SILLO CENTER, TOP	0.8	0	0	0	0	0	2.5~3	—	1~3	0	1	0~3	1.2~2.2	4	0	0.6
35	SILLO WEST, TOP	1.3	0	0	0.5	0	0	0	—	4~9	0.2	2~3	2~8, 2.2	0	4	0	1
36	BD. DISOLVING TANK, G. L.	1.2	0	0	0	0	0	0	0	2	0	0	0	0	2	0	0.2
37	NO. 2 SILLO SOUTH, G. L.	1.3	0	0	0	0	0	0	0	0.5	0	0	0	0	1	0	0.1
38	NO. 10 SILLO SOUTH, G. L.	1.3	0	0	0	0	0	0.5	0	0	0	1	0	0	1	0	0.1
39	INSIDE WHSE, WEST 1ST FLOOR	1.2	0.1	0	1	1	0	0	1	1	0	0.2	0.5	0.3	5	0	0.5
40	INSIDE WHSE, EAST 1ST FLOOR	0.8	0.2	0.5	0	1	0.5	0	0.5	0	0	0	0.2	0.2	1	0	0.3
41	IN PACK ROOM, WEST 1ST FL	1.0	0.5	0	1.1	1.5	0	0.3	1	0.3	0.5	0.3	0.3	0.3	4	0	0.5
42	IN PACK ROOM, EAST 1ST FL	1.5	0.2	0.5	0	0.8	0	0.5	0.2	0.5	0.5	0	0	0	1	0	0.3
A	FRONT OFFICE, G. L.			0													
B	FRONT OF MAIN GATE, G. L.			0.4													
C	NEAR RAIL ROAD, G. L.		0.02					0.3 0.5		0.9							
D	BETWEEN MAINT SHOPS, NORTH, G. L.		0.02		0.2			0 5		5	0.06 5						
E	PLAY GROUND		0.04		0.4						0.05 5						
F	PARKING AREA, NORTH					0.8	2.4										

(N) INDICATES EXCURSION VALUES

WJP 11/21/76

COLORITE 013251

AIR QUALITY MEASUREMENTS SHIN-ETSU PVC PLANT, KASHIMA BY TENNECO MONITORING TEAM

POINT NO	POINT DESCRIPTION	DATE / TIME WIND DIR / VEL MPH WEATHER COND TEMP, °F / R.H. PPM VCM BY METHOD	10/29/74 1530~1645 EAST, 4 MPH CLOUDY 64° 60%			10/30/74 1330~1530 SOUTH WEST 2~4 RAIN 68° 90%			10/30/74 20~203 NORTH RAIN 64° 90%			10/31/74 1100~1430 EAST 8 OVERCAST (EAST-QUARTERS) 61° 88%			10/31/74 2000~2030 WEST NORTHWEST 6 CLEAR 63° 60%			11/1/74 0935~1130 WEST NORTHWEST 6 CLEAR 63° 60%			11/1/74 2000~2030 WEST NORTHWEST 6 CLEAR 63° 60%		
			OVA	G/T	GC	OVA	G/T	GC	OVA	G/T	GC	OVA	G/T	GC	OVA	G/T	GC	OVA	G/T	GC	OVA	G/T	GC
1	GAS HOLDER, NORTH, G.L.	0.2				0						0			0			0					
2	VC COMPRESSOR, NORTH, G.L.	0.3				0.2-5	1.7	1.1				1-3	2	1.3	0			0	0	0.02			
3	VC COMPRESSOR, CENTER, G.L.	0.2				0.5-2						0.7			0			0					
4	VC COMPRESSOR, WEST, G.L.	1.5	2.0			0.4						15-25			2-25			0					
5	COOLING TOWER, SOUTH, G.L.	0.7-1				0						0			0			0					
6	REFRIG. WATER TANK, SOUTH, G.L.	0.2				0						0			0			0					
7	REFRIGERATOR COMP., G.L.	0.2				0.5						1			1			0					
8	300 (RECOV) SECTION, SOUTH, G.L.	2.5	1.8			0.5						0			0			0					
9	RECOVERY BLOWER, G.L.	0				2-4						0.5-2			0.5-1.5			0.5-1.5					
10	VC MEASURING TANK, G.L.	0.2				0.5						0.5			0			0					
11	OVER THE SEWER ~ 5CM	0.2				2.4						11			3.6			3.6					
12	POLY BLDG EAST, 2ND FLR.	0				0						1			2.5			2.5					
13	POLY BLDG CENTER, 2ND FLR.	0				0.5						0.2			0.5-3.5			0.5-3.5					
14	POLY BLDG WEST, 2ND FLR.	0.2				1.7						0			0.5			0.5					
15	POLY BLDG WEST, 4TH FLR.	0.3				1.5	2.3					1.5			0.2-5			0.2-5					
16	POLY BLDG CENTER, 4TH FLR.	0.5-1				2						2			4.5			4.5					
17	POLY BLDG EAST, 4TH FLR.	0.2				1.7	2.1	0.6				1.5	0.8	0.2	0.5-2	0.9	0.8	0.5-2	0.9	0.8			
18	POLY BLDG EAST, ROOF	1				2-4						9			0.5			0.5					
19	POLY BLDG EAST, ROOF	0-1				0.5						4-7			0			0					
20	POLY BLDG ROOF NEAR EXH. BLOWER	-				-						-			-			-					
21	POLY BLDG WEST, ROOF	-				1.0						0-14			0			0					
22	CENTRAL CONTROL ROOM ENTRANCE	-				1-4	2.5	4.3	0.5	0.5	0.4	0-1	0.2	0.2	0	0	0	0-0.5	0.3	0.6		0.07	
23	VACUUM PUMP, G.L.	0	0			0	0	0.04				1-2	5	0.2	1.5	1.0	0.3	1.5	1.0	0.3			
24	NO. 3 SLURRY TANK, G.L.	0				0						0.5			0			0					
25	NO. 5 SLURRY TANK, G.L.	0				0	0	0				0			0			0					
26	NO. 3 DRYER, G.L.	0				0						0			0			0					
27	NO. 1 DRYER, G.L.	0				0						0			0			0					
28	DEMION. WATER FACILITY, G.L.	0				1-3	2	2.3				0.5	0.15	0.3	0.5	1	0.2	1.5-2	0.4	0.5		0.14	
29	SIL. EAST, G.L.	0				0						0			0			0					
30	SIL. CENTER, G.L.	0				0						0			0			0					
31	SIL. WEST, G.L.	0				0						0			0			0					
32	SIL. WEST, M.I.O. STAIRS	-				0						0			0			0					
33	SIL. EAST, TOP	-				0						0.5			2.5			2.5					
34	SIL. CENTER, TOP	-				0						0			5-10			5-10					
35	SIL. WEST, TOP	-				0						0.5			0			0					
36	BD. DISSOLVING TANK, G.L.	-				0	0	0				0.5	TR	0.06	0	0	0.02	1.5	0.6	0.3		2.3	
37	NO. 2 SIL. SOUTH, G.L.	-				0			0.5	0.2	0.06	0			0			0					
38	NO. 10 SIL. SOUTH, G.L.	-				0			0	0	0	0			0			0					
39	INSIDE WAREHOUSE, WEST 1ST FLR.	-				0.3						0			0			0					
40	INSIDE WAREHOUSE, EAST 1ST FLR.	-				0.5						0.5			0			0					
41	IN PACKER ROOM, WEST 1ST FLR.	-				0.3						0			0.5			0					
42	IN PACKER ROOM, EAST 1ST FLR.	0				0.3						0			0			0					
43	SCREENER ROOM, 1ST FLR.	0				-						-			-			-					
44	SCREENER ROOM, 2ND FLR.	0				-						-			-			-					
45	SCREENER ROOM, 3RD FLR.	0.2	0.4			-						-			-			-					
46	COOLING WATER TANK, G.L.	-				-						-			-			-					
47	UP WIND (TOWNSHIP WEST OF C/T)	-				0	0	0.06	0	0	0	0	0	0	0	0	0	0	0	0.02		0	
48	BELOW WET SCREENER, G.L.	-				0	0	0.1				0	0.5	0.02	0.1	TCE	0.2	0.1	TCE	0.2			

COLORITE 013252

JWP 11/5/74

TABLE IV

SHIN-ETSU MONITORING DATA

VCM CONCENTRATION IN AIR DURING VARIOUS DRAINING-OUT OPERATIONS(MEASUREMENTS WITH CENTURY OVA, CORRECTED FOR BACKGROUND)

Operation	Time	Air Over Sewer, ppm VCM	Air in Surroundings, ppm VCM	Operation Frequency
R-03 drain tank under VCM gas cooler	immediately after 2 minutes after 4 minutes after 6 minutes after	1% or more 50 to 100 7 to 10 ND	100 to 200 20 to 40 2 0	1 time per day
R-07 gas holder	immediately after start immediately after stop 1 minute after stop 5 minute after stop	1% or more 30 to 50 8 5	100 to 1000 5 to 7 3 to 4 0 to 1	1 time per day
R-05 VCM recovery blower (roots)	immediately after start 1 minute after stop 2 minutes after stop	- - -	100 to 1000 1 to 2 0	1 time per day
R-02 to R-05 drain pipe be- tween water scrubber and VCM recovery blower	immediately after start 1 minute after stop	- -	10 to 20 2 to 3	1 time per day

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TABLE V

SHIN-ETSU MONITORING DATA

VCM CONCENTRATION IN AIR DURING STRAINER EXCHANGE OPERATIONS

Strainer Exchange Operations	Time	Operation	Close to Strainer	3M Downwind 1.5M Height	Operation Frequency
R-039-1 strainer exchange	start - 0 minutes	a VCM purge		500 to 1000	1 time per 2 days
	after 4 minutes	b opening top head	10 to 15	70 to 100	
		c just after opening top head	200 to 500	100 to 200	
		d during filter exchange	15 to 25	10 to 20	
	after 7 minutes	e set the top head	8 to 10	10 to 15	
	after 11 minutes	f gas replacement		0.5 to 0.8%	
	after 12 minutes	g end of all operation	2 to 3	3 to 15	
R-039-2 strainer exchange	after 0 minutes	a VCM purge		400	1 time per 2 days
	after 5 minutes	b opening top head		20 to 30 (max 400)	
		c just after opening top head	1000	100 to 200	
		d during filter exchange		20 to 30 (max 500)	
	after 9 minutes	e set the top head	15	7 to 8	
	after 13 minutes	f gas replacement		1000	
	after 15 minutes	g end of all operation	2 to 3	2 to 3	

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TABLE V Page 2

Strainer Exchange Operations	Time	Operation	Close to Strainer	3M Downwind 1.5M Height	Operation Frequency
P-008 after VCM charge pump	after 0 minutes	a VCM purge		20 to 40 (max 300)	1 time 3 days
		b opening top head	15 to 30 (max 500)	3 to 7	
	after 7 minutes	c just after opening top head	>1%	100 to 1000	
		d during filter exchange	100 to 300	17 to 35	
	after 11 minutes	e set the top head	30 to 60	3 to 15 (max 50)	
	after 17-18 minutes	f gas replacement	40 to 60	3 to 15 (max 100) (@ 10M, 50 to 70)	
	after 20 minutes	g end of all operation	-	1 to 2	
P-002 before VCM transfer pump	0	a VCM purge		200 to 300	1 time 2 days
		b opening top head	10 to 20 (max 400)	7 to 10	
	3	c just after opening top head	1000	100 to 200	
		d during filter exchange	20 (max 200)	10 to 15	
	7	e set the top head	5 to 10 (max 100)	5	
	10	f gas replacement	-	100 to 500	
	12	g end of all operation	1 to 2	0 to 2	

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TABLE VI

SHIN-ETSU MONITORING DATA

VCM CONCENTRATION IN AIR SURROUNDING ROTATING EQUIPMENT

Equipment Number	Equipment Description	ppm VCM			
		<u>Operating Condition</u>		<u>Shutdown</u>	
		Close to Seal	Surrounding Area	Close to Seal	Surrounding Air
R-005	VCM recovery blower	1 to 2	0	0.5 to 1.5	0
R-014-1	#1 compressor	1% or more	10 to 15	-	-
R-014-2	#2 compressor	-	-	0.5 to 1%	5
R-022	recovery VCM pump	500 to 1000	10 to 15	1.5 to 3.5	0
R-026	crude VCM pump	0.5 to 1%	15 to 20	-	-
R-031	reflux pump	1% or more	70 to 100	-	-
P-003	VCM transfer pump	1% or more	100 to 300	0.5 to 2.5	0
P-006-1	#1 VCM charge pump	150 to 200	12 to 22	-	-
P-006-2	#2 VCM charge pump	1% or more	100 to 200	70 to 150	3 to 5
D-006	slurry pump #1	0.5 to 3	0.5 to 1	-	-
	" " #2	0.5 to 3	0.5 to 1	-	-
	" " #3	0 to 1	0	-	-
	" " #4	-	-	-	-

NOTE: Measurements of surrounding air taken at same height of machine approximately 1M downwind.

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TABLE VII

SHIN-ETSU MONITORING DATA

VCM CONCENTRATION IN AIR NEAR THE TOP MANHOLE OR REACTOR TAKEN 1 TO 2M DOWNWIND @ HEIGHT ABOVE MANHOLE AS NOTED

(MEASURED WITH CENTURY OVA, CORRECTED FOR BACKGROUND)

Date & Reactor Number →		10/5 No. 3		10/7 No. 1		10/12 No. 5		10/12 No. 3	
Operation ↓	Monitoring Height →	0.1M	1.5M	0.1M	1.5M	0.1M	1.5M	0.1M	1.5M
immediately after opening manhole		1%	1000	1000	1000	1%	1000	1%	1%
flexhose in manway after 1 minute		20-30	70	80-100	100	20-30	20-30	1000-3000	1000-3000
" " " " 3 minutes		5	3	15	35	6-10	7-12	25-45	35-55
" " " " 5 minutes		5	3	4	4	1	1	2-3	1.5
" " " " 10 minutes		7	7-8	2	3	2	2-10	1-2	1-2
" " " " 15 minutes		-	-	2	3	-	-	-	-
" " " " 20 minutes		-	-	1	2	-	-	-	-
open bottom manhole, ppm		30-50	50-70	1000	1000	50-100	100-1000	100-1000	100-1000
elapsed time after slurry discharge		14 min.	14 min.	40 min.	40 min.	14 min.	14 min.	13 min.	13 min.
3 minutes after bottom manhole open		3-13 ppm	50-100	100-200	100-200	7-11	12	26-65	12-25
start washing @ bottom manhole 1 minute after above		0-1	0-1	2-3	1-2	0.5-1.5	0.5-1.5	4-14	9-25
elapsed time after bottom manhole open		5 min.	5 min.	5 min.	5 min.	5 min.	5 min.	6 min.	6 min.

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TABLE

SHIN-ETSU MONITORING DATA

VCM CONCENTRATION IN AIR DURING SLURRY DISCHARGE 1 TO 2M DOWNWIND FROM WET SIEVE(MEASURED WITH CENTURY OVA, CORRECTED FOR BACKGROUND)

	Date →	10/4	10/5	10/7*	10/12*	10/12*
Operation ↓	Reactor Number →	2	3	1	5	3
after start of discharge		1800-2000	500-1000	10-100	100-300	100-500
3 minutes after start of discharge		500-1000	250-350	1-2	100-200	30-70
5 minutes after start of discharge		300-700	100-200	0.5-1	25-45	3
10 minutes after start of discharge		10-150	100-200	3-10	3-8	1
at finish of discharge		2-3	1-2	0.5	1	3
3 minutes after finish of discharge		0	0.2	0.5	0-1	0-1
5 minutes after finish of discharge		1	0	1.5	-	-
10 minutes after finish of discharge		0	0	1.5	-	-
15 minutes after finish of discharge		0	0	1	-	-

*Connected handhole of wet sieve to exhaust blower with flexible hose.

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TABLE IX

SHIN-ETSU LONG-TERM (6-7 HOUR) MONITORING

Date	10/30/74	10/31/74	11/1/74
Time On/Off	1430/2030	1030/1630	1030/1750
<u>Sample Point</u>			
Screen Room, 3rd Floor	1.1	0.9	-
Central Control Room	1.3	0.9	0.5
Yard - Downwind	0.3	0.1	-
Recovery Area	0.7	0.5	-
Polymerization Building - 4th Floor - #5 (E. Wall)	-	-	1.0
Polymerization Building - 4th Floor - #1, #2 (E. Wall)	-	-	4.6
Polymerization Building - Ground Floor - Between #1 and Slurry Tank	-	-	0.3

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W.C. Champion
11/20/74

TABLE X

OPERATOR TIME BREAKDOWN - KASHIMA OPERATING PERSONNEL

<u>Location</u>	<u>Time/Shift</u>							
	<u>Foreman</u>	<u>Ass't. Foreman</u>	<u>Board Man</u>	<u>Polymerization Operators</u>			<u>Dryer Operator</u>	<u>Recovery & Utility</u>
				<u>4th Flr.</u>	<u>2nd Flr.</u>	<u>Discharge</u>		
Central Control Room ⁽¹⁾	4' 10"	3' 50"	6' 40"	2' 40"	2' 40"	2' 40"	3' 00" ⁽³⁾	2' 10"
Job Site ⁽²⁾	3' 00"	3' 20"	30"	4' 30"	4' 30"	4' 30"	4' 10"	5' 00"
Cafeteria	50"	50"	50"	50"	50"	50"	50"	50"

(1) Includes time in break room.

(2) for Foreman and Assistant Foreman - roving, 5 times/shift.

(3) Includes time analyzing resin samples.

TABLE XI

TIME-WEIGHTED VCM EXPOSURE AVERAGESKASHIMA OPERATING PERSONNEL

<u>Job Classification</u>	<u>8-Hour Time-Weighted VCM Exposure, ppm</u>		
	<u>Without Respirators</u>	<u>With Respirators</u>	<u>With CCR at 0.1 ppm VCM</u>
Foreman	7.2	2.5	0.8
Assistant Foreman	7.2	2.5	0.8
Board Man	3.0	3.0	0.2
4th Floor Polymerization Operator	20.0	2.6	1.5
2nd Floor Polymerization Operator	12.2	1.5	0.4
Discharge Operator	12.2	1.5	0.4
Dryer Operator	1.4	1.4	0.2
Recovery and Utility Operator	71.9	2.0	1.0

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