



INTERNAL
CORRESPONDENCE

APR 14 1983

UNION CARBIDE CORPORATION P.O. BOX 579, 4625 ROYAL AVE.
METALS DIVISION NIAGARA FALLS, NEW YORK 14302

To (Name)	Messrs. R. J. Kronkhyte	Date	April 11, 1983
Division	J. L. Myers	Originating Dept.	New Product Development
Location	UCC - Metals Division	Area	
Area	King City, CA	Subject	Asbestos Dust Control Results of NIOSH Air Monitoring Survey of King City Bagging Room Operations
Copy to	Messrs. G. L. Dickson T. J. Kagetsu D. F. Kapral R. O. Marsten H. B. Rhodes J. B. Rouse F. L. Smith W. C. Thurber		Project No. 530-10903

[Handwritten initials: JLG, HJR]

During the week of January 23-30, 1983, NIOSH ran a three-day air monitoring survey of the plant bagging operations. Objectives of the survey, test protocols and operating conditions are discussed in the attached report issued by the writer February 3, 1983.

The fiber count results for March 25, 26 and 27 are shown in Tables I, II and III, respectively. Ceiling value concentrations in the main circuit bagging area ranged from 0.4 to 6.8 fibers/cc for personal samples. Personal ceiling exposures for the RG-244 bagging operator were between 1.1 and 6.6 fibers/cc. Personal time weighted averages (TWA) based on approximately four hours of testing per day demonstrated levels in excess of 2.0 fibers/cc in four separate instances. TWA's for operators in the main circuit bagging room ranged from 0.5 to 3.6 fibers/cc. TWA's for the RG-244 bagger were 1.4 to 3.8 fibers/cc.

The high exposures are attributed for the most part to various mechanical problems evident during the course of these tests; the details of which are covered in the preliminary report appended. However, these tests demonstrate the need for some sort of continuous monitoring program. It would, in my opinion, behoove us to proceed with a plant evaluation of continuous air monitoring equipment as soon as possible.

Tom Cooper, project leader of the NIOSH survey team, contacted me March 30th. They have completed the dust counts and their results are considerably lower than ours. According to Tom, their highest ceiling value was 2.7 fibers/cc and the TWA's were all less than 0.6 fibers/cc. I did not discuss our findings with him. He is sending us copies of their raw data this week. The final report will not be forthcoming for at least another month or two.

Messrs. R. J. Kronkhyte
J. L. Myers

-2-

April 11, 1983

In view of the discrepancies between labs, we recounted several of the more heavily loaded filters. These results are shown in Table IV. Generally speaking, the replicate counts demonstrated correlations with original test results within the accepted limits of variance. With one exception, Sample D-60, the replicate counts were significantly lower than the original count. This sample contained a considerable amount of fine fiber with diameters approaching the visible detection limit at 400X magnification and was very difficult to count. This type of fiber was detected in some of the other RG-244 samples as well. With fine particulate of this nature, every field viewing area has to be scrutinized in detail at several focal planes. Normally, a sample can be counted in 10 to 20 minutes. By comparison, it took approximately an hour to count D-60.

As you are aware, our fiber does not exhibit the morphology typical of Canadian chrysotile. Coalinga asbestos has a much smaller mean diameter and fiber length distribution. Because of this and the fact that most counting laboratories are not familiar with Coalinga asbestos, their fiber counts are often artificially low. I should point out that it is possible that the NIOSH counts are correct. Prior studies have shown that the variance between simultaneous multiple samples can be quite high. In this instance, however, I think the problem is related to differences in the counting procedure rather than between samples. It would appear that the NIOSH counting lab missed a significant amount of asbestos fiber in some of the samples.


B. L. Ingalls

BLI:et
Attach.

TABLE I

KING CITY AIR MONITORING TEST RESULTS - MARCH 25, 1983

Sample No.	Main Circuit Bagging Area				RG-244 Circuit Bagging Area			
	Sample Identification	Time		Fibers/cc of air	Sample Identification	Time		Fibers/cc of air
		On	Off			On	Off	
D-54	Personal - L. Trevino-bagger	8:05	10:01	0.7	Personal - J. Godinho-bagger	10:34	12:01	6.6 ⁽²⁾
D-44	Personal - L. Trevino-bagger	13:47	15:34	6.8 ⁽¹⁾	Personal - J. Godinho-bagger	13:50	15:32	1.5
				(TWA = 3.6)				(TWA = 3.8)
D-45	Personal - H. Segobia-palletizer	8:13	10:01	0.4	Area - near broken bag disposal unit	10:31	11:56	0.1
D-64	Personal - H. Segobia-palletizer	13:45	15:34	0.6	Area - near broken bag disposal unit	13:51	15:31	0.2
				(TWA = 0.5)				(TWA = 0.2)
D-56	Area - at end of bag shaper	8:04	10:07	0.1	Area - over bagging unit	10:33	11:58	0.3
D-51	Area - at end of bag shaper	13:46	15:38	0.3	Area - over bagging unit	13:54	15:31	0.2
				(TWA = 0.2)				(TWA = 0.2)
D-63	Area - over bagging unit	8:11	10:05	0.2				
D-65	Area - over bagging unit	13:42	15:39	0.3				
				(TWA = 0.3)				

(1) Bagger entered product bin for ~ 20 minutes during this sample period.

(2) RG-244 bagging unit not working properly. Some bag breakage occurred during this period.

TABLE II

KING CITY AIR MONITORING TEST RESULTS - MARCH 26, 1983

Sample No.	Main Circuit Bagging Area				RG-244 Circuit Bagging Area			
	Sample Identification	Time		Fibers/cc of air	Sample No.	Sample Identification	Time	
		On	Off				On	Off
J-36	Personal - L. Trevino-bagger	8:05	10:00	2.8	H-14	Personal - J. Godinho-bagger	8:05	9:56
K-41	Personal - L. Trevino-bagger	12:56	15:07	1.4	J-32	Personal - J. Godinho-bagger	12:52	15:01
			(TWA = 2.1)				(TWA = 1.4)	
D-57	Personal - H. Segobia-palletizer	8:01	10:00	1.3	K-31	Area - Near broken bag disposal unit	8:00	9:56
D-74	Personal - H. Segobia-palletizer	12:58	15:09	1.1	C-23	Area - Near broken bag disposal unit	12:49	15:02
			(TWA = 1.2)				(TWA = 0.3)	
UCC 8-68	Area - Over main bagging unit	7:41	9:58	0.6	J-50	Area - Over bagging unit	8:01	9:56
L-74	Area - Over main bagging unit	12:42	15:10	0.4	J-20	Area - Over bagging unit	12:50	15:03
			(TWA = 0.5)				(TWA = 0.1)	
J-53	Area - Over Auger packer	7:46	9:58	0.9				
K-35	Area - Over Auger packer	12:43	15:10	1.3				
			(TWA = 1.1)					
D-50	Area - Over bag shaper	7:43	9:56	0.4				
K-36	Area - Over bag shaper	12:44	15:08	0.2				
			(TWA = 0.3)					

TABLE III

KING CITY AIR MONITORING TEST RESULTS - MARCH 27, 1983

Sample No.	Main Circuit Bagging Area			RG-244 Circuit Bagging Area			
	Sample Identification	Time On Off	Fibers/cc of air	Sample No.	Sample Identification	Time On Off	Fibers/cc of air
E-65	Personal - L. Trevino-bagger	8:01 9:59	1.6	D-40	Personal - J. Godinho-bagger	8:11 8:14 9:31 10:01	5.1 ⁽¹⁾
A-16	Personal - L. Trevino-bagger	13:15 15:19 (TWA = 1.3)	1.1	J-72	Personal - J. Godinho-bagger	13:28 15:14 (TWA = 2.3)	1.4
C-30	Personal - M. Segobia-palletizer	8:02 10:01	0.5	B-96	Area - Near broken bag disposal unit	8:02 9:56	0.7
K-45	Personal - M. Segobia-palletizer	13:18 15:20 (TWA = 0.7)	0.9	C-26	Area - Near broken bag disposal unit	13:16 15:13 (TWA = 0.5)	0.4
A-10	Area - Over main bagging unit	8:03 10:10	<0.1	B-53	Area - Over bagging unit	8:03 8:14	5.5 ⁽¹⁾
J-67	Area - Over main bagging unit	13:16 15:21 (TWA = 0.5)	0.9	L-85	Area - Over bagging unit	13:16 15:14 (TWA = 0.5)	0.1
C-32	Area - Over Auger packer	8:03 10:08	0.1				
J-66	Area - Over Auger packer	13:16 15:21 (TWA = 0.7)	1.2				
K-30	Area - Over bag shaper	8:05 10:06	<0.1				
D-76	Area - Over bag shaper	13:18 15:22 (TWA = 0.3)	0.5				

(1) RG-244 bagging unit had a leak and repairs took most of the morning.

TABLE IV

UCC REPLICATE FIBER COUNTS

<u>Sample No.</u>	<u>Original Count</u> ⁽¹⁾	<u>Replicate Count</u> ⁽²⁾	<u>Replicate Count</u> ⁽³⁾
J-36	3.1	1.3	2.7
D-40	5.1	4.0	6.2
D-44	6.8	6.7	8.1
D-60	6.6	3.4	4.6
D-64	0.6	0.6	0.6

(1) Performed by F. L. Smith - March 11, 1983

(2) Performed by F. L. Smith - March 29, 1983

(3) Performed by B. L. Ingalls - March 30, 1983

REPORT NO. 83-M-4

FILE NO. 530-10903

UNION CARBIDE CORPORATION

METALS DIVISION

TECHNOLOGY DEPARTMENT - PRODUCT DEVELOPMENT

TRIP TO: King City, California

DATE: January 23-30, 1983

BY: B. L. Ingalls

PURPOSE: NIOSH Monitoring Survey

INTRODUCTION

NIOSH ran a three day air monitoring survey of the plant bagging operations. The objective of this study is to document effective methods currently in practice for the control of airborne dust and further promote their use in industry.

DISCUSSION

NIOSH personnel in attendance:

Thomas C. Cooper, Mining Engineer (Project Leader) NIOSH, 4676 Columbia Parkway, Cincinnati, OH 45226, Telephone: 513-684-4320

Paul E. Caplan, P.E., C.I.H. Res. Ind. Hygienist (address, same as above) Telephone: 513-684-4442

Alfred A. Amendola, P.E. Chief, Materials Processing, (address, same as above) 513-684-4224

Pierre L. Belanger, M.S., Industrial Hygienist, NIOSH, DHEW, region IX 50 United Nations Plaza, San Francisco, CA 94102, telephone: 415-556-3781

Test Protocol

Air samples were obtained on bagging personnel in both the RG-244 and Main circuit bagging areas for approximately two consecutive hours in the morning and again in the afternoon of January 25, 26 and 27, 1983. A total of eighteen stationary area locations were also monitored at the same times in the two bagging rooms. NIOSH collected a total of 120 area and 18 personnel samples over the course of the three days. Samples were collected by Union Carbide simultaneously on the three bagging operators and at five of the stationary area points monitored by NIOSH totaling 47 samples in all. Area sampling locations are shown in attached schematics of the RG-244 and Main circuit bagging rooms.

Test Protocol cont'd

NIOSH also conducted tests for hood face-velocities, duct and static pressure measurements and pitot tube traverses of the ventilation systems in the two bagging areas.

NIOSH used MSA model G pumps calibrated to a setting of 1.5 L/m. UCC used MSA model G and new Gilian model HF 113T pumps also set at 1.5 L/m. Milliporemembrane filters of 0.8 micron porosity were used throughout.

Sample identifications and test information regarding sampling times, locations, and other pertinent data are appended. Photographs were taken by NIOSH of the various test locations and negatives were left with UCC for editing prior to release.

Operating Conditions

January 25, 1983- Weather conditions: temperature low 60's with scattered clouds and light to moderate winds (5-15 mph).

The RG-244 bagging unit was not performing properly during the grave shift resulting in excessive bag breakage. The problem was resolved before testing commenced but some breakage did occur during the day. Pellet cooler broke down requiring approximately 1 1/2 days to repair.

Bauer mill seals failed sometime during later part of the grave shift. Both Main circuit and RG-244 products were contaminated with oil necessitating a temporary shut-down and purging of the circuits. The Bauer was bypassed for the remainder of the week while repairs were made. As a result, only RG-244 and SG-103.5 were produced during the monitoring tests. The Black and Stoker packers were used for the main circuit material during the morning of the 25th. Switched to the Auger packer and plastic bags in the afternoon which continued for the remainder of the week. The main circuit bagger went into the product bin during the last 20 minutes of the morning test (sample P-1, 8:05 - 10:01am).

January 26, 1983 - Weather cloudy with a slight drizzle in the afternoon. Temperatures ranged from high 50's to mid 60's. Winds medium to high with gusts 10-30 mph. Some dusting noticed late morning in RG-244 bagging area. A Raymond mill was being repaired and considered a possible source of the problem.

RG-244 bagger went inside the bagging unit temporarily (2-5 minutes) during the morning test. (Sample P-3, 8:05-9:56 am). RG-244 rotolouvre drier was not operating properly. Firing unit repeatedly kicking out causing erratic moisture control. Ultimately, it was repaired during the course of the day.

The main circuit ventilation duct for the broken bag disposal unit was found to be plugged several feet during pitot tests. A considerable dust cloud was generated in the area for approximately 2-3 minutes while the duct was being cleaned at 3:05 - 3:08 pm.

January 27, 1983 - Rain light to heavy during the morning with winds up to 25-35 mph. Temperature 50-55° Cloudy with higher temperatures and intervals of sunshine during the afternoon.

RG-244 bagger unit leaking asbestos fines. Considerable dusting in bag room during grave shift; fines on the rafters and floor etc. Windy conditions caused dust swirling effects in the bag room. Testing was terminated for

approximately 1 1/2 hours while repairs were made to the bagging unit. NIOSH subsequently decided to discard morning samples obtained in the RG-244 area because of abnormal conditions stated.

Preliminary Observations

Dust and hood velocities measured by NIOSH were found in general to be within design specification limits established by UCC Engineering.

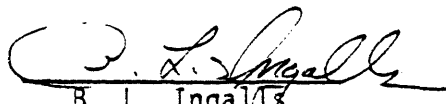
NIOSH Comments:

In general, plant dust controls and work practices were good, but could be improved in some areas. No serious problems were noted. Suggestions included:

1. A ventilation hood over the RG-244 broken bag disposal unit.
2. Modification of the air duct pickup system for the main circuit broken bag disposal system to prevent clogging.
3. The addition of plastic closure strips at the openings of the bag shapers and shrink wrap ovens where not already in use.
4. Bar to be installed across RG-244 bagger hood opening to prevent operators from entering the unit during cleaning.
5. Removal of an elbow in the air duct hose to the RG-244 bagger cone to improve flow.
6. Eliminate spillage from RG-244 bag spouts between packer and weighing scale (work practice problem).
7. An enclosure or hood for the RG-244 Micro-Pulverizer equipment (UCC suggestion).
8. Main circuit bagger enclosure exhaust duct slide gate requires some sort of locking mechanism to prevent accidental closing.
9. Exhaust dust catcher under main circuit straightening belt just before shrink wrapping device not working properly.

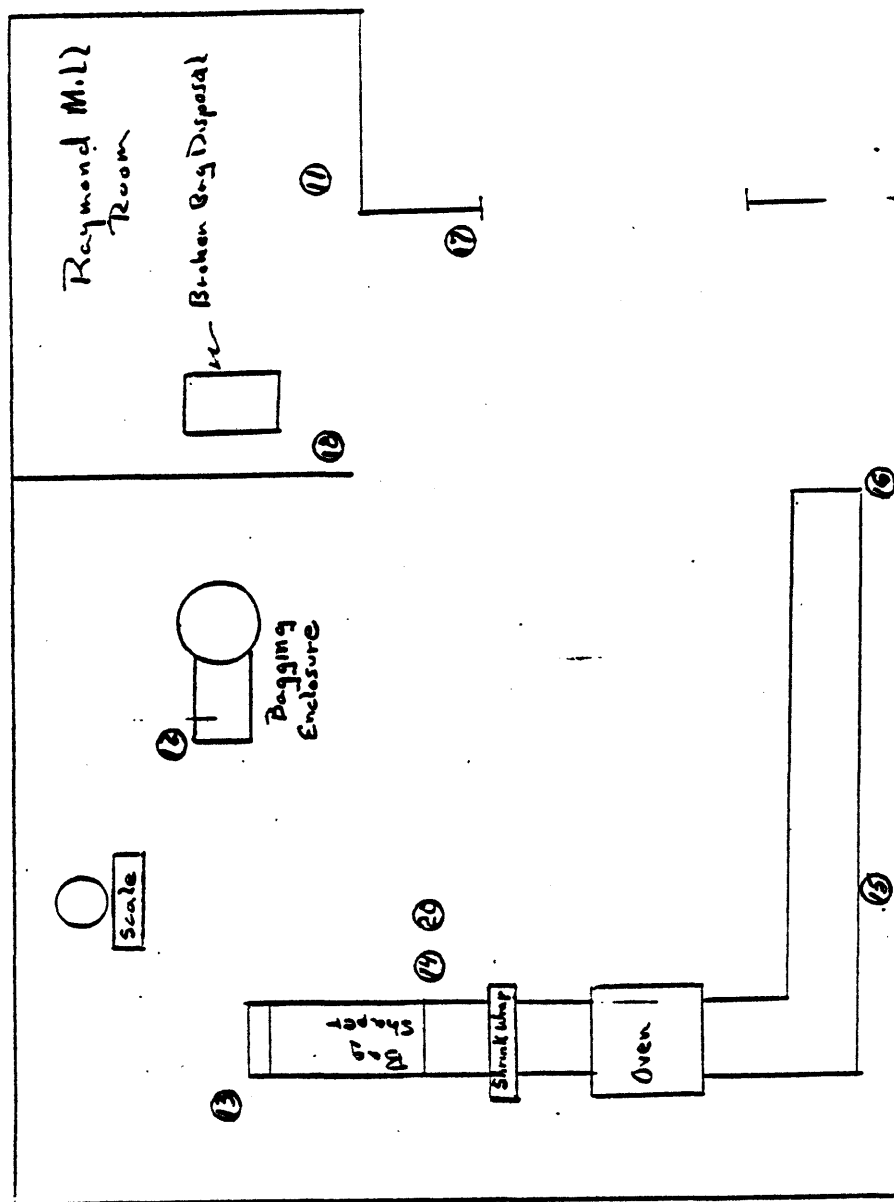
CONCLUSIONS

Conclusions are pending completion of the fiber counts and compilation of the test results. At such time, the results of the two laboratories will be exchanged for comparative purposes.

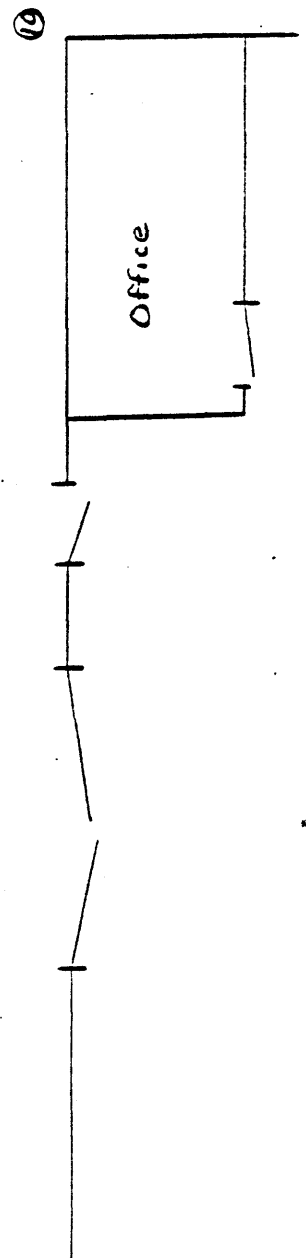
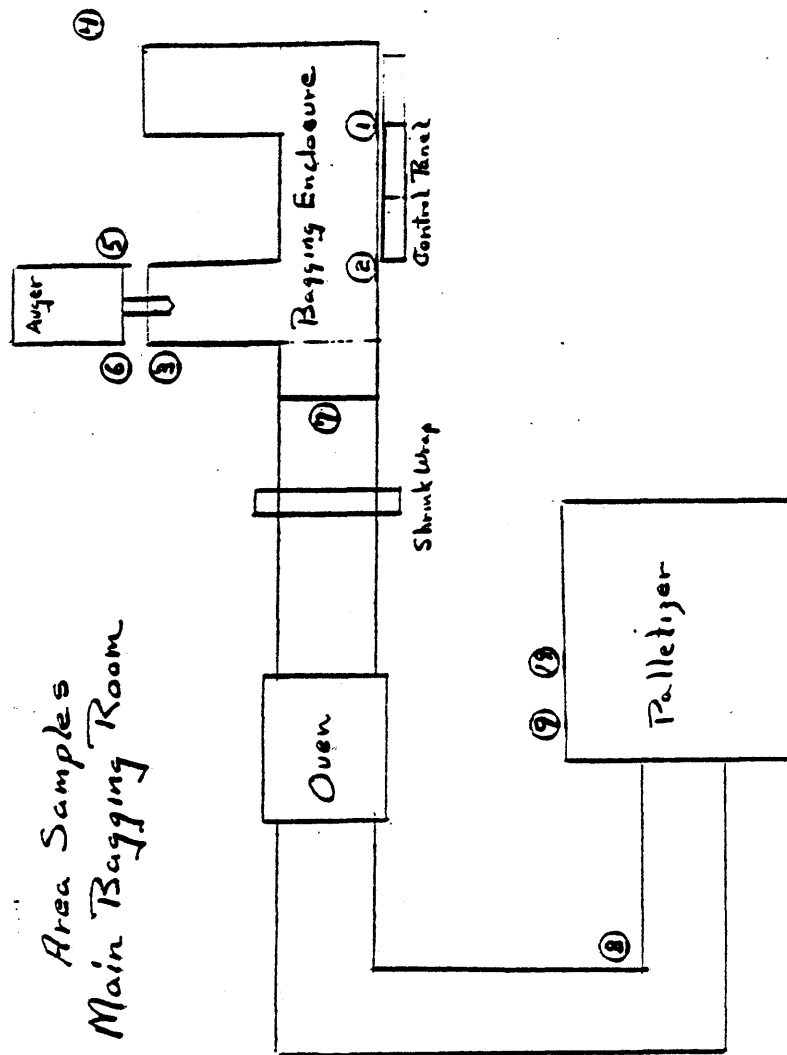

B. L. Ingalls

/jl

Area Samples RG-244 Bagging Room



Area Samples
Main Bagging Room



ASBESTOS INDUSTRIAL HYGIENE SAMPLE SUMMARY

Page 1 of 24

IDENTIFICATION

Plant: King City I.D.#: 0401062
 Worker Sampled: Leo Tavares
 Soc. Sec. #: 572 48 2656
 Job Description: 038 Bagging (Main Content)
 Sample Type: Personal Area ✓
 Sampled By: CB Date: 1/25/83
 Counted By: JB Date: 3/10/83

PERMISSIBLE EXPOSURE LIMIT(S)

TWA: _____
 Ceiling: _____
 BASIS:
 MSHA _____ OSHA _____ STATE _____ UCC _____
 OTHER NIOSH

WORKPLACE CONDITIONS:

Operations: Normal _____ Not Normal ✓
 Explain: Person breathing oil
 Ventilation: Type Exhaust system
 Normal ✓ Not Normal _____
 Explain: _____

WEATHER CONDITIONS:

Precipitation _____ Cloudy _____ Partly Cloudy ✓ Clear _____
 Wind: Calm _____ Light ✓ Medium _____ High _____ ° Temperature 66 °F

Graticle Field Area: 6038 mm² Type: WB Scheduled Hours Per Shift: _____

SAMPLING INFORMATION				INPUT DATA				RESULTS			
Sample I.D.	Respirator	Pump	Time	Flow	Count Data	Duration	Concentration	Work Description/Remarks			
Job Location	Type	Type	Start (Hr:Min)	Rate (lpm)	Fibers	Fields	F/cc	% of PEL			
<u>P-24</u>	<u>NIOSH</u>	<u>7.3129</u>	<u>8:05</u>	<u>1.5</u>	<u>555</u>	<u>100</u>	<u>718</u>		<u>NIOSH</u>	<u># 677</u>	<u>Bagging SG-100</u>
<u>P-44</u>	<u>NIOSH</u>	<u>7.3129</u>	<u>13:47</u>	<u>1.5</u>	<u>121.5</u>	<u>25</u>	<u>6.813</u>		<u># 1006</u>	<u>Bagging SG-100</u>	<u>When entered bagging product bin</u>
<u>P-1</u>	<u>NIOSH</u>	<u>7.3129</u>	<u>15:34</u>	<u>1.5</u>	<u>TWA</u>	<u>3.643</u>					<u>for a last 20 minutes of sampling period</u>

ASBESTOS INDUSTRIAL HYGIENE SAMPLE SUMMARY

Page 3 of 27

IDENTIFICATION

Plant: King City I.D.#: 0401062
 Worker Sampled: John Brecheche
 Soc. Sec. #: 558-47-2831
 Job Description: RC 244 Bagging
 Sample Type: Personal Area: 80
 Sampled By: GB Date: 12/1/83
 Counted By: JS Date: 3/1/85

PERMISSIBLE EXPOSURE LIMIT(S)

TWA: _____
 Ceiling: _____
BASIS:
 MSHA OSHA STATE UCC
 OTHER NIOSH

WORKPLACE CONDITIONS:

Operations: Normal ☐ Not Normal ☒
 Explain: Bagging
 Ventilation: Type Exhaust system
 Normal ☒ Not Normal ☐
 Explain: _____

WEATHER CONDITIONS:

Precipitation: Cloudy ☐ Partly Cloudy ☐ Clear ☐
 Winds: Calm ☐ Light ☐ Medium ☐ High ☐ Temperature 60 °F

Scheduled Hours Per Shift: _____

Graticle Field Area: 2038 mm² Type: WB

SAMPLING INFORMATION				INPUT DATA				RESULTS			
Sample I.D.	Respirator	Pump	Time	Flow	Count Data	Duration	Concentration	Work Description/Remarks			
Job Location	Type	I.D.#	Start (Hr:Min)	Stop (Hr:Min)	Fiber	Field	F/cc	% of PEL			
<u>P 60</u>	<u>Canister</u>	<u>73374</u>	<u>10:24</u>	<u>12:01</u>	<u>1145</u>	<u>30</u>	<u>87</u>	<u>6.89</u>	<u>NIOSH</u>	<u>Bagging (insulated 30 min lunch period)</u>	
<u>D 52</u>	<u>Canister</u>	<u>73374</u>	<u>13:50</u>	<u>15:32</u>	<u>99</u>	<u>100</u>	<u>102</u>	<u>1456</u>	<u>#1014</u>	<u>RC 244 bagger used not working properly - some bag breakage mostly during spare shift</u>	
<u>P 3</u>						<u>TWA</u>	<u>3815</u>				

ASBESTOS | INDUSTRIAL HYGIENE SAMPLE SUMMARY

Page 7 of 24

IDENTIFICATION,

Plant: K. 11 I.D.#: Q701062

Worker Sampled: _____

Soc. Sec. #: _____

Job Description:

Sample Type: Personal Area ☒

Sampled By: [Signature] Date: 1/25/13

Counted By: AE Date: 5/11/8

Graticle Field Area: 0038 cm^2 Type: W3

Graticle Field Area: 0038 cm^2 Type: W3

PERMISSIBLE EXPOSURE LIMIT(S)

TWA: _____

Coilings: _____

BASIS:

MSHA___ OSHA___ STATE___ UCC___

OTHER None

WORKPLACE CONDITIONS:

Operations: Normal ___ Not Normal ___

Explain Explain

Ventilation: Type Exhaust

Normal ☒ Not Normal ☐

Explain _____

WEATHER CONDITIONS:

Precipitation — Cloudy — Partly Cloudy — Clear —

Winds: Calm — Light ~~Medium~~ High — ~~Temperature~~ 60°F

Scheduled Hours Per Shift: _____

[illegible]

Page 6 of 24

PERMISSIBLE EXPOSURE LIMIT(S)

WORKPLACE CONDITIONS:

Plant: Kum. Lily I.D.#: 0401062

Worker Sampled: _____

Soc. Sec. #: _____

Job Description: _____

Sample Type: Personal Area ☒

Sampled By: CE Date: 1/25/13

Counted By: Date: 3/14/88Graticle Field Area: 0058² mm² Type: WP

Scheduled Hours Per Shift:

Precipitation — Cloudy — Partly Cloudy — Clear —

Wind: Calm — Light $\swarrow$ Medium $\swarrow$ High —

INPUT DATA

$$\frac{\nabla}{\nabla}$$

RESULTS

Form: UCC/MTLS-OIL-B2-4/2A

Page 5 of 24

PERMISSIBLE EXPOSURE LIMIT(S)

TWA: _____

Celling: _____

A/C/S:

MSHA__ OSHA__ STATE__ UCC__

OTHER N1051H

Scheduled Hours Per Shift: MSA pump setting 5.0

RESULTS

Form: UCC/MTLS-011-82--4/2A

WORKPLACE CONDITIONS:

Operations: Normal ___ Not Normal ___
 Explain Down by
 Ventilations: Type Ex/Temp
 Normal ___ Not Normal ___
 Explain X

WEATHER CONDITIONS:
Precipitation ☒ Cloudy ☐ Partly Cloudy ☒ Clear ☐

Precipitation ☒ Cloudy ☐ Partly Cloudy ☒ Clear ☐
Wind: Calm ☐ Light ☐ Medium ☒ High ☐ Temperature 60 °F

Wind: Calm — Light — Medium — High — Temperature 61.0° F

Wind: Calm — Light — Medium — High — Temperature 61.0° F

Form: UCC/MIS-OI-B2-4/2A

ASBESTOS INDUSTRIAL HYGIENE SAMPLE SUMMARY

IDENTIFICATION

Plant: Kaiser Aluminum
 Worker Sample: Aluminum Refining
 Soc. Sec. #: 348-44-4880
 Job Description: Aluminum Refining
 Sample Type: Personal
 Sampled By: W. J. ... Date: 4/26/83
 Counted By: W. J. ... Date: 5/14/83

PERMISSIBLE EXPOSURE LIMITS

FWA: _____
 Ceiling: _____
 ASHA: _____ STATE: UCB
 OTHER: Asbestos

WORKPLACE CONDITIONS

Operation: Normal
 Equipment: Asbestos Refining
 Ventilation: Asbestos Refining
 Material: Asbestos
 Exposure: Asbestos Refining

WEATHER CONDITIONS

Observation: Cloudy
 Wind: Light
 Temperature: 60°F

Scheduled Hours Per Shift

Graticule Field Area: 100 Type: UCB

Sample ID	Sample Location	Sample Type	Sample Date	Exposure Data				Concentration (f/cc)	Concentration (ppm)	Concentration (ppb)	Notes
				Flow Rate (lpm)	Flow Rate (lpm)	Flow Rate (lpm)	Flow Rate (lpm)				
12-79	12-79	12-79	12-79	15	100	103	100	1238	117	1117	Asbestos Refining
12-80	12-80	12-80	12-80	15	100	103	100	1238	117	1117	Asbestos Refining
12-81	12-81	12-81	12-81	15	100	103	100	1238	117	1117	Asbestos Refining
12-82	12-82	12-82	12-82	15	100	103	100	1238	117	1117	Asbestos Refining
12-83	12-83	12-83	12-83	15	100	103	100	1238	117	1117	Asbestos Refining
12-84	12-84	12-84	12-84	15	100	103	100	1238	117	1117	Asbestos Refining
12-85	12-85	12-85	12-85	15	100	103	100	1238	117	1117	Asbestos Refining
12-86	12-86	12-86	12-86	15	100	103	100	1238	117	1117	Asbestos Refining
12-87	12-87	12-87	12-87	15	100	103	100	1238	117	1117	Asbestos Refining
12-88	12-88	12-88	12-88	15	100	103	100	1238	117	1117	Asbestos Refining
12-89	12-89	12-89	12-89	15	100	103	100	1238	117	1117	Asbestos Refining
12-90	12-90	12-90	12-90	15	100	103	100	1238	117	1117	Asbestos Refining
12-91	12-91	12-91	12-91	15	100	103	100	1238	117	1117	Asbestos Refining
12-92	12-92	12-92	12-92	15	100	103	100	1238	117	1117	Asbestos Refining
12-93	12-93	12-93	12-93	15	100	103	100	1238	117	1117	Asbestos Refining
12-94	12-94	12-94	12-94	15	100	103	100	1238	117	1117	Asbestos Refining
12-95	12-95	12-95	12-95	15	100	103	100	1238	117	1117	Asbestos Refining
12-96	12-96	12-96	12-96	15	100	103	100	1238	117	1117	Asbestos Refining
12-97	12-97	12-97	12-97	15	100	103	100	1238	117	1117	Asbestos Refining
12-98	12-98	12-98	12-98	15	100	103	100	1238	117	1117	Asbestos Refining
12-99	12-99	12-99	12-99	15	100	103	100	1238	117	1117	Asbestos Refining
13-00	13-00	13-00	13-00	15	100	103	100	1238	117	1117	Asbestos Refining

ASBESTOS INDUSTRIAL HYGIENE SAMPLE SUMMARY

Page 11 of 24

IDENTIFICATION

Plant: Kemp City I.D.#: C401062

Worker Sampled: _____

Soc. Sec. #: _____

Job Description: _____

Sample Type: Personal Area ☒

Sampled By: [Signature] Date: 4/26/83

Counted By: [Signature] Date: 5/14/83

Graticle Field Area: 1038 min² Type: WPS

PERMISSIBLE EXPOSURE LIMIT(S)

TWA: _____

Callings: _____

BASIS:

MSHA _____ OSHA _____ STATE _____ UCC _____

OTHER NIOSH

WORKPLACE CONDITIONS:

Operations: Normal _____ Not Normal _____

Explain Process by Manual

Ventilation: Type Exhaust System

Normal _____ Not Normal _____

Explain Exhaust System

WEATHER CONDITIONS:

Precipitation _____ Cloudy _____ Partly Cloudy _____ Clear _____

Winds: Calm _____ Light _____ Medium _____ High _____ Temperature (C)°F

Scheduled Hours Per Shift: _____

SAMPLING INFORMATION				INPUT DATA				RESULTS	
Sample I.D.	Respirator	Pump	Time	Flow	Count Data	Duration	Concentration	Work Description/Remarks	
Job Location	Type	I.D.#	Start (Hr:Min)	Rate (lpm)	Fibers	(Min)	F/cc	% of PEL	
D-65 E-142	<u>G-6000</u> <u>T-3376</u>	<u>G-6000</u> <u>T-3376</u>	7:41 9:58	1.5	52.5	137	575		NIOSH #592 & 974 Over main bagging work
L-74 A-142	<u>G-6000</u> <u>T-3376</u>	<u>G-6000</u> <u>T-3376</u>	12:42 15:10	1.5	35.5	100	360		#592 & 894 Same
						TEQA	463		Short cloud generated
									last sample of maintenance
									15:05 - 15:08 during unloading
									of broken bag disposed
									in dust

ASBESTOS INDUSTRIAL HYGIENE SAMPLE SUMMARY

Page 13 of 24

IDENTIFICATION

Plant: King City I.D.#: 0401062
 Worker Sampled: _____
 Soc. Sec. #: _____
 Job Description: _____
 Sample Type: Personal Area ☒
 Sampled By: C. J. C. Date: 12/26/83
 Counted By: 42 Date: 3/14/83

Graticle Field Area: 10236 min 2 Type: WZ

PERMISSIBLE EXPOSURE LIMIT(S)

TWA: _____
 Ceiling: _____
 BASIS:
 MSHA OSHA STATE UCC
 OTHER NIOSH

WORKPLACE CONDITIONS

Operations: Normal ☒ Not Normal ☒
 Explain: after dinner by hand
 Ventilations: Type Exhaust
 Normal ☒ Not Normal ☒
 Explain: after page 9

WEATHER CONDITIONS

Precipitation ☒ Cloudy ☒ Partly Cloudy ☒ Clear ☒
 Winds: Calm ☒ Light ☒ Medium ☒ High ☒ Temperature 65.0 °F

Scheduled Hours Per Shift: _____

SAMPLING INFORMATION				INPUT DATA				RESULTS			
Sample I.D.	Respirator	Pump	Time	Flow	Count Data	Duration	Concentration	Work Description/Remarks			
Job Location	Type	I.D.#	Start (Hr:Min)	Stop (Hr:Min)	Fibers	Fields	F/cc	% of PEL			
<u>15-20</u>		<u>6.2.100</u>	<u>7:43</u>	<u>9:56</u>	<u>33.5</u>	<u>100</u>	<u>3.38</u>		<u>NIOSH</u>		
<u>A-7</u>		<u>7.2275</u>							<u>4921</u>	<u>Green Gray shape</u>	
<u>K-36</u>		<u>6.2.100</u>	<u>12:44</u>	<u>1:56</u>	<u>16.5</u>	<u>100</u>	<u>.172</u>		<u>4925</u>	<u>same</u>	
<u>A-7</u>		<u>7.2275</u>				<u>Tw A</u>	<u>.271</u>			<u>about cloud green level but</u>	
										<u>except if number due to</u>	
										<u>undergoing of further dry</u>	
										<u>disposal air duct</u>	

ASBESTOS INDUSTRIAL HYGIENE SAMPLE SUMMARY

Page 21 of 24

IDENTIFICATION

Plant: Kenn C. Co. I.D. #: 67062
 Worker Sampled: J. L. Brachman
 Soc. Sec. #: 558-77-2531
 Job Description: RC 124 Ryger
 Sample Type: Personal Area: _____
 Sampled By: Chas Date: 1/26/83
 Counted By: JS Date: 1/31/83

Graticle Field Area: 0038 mm² Type: WB

PERMISSIBLE EXPOSURE LIMIT(S)

TWA: _____
 Ceiling: _____
 BASIS: _____
 MSHA OSHA STATE UCC _____
 OTHER: MOSH

WORKPLACE CONDITIONS:

Operations: Normal _____ Not Normal _____
 Explain: By hand
 Ventilation: Type Exhaust system
 Normal _____ Not Normal _____
 Explain: None existing (ref. 12.14)

WEATHER CONDITIONS:

Precipitation: Cloudy _____ Partly Cloudy _____ Clear _____
 Winds: Calm _____ Light _____ Medium _____ High _____
 Temperature: _____ °F

SAMPLING INFORMATION				INPUT DATA				RESULTS			
Sample I.D.	Respirator	Pump	Time	Flow	Count Data	Duration	Concentration	Work Description/Remarks			
Job Location	Type	Type	Start (Hr:Min)	Rate (lpm)	Fibers	(Min)	F/cc				
	% Use	I.D. #	Stop (Hr:Min)		Fields		% of PEL				
H-14 P-3		Gibson 7-7774	8:55	1.5	135	111	1.824	MOSH			
								#966 RC 124 Ryger			
								Byger entered bagging unit for ~3 minutes.			
J-12 P-3		Gibson 7-3374	12:52	1.5	915	129	1.064	#946 Same			
						TWA	1.412	light dust noticed in			
								open area. Same			
								unknown. Followed up with			
								R. Chas			

Page 5 of 24

PERMISSIBLE EXPOSURE LIMIT(S)

WORKPLACE CONDITIONS:

Worker Sampled:

Soc. Sec. #: _____

Job Description:

Sample Type: Personal Area ✓

Sampled By: CEA Date: 10/6/13

Counted By: Date: 3/14/83

Graticle Field Area: 0.228 mm² Type: WL

Scheduled Hours Per Shift:

Scheduled Hours Per Shift:

Wind:

m - Light -

Medium ~~2~~ Flight

Temperature

Future of CP

Form: UCC/MTI S-OH-B2-4/2A

Page 6 of 24

PERMISSIBLE EXPOSURE LIMIT(S)

Plant: Ferny City I.D.#: 6701062

Worker Sampled:

Soc. Sec. #: _____

Job Description:

Sample Type: Personal Area ☒

Sampled By: C. S. S. Date: 12/1/63

Counted By: 2/5 Date: 3/14/83

Graticle Field Area: 1228 ^{ms²} Type: WB

Scheduled Hours Per Shift: _____

WORKPLACE CONDITIONS:

Operations: Normal ___ Not Normal ___

Explain h-a-a-i-i

Ventilation: Type ExhaustNormal Not Normal

WEATHER CONDITIONS:

Precipitation 1-Cloudy Partly Cloudy Clear

Wind: Calm ___ Light ___ Medium ☒ High ___ π Temperature 22.0°F

1000 Pump Setting 4.0

RESULTS

[illegible]

WORKPLACE CONDITIONS:

WEATHER CONDITIONS:

Precipitation ☒ Cloudy ☐ Partly Cloudy ☐ Clear ☐
Wind: Calm ☐ Light ☐ Medium ☐ High ☐ Temperature 53°F

Scheduled Hours Per Shift: _____

[illegible]

Page 15 of 24

PERMISSIBLE EXPOSURE LIMIT(S)

WORKPLACE CONDITIONS:

Plant: King City I.D.#: 0-101062
 Worker Sampled: Marion E. Segerson
 Soc. Sec. #: 544-44-9880
 Job Description: 635-Cell Packer (Main Circuit)
 Sample Type: Personal ☒ Area ☐
 Sampled By: CE Date: 1/27/83
 Counted By: JS Date: 3/16/83

TWA: _____
 Ceiling: _____

BASIS:
 MSHA _____ OSHA _____ STATE _____ UCC _____
 OTHER Niosh

Operations: Normal _____ Not Normal ☒
 Explain: Recessed by previous
 Ventilation: Type Exhaust by line
 Normal _____ Not Normal _____
 Explain: _____

WEATHER CONDITIONS:

WEATHER CONDITIONS:

Precipitation __ Cloudy __ Partly Cloudy __ Clear __
Wind: Calm __ Light __ Medium __ High __ ° Temperature __ ° F

Scheduled Hours Per Shift: _____

INPUT DATA -

RESULTS

[illegible]

ASBESTOS	INDUSTRIAL HYGIENE SAMPLE SUMMARY
----------	-----------------------------------

WORKPLACE CONDITIONS:

Graticle Field Area: 0.038 mm² Type: WB

OTHER 6154

Wind: Calm ___ Light ___ Medium ___ High ___ °F

Scheduled Hours Per Shift: _____

[illegible]

PERMISSIBLE EXPOSURE LIMIT(S)

Graticle Field Area

Scheduled Hours Per Shift:

Explain _____

Wind: Calm — Light — Medium — High — ☒ Temperature 55°F

Form: UCC/MTLS-011-82-4/2A

Page 27 of 28

PERMISSIBLE EXPOSURE LIMIT(S)

WORKPLACE CONDITIONS:

Plant: Kings City I.D.#: 67415-66

Worker Sampled: _____

Soc. Sec. #: _____

Job Description: _____

Sample Type: Personal _____ Area ✓

Sampled By: C.C. Date: 1/27/83

Counted By: 78 Date: 13/12/2011

Graticle Field Area: .0038 ^{cm} ² Type: WB

Scheduled Hours Per Shift:

Scheduled Hours Per Shift: _____

Scheduled Hours Per Shift: _____

Scheduled Hours Per Shift: _____

Winds: _____

Scheduled Hours Per Shift: _____

Scheduled Hours Per Shift: _____

Scheduled Hours Per Shift: _____

Scheduled Hours Per Shift: _____

Winds: Calm ___ Light ___ Medium ___ High ___ Temperature $\int$ °F _____

[illegible]

Page 22 of 24

PERMISSIBLE EXPOSURE LIMIT(S)

WORKPLACE CONDITIONS:

Plant: Stacy City I.D.#: 0401062

Worker Sampled: Johan Guelinck

Soc. Sec. #: 558-47-7831

Job Description: RC-244 ~~RC-244~~

Sample Type: Personal ☒ Area ☐

Sampled By: 32 Date: 1/27/83

Counted By: 78 Date: 3/14/8

Graticle Field Area: 1238 mm² Type: WB

SAMPLING INFORMATION

Sample I.D.	Respirator	Pump	Time
-------------	------------	------	------

Job Location	Type	Type	Start	Stop
	α Uea	10 #	(Mar-Mio)	(Mar-Mio)

DATE	NO USE	I.D.#	TIME
D-40			

11:8 11:9 11:10 11:11 11:12 11:13 11:14 11:15 11:16 11:17 11:18 11:19 11:20 11:21 11:22 11:23 11:24 11:25 11:26 11:27 11:28 11:29 11:30 11:31 11:32 11:33 11:34 11:35 11:36 11:37 11:38 11:39 11:40 11:41 11:42 11:43 11:44 11:45 11:46 11:47 11:48 11:49 11:50 11:51 11:52 11:53 11:54 11:55 11:56 11:57 11:58 11:59 12:00 12:01 12:02 12:03 12:04 12:05 12:06 12:07 12:08 12:09 12:10 12:11 12:12 12:13 12:14 12:15 12:16 12:17 12:18 12:19 12:20 12:21 12:22 12:23 12:24 12:25 12:26 12:27 12:28 12:29 12:30 12:31 12:32 12:33 12:34 12:35 12:36 12:37 12:38 12:39 12:40 12:41 12:42 12:43 12:44 12:45 12:46 12:47 12:48 12:49 12:50 12:51 12:52 12:53 12:54 12:55 12:56 12:57 12:58 12:59 13:00 13:01 13:02 13:03 13:04 13:05 13:06 13:07 13:08 13:09 13:10 13:11 13:12 13:13 13:14 13:15 13:16 13:17 13:18 13:19 13:20 13:21 13:22 13:23 13:24 13:25 13:26 13:27 13:28 13:29 13:30 13:31 13:32 13:33 13:34 13:35 13:36 13:37 13:38 13:39 13:40 13:41 13:42 13:43 13:44 13:45 13:46 13:47 13:48 13:49 13:50 13:51 13:52 13:53 13:54 13:55 13:56 13:57 13:58 13:59 14:00 14:01 14:02 14:03 14:04 14:05 14:06 14:07 14:08 14:09 14:10 14:11 14:12 14:13 14:14 14:15 14:16 14:17 14:18 14:19 14:20 14:21 14:22 14:23 14:24 14:25 14:26 14:27 14:28 14:29 14:30 14:31 14:32 14:33 14:34 14:35 14:36 14:37 14:38 14:39 14:40 14:41 14:42 14:43 14:44 14:45 14:46 14:47 14:48 14:49 14:50 14:51 14:52 14:53 14:54 14:55 14:56 14:57 14:58 14:59 15:00 15:01 15:02 15:03 15:04 15:05 15:06 15:07 15:08 15:09 15:10 15:11 15:12 15:13 15:14 15:15 15:16 15:17 15:18 15:19 15:20 15:21 15:22 15:23 15:24 15:25 15:26 15:27 15:28 15:29 15:30 15:31 15:32 15:33 15:34 15:35 15:36 15:37 15:38 15:39 15:40 15:41 15:42 15:43 15:44 15:45 15:46 15:47 15:48 15:49 15:50 15:51 15:52 15:53 15:54 15:55 15:56 15:57 15:58 15:59 16:00 16:01 16:02 16:03 16:04 16:05 16:06 16:07 16:08 16:09 16:10 16:11 16:12 16:13 16:14 16:15 16:16 16:17 16:18 16:19 16:20 16:21 16:22 16:23 16:24 16:25 16:26 16:27 16:28 16:29 16:30 16:31 16:32 16:33 16:34 16:35 16:36 16:37 16:38 16:39 16:40 16:41 16:42 16:43 16:44 16:45 16:46 16:47 16:48 16:49 16:50 16:51 16:52 16:53 16:54 16:55 16:56 16:57 16:58 16:59 17:00 17:01 17:02 17:03 17:04 17:05 17:06 17:07 17:08 17:09 17:10 17:11 17:12 17:13 17:14 17:15 17:16 17:17 17:18 17:19 17:20 17:21 17:22 17:23 17:24 17:25 17:26 17:27 17:28 17:29 17:30 17:31 17:32 17:33 17:34 17:35 17:36 17:37 17:38 17:39 17:40 17:41 17:42 17:43 17:44 17:45 17:46 17:47 17:48 17:49 17:50 17:51 17:52 17:53 17:54 17:55 17:56 17:57 17:58 17:59 18:00 18:01 18:02 18:03 18:04 18:05 18:06 18:07 18:08 18:09 18:10 18:11 18:12 18:13 18:14 18:15 18:16 18:17 18:18 18:19 18:20 18:21 18:22 18:23 18:24 18:25 18:26 18:27 18:28 18:29 18:30 18:31 18:32 18:33 18:34 18:35 18:36 18:37 18:38 18:39 18:40 18:41 18:42 18:43 18:44 18:45 18:46 18:47 18:48 18:49 18:50 18:51 18:52 18:53 18:54 18:55 18:56 18:57 18:58 18:59 19:00 19:01 19:02 19:03 19:04 19:05 19:06 19:07 19:08 19:09 19:10 19:11 19:12 19:13 19:14 19:15 19:16 19:17 19:18 19:19 19:20 19:21 19:22 19:23 19:24 19:25 19:26 19:27 19:28 19:29 19:30 19:31 19:32 19:33 19:34 19:35 19:36 19:37 19:38 19:39 19:40 19:41 19:42 19:43 19:44 19:45 19:46 19:47 19:48 19:49 19:50 19:51 19:52 19:53 19:54 19:55 19:56 19:57 19:58 19:59 20:00 20:01 20:02 20:03 20:04 20:05 20:06 20:07 20:08 20:09 20:10 20:11 20:12 20:13 20:14 20:15 20:16 20:17 20:18 20:19 20:20 20:21 20:22 20:23 20:24 20:25 20:26 20:27 20:28 20:29 20:30 20:31 20:32 20:33 20:34 20:35 20:36 20:37 20:38 20:39 20:40 20:41 20:42 20:43 20:44 20:45 20:46 20:47 20:48 20:49 20:50 20:51 20:52 20:53 20:54 20:55 20:56 20:57 20:58 20:59 21:00 21:01 21:02 21:03 21:04 21:05 21:06 21:07 21:08 21:09 21:10 21:11 21:12 21:13 21:14 21:15 21:16 21:17 21:18 21:19 21:20 21:21 21:22 21:23 21:24 21:25 21:26 21:27 21:28 21:29 21:30 21:31 21:32 21:33 21:34 21:35 21:36 21:37 21:38 21:39 21:40 21:41 21:42 21:43 21:44 21:45 21:46 21:47 21:48 21:49 21:50 21:51 21:52 21:53 21:54 21:55 21:56 21:57 21:58 21:59 22:00 22:01 22:02 22:03 22:04 22:05 22:06 22:07 22:08 22:09 22:10 22:11 22:12 22:13 22:14 22:15 22:16 22:17 22:18 22:19 22:20 22:21 22:22 22:23 22:24 22:25 22:26 22:27 22:28 22:29 22:3

10:00 15:30 9:30

Author	Year	Country	Sample Size	Study Design	Findings
Smith et al.	2015	USA	1,200	Longitudinal	Increased risk of depression in children of parents with mental illness.
Johnson et al.	2016	UK	800	Cross-sectional	Higher levels of anxiety in children of parents with anxiety disorders.
Lee et al.	2017	Canada	950	Case-control	Association between parental mental illness and child behavioral problems.
Chen et al.	2018	Australia	1,100	Longitudinal	Impact of parental mental health on child cognitive development.
Wong et al.	2019	South Korea	700	Cross-sectional	Parental mental illness linked to increased child emotional distress.
Miller et al.	2020	Germany	1,300	Longitudinal	Stressful family environment mediates the link between parental mental illness and child outcomes.
Patel et al.	2021	India	600	Cross-sectional	High prevalence of mental health issues in children of parents with mental illness.
Nguyen et al.	2022	Vietnam	500	Longitudinal	Parental mental health significantly affects child social skills.
Alvarez et al.	2023	Spain	1,000	Cross-sectional	Children of parents with mental illness show higher rates of school absenteeism.
Kim et al.	2024	South Korea	1,400	Longitudinal	Parental mental illness associated with increased child risk of substance use.
Roberts et al.	2025	USA	1,500	Cross-sectional	Family dysfunction as a key factor in child mental health outcomes.

F.72

1.51 87:41

bioRxiv preprint doi: <https://doi.org/10.1101/2020.03.10.332811>; this version posted March 11, 2020. The copyright holder for this preprint (which was not certified by peer review) is the author/funder, who has granted bioRxiv a license to display the preprint in perpetuity. It is made available under aCC-BY-NC-ND 4.0 International license.

[illegible]

--	--	--	--	--	--

[illegible]

Figure 1. The effect of the concentration of the solution on the adsorption of the dye. The concentration of the solution was 0.01, 0.02, 0.03, 0.04, 0.05, 0.06, 0.07, 0.08, 0.09, 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0, 1.5, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0, 10.0, 15.0, 20.0, 30.0, 40.0, 50.0, 60.0, 70.0, 80.0, 90.0, 100.0, 150.0, 200.0, 300.0, 400.0, 500.0, 600.0, 700.0, 800.0, 900.0, 1000.0, 1500.0, 2000.0, 3000.0, 4000.0, 5000.0, 6000.0, 7000.0, 8000.0, 9000.0, 10000.0, 15000.0, 20000.0, 30000.0, 40000.0, 50000.0, 60000.0, 70000.0, 80000.0, 90000.0, 100000.0, 150000.0, 200000.0, 300000.0, 400000.0, 500000.0, 600000.0, 700000.0, 800000.0, 900000.0, 1000000.0, 1500000.0, 2000000.0, 3000000.0, 4000000.0, 5000000.0, 6000000.0, 7000000.0, 8000000.0, 9000000.0, 10000000.0, 15000000.0, 20000000.0, 30000000.0, 40000000.0, 50000000.0, 60000000.0, 70000000.0, 80000000.0, 90000000.0, 100000000.0, 150000000.0, 200000000.0, 300000000.0, 400000000.0, 500000000.0, 600000000.0, 700000000.0, 800000000.0, 900000000.0, 1000000000.0, 1500000000.0, 2000000000.0, 3000000000.0, 4000000000.0, 5000000000.0, 6000000000.0, 7000000000.0, 8000000000.0, 9000000000.0, 10000000000.0, 15000000000.0, 20000000000.0, 30000000000.0, 40000000000.0, 50000000000.0, 60000000000.0, 70000000000.0, 80000000000.0, 90000000000.0, 100000000000.0, 150000000000.0, 200000000000.0, 300000000000.0, 400000000000.0, 500000000000.0, 600000000000.0, 700000000000.0, 800000000000.0, 900000000000.0, 1000000000000.0, 1500000000000.0, 2000000000000.0, 3000000000000.0, 4000000000000.0, 5000000000000.0, 6000000000000.0, 7000000000000.0, 8000000000000.0, 9000000000000.0, 10000000000000.0, 15000000000000.0, 20000000000000.0, 30000000000000.0, 40000000000000.0, 50000000000000.0, 60000000000000.0, 70000000000000.0, 80000000000000.0, 90000000000000.0, 100000000000000.0, 150000000000000.0, 200000000000000.0, 300000000000000.0, 400000000000000.0, 500000000000000.0, 600000000000000.0, 700000000000000.0, 800000000000000.0, 900000000000000.0, 1000000000000000.0, 1500000000000000.0, 2000000000000000.0, 3000000000000000.0, 4000000000000000.0, 5000000000000000.0, 6000000000000000.0, 7000000000000000.0, 8000000000000000.0, 9000000000000000.0, 10000000000000000.0, 15000000000000000.0, 20000000000000000.0, 30000000000000000.0, 40000000000000000.0, 50000000000000000.0, 60000000000000000.0, 70000000000000000.0, 80000000000000000.0, 90000000000000000.0, 100000000000000000.0, 150000000000000000.0, 200000000000000000.0, 300000000000000000.0, 400000000000000000.0, 500000000000000000.0, 600000000000000000.0, 700000000000000000.0, 800000000000000000.0, 900000000000000000.0, 1000000000000000000.0, 1500000000000000000.0, 2000000000000000000.0, 3000000000000000000.0, 4000000000000000000.0, 5000000000000000000.0, 6000000000000000000.0, 7000000000000000000.0, 8000000000000000000.0, 9000000000000000000.0, 10000000000000000000.0, 15000000000000000000.0, 20000000000000000000.0, 30000000000000000000.0, 40000000000000000000.0, 50000000000000000000.0, 60000000000000000000.0, 70000000000000000000.0, 80000000000000000000.0, 90000000000000000000.0, 100000000000000000000.0, 150000000000000000000.0, 200000000000000000000.0, 300000000000000000000.0, 400000000000000000000.0, 500000000000000000000.0, 600000000000000000000.0, 700000000000000000000.0, 800000000000000000000.0, 900000000000000000000.0, 1000000000000000000000.0, 1500000000000000000000.0, 2000000000000000000000.0, 3000000000000000000000.0, 4000000000000000000000.0, 5000000000000000000000.0, 6000000000000000000000.0, 7000000000000000000000.0, 8000000000000000000000.0, 9000000000000000000000.0, 10000000000000000000000.0, 15000000000000000000000.0, 20000000000000000000000.0, 30000000000000000000000.0, 40000000000000000000000.0, 50000000000000000000000.0, 60000000000000000000000.0, 70000000000000000000000.0, 80000000000000000000000.0, 90000000000000000000000.0, 100000000000000000000000.0, 150000000000000000000000.0, 200000000000000000000000.0, 300000000000000000000000.0, 400000000000000000000000.0, 500000000000000000000000.0, 600000000000000000000000.0, 700000000000000000000000.0, 800000000000000000000000.0, 900000000000000000000000.0, 10000000

Author	Year	Country	Sample Size	Method	Findings
Smith et al.	2001	USA	1,200	Survey	High levels of stress and anxiety reported among adolescents.
Johnson et al.	2003	UK	800	Interview	Adolescents with mental health problems often experience social isolation.
Williams et al.	2005	Canada	1,500	Survey	Increased risk of substance use among adolescents with mental health issues.
Chen et al.	2007	China	2,000	Survey	Mental health problems often go undiagnosed in this population.
Miller et al.	2009	USA	900	Interview	Adolescents with mental health problems often experience stigma.
Lee et al.	2011	South Korea	1,100	Survey	High levels of academic pressure contribute to mental health problems.
Patel et al.	2013	India	1,300	Survey	Mental health problems often go undiagnosed in this population.
Nguyen et al.	2015	Vietnam	1,400	Survey	High levels of stress and anxiety reported among adolescents.
Wong et al.	2017	Canada	1,600	Survey	Increased risk of substance use among adolescents with mental health issues.
Kim et al.	2019	South Korea	1,700	Survey	High levels of academic pressure contribute to mental health problems.
Thompson et al.	2021	USA	1,800	Survey	High levels of stress and anxiety reported among adolescents.

[illegible]

1. The first step in the process of developing a business plan is to conduct a market analysis. This involves researching the industry, identifying potential customers, and understanding the competitive landscape. A thorough market analysis provides valuable insights into the viability of the business idea and helps to shape the overall strategy.

100 *Journal of Management Inquiry* 16(1)

--	--	--	--

[The page contains faint, illegible markings.]

UCC 001415

