TRSA TEXTILE RENTAL SERVICES ASSOCIATION OF AMERICA
REPRESENTING THE TEXTILE RENTAL INDUSTRY: LINEN SUPPLY, UNIFORM RENTAL, DUST CONTROL AND COMMERCIAL LAUNDRY SERVICES

Headquarters:
1130 E. BEACH BLVD.
SUITE B
P.O. BOX 1283
HALLANDALE, FL 33008-1283
305/457-7555
FAX 305/457-3890

JOHN J. CONTNEY, CAE
Executive Director

Washington, D.C., office:
GALLAND, KHARASCH, MORSE
& GARFINKLE, P.C.
1054 31ST ST., N.W.
WASHINGTON, DC 20007-4492
202/833-6395
FAX 202/337-8787

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President
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Nominating
RONALD BOOTH
Plant

July 7, 1994

Tom Hodous, M.D.
Mail Stop 1174
Division Safety Research, NIOSH
944 Chestnut Ridge Road
Morgantown, West Virginia 26505

Dear Tom:

Enclosed are five (5) exhibits of limited testing details on garment contamination levels of apparel being picked up from a customer for commercial laundering by a uniform rental service company. One (1) exhibit describes contamination removal efficiency of a typical commercial laundering process.

These are very rudimentary reports at best. They are submitted for information purposes. There are additional situation reports like these that can be obtained elsewhere in the uniform rental service industry if they are useful or desirable.

Sincerely,

Cliff Weller

Clifford Weller
Manager of Marketing

CW/il
Enclosures
cc: Bob Mason
Room 256, Div. of Standards, NIOSH
4676 Columbia Parkway
Cincinnati, OH 45226

TEXTILE REUSE
REDUCES SOLID WASTE

ARATEX

INTRA-COMPANY MEMO

Date: May 28, 1992

TO:

FROM:

SUBJECT: Lead Account

COPIES: J. Baumgartner/ G. Duffield, D. Hennessey
R. Simpson/ P. Krejci/ R. Eicks/ Operations

Based on the information you provided regarding the size of the account (250 man) and the laboratory results provided from the initial test washing (see attached), I would not recommend processing this account at the plant, since the processing of this account would contribute 0.64 mg/l of lead to the effluent. The daily discharge limit is 1.07 mg/l and the monthly average limit is 0.71 mg/l. With current lead concentrations in existing effluent we would violate our discharge permit. However, if practical, the plant with the wastewater treatment is capable of treating the lead in the wastewater and can produce an effluent well within the limits.

Other issues that need to be considered when handling this account is airborne contamination. I would suggest contacting Bob Eicks to initiate personal monitoring and use of water soluble bags if deemed appropriate.

If you should have any further questions or if I can be of any additional assistance, please call. I appreciate your assistance in providing the specifics regarding this account.

TEI ANALYTICAL, INC.

LABORATORY REPORT

Aratex Services, Inc.

Attn:

SAMPLE RECEIVED: 05-12-92 1200

TEI NO. 92465
SAMPLE IDENTIFICATION: Sample Drain 1

TEST	RESULT		DATE PERFORM
Sample Preparation			05-13-92
Lead	25.8	mg/l	05-13-92

Performed on Rush Basis

TEI NO. 92466
SAMPLE IDENTIFICATION: Sample Drain 2

TEST	RESULT		DATE PERFORM
Sample Preparation			05-13-92
Lead	4.04	mg/l	05-13-92

Performed on Rush Basis

ARATEX

INTRA-COMPANY MEMO

Date: December 14, 1993

TO:

FROM:

SUBJECT:

COPIES: R. Simpson/ J. Cain/ J. Dobrowolski/ J. Coakley/
B. Boden/ B. Murray/ J. Crouse/ P. Krejci/

The attached analytical report shows the subject coveralls are contaminated with lead. Based on the information provided, the estimated amount of lead per coverall is approximately 216 mg.

The estimated impact on the wastewater is as follows:

At 216 mg/coverall and 2.5 lbs/coverall, each 100 lb CDW contributes 8,640 mg of lead.

If 100% is discharged to the wastewater, the impact will be an additional 0.026 mg/l for every 100 lbs. processed. This is based on an average flow of 89,000 gpd.

Analytical results have revealed effluent concentrations of lead as high as 0.89 mg/l. The limit set forth in your discharge permit is 2.00 mg/l, therefore, you should maintain compliance with the local limits.

Handling this type of merchandise requires special procedures if the action level of 30 micrograms/cubic meter, or the permissible exposure limit (PEL) of 50 micrograms/cubic meter are exceeded. As we discussed please assure that the necessary precautions are being addressed. If the customer has information indicating that the material, paint, etc. no longer contains lead, then we can respond accordingly. If not, the coveralls, at a minimum must be transported in a sealed bag and be properly labeled. Please make certain that the customer and our route representative are aware of these requirements. These two items are required by OSHA regulations. Also further testing to determine employee exposure may be required. Please refer to your Industrial Hygiene Study, conducted by Keter Environmental on April 14, 1993 for information on proper handling, and labeling requirements.

Please call if you have any questions or need additional information.

TEI ANALYTICAL, INC.

7177 NORTH AUSTIN • NILES, ILLINOIS • 60648 • 708/647-1345

LABORATORY REPORT

Aratex Services, Inc.

REPORT#: 00001092
REPORT DATE: 11/19/1993

CUST PO#: 17517-G

ATTN:

SAMPLE RECEIVED: 11/11/1993 10:04

TEI NUMBER: 00001408 SAMPLE ID: Coverall 10-C-200-10

TEST	RESULTS		DATE PERFORM
Preparation (3050)	.		11/17/19
Lead (7420)	191	mg/kg	11/17/19

Gayle E. O' Neill, Ph.D.

March 22, 1994

TO:

FROM:

SUBJECT:

COPIES: R. Simpson/ R. Doman/ G. Smyth/
G. Duffield/ P. Krejci/

Based on the information you provided regarding the size of the account(20 men, exposed to lead) and the laboratory results obtained from the initial test washing I recommend the following:

The lead concentrations found on the merchandise that was test washed will contribute 0.021 mg/l of lead to the wastewater being discharged at the plant. The current wastewater limit is 0.71 mg/l. Based on existing, but outdated, lab data this account should not impact your effluent, however, I do recommend that you conduct composite sampling on the effluent for lead to assure that the concentration is below the permitted discharge limit for the plant. If practical, the uniforms could be processed at the plant. The wastewater system is capable of removing lead, and can produce an effluent well within the limits.

Consideration must also be given to the proper handling of the merchandise. There are stringent Health and Safety requirements that must be met when handling uniforms contaminated with lead. Airborne contaminants are a specific concern that may affect the route representative, soil handlers, and washfloor personnel. At a minimum, water soluble bags can be used which will minimize the exposure to our employees. Plastic bags may be used which would provide protection to the route driver, however, washfloor personnel would be exposed when opening the bag, and loading the washer. Also, the plastic bags would need to be disposed of properly. These two alternatives provide the best assurances of minimal exposure. If these practices become difficult to implement please let us know so that we can discuss other options.

The information you provided regarding the account, etc. is appreciated and made the review that much easier. If you have any further questions or if I can be of any further assistance please call.

TEI ANALYTICAL, INC.

MAR 21 1994

LABORATORY REPORT

Aratex Services, Inc.

REPORT#: 00001700
REPORT DATE: 03/16/1994

CUST PO#: 55596

ATTN:

SAMPLE RECEIVED: 03/07/1994 12:19

TEI NUMBER: 00003158 SAMPLE ID: Sample #1

TEST	RESULTS		DATE PERFORM
Preparation (3010)	.		03/11/19
Lead (7420)	11.5	mg/l	03/14/19

TEI NUMBER: 00003159 SAMPLE ID: Sample #2

TEST	RESULTS		DATE PERFORM
Preparation (3010)	.		03/11/19
Lead (7420)	1.41	mg/l	03/14/19

Samples preserved upon receipt.
Copy to

Gayle E. O' Neill, Ph.D.

ARATEX

Date: March 20, 1992

TO:

FROM:

SUBJECT: Plant Visit Report

DATE OF VISIT: February 26, 1992 LOCATION VISITED:

COPIES: W. Leonard/A. Spielfogel/ R. Simpson/ J. Santos/
J. Baumgartner/ D. Pack/ R. Stefaniak/ I. Jacobs/
J. Bornstein/ G. Sherman/ D. Haft/ C. Beaman/
A. Pygin/ P. Krejci/ File /Operation,

PURPOSE OF VISIT:

Meet with Department of Water and Power, Converter Station, to evaluate potential for mercury contamination on Clean Room Coats and Worker Coveralls.

ACTIONS:

Dan Haft, District Manager, and I met with Don Schaur, Supervisor of Maintenance and Bruce Hendman, Electrical Mechanic Supervisor, to review how our coveralls and coats are used and discuss the potential for mercury contamination of our garments.

The facility converts D.C. electrical power to A.C. power and distributes to the greater area. This facility distributes approximately 80% of the required electrical power.

Their process utilizes 42, 13,000 pound, mercury vacuum tubes. Each tube contains 360 lbs of mercury. Each tube is annually inspected, cleaned and rebuilt. When a tube is scheduled for maintenance, the unit is taken into the Clean Room where it is dismantled, cleaned and re-stored. The mercury in the tube is recovered, re-cycled and re-used. Clean room garments are worn to assure that the equipment is not contaminated by outside particulates, etc.

Our concerns arise when a clean room coat becomes contaminated with mercury and is washed at our plant. The first sample that was analyzed revealed a mercury concentration of 15.0 mg/l. At this level, we would violate our wastewater discharge permit at the plant, if we had washed those garments. Subsequent tests revealed a maximum concentration of 0.28mg/l, which can be safely handled, and would not impact our discharge. Don and Bruce indicated that they currently monitor the work areas for mercury contamination, and their employees are periodically tested. They assured us, now that they are more aware of our concerns, that they would monitor the garment use more closely and keep us informed of any irregularities.

I would like to thank Dan Haft and Chuck Beaman for their diligence and assistance with this matter. Please call if you need further assistance.

TEI ANALYTICAL, INC.

LABORATORY REPORT

August 22, 1991 #7336

Aratex Services, Inc. P.O. 45505-A-528

Attn: SAMPLE RECEIVED: 08-15-91 0800

TEI NO. 85286
SAMPLE IDENTIFICATION: Smocks, Cap, Shoes

TEST	RESULT		DATE PERFORMED
Mercury	32, 22	ppm	08-20-91

g. e. Marks

Gayle E. Marks, Ph.D.

From: :: 23-AUG-1990 15:49
To:
Subj:

Interoffice Memorandum Aratex Services Inc. 23-AUG-1990 15:

FROM: [::]

TO: Don Shawver [::SHAWVER]
CC: Rich De Luca [::DELUCA]
CC: John Mueller [::MUELLER]
CC: Carol Leist [::LEIST]

SUBJ:

I talked to Mark Jackson of today and he verbally reported that the initial contamination levels were 50-500 fibers/mm sq.

Final results ranged from not detectable to 7 fibers/mm sq. but he had not separated the results by wash process. He will FAX the results to me as soon as he has them categorized. They are only aware of the processes as A and B.

Based on the above numbers the removal range is 86 to 100 percent.

The type of fabric may have some bearing on the removal percentage and we will have to wait until we see the detailed report to determine if there may be a concern.

I believe that we can proceed with finalizing the contract service and then conduct an Industrial Hygiene survey at one of our plants to evaluate our employee exposure when handling cleaned garments.

We should begin with the use of water soluble bags. After we are serving in the locations we can then take a look at elimination of these type bags.

If a concern pops up when I see the final data I will advise immediately.

CERAMIC FIBER SOIL WASH TEST

PURPOSE: Determine the cleanability of cotton coveralls worn one (1) day in service under ceramic fiber exposure.

TEST PROCEDURE:

1. Deliver 75 coveralls to area plant as designated by .

2. Coveralls will be random sizes and to allocate 25 coveralls (one wash load) per day for three days to employees who are exposed to ceramic fibers. Heavy to light exposure for each day should be included to obtain a representative sample for each of the three wash loads.

3. At the end of the day, the coveralls are to be removed by employee and placed in water soluble bags furnished by Aratex. Bags should be tied with the water soluble strip supplied. All bags are to be coded with wear date and tagged with a tag indicating contamination with "Ceramic Fibers." Each bag can hold 2-4 coveralls when rolled up. BE SURE BAGS DO NOT GET WET SINCE THEY ARE WATER SOLUBLE.

4. One coverall per day from a heavy and light exposure should be retained by and RCF fibers contamination measured. If there is a need to specify a test method for particle contamination, Aratex suggests ASTM F51-68 alternate method 1 square foot sampling.

5. Bagged coveralls for all three days exposure will be picked up by Aratex at a location to be specified and washed in a 50 Lb. rated washer at their plant. Coveralls will also be extracted and then dried in a gas fired dryer.

6. Aratex will document wash/dry process as follows:

   a. Wash loads will be designated as A, B and C to correspond to the three wear dates. All coveralls washed in a load must be from the same date of exposure.

   b. Each of the three loads will be washed on the same formula.

   c. The water level, temperature, time and type/quantity of chemicals for each step in formula must be recorded for each load along with the washer manufacturer, model and size.

   d. The time and speed of the extraction cycle plus the extractor manufacturer, model and size must be recorded.

   e. The drying time and temperature must be recorded for each load along with the dryer manufacturer, model and size.

7. Aratex will fold coveralls, bag in poly (fully sealed) and retain for future reference. Person bagging coveralls should wear a dust mask (asbestos type) and a frock which should be washed after folding is completed. Also wash hands, arms and face after folding is complete. Fold in an area away from normal production and vacuum table area when complete.

8. Two (2) coveralls from each wash load will be randomly selected by Aratex, identified per exposure date and wash load code and sent in fully sealed poly bags to the location designated by for residual particle contamination testing.

ARA services
ARATEX SERVICES, Inc.

WASH TEST

125 Lb. American Washer/Extractor

7/24/90

Test #1 - Bags #2 and #3, 35 lb. load weight, Formula B.

This is the standard industrial shirt formula with an overflow of approximately two minutes before draining of the wash liquor on the break and carryover. Also, the non-ionic surfactant N-100 quantity was doubled. Vent was at top of the cylinder requiring entire cylinder to fill with water to overflow.

Break, lo level, 165°, 12 minutes, 4 Lb. #3, 5 fl. oz. N-100, drained for 10 seconds after 1 minute, since level control sensed a higher level.
Overflow - 1.25 minutes (low suds)
Drain - did not drain totally and refilled. Drained it manually.
Carryover, lo level, 165°, 3 minutes.
Overflow - 2 minutes (hi suds)
Drain - manually drained
Rinse, hi level, 121°, 2 minutes
Rinse, hi level, 103°, 2 minutes
Rinse, hi level, 103°, 2 minutes
Rinse, hi level, 102°, 2 minutes
Sour, lo level, _____, 5 minutes, 4 oz. sour

Since load was small it would not balance for extract and was extracted in two batches in a small centrifugal extractor.

Garments were dried in an American 100 Lb. gas dryer. The pant fly layer was just slightly damp indicating the drying time was proper.
Cycle: 25 minutes heat at 185°F., 3.5 minutes cool down.

NOTE: If the garments were to be pressed, they would not have been fully dried and may have had more residual ceramic fibers present.

7/25/90

Test #2, Bags #1 and #4, 52 Lb. load weight, Formula A.

This is the standard industrial shirt formula, except the non-ionic surfactant N-100 was doubled.

Break, lo level, 152°, 15 minutes, (low suds), 4 Lb. #3, 5 fl. oz. N-100.
Carryover, lo level, 155°, 5 minutes (very hi suds) drain time very long.
Rinse, hi level, 154°, 2 minutes
Rinse, hi level, 148°, 2 minutes
Rinse, hi level, 126°, 2 minutes
Rinse, hi level, 90°, 2 minutes
Sour, lo level, 83°, 5 minutes, filled to hi level and drained to low, 4 oz. sour.
Some excess suds before extraction.

Extraction and drying was identical to test #1.

ARATEX

INTRA-COMPANY MEMO

Date: June 1, 1993

TO:

FROM:

SUBJECT: Mercury Containing Soiled Merchandise

COPIES: F. Lenway/ J. Baumgartner/ R. Doman/ G. Duffield/
J. Mountain/ R. Simpson/
File: Operations

The merchandise and water samples that you submitted were analyzed for lead, cadmium and mercury. The results of the analyses indicate that handling and processing affected merchandise could result in employee exposure wastewater and sludge disposal problems, primarily due to mercury. If this account is considered, I recommend that the following be done as soon as possible after service begins.

1) Industrial Hygiene Study - Route and plant operators that handle the soiled merchandise should be evaluated for possible airborne exposure. (Estimated cost $2,500)

2) The wastewater should be sampled and tested to determine whether the level of the contaminants would or could cause a compliance problem. (Estimated cost $100)

3) Your wastewater pit and/or shaker screen sludge should be tested for TCLP to determine whether the account causes your waste to be hazardous. This should be done prior to disposal of any waste. (Estimated cost $1000/each)

I suggest that soiled merchandise be handled in plastic or water soluble bags. (This may be required pending the results of the industrial hygiene study). Should this account cause wastewater or sludge disposal problems, it is doubtful that an economically feasible solution can be implemented.

I hope this answers your questions. Please do not hesitate to call if you decide to move further on this issue.

TEI ANALYTICAL, INC.

April 5, 1993

LABORATORY REPORT

#10384

Aratex Services, Inc.

P.O. #97637-B

Attn:

SAMPLE RECEIVED: 03-31-93 1600

TEI NO. 101704
SAMPLE IDENTIFICATION: Shirt A

TEST	RESULT		DATE PERFORME
Cadmium (6010)	<0.2	mg/kg	04-01-93
Performed on Rush Basis			

TEI NO. 101705
SAMPLE IDENTIFICATION: Shirt B

TEST	RESULT		DATE PERFORME
Cadmium (6010)	<0.2	mg/kg	04-01-93
Performed on Rush Basis			

TEI NO. 101706
SAMPLE IDENTIFICATION: Pants A

TEST	RESULT		DATE PERFORME
Cadmium (6010)	0.3	mg/kg	04-01-93
Performed on Rush Basis			

TEI NO. 101707
SAMPLE IDENTIFICATION: Pants B

TEST	RESULT		DATE PERFORME
Cadmium (6010)	0.2	mg/kg	04-01-93
Performed on Rush Basis			

Copy:

Gayle E. O'Neill, Ph.D.

TEI ANALYTICAL, INC.

April 5, 1993

LABORATORY REPORT

#10384

Aratex Services, Inc.

Attn:

SAMPLE RECEIVED: 03-31-93 1600

TEI NO. 101708
SAMPLE IDENTIFICATION: Mat Dust

TEST	RESULT		DATE PERFORME
Mercury (7470)	323	mg/kg	04-02-93

Performed on Rush Basis

G. E. O'Neill

Gayle E. O'Neill, Ph.D.