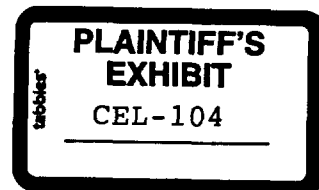


Inter-office Memorandum

TO (Name and Location) As Listed*	DATE January 9, 1980
FROM (Name and Location) C. W. Whaley	REFERENCE NO. CWW-126-80

*E. L. Tejml ✓
D. H. Miller ✓
W. F. Soward ✓
K. A. Dunn
L. E. Hackfeld ✓

E. D. Luke ✓
D. G. Bremer ✓
C. J. Schaefer ✓
C. D. Barrett, Dallas
G. A. Rodenhausen, NYO



SUBJECT: Employee Notification of Recent Toxicity Testing
Results on Triphenylphosphine and Triphenylphosphine
Oxide

Attached are a communique and "back-up" questions and answers for informing Bay City Plant and Arthur Brothers, Inc. employees of recent toxicity testing results on triphenylphosphine (TPP) and triphenylphosphine oxide (TPPO). If you have any questions concerning the BCP addition to this statement, we will discuss these at a meeting to be called by Dave Bremer on Friday, January 11, 1980.

C W Whaley
C. W. Whaley

CWW/cmr

Attachments

File: 71-2

005019

ROUGH DRAFT - CONFIDENTIAL

TOXICITY TEST RESULTS
OF TRIPHENYLPHOSPHINE AND TRIPHENYLPHOSPHINE OXIDE

In 1977, you were informed that based on toxicity studies conducted in Germany, triphenylphosphine had been found to be neurotoxic (i.e., toxic to the nervous system) in laboratory animals. Based on these early tests, Celanese implemented safe handling procedures aimed at minimizing employee exposure. Recently, we received additional toxicity test results based on studies sponsored by our American supplier of this material. In these recent studies, dogs were fed various doses of either triphenylphosphine (TPP) or its reaction product triphenylphosphine oxide (TPPO). In some cases, the dogs were given single doses and in other cases they were given small doses over a period of two to three weeks. Test results have confirmed the earlier German results. Both TPP and TPPO were found to affect the dogs' nervous system at the lowest dose tested. Furthermore, the TPP exposed animals suffered partial paralysis and were unable to stand for normal periods of time.

These test results are of significant concern to Celanese because the "no effect level" (i.e., the dose which produces no paralysis or other neurotoxic effects) is not known. Moreover, it has not yet been determined whether inhalation of TPP can result in neurotoxic effects. Our supplier is presently sponsoring additional toxicity studies to answer these questions.

Although there have been no known cases of TPP or TPPO induced neurotoxicity in humans, the animal test results suggest this possibility. Therefore, we should continue to consider these materials as being highly toxic. Employee contact should be avoided. Approved personal protective equipment should be used when handling these materials.

TPP is used as a catalyst in the propanol, butanol and synthetic fatty acids processes at the BCP. TPP is present in various streams of these processes along with its reaction products TPPO and other phosphines.

Precautions have been taken throughout the BCP to minimize employee exposure to TPP and its reaction products. Standard Operating Procedures have been instituted for handling TPP in Traffic, Operations, Maintenance, and the Laboratory. In addition, attention was given to proper disposal of TPP containers and samples. Equipment containing TPP/TPPO in the units have been identified by labeling as a warning to Operations

005020

and Maintenance personnel. Where there is a potential for direct contact with TPP/TPPO, the use of personal protective equipment is required to minimize exposure. For example, during the catalyst mixing operation, the Operators wear fresh air hoods and disposable coveralls, boots and gloves. In addition, each TPP mixing facility is equipped with a dust collection system to minimize TPP dusting.

The Occupational Safety and Health Administration (OSHA) has not established a permissible exposure limit for TPP and TPPO. However, based on available animal toxicity data, Celanese believes TPP and TPPO should be considered highly toxic and any employee contact should be avoided. If employees use recommended procedures, protective equipment, and follow good industrial hygiene practices no harmful exposure should occur.

005021

BACK-UP "QUESTIONS AND ANSWERS"

1. Who is our domestic supplier of triphenylphosphine?

M & T Chemical Company

2. What happened when dogs were given single oral doses of triphenylphosphine?

All dogs given one oral dose of 500 mg/kg (milligrams per kilogram of body weight, about one-half ounce of TPP for a 50-pound dog) died within 24 hours after receiving the dose. Before death, the dogs experienced convulsions, tremors, vomiting and other signs of neurotoxicity -- an effect on the dog's nervous system. Similar neurotoxic symptoms were observed in dogs given a single oral dose of 300 mg/kg of TPP and one of the six dogs given this dose died. A single dose of 50 mg/kg did not produce observable results similar to those from higher doses.

3. Describe the test results when animals were given repeated doses of triphenylphosphine.

When oral doses of 50 mg/kg of TPP were given to six dogs daily for 14 days, the dogs became weak and were unable to stand for normal periods of time. This partial paralysis continued for two weeks after administration of TPP was stopped. Subsequent microscopic examination of the brain, spinal cord, and sciatic nerve of these dogs revealed evidence of neurotoxic effects of the TPP.

4. Is TPP a severe eye and skin irritant?

No.

5. Describe the test results when the dogs were given single doses of TPPO.

Single oral doses of triphenylphosphine oxide were more toxic to dogs than equivalent doses of triphenylphosphine. All six dogs given a single oral dose of 300 mg/kg of TPPO died within 24 hours. A single oral dose of TPPO of 50 mg/kg produced convulsions but not lethality.

6. Describe the test results when dogs were given repeated doses of TPPO.

Unlike TPP, repeated 50 mg/kg of TPPO for 21 days did not cause signs of paralysis.

7. Is TPPO a severe skin and eye irritant?

No toxicity information is available.

005022

8. What additional toxicity studies will M & T be conducting?

M & T is presently sponsoring additional feeding and inhalation studies in dogs with TPP and TPP0. The objective of the studies is to determine a "no effect" level of exposure. The studies should also determine whether inhalation of the dust poses a health hazard.

9. When should the additional tests be completed?

Within six months.

005023

Interoffice Memorandum

TO (Name and Location)	As Listed*	DATE	January 9, 1980
FROM (Name and Location)	C. W. Whaley	REFERENCE NO.	CWW-126-80

*E. L. Tejml
D. H. Miller
W. F. Soward
K. A. Dunn
L. E. Hackfeld

E. D. Luke
D. G. Bremer
C. J. Schaefer
C. D. Barrett, Dallas
G. A. Rodenhause, NYO

SUBJECT: Employee Notification of Recent Toxicity Testing Results on Triphenylphosphine and Triphenylphosphine Oxide

Attached are a communique and "back-up" questions and answers for informing Bay City Plant and Arthur Brothers, Inc. employees of recent toxicity testing results on triphenylphosphine (TPP) and triphenylphosphine oxide (TPPO). If you have any questions concerning the BCP addition to this statement, we will discuss these at a meeting to be called by Dave Bremer on Friday, January 11, 1980.

Handwritten list of names:
Dunn
Cunn
Gunn
Horton
Allen
Horton
Horton
Ripple
Gruin

Go down + look @ TPP cases

CW Whaley
C. W. Whaley

CWW/cmr

Attachments

File: 71-2

Possibility of getting in lump on block form.

- 1) Get w/ supervisors on what size containers are best for dumping ^{quality} Also questioning about quality of TPP (lump etc.).
- 2) Possibility of enclosed dumping system (with glove inserts) to prevent getting stuff on floor. (Industrial vacuum cleaner?)
3. Also Eng. to look @ way to keep ~~the~~ organic vapors from backing up when dumping. Stan feeder on similiar device.

005024

ROUGH DRAFT - CONFIDENTIAL

TOXICITY TEST RESULTS
OF TRIPHENYLPHOSPHINE AND TRIPHENYLPHOSPHINE OXIDE

In 1977, you were informed that based on toxicity studies conducted in Germany, triphenylphosphine had been found to be neurotoxic (i.e., toxic to the nervous system) in laboratory animals. Based on these early tests, Celanese implemented safe handling procedures aimed at minimizing employee exposure. Recently, we received additional toxicity test results based on studies sponsored by our American supplier of this material. In these recent studies, dogs were fed various doses of either triphenylphosphine (TPP) or its reaction product triphenylphosphine oxide (TPPO). In some cases, the dogs were given single doses and in other cases they were given small doses over a period of two to three weeks. Test results have confirmed the earlier German results. Both TPP and TPPO were found to affect the dogs' nervous system at the lowest dose tested. Furthermore, the TPP exposed animals suffered partial paralysis and were unable to stand for normal periods of time.

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↓
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Precautions have been taken throughout the BCP to minimize employee exposure to TPP and its reaction products. Standard Operating Procedures have been instituted for handling TPP in Traffic, Operations, Maintenance, and the Laboratory. In addition, attention was given to proper disposal of TPP containers and samples. Equipment containing TPP/TPPO in the units have been identified by labeling as a warning to Operations

and Maintenance personnel. Where there is a potential for direct contact with TPP/TPPO, the use of personal protective equipment is required to minimize exposure. For example, during the catalyst mixing operation, the Operators wear fresh air hoods and disposable coveralls, boots and gloves. In addition, each TPP mixing facility is equipped with a dust collection system to minimize TPP dusting.

The Occupational Safety and Health Administration (OSHA) has not established a permissible exposure limit for TPP and TPPO. However, based on available animal toxicity data, Celanese believes TPP and TPPO should be considered highly toxic and any employee contact should be avoided. If employees use recommended procedures, protective equipment, and follow good industrial hygiene practices no harmful exposure should occur.

Even so as an additional precaution we are going to review the following items to determine if we can further reduce the potential for exposure.

- a) obtain TPP in optimum package size for dumping
- b) improved TPP quality from a free flowing ~~(lumpy)~~ ^{none caking} standpoint.
- c) improved dumping system to minimize spillage ^{timed method to clean up spillage}
- d) reduce organic vapor buildup during dumping operation.

e) sampling incoming shipments

f) lab sampling in unit

g) TPP on RFS & line labeled.

*Direct
have
L.E.M. & Riddle
person to inspect*

BACK-UP "QUESTIONS AND ANSWERS"

1. Who is our domestic supplier of triphenylphosphine?

M & T Chemical Company

2. What happened when dogs were given single oral doses of triphenylphosphine?

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No.

5. Describe the test results when the dogs were given single doses of TPPO.

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6. Describe the test results when dogs were given repeated doses of TPPO.

Unlike TPP, repeated 50 mg/kg of TPPO for 21 days did not cause signs of paralysis.

7. Is TPPO a severe skin and eye irritant?

No toxicity information is available.

005027

8. What additional toxicity studies will M & T be conducting?

M & T is presently sponsoring additional feeding and inhalation studies in dogs with TPP and TPP0. The objective of the studies is to determine a "no effect" level of exposure. The studies should also determine whether inhalation of the dust poses a health hazard.

9. When should the additional tests be completed?

Within six months.

005028

Interoffice Memorandum

TO (Name and Location) *As Listed	DATE January 25, 198
FROM (Name and Location) C. J. Schaefer	REFERENCE NO. CJS-18-80

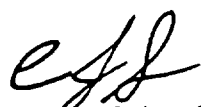
*C. W. Whaley
W. G. Cornman
D. F. Ripple
N. V. Smith
G. E. Organ

R. W. Sanders
E. M. Sullivan
G. B. Durett
D. K. Mastell
D. G. Bremer

Meeting To Discuss Additional Safeguards To Prevent TPP Exposure

Listed below are the action items we agreed on at the January 16, 1980 subject meeting.

1. Operations will promptly notify Purchasing of any flowability problems due to quality and of any need to change container size. This is actually current procedure and there are no problems at this time.
2. Engineering will determine the feasibility and economics of completely enclosed TPP dump systems. Operations will initiate RFS's.
3. Operations will take action to insure respirators are cleaned after each use and stored in a clean TPP-free environment.
4. Carroll Whaley and Roy Sanders will observe sampling of new shipments of TPP and recommend an appropriate SOP and protective equipment for this activity.
5. The Laboratory will notify Operations of any changes needed (to prevent exposure) on sampling systems containing TPP.
- X 6. Operations will investigate the best way to clean up TPP spilled in dump areas - dump areas will be kept clean.
7. Need Process Engineering to look at dump system modifications or SOP changes to reduce organic vapor backup to TPP dump bins.
8. Joe Schaefer will check with Bob Allen on Maintenance compliance with TPP SOP.


C. J. Schaefer

CJS/las

cc: E. L. Tejml
K. A. Dunn
D. H. Miller
W. F. Soward

L. E. Moore
C. V. McSwain
R. E. Allen
G. A. Vos - Dallas

005029

Interoffice Memorandum

T 2-25-80
3-25-80
4-15-80
GEN 55 (REV. 6)

TO (Name and Location)	DATE
*As Listed	January 25, 198
FROM (Name and Location)	REFERENCE NO.
C. J. Schaefer	CJS-18-80

*C. W. Whaley
W. G. Cornman
D. F. Ripple ✓
N. V. Smith
G. E. Organ

R. W. Sanders
E. M. Sullivan
G. B. Durett
D. K. Mastell
D. G. Bremer

Meeting To Discuss Additional Safeguards To Prevent TPP Exposure

Check On

Listed below are the action items we agreed on at the January 16, 1980 subject meeting.

Portable enclosure
is being evaluated.
will be ready during
the next mkt.

1. Operations will promptly notify Purchasing of any flowability problems due to quality and of any need to change container size. This is actually current procedure and there are no problems at this time.

2. Engineering will determine the feasibility and economics of completely enclosed TPP dump systems. Operations will initiate RFS's.

3. Operations will take action to insure respirators are cleaned after each use and stored in a clean TPP-free environment.

4. Carroll Whaley and Roy Sanders will observe sampling of new shipments of TPP and recommend an appropriate SOP and protective equipment for this activity.

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6. Operations will investigate the best way to clean up TPP spilled in dump areas - dump areas will be kept clean.

7. Need Process Engineering to look at dump system modifications or SOP changes to reduce organic vapor backup to TPP dump bins.

8. Joe Schaefer will check with Bob Allen on Maintenance compliance with TPP SOP.

CJS
C. J. Schaefer

CJS/las

cc: E. L. Teiml
K. A. Dunn
D. H. Miller
W. F. Soward
L. E. Hackfeld

L. E. Moore
C. V. McSwain
R. E. Allen
G. A. Vos - Dallas
C. D. Barrett - Dallas

005030

PROH
will be
Cabinet
keeping
use of
respirators
to
SOP
write
key of
for no
same
now

SFA has cabinet
in use - cleaning
but not using
will start using
key will notify
me of next shipment
for observation.
Broom & wash down
dumps for TPP in
addition.
let guy air lock
feed system is stalled
again in B.O.H.
to be working
with new TPP. If continues
to operate OK will install
in PROH.

Interoffice Memorandum

TO (Name and Location)	DATE
* As Listed	May 16, 1980
FROM (Name and Location)	REFERENCE NO.
C. J. Schaefer	CJS-92-80

* C. W. Whaley	H. C. Thiele
W. G. Cornman	P. B. Rapstine
N. V. Smith	D. G. Bremer
G. E. Organ	J. R. Higgins
E. E. Abels	J. E. Brents

Status of Additional Safeguards To Prevent TPP Exposure

On May 7, 1980, the personnel listed above met to review the status of additional safeguards (CJS-18-80) to prevent TPP exposure. Listed below are the highlights of the meeting.

1. The SFA Unit has been experiencing flowability problems with the 225 lb M & T TPP drums. Purchasing has been notified. Bill Cornman said they will probably go to the 50 lb drums used by Area I after they use up the existing supply of 225 lb drums. Flowability of 50 lb drums is good.
2. Operations has submitted RFS's for Engineering to determine cost and feasibility of totally enclosed TPP dump systems. A sock type enclosed system has been tried in SFA but is not yet satisfactory due to
 - 1) poor hopper accessibility due to high hopper height cause by valve temporarily replacing slide gate
 - 2) insufficient vacuum system
 - 3) 225 lb drum flowability problems

Jim Brents said the 50 lb drums would be good to standardize on for the enclosed dump systems. Jim is going to publish status report on his investigation of totally enclosed dump systems. If the sock type system in SFA Unit is not satisfactory Jim feels any alternate totally enclosed system is going to be expensive.

Carrol Whaley mentioned that the ventilation systems on the Butanol and Propanol TPP dump systems combined with the protective equipment provided adequate operator protection. However, a totally enclosed dump system might eliminate the need for some of the protective equipment. If an economically feasible enclosed dump system cannot be engineered the SFA ventilation system will be modified and made similar to the BuOH and Propanol systems.

3. Respirators (with few exceptions) are being cleaned after each use and stored in a clean TPP-free environment.
4. Appropriate SOP not yet defined for sampling incoming shipments of TPP. This will be done by C. Whaley and E. Abels after observing sampling of next TPP shipment.

005031

5. SOP's have been written for sampling all stream, containing TPP in the BuOH and Propanol Units. SFA Unit will write SOP's.
6. Rotary lock has been reinstalled on BuOH TPP dump system but Operations has not noticed significant change in vapors at dump bin. Organic vapor backup in BuOH and Propanol needs further attention - no problem in SFA Unit.


C. J. Schaefer

CJS/rg

cc: E. L. Tejml
D. H. Miller
K. A. Dunn
W. F. Soward
L. E. Hackfeld
G. B. Durett
L. E. Moore
D. F. Ripple
R. E. Allen
C. R. Pennington
C. V. McSwain
G. Vos - Dallas
C. D. Barrett - Dallas

005032

Interoffice Memorandum

TO (Name and Location) As Listed	DATE May 30, 1980
FROM (Name and Location) J. E. Brents	REFERENCE NO. E-375-JEB-80

cc: C. J. Schaefer
C. W. Whaley
W. G. Cornman
N. V. Smith
P. B. Rapstine
D. G. Bremer
J. R. Higgins
C. R. Pennington

Subject: Status Report on Engineering Activities to Up-grade TPP Dump Systems

Engineering efforts to obtain data on a "totally enclosed" TPP dump system have so far been unsuccessful. No vendor contacted offers such a system as such. Custom designed equipment fabricators could, in all probability, come up with such a system, but the cost would, no doubt, be in the \$100M range (or more). I don't think this would be economically justified for the BuOH and PrOH units dump systems just to eliminate some of the protective equipment requirements.

The SFA unit TPP dump system needs to be modified such that it is at least equal to the BuOH and PrOH unit systems level of operator protection. This will require a complete re-design of the hopper, dust collection system, and mix tank/hopper interface block valve. RFS#1-0303 has been estimated and routed for approval to do the required work on the SFA dump system. The estimate is \$37.1M capital and \$1.1M expense and is based on a dust collection system identical to Area I systems, complete re-design of hopper for height, 50lb. drums, hood for dust control, etc., and a new air operated block valve that will not leak through at V-1003's N₂ blanket pressure of 10 psig.

If there are any questions about this status report, feel free to call me.


J. E. Brents

JEB/pc

file: 5.5.0.0

cc: E. L. Tejml
D. H. Miller
K. A. Dunn
W. F. Soward
L. E. Hackfeld
G. B. Durett

L. E. Moore
D. F. Ripple
R. E. Allen
C. V. McSwain
G. Vos O DALLAS
C. D. Barrett - DALLAS

005033

Interoffice Memorandum

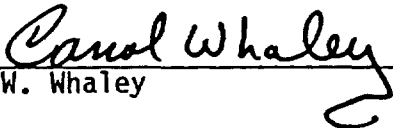
TO (Name and Location)	DATE
B. L. Fritz	August 26, 1982
FROM (Name and Location)	REFERENCE NO.
C. W. Whaley	CWW-339-82

SUBJECT: Survey of TPP Mix Area

Periodically, I survey the TPP mix areas to evaluate compliance with plant safety and health procedures. On August 24, 1982 I toured the SFA-TPP mix area and made the following observations:

- General housekeeping is good.
- The TPP dust collection system appears to be well maintained.
- Improvement is needed in the maintenance and storage of respiratory protection equipment. Materials for proper cleaning and storage of respiratory protection equipment should be provided. The air hood is currently kept in a cabinet but is not stored in a plastic bag.

Attached is the plant AP pertaining to the respiratory protection program. I have highlighted the areas which I feel need attention to get into compliance. If you have any questions regarding my observations, call me at Ext. 4077.


C. W. Whaley

CWW/dj

cc: C. J. Schaefer
W. G. Cornman

D. G. Bremer
L. I. Wallace

005034

Section VIII

SAFETY

Bay City No. 32

Respiratory Protection Program

Date: 12/17/80

PURPOSE:

This Respiratory Protection Program establishes requirements for the selection, use, inspection and maintenance of respiratory equipment within the confines of the Bay City Plant of Celanese Chemical Company, Inc. The respiratory equipment shall be used for safeguarding employees against airborne contaminants and oxygen deficient work atmospheres.

This program does not apply to mine and tunnel rescue work or protection against airborne radiation.

The Bay City Plant Respiratory Protection Program incorporates provisions of the General Industry Standards, 29 CFR 1910.134 (OSHA), Respiratory Protection and ANSI Z 88.2 - 1969 of American National Standard Practices for Respiratory Protection.

PROCEDURES:

- I. Bay City Plant Management assumes the responsibility for the implementation and maintenance of the Respiratory Protection Program. Each employee has the responsibility to know and adhere to this policy.
- II. The Respiratory Protection Program shall be administered by the Respiratory Protection Program Administrator from within the Plant Safety Section.
- III. Facial hair and other facial features must not interfere with the facepiece-to-face seal of a respirator if plant activities may require that face-fit type respirators be worn during normal or abnormal conditions.
- IV. Responsibilities
 - ✓ A. Owning Supervisor
 - ✓ 1. Shall procure, use, inspect and maintain respiratory protection equipment in accordance with requirements of this program. The Plant Industrial Hygienist and Respiratory Protection Program Administrator shall determine the proper respirator selection.

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Section VIII

SAFETY

Bay City No. 32

Respiratory Protection Program

Date: 12/17/80

2. Shall ensure that inspection records are sent to Respiratory Protection Program Administrator for retention.
3. Shall ensure that a sufficient supply of approved respiratory protection equipment, for contaminants likely to be encountered in everyday work practices or in emergency situations, is provided and readily available.
4. Shall ensure that respirators are worn by the employees when required.
5. Shall ensure that each employee who may be required to wear a respirator receive appropriate respirator training provided by the Bay City Plant Safety Section.

 B. Employee

- 
1. Each employee shall use, inspect, clean, and maintain his/her respiratory protective equipment as instructed by his/her supervisor.

C. Purchasing Section

1. Shall purchase only respirators that bear the approval of the National Institute for Occupational Safety and Health (NIOSH) and approved by the Plant Industrial Hygienist and the Respiratory Protection Program Administrator.
2. Shall require vendors that supply breathing-air cylinders and breathing-air compressors to the Bay City Plant comply with specifications for Grade "D" breathing-air as described in the Compressed Gas Association's, Commodity Specification for Air, Pamphlet G-7.1, ANSI Z 86.1 - 1973.

D. Safety Section

1. Shall screen employees and prospective employees who must wear respirators for physical impairments or complications which may cause difficulty in performing job functions safely. Refer to Health Monitoring Program.

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Section VIII

SAFETY

Bay City No. 32

Respiratory Protection Program

Date: 12/17/80

2. Shall provide initial and recurring training courses in Respiratory Protection for all employees that may be required to wear respirators.
3. Shall be responsible for administration of Respiratory Protection Program.

E. Plant Industrial Hygienist

1. The Plant Industrial Hygienist shall periodically monitor employee exposure to airborne contaminants. Monitoring shall also be conducted following new unit start-ups or process modifications which could result in new hazards.
2. The Plant Industrial Hygienist shall be consulted for assistance in selecting appropriate respiratory protection equipment.
3. Any changes to the Respiratory Protection Program (i.e., Administrative Procedure and S.O.P.) shall be approved by the Plant Industrial Hygienist.

V. A Maintenance Program shall be contracted to perform

- A. Cleaning and Disinfecting of respirators in wash water with temperature of 120°-140°
- B. Drying
- C. Inspection and Repair after laundering with NIOSH approved repair parts
- D. Leak checked
- E. Individually bagged

VI. Ambient Hazards (Defined)

- A. Excessive contaminants, including gases, vapors, dusts, fumes, and mists

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Section VIII

SAFETY

Bay City No. 32

Respiratory Protection Program

Date: 12/17/80

B. Oxygen deficient work atmosphere

C. Combination of excessive contaminants and oxygen deficiency

VII. Control Measures

The primary objective shall be to control Ambient Hazards by accepted engineering controls such as confinement of the operation and local exhaust ventilation. Alternate controls may include administrative changes or the substitution of less toxic materials or approved respiratory protection. Respiratory protection shall not be used as a substitute if engineering or administrative controls are feasible and practical, except as an interim measure.

RESPIRATORY PROTECTION PROGRAM:

The following requirements are necessary considerations in a Respiratory Protection Program. Standard Operating Procedures (S.O.P.) will be based upon the following data:

I. Selection and Procurement

A. Selection shall be based upon

1. Oxygen deficient work atmosphere
2. Ambient concentration, toxicity, reactivity and irritancy of contaminants
3. Work requirements and conditions
4. Characteristics and limitations of approved respirators
5. Wearer comfort and acceptance

B. Respirator shall be NIOSH approved.

C. The Plant Industrial Hygienist shall determine type of respirator to be used based upon contaminant and exposure potential based on contaminant monitoring data.

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Section VIII

SAFETY

Bay City No. 32

Respiratory Protection Program

Date: 12/17/80

II. Training and Education in Proper Use of Respirators

- A. Instruction in the nature of the hazard
- B. Explanation of why other control strategies are not feasible or practical
- C. A discussion of the reasons for selecting this respirator for this particular use
- D. A discussion of the respirators capabilities and limitations
- E. Instruction and training in actual use of the respirator
- F. Classroom and field training to recognize and cope with emergency situations
- G. Special training for special use

✓
III. Inspection

- A. Employees assigned personal respirators shall inspect them before and after each use as instructed during training session.
- ✓ B. Common use respirators shall be inspected before use and shall be cleaned after each use by the individual that has worn the respirator.
- C. Random inspections of personal, common use, and emergency respirators will be conducted by the Safety Section and the Plant Industrial Hygienist.
- ✓ D. The Owning Units will make weekly inspections on emergency, personal, and common use respirators. Records shall be forwarded by the Owning Unit Supervisor to the Safety Section for retention.
- E. Routine maintenance of personal respirators such as replacement of cartridges or filters shall be performed by the owning individual. A supply of all necessary items will be kept in stock in the Warehouse.

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Section VIII

SAFETY

Bay City No. 32

Respiratory Protection Program

Date: 12/17/80

IV. Maintenance

- A. Emergency respirators shall be rotated through a repair and cleaning shop on a regular basis.
- B. Assigned or personal respirators will be sent to a maintenance and cleaning shop on a regular basis.
- C. All repairs will be performed by an authorized individual or repair shop.
- D. All repairs must be made with NIOSH approved parts.

V. Fit Testing

- A. An employee must take and pass a qualitative leak test performed with the appropriate respirator(s) using irritant smoke or iso-amyl acetate while simulating body movements associated with normal work activities. The employee should be issued an identical make and model of the respirator that he/she used to pass the qualitative leak test.
- B. Employees required to wear face-fit type respirators will not have facial hair that would prevent the proper facepiece-to-face seal of a respirator.
- C. Employees who are required to wear respirators shall perform a positive or negative pressure leak test before entering a contaminated atmosphere.
- D. Eye glasses shall not be worn under full-face respirators except where they have been properly installed in approved adapters and do not interfere with face-to-respirator seal. Employees who need corrective lens should not wear full-face respirators without these adapters and glasses, except during emergencies.
- E. Contact lens shall not be worn inside the plant except for rare instances where for medical reasons an employee cannot function with regular glasses. Permission must be obtained from the Safety Section and certain conditions must be met by employee.

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Bay City No. 32

Respiratory Protection Program

Date: 12/17/80

✓ VI. Storage

- ✓ A. Reusable personal respirators shall be stored in sealed plastic bags and protective containers after being properly cleaned and maintained.
- B. Respirators shall not be stored in areas of extreme temperatures.
- ✓ C. Respirators should not be stored in areas where chemicals might damage or contaminate them.

VII. Routine Application

- A. Where respirators are required for routine use they should be individually assigned.
- B. The atmosphere shall be monitored before entry into confined spaces or other areas which might be subject to oxygen deficiencies or excessive concentrations of toxic contaminants.

VIII. Emergency Application

A. Emergency Work Situations

- 1. Employees must wear an air-line respirator with auxiliary air tanks, or a self-contained unit, and must be equipped with safety harness and lines, where an oxygen deficient work atmosphere exists.
 - 2. An attendant shall be present and located such that he/she is not likely to be overcome by an event affecting the wearer. The attendant shall have the necessary equipment for an emergency rescue.
 - 3. Communications shall be maintained between all parties present.
- B. Immediately Dangerous Atmospheres (normally work is not performed in IDLH atmospheres; however, emergency situations arise where such entry may be required.)

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Bay City No. 32

Respiratory Protection Program

Date: 12/17/80

1. A self-contained respirator or an air-line unit with auxiliary tank must be worn where an atmosphere immediately dangerous to life and health (IDLH) may be expected.
2. Persons wearing air-line respirators with auxiliary tank must be equipped with safety harness and lines in atmospheres immediately dangerous to life or health (IDLH).
3. There shall be at least two standby persons stationed outside the toxic atmosphere. They shall remain in communication with those in the toxic atmosphere. At least one shall have the necessary self-contained breathing apparatus and equipment on hand for emergency rescue.

IX. Emergency Respirators

- A. Adequate respiratory protection will be kept easily accessible to facilitate the safe escape of all employees from areas in which immediately dangerous to life and health (IDLH) atmospheric contamination may occur.
- B. Emergency escape respirators will be of a type which is easily put on, such as an escape unit with a plastic hood. These will be kept in the immediate vicinity of work stations subject to dangerous toxic contamination.
- C. Respirators used for emergency re-entry will be self-contained breathing apparatus (SCBA) units required for immediately dangerous to life or health (IDLH) atmospheres. The IDLH units will be kept immediately outside areas likely to be quickly contaminated. Additional units may be kept at a central location or on emergency vehicles.
- D. Considerations will be given during emergency planning to assure that a fully adequate supply of breathing-air tanks is available, and that adequate refilling capacity exists on plant site.

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Interoffice Memorandum

TO (Name and Location) L. T. Pless	DATE August 26, 1982
FROM (Name and Location) C. W. Whaley	REFERENCE NO. CWW-340-82

cc: C. J. Schaefer A. B. Savage
 L. J. Cribb J. E. Brents
 D. G. Bremer L. I. Wallace
 J. P. Lieck

SUBJECT: Survey of TPP Mix Areas

Periodically, I survey the TPP mix areas to evaluate compliance with plant safety and health procedures. Following a survey on May 26, 1982, I recommended corrective action to improve general housekeeping and comply with plant safety and health procedures. On August 25, 1982, I conducted another survey of the TPP areas and found that little progress has been made in correcting the deficiencies. One notable improvement is the installation of new boots between the TPP dump and mix vessels which appears to have reduced leaks. Once again I recommend that corrective action be taken on the following items:

Propanol - TPP Mix Area

1. General housekeeping needs improvement (dust, oil, etc. on floor).
2. Unlabeled bottles of liquid are setting in the area.
3. The dust collector catch pan is missing. The pan should be installed like the SFA design.
4. Equipment for proper cleaning and storage of respiratory protection equipment should be provided. Air hood is currently in a plastic bag lying on the floor.

Butanol - TPP Mix Area

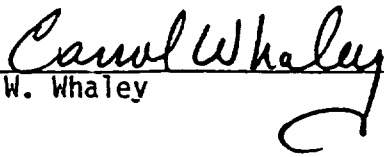
1. General housekeeping needs improvement (tape, disposable clothing, disposable boots, drum tabs, dust on the floor).
2. Equipment for proper cleaning and storage of respiratory protection equipment should be provided. Air hood is currently stored in a cabinet but is not properly cleaned and stored in a plaster bag.
3. Unlabeled bottles of liquids and solids sitting in the area.
4. Dust collector catch pan needs to be installed like SFA design. Pan currently has trash, rags, etc. inside.

During the survey, I also noticed two disposable air suits on the floor in the Butanol TPP mix area. As we previously discussed I am in favor of substituting these suits for current protective equipment providing the suits are disposed of properly after each use and SOP's are updated to reflect their use. I am apposed to reusing the suits in TPP service for hygiene and health reasons.

Attached are unit and plant SOP's/AP's pertaining to TPP mixing and respiratory

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protection. I have highlighted the areas which I feel need attention to get into compliance. If you have any questions regarding my recommendations call me at Ext. 4077.


C. W. Whaley

CWW/dj

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ANY CHANGES TO THIS SOP MUST BE APPROVED
BY THE SAFETY SUPERVISOR, INDUSTRIAL
HYGIENIST, AND OWNING SUPERINTENDENT INVOLVED

SOP for Disposal of Empty TPP Fiberpacs, Fiberpac
Liners, and Disposable Protective Clothing

Triphenylphosphine (TPP), a catalyst used in the Oxo-BuOH reactor system, is received in 50 pound fiberpacs and ≈3 fiberpacs of TPP are added to the reaction system once each week. Since animal tests indicate that TPP is a potential nerve toxin, special precautions must be taken in the handling and disposal of this material.

✓ The following procedures will be used for TPP fiberpac, fiberpac liners, and disposable protective clothing disposal.

1. After the TPP is dumped into the catalyst addition system, the fiberpac's polyethylene liners will be secured with rubber bands. (The operator will insure that all the TPP, except for thin film of TPP powder left on the liner, is emptied from the fiberpac.) The liners should be pulled from the fiberpacs and placed in a separate fiberpac.
- ✓ 2. The disposable protective clothing will be placed in the fiberpac with the liners.
3. The lids should be secured and the empty fiberpacs placed in the special temporary storage container placed near the base of the TPP addition system structure.
4. At least once each week, Maintenance will insure that the empty fiberpacs and used protective clothing are picked up and burned in the solid waste incinerator. The personnel picking up the empty fiberpacs should wear gloves.
5. The polyethylene liners will not be burned in the solid waste incinerators, since burning significant quantities of TPP could result in smoking of the solid waste incinerator and in possibly emitting toxic fumes from the incinerator. When the container for the liners becomes full, the Shipping Supervisor should be notified and he will arrange to pick up. The liners will be temporarily stored in the chemical warehouse, along with any off-spec TPP, until off-site disposal can be arranged by the Environmental Maintenance Section.
6. For the same reason as mentioned in No. 5, no off-spec or any bulk TPP powder should be burned in the solid waste incinerator. For off-spec or any bulk TPP powder needing disposal, contact the Environmental Section and they will arrange for off-plant disposal at a registered commercial solid waste disposal site.

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Safety Notes

TPP is known to be toxic and can therefore be detrimental to the health of unit personnel if proper handling precautions are not used.

- ✓ 1. Protective wearing apparel must be worn at all times while handling TPP. Protective clothing is to be used only one time and disposed of in the prescribed manner.
2. Fresh air hoods will be worn during TPP mixing. Bottled breathing air and fresh air hoods are provided and must be in use before opening TPP containers.
3. A drum lift has been provided for dumping the 220 lb. size drums. 50 lb. drums require two people to dump.
4. The dust collection system must be in service while TPP is being added to the mix tank.

I. Objective

To maintain a charge of TPP solution to be added to the OXO BuH Reactor (R-38) as needed. Sample analysis of R-38 material will determine the frequency of addition and TPP concentration required in each mix.

II. Standard Operating Procedure

1. Fill V-916 to prescribed level with crude BuH from V-829 or T-4 overhead. It is desirable to use V-829 material since its temperature will be lower, and therefore less vapor will be present prior to actual mixing. BuH vapors have a detrimental effect on the TPP dust filters, making them less effective.
2. Check V-916 for a positive nitrogen pressure to prevent oxygen contamination of V-916. Oxygen will result in TPPO formation.
3. Start mixer (M-1320).
4. Strap TPP container in drum lift and lift into position.
5. Don protective equipment and clothing before opening TPP container.
- ✓ 6. Start up the dust filtering system and check for proper operation.
7. Dump prescribed lbs. of TPP into V-916.
8. Immediately following the last container being dumped, close the filtering system doors and shut down the fan. This will prevent BuH vapors from being pulled through the filters and damaging filter elements.

- ✓ 9. Immediately after shutdown of the dust removal system, operate the "kick bars" on the side of the filter case several times. This will prevent BuH vapors from dissolving TPP dust and resulting in filter inefficiency or plugging.
- ✓ 10. After operating kick bars, dump the filtered TPP into the provided container. Dump collected TPP dust into one of the plastic liners from TPP drums and store in provided container.
11. Collect any spilled TPP from the floor and put in plastic bag described in item #10.
12. When items 1 through 11 have been completed, protective clothing and fresh airhoods may be removed.
 - ✓ a. Clean fresh air hoods with soap and water and store in their proper containers. (Include air hoses)
 - ✓ b. Used protective clothing must be stored in the provided container. (Located northwest corner of unit 100 mix building)
13. Heat material (TPP/BuH) in V-916 to 110°F, using V-916 heater (HE-881), while continuing to agitate with mixer (M-1320).
14. Add TPP solution to R-38 per unit supervisor's instructions.

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Section VIII

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Bay City No. 32

Respiratory Protection Program

Date: 12/17/80

PURPOSE:

This Respiratory Protection Program establishes requirements for the selection, use, inspection and maintenance of respiratory equipment within the confines of the Bay City Plant of Celanese Chemical Company, Inc. The respiratory equipment shall be used for safeguarding employees against airborne contaminants and oxygen deficient work atmospheres.

This program does not apply to mine and tunnel rescue work or protection against airborne radiation.

The Bay City Plant Respiratory Protection Program incorporates provisions of the General Industry Standards, 29 CFR 1910.134 (OSHA), Respiratory Protection and ANSI Z 88.2 - 1969 of American National Standard Practices for Respiratory Protection.

PROCEDURES:

- I. Bay City Plant Management assumes the responsibility for the implementation and maintenance of the Respiratory Protection Program. Each employee has the responsibility to know and adhere to this policy.
- II. The Respiratory Protection Program shall be administered by the Respiratory Protection Program Administrator from within the Plant Safety Section.
- III. Facial hair and other facial features must not interfere with the facepiece-to-face seal of a respirator if plant activities may require that face-fit type respirators be worn during normal or abnormal conditions.
- IV. Responsibilities
 - ✓ A. Owning Supervisor
 - ✓ 1. Shall procure, use, inspect and maintain respiratory protection equipment in accordance with requirements of this program. The Plant Industrial Hygienist and Respiratory Protection Program Administrator shall determine the proper respirator selection.

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Respiratory Protection Program

Date: 12/17/80

- ✓ 2. Shall ensure that inspection records are sent to Respiratory Protection Program Administrator for retention.
- 3. Shall ensure that a sufficient supply of approved respiratory protection equipment, for contaminants likely to be encountered in everyday work practices or in emergency situations, is provided and readily available.
- 4. Shall ensure that respirators are worn by the employees when required.
- 5. Shall ensure that each employee who may be required to wear a respirator receive appropriate respirator training provided by the Bay City Plant Safety Section.

✓ B. Employee

- ✓ 1. Each employee shall use, inspect, clean, and maintain his/her respiratory protective equipment as instructed by his/her supervisor.

C. Purchasing Section

- 1. Shall purchase only respirators that bear the approval of the National Institute for Occupational Safety and Health (NIOSH) and approved by the Plant Industrial Hygienist and the Respiratory Protection Program Administrator.
- 2. Shall require vendors that supply breathing-air cylinders and breathing-air compressors to the Bay City Plant comply with specifications for Grade "D" breathing-air as described in the Compressed Gas Association's, Commodity Specification for Air, Pamphlet G-7.1, ANSI Z 86.1 - 1973.

D. Safety Section

- 1. Shall screen employees and prospective employees who must wear respirators for physical impairments or complications which may cause difficulty in performing job functions safely. Refer to Health Monitoring Program.

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Date: 12/17/80

2. Shall provide initial and recurring training courses in Respiratory Protection for all employees that may be required to wear respirators.
3. Shall be responsible for administration of Respiratory Protection Program.

E. Plant Industrial Hygienist

1. The Plant Industrial Hygienist shall periodically monitor employee exposure to airborne contaminants. Monitoring shall also be conducted following new unit start-ups or process modifications which could result in new hazards.
- ✓ 2. The Plant Industrial Hygienist shall be consulted for assistance in selecting appropriate respiratory protection equipment.
- ✓ 3. Any changes to the Respiratory Protection Program (i.e., Administrative Procedure and S.O.P.) shall be approved by the Plant Industrial Hygienist.

V. A Maintenance Program shall be contracted to perform

- A. Cleaning and Disinfecting of respirators in wash water with temperature of 120°-140°
- B. Drying
- C. Inspection and Repair after laundering with NIOSH approved repair parts
- D. Leak checked
- E. Individually bagged

VI. Ambient Hazards (Defined)

- A. Excessive contaminants, including gases, vapors, dusts, fumes, and mists

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Respiratory Protection Program

Date: 12/17/80

B. Oxygen deficient work atmosphere

C. Combination of excessive contaminants and oxygen deficiency

VII. Control Measures

The primary objective shall be to control Ambient Hazards by accepted engineering controls such as confinement of the operation and local exhaust ventilation. Alternate controls may include administrative changes or the substitution of less toxic materials or approved respiratory protection. Respiratory protection shall not be used as a substitute if engineering or administrative controls are feasible and practical, except as an interim measure.

RESPIRATORY PROTECTION PROGRAM:

The following requirements are necessary considerations in a Respiratory Protection Program. Standard Operating Procedures (S.O.P.) will be based upon the following data:

I. Selection and Procurement

A. Selection shall be based upon

1. Oxygen deficient work atmosphere
2. Ambient concentration, toxicity, reactivity and irritancy of contaminants
3. Work requirements and conditions
4. Characteristics and limitations of approved respirators
5. Wearer comfort and acceptance

B. Respirator shall be NIOSH approved.

C. The Plant Industrial Hygienist shall determine type of respirator to be used based upon contaminant and exposure potential based on contaminant monitoring data.

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II. Training and Education in Proper Use of Respirators

- A. Instruction in the nature of the hazard
- B. Explanation of why other control strategies are not feasible or practical
- C. A discussion of the reasons for selecting this respirator for this particular use
- D. A discussion of the respirators capabilities and limitations
- E. Instruction and training in actual use of the respirator
- F. Classroom and field training to recognize and cope with emergency situations
- G. Special training for special use

✓ III. Inspection

- A. Employees assigned personal respirators shall inspect them before and after each use as instructed during training session.
- ✓ B. Common use respirators shall be inspected before use and shall be cleaned after each use by the individual that has worn the respirator.
- C. Random inspections of personal, common use, and emergency respirators will be conducted by the Safety Section and the Plant Industrial Hygienist.
- ✓ D. The Owning Units will make weekly inspections on emergency, personal, and common use respirators. Records shall be forwarded by the Owning Unit Supervisor to the Safety Section for retention.
- E. Routine maintenance of personal respirators such as replacement of cartridges or filters shall be performed by the owning individual. A supply of all necessary items will be kept in stock in the Warehouse.

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City No. 32

Respiratory Protection Program

Date: 12/17/80

IV. Maintenance

- A. Emergency respirators shall be rotated through a repair and cleaning shop on a regular basis.
- B. Assigned or personal respirators will be sent to a maintenance and cleaning shop on a regular basis.
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Respiratory Protection Program

Date: 12/17/80

✓ VI. Storage

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- B. Respirators shall not be stored in areas of extreme temperatures.
- ✓ C. Respirators should not be stored in areas where chemicals might damage or contaminate them.

VII. Routine Application

- A. Where respirators are required for routine use they should be individually assigned.
- B. The atmosphere shall be monitored before entry into confined spaces or other areas which might be subject to oxygen deficiencies or excessive concentrations of toxic contaminants.

VIII. Emergency Application

A. Emergency Work Situations

1. Employees must wear an air-line respirator with auxiliary air tanks, or a self-contained unit, and must be equipped with safety harness and lines, where an oxygen deficient work atmosphere exists.
2. An attendant shall be present and located such that he/she is not likely to be overcome by an event affecting the wearer. The attendant shall have the necessary equipment for an emergency rescue.
3. Communications shall be maintained between all parties present.

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Respiratory Protection Program

Date: 12/17/80

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