

# Administrative Record

7

COMMONWEALTH OF PENNSYLVANIA  
DEPARTMENT OF ENVIRONMENTAL RESOURCES

In the Matter of:

WESTINGHOUSE ELECTRIC CORPORATION : Groundwater and Drinking  
One Tuscarawas Road : Water Contamination  
Beaver, Pennsylvania 15009 :

## CONSENT ORDER AND AGREEMENT

This Consent Order and Agreement is entered into this 23rd day of June, 1989, by and between the Commonwealth of Pennsylvania, Department of Environmental Resources ("Department") and Westinghouse Electric Corporation ("Westinghouse").

## FINDINGS OF FACT

The Department has made and determined the findings in Paragraphs A through J, which Westinghouse agrees are true and correct. Based upon the data available at this time, the Department also has made and determined the findings in Paragraphs K through T, which it believes are true and correct. Westinghouse does not agree that those findings are true and correct. Westinghouse consents to the jurisdiction and power of the Department regarding this Consent Order and Agreement. Westinghouse agrees that the findings set forth in Paragraphs A through J are sufficient to authorize issuance of Paragraphs 1 through 32 of this Consent Order and Agreement.

A. The Department is the agency with the duty and authority to administer the Clean Streams Law, Act of June 22, 1937, P.L. 1987, as amended, 35 P.S.

\$691.1 et seq. ("CSL"); the Solid Waste Management Act, Act of July 7, 1980, P.L. 380, as amended, 35 P.S. §6018.101 et seq. ("SWMA"); the Pennsylvania Safe Drinking Water Act, Act of May 1, 1984, P.L. 206, 35 P.S. §721.1 et seq. ("PSDWA"); Section 1917-A of the Administrative Code, Act of April 9, 1929, P.L. 177, as amended, 71 P.S. §510-17 ("Administrative Code"); and the rules and regulations promulgated under the aforesaid statutes.

B. Westinghouse is a Pennsylvania corporation with its principal office located at the Westinghouse Building, Six Gateway Center, Pittsburgh, Pennsylvania 15222.

C. Westinghouse is a "person" as defined in Section 1 of the CSL, 35 P.S. §691.1; Section 3 of the SWMA, 35 P.S. §6018.103; and Section 3 of the PSDWA, 35 P.S. §721.3.

D. Westinghouse has owned and operated a facility for the manufacture of, inter alia, electrical industrial controls in Vanport Township, Beaver County, with a mailing address of One Tuscarawas Road, Beaver, Pennsylvania 15009 ("Facility"). Westinghouse has owned and operated the Facility since the late 1940's.

E. Westinghouse has used trichloroethylene ("TCE") at the Facility for, inter alia, degreasing of metal parts and components. There is groundwater contamination from TCE under, about and nearby the Facility.

F. The Vanport Township Municipal Authority ("VIMA") operates public water supply pumping wells ("pumping wells") in Vanport Township approximately 2500 feet from the Facility property line. The VIMA pumping wells are approximately 300 feet from the Ohio River. The VIMA operates a community water system as

defined in Section 3 of the PSDWA, 35 P.S. §721.3. Approximately 10,000 persons are supplied with water by VIMA.

G. The VIMA pumping wells are contaminated with TCE. In April, 1988, the Department informed the customers of VIMA that certain precautions, including boiling the water before drinking it and taking showers in ventilated areas, would be advisable. The amount of TCE in the VIMA public water supply system is in excess of the maximum contaminant levels, as defined in Section 3 of the PSDWA, 35 P.S. §721.3, and as specified under the regulations adopted pursuant to the PSDWA, 25 Pa. Code §109.202.

H. Since May 1, 1989, Westinghouse has made drinking water available to the customers of the VIMA. The manner in which Westinghouse has been providing drinking water is approved by the Department.

I. TCE is a synthetic chemical with no natural sources.

J. Exposure to TCE in sufficient quantities may result in harmful effects to human and animal health and to the environment.

\* \* \* \* \*

K. An aquifer under the Facility is the same aquifer as that used by the VIMA pumping wells. The pumping wells are hydraulically downgradient from the Facility. Groundwater flow from the Facility is generally to the southwest in the direction of the location of the VIMA pumping wells and the Ohio River.

L. At no time did Westinghouse request or receive a permit authorizing the discharge of TCE into the groundwater under or nearby the Facility. Westinghouse did have permits to discharge various industrial wastes into the surface water of Two Mile Run and the Ohio River. Under Sections 301 and 307 of

the CSL, 35 P.S. §§691.301 and 691.307, Westinghouse was prohibited from discharging industrial wastes, including TCE, into the waters of the Commonwealth, including the groundwater, without a permit.

M. The discharge of TCE into the groundwater without authorization by a permit and resulting in pollution constitutes a public nuisance and unlawful conduct as defined in Sections 3, 307(c), 401 and 611 of the CSL, 35 P.S. §§691.3, 691.307(c), 691.401 and 691.611.

N. At no time did Westinghouse request or receive a permit authorizing the disposal of TCE at the Facility pursuant to the Solid Waste Management Act, the Act of July 31, 1968, P.L. 788, as amended, 35 P.S. §6001 et seq. (repealed), or its successor, the SWMA.

O. Any TCE that has been leaked, spilled and/or discharged onto the ground at, and into the groundwater under, the Facility, would constitute disposal of solid wastes and disposal into a disposal facility.

P. The presence of TCE in the groundwater under and about Westinghouse's Facility constitutes pollution of the groundwater and a public nuisance.

Q. Any unauthorized disposal of TCE onto the ground at, and into the groundwater under, the Facility, would be contrary to Sections 301, 401 and/or 501 of the SWMA, 35 P.S. §§6018.301, 6018.401 and 6018.501. -

R. Any disposal of TCE onto the ground at, and into the groundwater under, the Facility, would constitute a public nuisance and unlawful conduct pursuant to Sections 601 and 610 of the SWMA, 35 P.S. §§6018.601 and 6018.610.

S. Any discharge of TCE into the groundwater under the Facility and resulting contamination of the VIMA public water system would constitute a

public nuisance under, and a violation of, Sections 12 and 13 of the PSDWA, 35 P.S. §§721.12 and 721.13.

T. Although there has been no adjudication or trial on any issue or fact set forth above, the parties wish to resolve this matter expeditiously and without resort to litigation. Toward that end, by letter dated April 24, 1989, Westinghouse committed to various actions, some of which are encompassed by this Consent Order and Agreement.

#### CONSENT ORDER AND AGREEMENT

After full and complete negotiation of all matters set forth in this Consent Order and Agreement and upon mutual exchange of the covenants contained herein, the parties intending to be legally bound, it is hereby ORDERED by the Department and AGREED to by Westinghouse as follows:

1. This Consent Order and Agreement is an Order of the Department authorized and issued pursuant to Sections 5, 316, 402, 501 and 610 of the CSL, 35 P.S. §§691.5, 691.316, 691.402, 691.501 and 691.610; Sections 104 and 602 of the SWMA, 35 P.S. §§6018.104 and 6018.602; Section 5 of the PSDWA, 35 P.S. §721.5; and Section 1917-A of the Administrative Code, 71 P.S. §510-17.

#### TCE Air Stripping Tower System

2. By December 24, 1989, Westinghouse shall have constructed and installed an Air Stripping Tower System ("Tower") for the water drawn by the VIMA pumping wells. The Tower shall be designed, constructed and installed only in a manner that has been approved by permit(s) that has (have) been issued by the Department. The Department agrees to use its best efforts to expedite the per-

mit or modification applications that are submitted. Westinghouse shall design the Tower to reduce the concentration of TCE in the effluent from the Tower not to exceed 2.6 ug/l.

3. The Tower is to be operated by the VIMA. Westinghouse shall pay the VIMA for its costs directly incurred in the operation and maintenance of the Tower. Such payments shall be made monthly or as otherwise agreed to with the VIMA and shall continue until the Department determines that, for fifteen (15) consecutive sampling periods (as described in paragraph 4), the groundwater drawn by the VIMA pumping wells, measured at the influent to the Tower, contains concentrations of TCE of less than 5.0 ug/l. Such payments shall be reinstated if the Department determines that the TCE in the influent is 5.0 ug/l or greater and the Department determines that the Tower must be restarted on the basis of a groundwater study.

#### Sampling and Analysis

4. Beginning July 1, 1989, Westinghouse shall collect representative samples from the VIMA water supply and analyze the samples for the contaminants set forth in 40 C.F.R. §141.61. After the Tower is constructed, this sampling shall be done at the influent to the Tower. For the first year of sampling under this Consent Order and Agreement, the sampling shall be done on every sixth day, not including Saturdays, Sundays and holidays. For the second year and all subsequent years that the Tower is operated under this Consent Order and Agreement, the sampling shall be on every fifteenth (15th) day, not including Saturdays, Sundays and holidays. Sampling is not required on Saturdays, Sundays or holidays. The sampling and analysis shall be performed by using the collec-

tion techniques and analysis methods specified in EPA Method 502.1, 502.2, 524.1 or 524.2 [referenced in 40 C.F.R. §141.24(g)(10)]. Beginning on the first sampling date after the Tower has been determined to be operable by the Department, Westinghouse shall collect and analyze concurrent representative samples of the influent to and the effluent from the Tower. All analyses required by this paragraph shall be performed by laboratories certified pursuant to 25 Pa. Code §109.801 or approved by the Department in writing. The sampling and analysis shall continue until the Department determines that, for fifteen (15) consecutive sampling periods, the groundwater drawn by the VIMA pumping wells, measured at the influent to the Tower, contains concentrations of TCE of less than 5.0 ug/l. Such sampling and analysis shall be reinstated if the Department determines that the TCE in the influent is 5.0 ug/l or greater and the Department determines that the sampling and analysis are needed on the basis of a groundwater study.

#### Interim Supply of Drinking Water

5. Beginning May 1, 1989, and continuing until the Tower has begun operating, Westinghouse will make drinking water available to the customers of the VIMA. The drinking water shall be purchased from an approved source pursuant to 25 Pa. Code §§109.501-109.503 and shall comply with the MCLs. The drinking water shall be made available by Westinghouse only in a manner that has been approved by the Department.

#### Reporting

6. Beginning in July, 1989, and continuing until December, 1990, Westinghouse shall submit monthly progress reports to the Department by the fif-

teenth day of each month describing the work accomplished during the prior calendar month. These progress reports shall include, at a minimum: (1) a description of the actions that have been taken toward achieving compliance with this Consent Order and Agreement; (2) the sampling and analytical data required by paragraph 4 of this Consent Order and Agreement; (3) all final reports containing results of all sampling, tests, analytical data and the interpretation of the data and all other information received by Westinghouse on the construction and installation of the Tower in the performance of the work under this Consent Order and Agreement; (4) a description of all data anticipated and activities scheduled for the next month in the performance of the work under this Consent Order and Agreement; and (5) a description of any problems encountered or delays in the performance of the work under this Consent Order and Agreement.

#### Record Preservation

7. Westinghouse agrees that it shall preserve, despite any document retention policy to the contrary, during the pendency of this Consent Order and Agreement and for a minimum of six (6) years after its termination, all records and documents in its possession which relate in any way to the existence, purchase, use, treatment, storage and/or disposal of TCE at the Facility or elsewhere in Beaver County. Westinghouse will use its best efforts to obtain copies of all documents, that relate in any way to the work being undertaken pursuant to this Consent Order and Agreement, that are in the possession of its employees, agents, accountants, contractors or non-privileged documents in the possession of its attorneys. After this six-year period, Westinghouse shall



notify the Department at least thirty (30) days prior to the destruction of any such documents. At any time, upon request by the Department, Westinghouse shall make available to the Department such records or copies of any such records. Additionally, if the Department requests that some or all of the documents be preserved for a longer period of time, Westinghouse shall give the documents to the Department for their preservation. The Department agrees to preserve all records and documents which relate to implementation of this Consent Order and Agreement for five years after its termination.

#### Material Violations

8. Failure to comply with Paragraphs 2 through 6 of this Consent Order and Agreement in the manner and within the time specified shall be a material violation. With respect to all provisions other than paragraphs 2 through 6, the Department shall give written notification of an alleged violation and the violation must continue for seven days before it shall be considered material. The Department may pursue all available remedies and penalties for material violations.

9. It is understood by the parties hereto that payment of any money hereunder shall neither constitute a waiver of Westinghouse's duty to meet its obligations under this Consent Order and Agreement nor preclude the Department from commencing an action to compel Westinghouse's compliance with the terms and conditions of this Consent Order and Agreement.

#### Civil Penalties

10. If Westinghouse fails to comply with Paragraph 5 hereof at the time and in the manner set forth in this Consent Order and Agreement, Westinghouse shall

pay a stipulated civil penalty of \$4,000.00 (FOUR THOUSAND DOLLARS) for the first week or any portion thereof, \$6,000.00 (SIX THOUSAND DOLLARS) for the second week or any portion thereof and \$8,000.00 (EIGHT THOUSAND DOLLARS) per week or any portion thereof thereafter until Westinghouse complies with Paragraph 5.

11. If Westinghouse fails to comply with Paragraph 2 hereof within the time and in the manner set forth in this Consent Order and Agreement, Westinghouse shall pay a stipulated civil penalty of \$21,000.00 (TWENTY-ONE THOUSAND DOLLARS) per week or any portion thereof until Westinghouse complies with Paragraph 2.

12. If Westinghouse fails to comply with any other requirement of this Consent Order and Agreement, the Department shall provide written notice of such alleged violation and if it continues after seven days subsequent to Westinghouse's receipt of the Notice, Westinghouse shall pay a stipulated penalty of \$2,000.00 (TWO THOUSAND DOLLARS) per week or any portion thereof.

13. The Department shall have the authority, in its sole discretion, to reduce or forgive the civil penalties provided by this Consent Order and Agreement. Westinghouse shall pay the civil penalties within seven days after being requested to make payment by the Department. Such penalty payments shall be made by cashier's or certified check, payable to the Commonwealth of Pennsylvania and shall be sent to the Department project officer. If Westinghouse objects to grounds for the assessment of civil penalties, it shall appeal to the Environmental Hearing Board within thirty (30) days of such assessment, but such appeal shall not act as a stay or otherwise affect

Westinghouse's obligations under this Consent Order and Agreement, and provided, however, that Westinghouse is not entitled to challenge the stipulated penalty amounts as provided hereunder in any such appeal. In such an appeal, Westinghouse shall have the burden of proceeding and of proving that the grounds for DER's assessment were arbitrary and capricious, or otherwise contrary to law.

#### Force Majeure

14. Westinghouse shall be excused from (1) complying with any obligation under this Consent Order and Agreement, and (2) for the payment of any stipulated penalty, for the period of time up to or equal to the loss of time caused by any event beyond Westinghouse's control which causes delay in the achievement of any obligation under this Consent Order and Agreement (hereinafter "force majeure event"), provided, however, that Westinghouse shall have the burden of demonstrating to the Department and to any court that the delay was caused by circumstances beyond Westinghouse's control which could not be overcome by all reasonable diligence, and that it complied with the conditions below. If the Department determines Westinghouse has satisfied all the provisions below, the Department will grant an extension of time for the period of time up to or equal to the loss of time caused by the event.

15. A force majeure event may include a riot, civil disorder, act of God, weather so severe as to impede construction, work slowdown or stoppage, strike, or unavailability of materials or labor. A force majeure event may also include inability to obtain site access, approval of the VIMA for permit applications, Department review and approval of permit applications, but only if Westinghouse

provides notice required by paragraph 16 herein and otherwise complies with paragraph 14 herein. Force majeure shall not include increased costs, changed economic circumstances or nonattainment of the goals and standards set forth in this Consent Order and Agreement, except as specifically provided herein.

16. In order for Westinghouse to take advantage of these force majeure provisions, it shall certify to the Department under penalty of law pursuant to 18 Pa. C.S. §4904, any delay incurred due to an alleged force majeure event within two (2) days by telephone. Within seven (7) business days Westinghouse shall provide notification in writing of the date of discovery of the event causing the delay. Notification shall be made to the Department's project officer and shall include all relevant documentation in its possession or available to it, substantiating the cause of delay and all steps taken by Westinghouse to mitigate, limit or remedy the delay. The total of all extensions pursuant to this force majeure provision, individually or in conjunction with previous extensions, shall not exceed one hundred twenty (120) calendar days.

17. Westinghouse's failure to comply with the requirements of these force majeure provisions shall render these force majeure provisions null and void and of no effect as to the event which forms the basis for the request for the extension.

#### Compliance with Law; Permits and Approvals

18. Nothing in this Consent Order and Agreement authorizes any violation of any permit, law or regulation, and all actions required under this Consent Order and Agreement shall be undertaken in accordance with all applicable or relevant and appropriate local, state and federal requirements, including laws, regula-

tions, standards of performance, criteria and other substantive environmental protection requirements. The Department agrees to use its best efforts to issue necessary authorizations, approvals or permits required to implement this Consent Order and Agreement.

#### Reservation of Rights

19. The Department specifically reserves all rights to enforce this Consent Order and Agreement and to institute equitable, administrative, civil and criminal actions, including actions to recover civil and criminal penalties and fines and natural resource damages, for any past, present or future violation of any statute, regulation, permit or order or for any pollution or potential pollution to the air, land, or waters of the Commonwealth, including but not limited to actions based upon the facts described in this Consent Order and Agreement. These rights are cumulative and the exercise of one right does not preclude the exercise of any other, provided, however, that if the Department assesses and collects penalties pursuant to the provisions of Paragraphs 10, 11 and/or 12 of this Consent Order and Agreement, no other action taken by the Department will include a request for penalties or fines for the specific violation(s) of this Consent Order and Agreement for which a stipulated penalty has been assessed and paid.

#### Reimbursement of Costs and Expenses

20. Westinghouse shall reimburse the Department for its reasonable costs and expenses incurred regarding the investigation of the facts concerning Westinghouse's purchase, use, storage, disposal and treatment of TCE at the

Facility, in the VIMA pumping wells and in the groundwater in Vanport Township. By July 14, 1989, the Department will submit to Westinghouse an accounting of its costs and expenses incurred during the period from January 1, 1988 through April 24, 1989. The Department's submittal shall include the name and job title of the individual performing the task, the task performed, the time to perform the task and/or the bid received by the Department for the task which contains such information. The Department will be reimbursed for its overtime personnel costs (including overhead) and travel costs. The Department will also be reimbursed for all of its expenditures to third parties. By August 30, 1989, Westinghouse shall make payment to reimburse the Department for its costs and expenses. Payment shall be made by cashier's or certified check, payable to the Commonwealth of Pennsylvania; to the Solid Waste Abatement Fund and/or to the Hazardous Sites Cleanup Fund, the proportions to be designated by the Department. Nothing in this Consent Order and Agreement shall preclude the Department from seeking reimbursement for costs and expenses incurred after April 24, 1989.

21. By August 30, 1989, or as otherwise agreed between Westinghouse and VIMA, Westinghouse also shall reimburse the VIMA for its reasonable costs and expenses incurred regarding the contaminants in the VIMA pumping wells. VIMA's costs and expenses shall include, but not be necessarily limited to, costs for groundwater investigation, air stripper design, permitting, Pennvest application preparation, sampling, analysis and associated consulting and engineering fees. The costs shall be documented and relate directly to the presence of TCE in the

VIMA water supply wells and, also, a copy of all bills received by the VIMA supporting the costs must be included in the submittal of VIMA to Westinghouse.

#### Pilot Project

22. By June 30, 1989, or as otherwise agreed between the Department, Westinghouse and VIMA, Westinghouse shall install a mobile air stripping tower at the VIMA pumping wells. The mobile tower will be operated for a period of approximately two months. The mobile tower is approximately 25' high, has a water discharge rate of approximately 83 gallons per minute and a TCE effluent air emission at its stack of approximately 0.26 lbs. per day. The mobile tower will be used as a pilot project to, inter alia, evaluate the media fouling rate and the design of the Air Stripping Tower System. No permits will be required to be issued by the Department in connection with the installation, operation or discharge of the mobile tower.

#### Ownership Changes

23. No change in ownership or corporate or partnership status relating to the Facility or Westinghouse shall in any way alter Westinghouse's responsibilities under this Consent Order and Agreement.

24. Prior to the effective date of transfer by Westinghouse of any legal or equitable ownership, leasehold or other interest in the Facility or in any part of the Facility, Westinghouse shall served a true and correct copy of this Consent Order and Agreement on the prospective transferee and shall notify the Department, in writing, of such prospective transfer within thirty (30) days of the date of such service.

Successors and Assigns; Parties Bound

25. This Consent Order and Agreement shall apply to and be binding on Westinghouse, its agents, successors and assigns and upon any other person, contractor and consultant acting under or for Westinghouse.

Correspondence Between the Parties

26. All correspondence, including payments, with the Department concerning this Consent Order and Agreement shall be addressed to:

Charles A. Duritsa, Regional Director  
Department of Environmental Resources  
121 South Highland Avenue  
Pittsburgh, PA 15206-3988

27. All correspondence with Westinghouse concerning this Consent Order and Agreement shall be addressed to:

J. W. Fisch  
Manager, Environmental Remediation,  
Industrial Hygiene & Safety  
Westinghouse Electric Corporation  
Room 1557, Westinghouse Building  
Eleven Stanwix Street  
Pittsburgh, PA 15222

In addition, Westinghouse agrees that service of any notice or any legal process for any purpose under this Consent Order and Agreement, including its enforcement, may be made by mailing a copy by first class mail to its attorney or to the above address.

Prior Drafts

28. Prior drafts of this Consent Order and Agreement shall not be admissible or otherwise used for purposes of determining the meaning or intent of any provisions herein in any litigation or in any other proceeding. No terms



of this Consent Order and Agreement shall be construed for or against any signing party.

#### Severability

29. It is the intent of the parties hereto that the clauses of this Consent Order and Agreement are severable and should any part of this Consent Order and Agreement be declared by a court of law to be invalid or unenforceable, the other clauses shall remain in full force and effect.

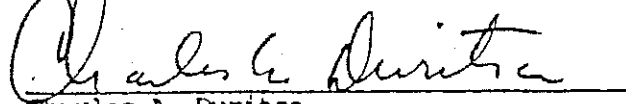
#### Entire Agreement

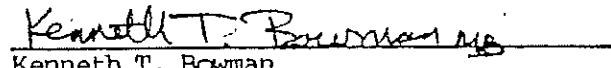
30. This Consent Order and Agreement shall constitute the entire integrated agreement of the parties. No prior or contemporaneous communications or prior drafts shall be relevant or admissible for purposes of determining the meaning or extent of any provisions herein in any litigation or any other proceeding.

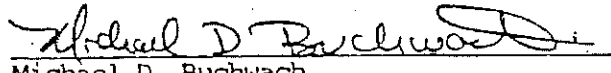
31. No changes, additions, modifications, or amendments of this Consent Order and Agreement shall be effective unless they are set out in writing and signed by the parties hereto.

32. No informal advice, guidance, suggestions or comments by any representative of the Department regarding reports, plans, specifications, schedules or other submissions by Westinghouse or the requirements of this Consent Order and Agreement will be construed as relieving Westinghouse of its obligations to obtain formal approval when required by this Consent Order and Agreement.

COMMONWEALTH OF PENNSYLVANIA,  
DEPARTMENT OF ENVIRONMENTAL RESOURCES

  
\_\_\_\_\_  
Charles A. Duritsa  
Regional Environmental Protection  
Director

  
\_\_\_\_\_  
Kenneth T. Bowman  
Assistant Counsel

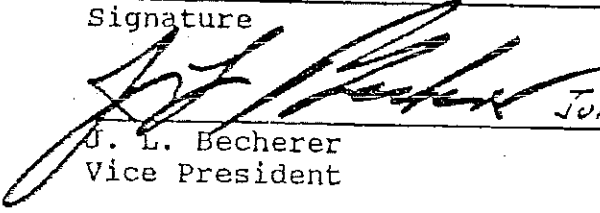
  
\_\_\_\_\_  
Michael D. Buchwach  
Assistant Counsel

Westinghouse hereby consents to the terms and entry of this Consent Order and Agreement and hereby, with advice of counsel, knowingly waives any right it may have to appeal from this Order and any determinations by the Department made pursuant to this Consent Order and Agreement, which rights may derive from Section 4 (c) of the Environmental Hearing Board Act, 35 P.S. §7514(c), and the Administrative Agency Law, 2 Pa. C.S. §103(a), and Chapters 5A and 7A. The undersigned hereby covenant and agree that they are authorized to consent to the Order and Agreement on behalf of Westinghouse. Nothing in this waiver shall be construed to imply that Westinghouse waives its right in Paragraph 13 to appeal from a civil penalty assessment.

WESTINGHOUSE ELECTRIC CORPORATION

Signature

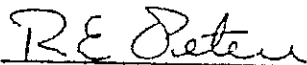
Date

  
J. L. Becherer  
Vice President

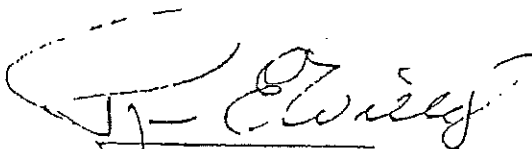
June 23, 1989

Signature

Date

  
R. E. Peters  
Assistant Secretary

June 23, 1989

  
Attorney for Westinghouse  
Roger E. Wills, Jr.

(Signature requirements: Two signatures, by a President or Vice-President, and by a Corporate Secretary or Treasurer; alternatively, a resolution of the board of directors authorizing the execution of this agreement by an officer of the company.)

/rlw

## Trichloroethylene (TCE)

- A. **Properties:** Trichloroethylene is a clear, colorless, volatile liquid which is heavier than water, slightly soluble in water and exhibits a chloroform-like odor.
- B. **Uses:** It is used primarily as a metal degreasing agent and is also used for dry cleaning, cleaning and unclogging septic tank systems, in food processing and as an anesthetic for certain short-term surgical procedures.
- C. **Sources of Exposure:** Occupational exposure and living near metal degreasing operations and chemical plants producing trichloroethylene represent the major sources of exposure. It has also been found in beverages such as colas and oils and fats such as margarine. Most of the trichloroethylene found in drinking water can be attributed to groundwater contamination from improper waste disposal activities.
- D. **Routes of Entry:**
1. Oral—readily absorbed following ingestion
  2. Inhalation—readily absorbed in the lungs
  3. Dermal—absorbed through the skin but not as readily as through other routes of exposure
- E. **Some Toxic Effects**
1. Acute Effects—central nervous system disturbances and heart, liver and kidney damage
  2. Chronic Effects—central nervous system depression and heart damage. It is listed as a carcinogen by EPA and NAS.
- F. **Human Health Criteria and Standard for Drinking Water:**

Lifetime Cancer Risks and Associated Contaminant Concentrations  
(micrograms per liter— $\mu\text{g/L}$ )

<u>Cancer Cases</u>	<u>Risks</u>		<u>Associated Contaminant Concentrations</u>	
		<u>People Exposed</u>	<u>EPA</u>	<u>NAS</u>
1	in	1,000,000	2.6	1.5
1	in	100,000	26	15
1	in	10,000	260	150

No EPA Health Advisory is available

MCL ( $\mu\text{g/L}$ )

5