UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

September 9, 1975

Mr. Donald Sargent
Program Manager
Versar, Inc.
6621 Electronic Drive,
Springfield, Virginia 22151

Subject: Contract No. 68-01-3259

Dear Mr. Sargent:

This is to assign delivery order II under the subject contract for the

"Assessment of wastewater management and treatment technology, and associated costs in practice or available, to determine toxic pollutant effluent concentrations and daily load achievable in the manufacture of PCB's and by selected users of PCB's. The abbreviation, PCB's means polychlorinated biphenyls."

The subtask under this delivery order are outlined in the attachment.

Reports: Deliver the draft interim reports on subtask 1 on or before October 1, 1975.

Deliver the interim reports on subtasks 2 and 3 on or before October 15, 1975. Deliver the EPA-approved final report on or before October 31, 1975.

The information gathered in delivery order II shall be incorporated and used in delivery order I.

Sincerely,

David Garrett, P.E., Chief,
Special Projects Branch

cc: Mr. W.M. Rugemer, Jr.
R&D Procurement Section

DSW 330378

STLCOPCB4077022

~~Supplemental~~ Delivery order II (1)

Sub Task 1 - Manufacturing of PCB's

a. Completely describe the manufacturing process including methods used in storing, handling, and shipping the finished product. Describe the chemical composition of the PCB's being manufactured. As available identify the businesses to which the PCB's are being sold.

b. Completely describe the wastewater management treatment and effluent disposal practices currently in use and planned including materials handling, process controls and "good housekeeping" measures designed to prevent or reduce the introduction of PCB's in process wastewater, cooling water discharges and stormwater runoff. Ascertain the rates of flow, PCB's concentrations, pH and oils and greases in each of these and any other waste streams such as sewage and laundry wastes based on monitoring and other information obtained from the manufacturer, Federal, State or local enforcement agencies or other sources. In addition, describe solid wastes, air pollution, groundwater pollution control practices particularly as they relate to PCB's. Include flow diagrams of processes indicating current and suggested points of monitoring as well as PCB's concentrations and rates of flow.

c. Assemble, examine and technically evaluate alternative wastewater management treatment and effluent disposal methods that could be implemented by the manufacturer to achieve or approach achieving effluent limitations identified by the project officer as necessary to meet the purpose of Section 307(a) including zero aqueous discharge to navigable waters and prohibition. These alternatives should include, if appropriate, but

not limited to: (1) manufacturing process, materials handling modification, and substitute products; (2) treatment and effluent disposal measures practiced by PCB's users or other industries that might be successfully transferable; and (3) treatment and effluent disposal measures practiced by foreign manufacturers of PCB's. Assess, evaluate and compare the alternatives examined in terms of their effectiveness and reliability in achieving specified concentrations and amounts of PCB's in their ultimate disposal of PCB's in aqueous navigable water discharges and the resulting introduction, if any, of PCB's into the air, soil or groundwater, their operation and maintenance characteristics, and their capacity for being installed and put into operation within one year after promulgation and within three years after promulgation of Section 307(a) effluent standards. Flow diagrams should be included where applicable to show process methods and/or systems involved.

d. Assess the costs of each of the alternative wastewater management, treatment and effluent disposal methods and systems in terms of capital costs and annual operating costs in tabular, graphic and narrative form as appropriate including terms such as total annual cost per 1000 gallons and increased cost per unit of production. A description of monitoring costs should be included.

All findings in the report shall be documented with references to published literature, information and data obtained from the manufacturer or other sources. Complete descriptions of cost assumptions and computations used shall be included.

One or more site visits should be made to the manufacturing facility to directly observe manufacturing, materials handling and wastewater management practices. Attempt should be made to obtain any and all information possessed by the manufacturer pertaining to the above subtasks.

Task 2 - All Types of Transformer and Capacitor Manufacturing Using PCB's

Prepare a report on the power and electronic transformer and capacitor manufacturing industry relative to its use of PCB's and PCB's wastewater management, treatment, and effluent disposal.

a. Completely describe the typical use of PCB's in the manufacture of power and electronic types of transformers and capacitors including a description of the formulations and amounts of PCB's used and the methods of handling PCB's and waste streams containing PCB's. Describe the ultimate use and disposition of manufactured transformers and capacitors in terms of expected period of use, frequency of replacement of the PCB's, the treatment and ultimate disposal of replaced PCB's and the typical disposal of discarded transformers and capacitors.

b. Describe in tabular and narrative form the transformer and capacitor manufacturing industry located in the U.S. in terms of ownership, name, location and size of plants, and their annual use of PCB's and as available, the disposal of wastewaters generated in each.

c. Completely describe the typical wastewater management, treatment, and effluent disposal measures used and potentially useful to reduce PCB's in wastewaters or prevent the loss of PCB's including process wastewater, stormwater, cooling waters or other wastewater generated in and discharged from the various types of facilities. Ascertain the rates of flow, PCB's concentrations, and pH and oil and greases in each of the streams. Identify the direct or indirect means by which PCB's are introduced into such effluents regardless of transport media.

d. Assemble, examine and technically evaluate the full array of alternative wastewater management, treatment and effluent disposal measures that could

be implemented by the manufacturer to achieve or approach achieving effluent limitations identified by the project officer as necessary to meet the purposes of Section 307(a) including zero aqueous discharge to navigable waters and prohibition. These alternatives should include, if appropriate, but not limited to: (1) "good housekeeping", treatment, PCB's loss prevention, and effluent disposal measures normally practiced within the industry; (2) wastewater management, treatment and effluent disposal measures practiced by other industries that might be transferable; (3) manufacturing process and/or materials handling and modification that might be used to eliminate or reduce the direct or indirect introduction of PCB's into wastewaters; and (4) use of alternative materials or less polluting types of PCB's to wholly or partially substitute the current use of PCB's.

e. Assess the costs of each of the alternative wastewater treatment management, and effluent disposal methods and systems in terms of capital costs and annual operating costs in tabular, graphic and narrative form as appropriate including terms such as total annual cost per 1000 gallons and increased cost per unit of production. A description of monitoring costs should be included.

All findings in the report should be documented with references to published literature, information and data obtained from the manufacturer or other sources or complete descriptions of computations used, as appropriate. One or more site visits should be made to each of at least two major manufacturers of electronic type transformers and capacitors.

PROCUREMENT REQUEST RATIONALE

1. Title of Project: Assessment of wastewater management and treatment technology, and associated costs in practice or available, to determine toxic pollutant effluent concentrations and daily load achievable in the manufacture of PCB's and by selected users of PCB's. The abbreviation, PCB's means polychlorinated biphenyls.

2. Estimated Period of Performance: Dependent upon scheduling of required hearing.

3. Project Officer: Ralph Holtje.

4. Background: - Proposed toxic pollutant effluent standards were published by EPA on December 27, 1973, pursuant to Section 307(a) of the Federal Water Pollution Control Act Amendments. Evidence presented at the required adjudicatory hearing which followed publication resulted in the conclusion that the standards were based on inadequate data, leaving the Agency with no choice but to reconsider the entire matter.

   One inadequacy of the proposed standards was the evident lack of treatment technology capable of achieving the required effluent concentrations within the time allowed.

5. Purpose: Additional information is required concerning specific wastewater management and treatment processes and associated costs in use in specific facilities, in the pilot-demonstration stage or which might be successfully transferable in order to assemble and assess alternatives and to identify the best treatment methods resulting in the highest quality effluents and then to establish enforceable toxic pollutant effluent standards for industrial dischargers.

   The information sought through issuance of the subject procurement is of high priority as it is basic to the formulation of toxic pollutant standards and any technological and/or environmental variance judgments that may be necessary.

6. Procurement Abstract: Implementation of Section 307(a) of the FWPCA requires EPA to promulgate effluent standards controlling the discharge of toxic pollutants.

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Data concerning wastewater management technology and associated costs are essential to the formulation of feasible, defensible, enforceable effluent standards.

7. Scope of Work:

Task 1 - Manufacturing of PCB's

a. Completely describe the manufacturing process including methods used in storing, handling, and shipping the finished product. Describe the chemical composition of the PCB's being manufactured. As available identify the businesses to which the PCB's are being sold.

b. Completely describe the wastewater management treatment and effluent disposal practices currently in use and planned including materials handling, process controls and "good housekeeping" measures designed to prevent or reduce the introduction of PCB's in process wastewater, cooling water discharges and stormwater runoff. Ascertain the rates of flow, PCB's concentrations, pH and oils and greases in each of these and any other waste streams such as sewage and laundry wastes based on monitoring and other information obtained from the manufacturer, Federal, State or local enforcement agencies or other sources. In addition, describe solid wastes, air pollution, groundwater pollution control practices particularly as they relate to PCB's. Include flow diagrams of processes indicating current and suggested points of monitoring as well as PCB's concentrations and rates of flow.

c. Assemble, examine and technically evaluate alternative wastewater management treatment and effluent disposal methods that could be implemented by the manufacturer to achieve or approach achieving effluent limitations identified by the project officer as necessary to meet the purpose of Section 307(a) including zero aqueous discharge to navigable waters and prohibition. These alternatives should include, if appropriate, but

not limited to: (1) manufacturing process, materials handling modification, and substitute products; (2) treatment and effluent disposal measures practiced by PCB's users or other industries that might be successfully transferable; and (3) treatment and effluent disposal measures practiced by foreign manufacturers of PCB's. Assess, evaluate and compare the alternatives examined in terms of their effectiveness and reliability in achieving specified concentrations and amounts of PCB's in their ultimate disposal of PCB's in aqueous navigable water discharges and the resulting introduction, if any, of PCB's into the air, soil or groundwater, their operation and maintenance characteristics, and their capacity for being installed and put into operation within one year after promulgation and within three years after promulgation of Section 307(a) effluent standards. Flow diagrams should be included where applicable to show process methods and/or systems involved.

d. Assess the costs of each of the alternative wastewater management, treatment and effluent disposal methods and systems in terms of capital costs and annual operating costs in tabular, graphic and narrative form as appropriate including terms such as total annual cost per 1000 gallons and increased cost per unit of production. A description of monitoring costs should be included.

All findings in the report shall be documented with references to published literature, information and data obtained from the manufacturer or other sources. Complete descriptions of cost assumptions and computations used shall be included.

One or more site visits should be made to the manufacturing facility to directly observe manufacturing, materials handling and wastewater management practices. Attempt should be made to obtain any and all information possessed by the manufacturer pertaining to the above subtasks.

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Task 2 - All Types of Transformer and Capacitor Manufacturing Using PCB's

Prepare a report on the power and electronic transformer and capacitor manufacturing industry relative to its use of PCB's and PCB's wastewater management, treatment, and effluent disposal.

a. Completely describe the typical use of PCB's in the manufacture of power and electronic types of transformers and capacitors including a description of the formulations and amounts of PCB's used and the methods of handling PCB's and waste streams containing PCB's. Describe the ultimate use and disposition of manufactured transformers and capacitors in terms of expected period of use, frequency of replacement of the PCB's, the treatment and ultimate disposal of replaced PCB's and the typical disposal of discarded transformers and capacitors.

b. Describe in tabular and narrative form the transformer and capacitor manufacturing industry located in the U.S. in terms of ownership, name, location and size of plants, and their annual use of PCB's and as available, the disposal of wastewaters generated in each.

c. Completely describe the typical wastewater management, treatment, and effluent disposal measures used and potentially useful to reduce PCB's in wastewaters or prevent the loss of PCB's including process wastewater, stormwater, cooling waters or other wastewater generated in and discharged from the various types of facilities. Ascertain the rates of flow, PCB's concentrations, and pH and oil and greases in each of the streams. Identify the direct or indirect means by which PCB's are introduced into such effluents regardless of transport media.

d. Assemble, examine and technically evaluate the full array of alternative wastewater management, treatment and effluent disposal measures that could

be implemented by the manufacturer to achieve or approach achieving effluent limitations identified by the project officer as necessary to meet the purposes of Section 307(a) including zero aqueous discharge to navigable waters and prohibition. These alternatives should include, if appropriate, but not limited to: (1) "good housekeeping", treatment, PCB's loss prevention, and effluent disposal measures normally practiced within the industry; (2) wastewater management, treatment and effluent disposal measures practiced by other industries that might be transferable; (3) manufacturing process and/or materials handling and modification that might be used to eliminate or reduce the direct or indirect introduction of PCB's into wastewaters; and (4) use of alternative materials or less polluting types of PCB's to wholly or partially substitute the current use of PCB's.

e. Assess the costs of each of the alternative wastewater treatment management, and effluent disposal methods and systems in terms of capital costs and annual operating costs in tabular, graphic and narrative form as appropriate including terms such as total annual cost per 1000 gallons and increased cost per unit of production. A description of monitoring costs should be included.

All findings in the report should be documented with references to published literature, information and data obtained from the manufacturer or other sources or complete descriptions of computations used, as appropriate. One or more site visits should be made to each of at least two major manufacturers of electronic type transformers and capacitors.

8. Proposed Budget: [redacted]

9. Reports: Deliver 10 copies of draft interim report on Task 1 on or before September 15, 1975. Deliver 100 copies of EPA-approved final report on or before September 30, 1975. OK. 1 - 2 wks

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Deliver 10 copies of draft interim report on Tasks 2 and 3 on or before September 30, 1975. Deliver 100 copies of EPA-approved final report on or before October 15, 1975. 2 wks →

10. Clearance Required: None

WH/Holt:ja:mm: Room 2624 DSM: 245-3036: 8/12/75

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PLANT WASTE ANALYSIS

1. COMPANY _____ DATE _____
2. PLANT LOCATION _____ PLANT AGE _____
3. AVERAGE ANNUAL THRU PUT _____ lbs (tons)
4. PRODUCT(S) - (name)

   (a) _____ _____ lbs/year
   (b) _____ _____ lbs/year
   (c) _____ _____ lbs/year
   (d) _____ _____ lbs/year

5. PROCESS SOLID WASTE

   _____ _____ lbs/year (dry basis)

6. PROCESS DESCRIPTION - including methods used in storing, handling, and shipping the finished product.

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7. Process Flow Diagram (block diagram) indicating water flow through the system including current and suggested points of monitoring as well as PCB concentration and rate of flow.

(Please include location of waste streams)

7 A. COMPOSITION OF EFFLUENT STREAMS BEFORE TREATMENT

Constituents Present	Stream No. 1	Stream No. 2	Stream No. 3
Process Source			
Quantity GPD			
Acidity			
Alkalinity			
Ammonia			
BOD			
Carbonate			
Chloride			
COD			
Color			
Fluoride			
Hardness			
Iron, ferrous			
Nitrate			
Nitrite			
Nitrogen-Kjeldahl			
Oil			
PCB			
pH			
Phosphates			
Settleable Solids			
Silica			
Specific Conductance			
Sulfate			
TOC			

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Constituents Present	Stream No. 1	Stream No. 2	Stream No. 3
Total Dissolved Solids			
Total Solids			
Total Suspended Solids			
Total Volatile Solids			
Turbidity			
Trace Metals			
Aluminum			
Arsenic			
Barium			
Boron			
Cadmium			
Chromium			
Copper			
Iron (total & dissolved)			
Lead			
Magnesium			
Manganese			
Mercury			
Molybdenum			
Nickel			
Potassium			
Selenium			
Sodium			
Strontium			
Zinc			

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8. SOURCE RAW MATERIAL

9. WATER INPUTS TO PLANT

Type	Quanty GPD	Comments
(a) River		
(b) Lake		
(c) Municipal		
(d) Well		
(e) Mine/Quarry		
(f) Other		

10. WATER USAGE

Type	Total Quantity—GPD	% Recycle
(a) Process		
(b) Cooling		
(c) Boiler		
(d) Sanitary		
(e) Dust Control		
(f) Hydraulic		
(g) Other		
(h) Comments		

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11. EFFLUENTS FROM PROCESS AND/OR PROPERTY *

Outfall No.	Source	GPD
1.		
2.		
3.		
4.		
5.		

* Includes drainage and runoff

12. COMPOSITION OF :

Constituents * Present	EFFLUENT STREAMS AFTER TREATMENT						INTAKE	
	Stream No. 1		Stream No. 2		Stream No. 3		Intake Water	
	Ave.	Range	Ave.	Range	Ave.	Range	Ave.	Range
Acidity								
Alkalinity								
Ammonia								
BOD								
Carbonate								
Chloride								
COD								
Color								
Fluoride								
Hardness								
Iron, ferrous								
Nitrate								
Nitrite								
Nitrogen-Kjeldahl								
Oil								
PCB								
pH								
Phosphates								
Settleable Solids								

* See attached list on next page for additional applicable constituents and tests. Use back of this sheet if more room is needed.

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12. COMPOSITION OF :	EFFLUENT STREAMS AFTER TREATMENT						INTAKE (cont.
Constituents Present	Stream No. 1		Stream No. 2		Stream No. 3		Intake Water
	Ave.	Range	Ave.	Range	Ave.	Range	Ave. Range
Silica							
Specific Conductance							
Sulfate							
TOC							
Total Dissolved Solids							
Total Solids							
Total Suspended Solids							
Total Volatile Solids							
Turbidity							
Trace Metals							
Aluminum							
Arsenic							
Barium							
Boron							
Cadmium							
Chromium							
Copper							
Iron (total & dissolved)							
Lead Magnesium							
Manganese							
Mercury							
Molybdenum							
Nickel							
Potassium							

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12. COMPOSITION OF : EFFLUENT STREAMS AFTER TREATMENT | INTAKE (cont.)

Constituents Present	Stream No. 1 Ave.	Stream No. 1 Range	Stream No. 2 Ave.	Stream No. 2 Range	Stream No. 3 Ave.	Stream No. 3 Range	Intake Water Ave.	Intake Water Range
Selenium								
Sodium								
Strontium								
Zinc								
Calcium								
Temp. (winter) F								
Temp. (summer) F								

13. PROCESS WASTE TREATMENTS

Waste Stream Origin

(a)
(b)
(c)
(d)

(e) Describe present treatment and disposal

14. PRESENT TREATMENT INFORMATION

Description of Method*	When Installed	Capital Costs	Operating Costs	Raw Wastes Streams Treated
(a)				
(b)				
(c)				

15. PERFORMANCE OF TREATMENT METHODS

Method	Qualitative Rating	Waste Reduction Accomplished*
(a)		
(b)		
(c)		

*Include equipment, facilities, etc., including sizes and quantitative description.
**% reduction in waste load as measured by such quantities as Total Suspended or Dissolved Solids, Chlorides, Sulfates, pH, BOD, PCBs, other Organics, etc.

16. COST EFFECTIVENESS INFORMATION

List technology and rough cost estimates for elimination of your remaining plant wastes. (Recycle or zero waterborne waste basis) Please include isolation, containment, chemical treatment, settling ponds, filtrations, centrifuging, reverse osmosis, demineralization, evaporation, solids handling and disposal or other pertinent treatments.

Additional Treatment	Stream Treated	% Waste Reduction	Estimated Capital Costs	Estimated Operating Costs
(a)				
(b)				
(c)				
(d)				

17. FUTURE TREATMENT PLANS

Method	Estimated Installation Time	Estimated Cost	Estimated Performance
(a)			
(b)			
(c)			

18. GENERAL

(a) Do you foresee any changes in your waste load in the next few years (raw material or process changes, product purity, etc.)?

(b) Can the present process be modified or changed to significantly reduce effluent waste loads?

(c) Do "Good Housekeeping" practices have a major bearing on your effluent compositions or are they compositions determined entirely by by-products of the process or quality of raw materials used?

(d) Does this plant have any unique waste situations as compared to other plants producing the same products (raw material supply, process, geographical location, other)?

(e) Are the treatment processes now used -----

(1) sensitive to surges?

(2) shutdown and startup?

(3) maintenance requirements?

(f) Will the installation of projected waste control facilities cause air, noise, thermal or other pollution effects?

(g) Are space or land requirements factors in future waste control projects? (Explain)