

## DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

### RCRA Corrective Action Environmental Indicator (EI) RCRAInfo Code (CA725) Current Human Exposures Under Control

Facility Name: Sybron Chemicals, Inc.  
Facility Address: **Box 66, Birmingham Road, Birmingham, NJ**  
Facility EPA ID#: NJD002339406

#### Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental indicators (EIs) are measures being used by the Resource Conservation and Recovery Act (RCRA) Corrective Action Program to go beyond programmatic activity measures (e.g., reports received and approved) to track changes in the quality of the environment. The two EIs developed to date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

#### Definition of “Current Human Exposures Under Control” EI

A positive “Current Human Exposures Under Control” EI determination (“YE” status code) indicates that there are no unacceptable human exposures to “contamination” (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all contamination subject to RCRA corrective action at or from the identified facility [i.e., site-wide]).

#### Relationship of EI to Final Remedies

While final remedies remain the long-term objectives of the RCRA Corrective Action Program, the EIs are near-term objectives, which are currently being used as program measures for the Government Performance and Results Act of 1993 (GPRA). The “Current Human Exposures Under Control” EI is for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and does not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action Program’s overall mission to protect human health and the environment requires that final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

#### Duration / Applicability of EI Determinations

EI determination status codes should remain in the Resource Conservation and Recovery Act Information (RCRAInfo) national database system ONLY as long as they remain true (i.e., RCRAInfo status codes must be changed when the regulatory authorities become aware of contrary information).

#### Facility Information

The Sybron Chemicals, Inc., (Sybron) facility is located in Pemberton Township in Burlington County, New Jersey. The production facility, two former settling basins, and a former disposal area (referred to as Neck Field) are located on the south bank of the North Branch of Rancocas Creek (NBRC). Sybron also owns approximately 410 acres on the north side of the NBRC. Part of this area is occupied by the facility's wastewater treatment facility, a former open-pit mine, and executive offices. The remainder of this area is either wooded or farmed (Ref. 1). Surrounding land use is generally agricultural and residential in a semi-rural setting. The Pemberton Township wastewater treatment facility is located on the NBRC, approximately one-quarter mile upstream (east) of the site (Ref. 1).

Sybron, formerly called the Ionac Chemical Company, manufactures resins at the facility. Operations began in the early 1900's, at which time the facility processed locally-mined glauconite. The processed glauconite, a natural resin, was marketed to the water treatment industry. The plant eventually converted to the production of synthetic resins in the 1940's (Ref. 1). Currently, only synthetic-based resins are manufactured.

In early 1986, Forstmann-Little, Inc., purchased a controlling interest of Sybron Corporation Stock, which triggered the requirements of New Jersey's Environmental Cleanup Responsibility Act (ECRA) for the Sybron facility. Subsequently, Sybron was involved in a leveraged buyout by management, which triggered ECRA again. The ECRA requirements are governed by two administrative orders on consent dated May 13, 1986, and June 23, 1987. On August 30, 2000, Sybron Chemicals merged with Bayer Corporation and the Project Toledo Acquisition Corporation (Ref. 3). Sybron is now a wholly-owned subsidiary of Bayer Corporation, and Bayer has assumed all environmental liability at the site. An Amended Remediation Agreement was signed on September 26, 2000 (Ref. 2). Remedial activities are currently ongoing at the site.

**References:**

1. Results of the Implementation of the Partial Cleanup and Phase II ECRA Soil Investigations at the Sybron Chemicals, Inc., Volume I of II. Prepared by Environ Corporation. Dated June 1991.
2. Telephone memorandum prepared by John McPeak, re: Sybron Stock Purchase and Remediation Agreement. Dated September 27, 2001.
3. Letter from John McPeak, Sybron, to Sheila Migliarino, NJDEP, re: Sybron Transition to Bayer Corporation. Dated October 19, 2001.

1. Has **all** available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from solid waste management units (SWMUs), regulated units (RUs), and areas of concern (AOCs)), been **considered** in this EI determination?

If yes - check here and continue with #2 below.

If no - re-evaluate existing data, or

If data are not available skip to #6 and enter IN (more information needed) status code

Thirty-five areas of concern (AOCs) were identified during the Phase I (1988, 1989), Phase II (1990), and Phase III (1994) investigations (Refs. 1, 2, 3, 5). As of August 1995, 28 AOCs had received no further action (NFA) approval from the New Jersey Department of Environmental Protection (NJDEP) (Refs. 6, 8, 10). In general, NFA approvals were received because Sybron: (1) provided evidence that no release had occurred; (2) conducted sampling, the results of which indicated soil contaminant levels below New Jersey Residential Direct Contact Soil Cleanup Criteria (NJ RDCSCC); or (3) conducted remediation and post-remediation sampling, the results of which indicated contaminant levels in soil were below the NJ RDCSCC. The remaining seven AOCs (AOCs, 2, 4, 23, 30, 31, 33, 34) are either awaiting NFA approval from NJDEP or additional sampling and/or remedial activities (Ref. 9). A description of these seven AOCs, along with their current status, based upon available documentation, is presented below. Location details for the remaining seven AOCs are not provided on one figure<sup>1</sup>; thus, the following is a list of figures depicting the seven remaining AOCs at the facility.

- AOCs 1, 2, 4, 23 and 33 - Plate 1 of the Presentation of ECRA Sampling Results for Sybron Chemicals (Ref. 1).
- AOC 30 - Plate 22 of the Results of the Implementation of the Partial Cleanup and Phase II ECRA Soil Investigations (Ref. 4).
- AOC 34 - Figure 4 of the Report on Additional Remedial Investigations and Addendum to Cleanup Plan (Ref. 5).
- AOC 31 - Not found in available file materials.

Note that AOC 21 (Two Abandoned Settling Basins) has received a conditional NFA approval from NJDEP; however, residual soil contamination (zinc) is present above NJ RDCSCC and New Jersey Non-Residential Direct Contact Soil Cleanup Criteria (NJ NRDCSCC). Residual contamination at AOC 21 has been covered with a soil cover and the area will be included in the planned deed notice. AOC 21 is discussed further in subsequent questions to address potential exposure concerns, but is not fully discussed here because it has received a conditional NFA approval from NJDEP. AOC 21 is also depicted on Figure 1 of the Presentation of ECRA Sampling Results for Sybron Chemicals (Ref. 1).

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<sup>1</sup>Note that Sybron recently agreed to prepare an updated site survey map that will detail the location of current/historical AOCs on one figure. (Ref. 21)

**AOC 2, Tank (T-1) and Containment Area:** AOC 2 is located in the southern portion of the production area and included an equalization tank (T-1) with a containment structure of large cedar beams resting on a concrete base (Ref. 14). Soil samples collected in the containment structure during Phase II investigations (1990) detected 1,2-dichloropropane (PDC), arsenic, zinc, and total petroleum hydrocarbons (TPHC) in excess of the informal ECRA guidelines<sup>2</sup>. The contaminated sediment was removed, at which time degraded areas of concrete within the containment structure were observed. In addition, PDC was detected in well MW25, located five feet downgradient (north) of the containment structure; thus, it was suspected that leakage from the tank and containment structure had impacted underlying groundwater (Ref. 2). The tank was cleaned, dismantled and demolished in August 1999 (Ref. 15). The most recent soil investigations conducted within AOC 2 (January/February 2002) indicated an area approximately 135 feet by 165 feet is impacted with PDC above the NJ RDCSCC, and an area 105 feet by 150 feet is impacted above the NJ NRDCSCC (See Plate 3, Ref. 18). During the February 2002 investigations, residual product was also found at two distinct intervals—a shallow zone and deep zone. The shallow zone was six inches to one foot thick, located between one to three feet below the water table, and extended beneath and just beyond the perimeter of the buildings east of the T-1 area. The deep zone was six inches to one foot thick, located between four and eight feet below the water table. No evidence of dense non-aqueous phase liquid (DNAPL) was noted at the base of the shallow aquifer. Additional groundwater investigations were conducted in early 2004 (January/February). Results indicated that there is an additional potential PDC source area located on the west side of the storm water bypass line. PDC concentrations were detected up to 1,300 mg/L in grab groundwater samples in the area, with decreasing detections west of the settling basins (see Figure 6, March 2004 Remedial Investigation Data Summary Package [April 2004 - February 2004 Activities]) (Ref. 22). Eight additional monitoring wells (MW-35 through MW-42) were installed in this area as part of the recent remedial investigation to better define flow direction beneath AOC 2 and further characterize groundwater conditions downgradient of AOC 2. Sybron plans to develop a remedial investigation work plan to further assess the T-1/Pilot Plant Lagoon Sources (which includes AOCs 2, 4, 30 and 34) by late 2004 (Ref. 22). Sybron also plans to develop a site-wide deed notice that will include all residual soil contamination at the site above NJ RDCSCC. The deed notice will be completed upon completion of any necessary soil remediation activities at the site (Ref. 21).

**AOC 4, Aboveground Tank Containments:** AOC 4 consists of three areas located to the south, west, and southwest of AOC 2 in the southern portion of the plant area. This area contained two tanks: a Trimethylamine (TMA) Tank and a No. 2 Fuel Oil Tank. In the TMA Tank area, a small layer of resinous material was found adjacent to the aboveground storage tank in the tank containment area. During Phase II investigations all impacted soil within the containment structure and underlying the aboveground tank was excavated and disposed of off site. Based upon historic delineation sampling, all soil above the NJ RDCSCC was removed and no additional post-excavation sampling was required. On June 11, 1996, NJDEP approved a NFA recommendation for the TMA Tank area (Ref. 11). During the Phase II investigations in

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<sup>2</sup>During the Phase I and II investigations, NJDEP ECRA cleanup guidelines were used to evaluate soil contamination at the site. Upon promulgation of the NJ Soil Cleanup Criteria (Cleanup Standards for Contaminated Sites, N.J.A.C. 7:26D, February 3, 1992), all contaminant levels at the site were compared to NJ RDCSCC and NJ NRDCSCC, and all future investigation and actions were based upon these criteria.

the No. 2 Fuel Oil Tank area, an area of TPHC soil contamination was found at levels up to 25,000 mg/kg (the NJDEP-approved TPHC cleanup criterion is 10,000 mg/kg). In-situ bioremediation was proposed to address the TPHC contamination as physical constraints in the area restrict full delineation of the TPHC contamination. NJDEP approved of this proposal and indicated that post-remediation samples could be used to verify the lateral extent of TPHC contamination (Ref. 11). According to a NJDEP letter dated May 5, 1998, Sybron completed the in-situ bioremediation program. Sybron recently reviewed the results of the in-situ bioremediation program and other remedial investigations in this area (AOC 2 and 34) and has determined additional action is necessary in this area (Refs. 21, 22). Sybron plans to develop a remedial investigation work plan to further assess the T-1/Pilot Plant Lagoon Sources (which include AOCs 2, 4, 30 and 34) by late 2004 (Ref. 22).

**AOC 23, Neck Field:** AOC 23 is located south of the NBRC and north of AOC 21.

During the Phase I and II investigations, benzene, trichloroethylene (TCE), and chlorobenzene exceeded the NJ Impact to Ground Water Soil Cleanup Criteria (IGWSCC) and PDC exceeded IGWSCC (1.0 mg/kg) calculated by Sybron using NJDEP methodology. In 1994 and 1995, excavation and removal of buried materials were completed in the northwest portion of this AOC to depths of one to three feet below the water table. Crushed drums, scrap metal, plastic, broken glass bottles, empty fiber drums and off-specification ion-exchange resins were removed (Ref. 16). The excavation also removed free product encountered near soil sample PE05 and remaining residual product in other areas. Post-excavation samples at PE02 showed that residual antimony (max. of 23 mg/kg) and beryllium (max. of 5.10 mg/kg) concentrations exceeded the NJ RDCSCC (antimony = 14 mg/kg, beryllium = 2 mg/kg) and the NJ NRDCSCC (beryllium only, 2.0 mg/kg) in the area of soil sample PE02. NJDEP approved an NFA for this area, with the exception of the PE02 sample area where metal exceedances were reported. It was agreed that a deed notice would be implemented for the residual metals contamination (Refs. 12, 13). Sybron plans to develop a site-wide deed notice that will include all residual soil contamination at the site above NJ RDCSCC. The deed notice will be completed upon completion of any necessary soil remediation activities at the site (Ref. 21).

In March 2001, two monitoring wells (MW33 and MW34) were installed to assess whether remaining source material and/or residual free product were present in the Neck Field area and whether well MW23 was best suited to monitor contaminant concentrations. Wells MW23, MW33, and MW34 were sampled as part of the investigation. Sampling results indicated volatile organic compounds (VOCs) including benzene, PDC, 1,1,2,2-tetrachloroethene (PCE), and TCE in well MW33 above New Jersey Groundwater Quality Criteria (NJ GWQC). Concentrations of benzene and chlorobenzene were detected above NJ GWQC in well MW23. These concentrations exceeded well MW33 results, but no evidence of light non-aqueous phase liquid (LNAPL) or DNAPL was reported (Ref. 17). Subsequently, these wells were sampled in October 2001, December 2001, and January 2002. Based on a review of the resultant data, NJDEP concluded that the benzene and chlorobenzene concentrations detected in MW33 indicate that significant source material may remain at AOC 23 and required Sybron conduct further investigation and source delineation. During remedial investigation (RI) activities in 2003/early 2004, additional soil borings and temporary wells were advanced to further assess impacts in this area. VOC contamination was again reported in groundwater above NJ GWQC. Based upon the results of this investigation, Sybron has concluded that the groundwater VOC plume and

potential source area have been delineated in this location. Sybron believes that a limited source area is present, given the saturated soil analytical results and field observations of staining and residual product. Sybron plans to develop a remedial action work plan to initiate source remediation in this area by Fall 2004 (Ref. 22).

**AOC 30, Former Pilot Plant Lagoon and Section of Storm Sewer:** AOC 30 consists of the area of the former pilot plant lagoon and the section of storm sewer line between the pilot plant lagoon and the NBRC. Soil sample results collected in this area during various investigations from the Phase II through May 1996 indicate that silver and several polynuclear aromatic hydrocarbons (PAHs) exceed the NJ RDCSCC, NJ NRDCSCC, and/or NJ IGWSCC. Chlorobenzene has also been reported above NJ IGWSCC, and PDC has been reported above the IGWSCC (1.0 mg/kg) calculated by Sybron in pilot plant soil. Subsequently in November 1996, VOC-contaminated soil was excavated to depths below the water table and treated via ex-situ bioremediation. In April 1997, soil from a small area at the eastern end of the excavation was excavated below the water table and treated via ex-situ bioremediation. The ex-situ bioremediation was not entirely successful. The excavated material was staged on site, until it was sent for off-site disposal in late 2003 (Ref. 21). In addition, Sybron reported removal of VOC contaminated soil above the IGWSCC (Ref. 12), but residual levels of silver and PAH contamination remain. Sybron has installed an asphalt cap over impacted pilot plant lagoon soil. Sybron plans to develop a site-wide deed notice that will include all residual soil contamination at the site above NJ RDCSCC. The deed notice will be completed upon completion of any necessary soil remediation activities at the site (Ref. 21).

Sybron was required to monitor groundwater in this AOC to confirm the lack of residual source material and to justify a monitored natural attenuation (MNA) approach for remedial action. Sybron collected samples from MW6 and MW17, located downgradient of this AOC, to document a decreasing trend in contaminant concentrations. However, based on a review 2001 analytical results, NJDEP has concluded that MNA is not an appropriate remedial action (Ref. 19). NJDEP argued that the MNA approach is not appropriate because: (1) PDC concentrations in MW17 exceed one percent of its effective solubility and suggest the existence of product, and (2) it is likely that groundwater seepage from AOC 30 is partially responsible for elevated PDC concentrations detected in the NBRC at sampling location STR5 (Ref. 19). In September 2003, Sybron collected soil borings and grab groundwater samples in this area to further define the PDC contamination. Based upon the results, Sybron plans to develop a remedial investigation work plan to further assess the T-1/Pilot Plant Lagoon Sources (which include AOCs 2, 4, 30 and 34) by late 2004 (Ref. 22).

**AOC 31, Underground Process Wastewater Lines:** (Note that available documentation does not provide a figure depicting the specific location of this AOC). In 1991, as part of Phase III investigations, a video inspection of the underground process wastewater lines revealed some pipeline deterioration and cracking between Manhole 13 and Manhole 12, and that solids buildup was generally greater in this section (Ref. 5). In July 1995, Sybron cleaned the lines and reportedly repaired one section of the line (Ref. 17). Sybron concluded that soil sampling along the line was not necessary given that the sewer line was generally located at or below the water table, thus impacts would generally be to groundwater and not soil, and should be detected in downgradient well MW24. NJDEP conditionally approved the NFA for soil; however, as part of

the conditional approval, NJDEP requested that Sybron sample well MW24 (Ref. 11), which is located downgradient of the wastewater lines. NJDEP also requested that Sybron add well MW24 to the groundwater monitoring program to ensure that any potential contamination associated with this AOC would be monitored. The most recent, available groundwater sampling results (January 2002) detected PDC in well MW24 at 2.3 µg/L, slightly above the NJ GWQC of 1.0 µg/L (Ref. 18). No further actions are currently planned at this AOC, and this area will likely be incorporated with the site-wide groundwater remediation effort.

**AOC 33, North Branch of Rancocas Creek:** The NBRC meanders across the Sybron facility and bisects the eastern part of the facility. During the Phase I and II investigations, a total of 34 surface water samples were collected from the NBRC. Low levels of cadmium were detected, but not at concentrations above relevant standards (Ref. 5). Cadmium was not detected in any of the Phase III surface water samples. At the request of NJDEP, additional surface water samples were collected in 1995 to confirm that constituents were below the New Jersey Surface Water Quality Criteria (NJ SWQC). Lead was the only constituent that exceeded NJ SWQC. Its occurrence was attributed to elevated background concentrations (Ref. 9).

A total of 17 sediment samples were collected as part of the Phase I and II investigations. A few samples contained contaminants (including PDC, EDC, chromium, beryllium, and silver) above informal ECRA guidelines for soil. Methanol was also detected in one sample location at 145 mg/kg (no ECRA guideline was presented). However, Sybron argued that detected concentrations were relatively low and were not shown to impact surface water quality, thus no further actions were recommended for sediment at the time. In 1994, per NJDEP's request, additional sediment samples were collected for methanol. Sample results were non-detect (Ref. 6). Per a February 21, 1995, NJDEP letter, a stream sampling program was required for NBRC; however, no additional sediment sampling was required (Ref. 7). Based upon available documentation, it appears that NJDEP has not required additional sediment sampling since the 1994 samples for methanol.

Sybron is currently sampling surface water in the NBRC on a semi-annual frequency, with the most recent sampling events having been conducted in October 2003 and February 2004 (Ref. 22). The highest levels of PDC (4.3 µg/L in October 2003 and 26 µg/L in February 2004) were detected in sample location STR-5, which is located immediately downstream of the storm water bypass line outfall. These concentrations exceed the recommended SWQC (1.0 µg/L) recently provided by NJDEP<sup>3</sup> (Ref. 19). PDC concentrations downstream of STR-5 ranged from non-detect to 1.2 µg/L (October 2003 data). Only one upstream sample location (STR-8) detected PDC in October 2003 (1.4 µg/L) and February 2004 (2.2 µg/L) sampling events.

Sybron indicates that increases in total dissolved solids (TDS) along the NBRC adjacent to the site are due to the permitted wastewater treatment discharge, and possibly to groundwater

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<sup>3</sup> No NJ SWQC is available for PDC. Thus, NJDEP asked Sybron to calculate a health-based SWQC for PDC for NJDEP review. Sybron proposed a SWQC of 4.8 µg/L; however, NJDEP did not approve this criterion. NJDEP selected a criterion of 0.5 µg/L, based on exposure factors used by NJDEP in developing human health-based water quality criteria and the bio-concentration factor and cancer slope factor provided by EPA. NJDEP indicated that the higher of the 0.5 µg/L criterion and the practical quantitation limit for PDC (1.0 µg/L) can be used. Thus, the site-specific SWQC for PDC is 1.0 µg/L (Ref. 19).

discharge. TDS increased from 99 mg/L at an upstream location (STR1A) to 216 mg/L at the outfall (STR5), then continues to be detected at elevated levels to the furthest downstream location (STR26) at 232 mg/L, based upon October 2003 sample results. The highest TDS detection was 248 mg/L at STR24, located approximately 500 feet upstream of STR5 and north of AOC 23 (Ref. 22). Sybron proposed to drop TDS for the long-term surface water monitoring program; however, NJDEP deemed this unacceptable. NJDEP has requested that Sybron determine whether TDS concentrations are having an adverse impact on aquatic biota (Ref. 19). Sybron is currently evaluating the ecological impacts in the NBRC and plans to submit an Ecological Risk Assessment Report in the Fall of 2004 (Ref. 22).

**AOC 34, Low pH Discharge Area:** This AOC is located at the storm water outfall. Available documentation indicates that pH values of waters discharging from this outfall have consistently been below the New Jersey Pollution Discharge Elimination System (NJPDES) permit limit of 6.5. In 1993, a hydropunch investigation was conducted to determine if groundwater influx to the storm water bypass ditch was the source of the low pH. Groundwater sampling results obtained from this investigation indicate that local groundwater is the source of the low pH, but that the lateral extent of the plume is localized. The investigation indicated that all affected groundwater appears to discharge to the storm water bypass, which is subsequently treated in Sybron's wastewater treatment facility (Ref. 5). Subsequent sampling results obtained in February 1998 and on June 6 and July 6, 2001, indicated elevated concentrations of chloride and sulfate (Ref. 17) and that the area of low pH has not changed significantly since 1998. In a 2001 letter, Sybron proposed that the future monitoring and potential remedial actions for this area be incorporated into the program for the T-1 area (AOC 2) (Ref 17). During the late 2003 and early 2004 RI investigations, Sybron incorporated pH analysis into the sampling events that took place in AOC 2, AOC 30, and AOC 34. Thus, this AOC will be incorporated in the remedial investigation work plan to further assess the T-1/Pilot Plant Lagoon Sources (which include AOCs 2, 4, 30 and 34) that Sybron plans to prepare by late 2004.

#### **References:**

1. Presentation of ECRA Sampling Results for Sybron Chemicals. Prepared by Environ Corporation. Dated April 1989.
2. Results of the Implementation of the Partial Cleanup and Phase II ECRA Soil Investigations at the Sybron Chemicals, Inc., Volume I of II. Prepared by Environ Corporation. Dated June 1991.
3. Letter from John Cherry, Geoflux, Ltd., to John Sandstedt, Sybron Chemicals, Inc. Dated June 11, 1991.
4. Underground Storage Tank Closure Report. Prepared by MARCOR of Pennsylvania, Inc. Dated January 27, 1994.
5. Report on Additional Remedial Investigations and Addendum to Cleanup Plan. Prepared by Environ Corporation. Dated May 1994.
6. Letter from Wayne Howitz, NJDEP, to John Sandstedt, Sybron, re: Remedial Investigation Workplan Approval and Report on Additional Remedial Investigations and Addendum to Cleanup Plan. Dated December 16, 1994.
7. Letter from Douglas Stuart, NJDEP, to John Sandstedt, Sybron, re: Report on Additional Remedial Investigation and Addendum to Cleanup Plan. Dated February 21, 1995.

8. Letter from Douglas Stuart, NJDEP, to John Sandstedt, Sybron, re: Review of Remedial Action Report, February 2, 1995. Dated May 4, 1995.
9. Restated and Supplemental Remedial Action Workplan. Prepared by Environ Corporation. Dated June 1995.
10. Letter from Stephen Maybury, NJDEP, to John Sandstedt, Sybron Chemicals, re: Administrative Consent Order (ACO) in the Matter of Sybron Chemicals, Inc., Pemberton Twp., Burlington County, Restated and Supplemental Remedial Action Workplan, Dated June 30, 1995, ISRA Case E86097. Dated August 7, 1995.
11. Letter from Stephen Maybury, NJDEP, to John Sandstedt, Sybron Chemicals, re: Administrative Consent Order (ACO) in the Matter of Sybron Chemicals, Inc., Pemberton Twp., Burlington County, Response to NJDEP's 8/7/95 and 11/15/95 Letters, Dated April 22, 1996, ISRA Case E86097. Dated June 11, 1996.
12. Letter from Bryan Moore, NJDEP, to John Sandstedt, Sybron Chemicals, re: Administrative Consent Order (ACO) in the Matter of Sybron Chemicals, Inc., Pemberton Twp., Burlington County, Response to NJDEP's 10/16/96 Letter Dated July 15, 1997 (Original Copy Received August 12, 1997; Two Required Copies and Analytical Data received October 10, 1997), ISRA Case E86097. Dated December 22, 1997.
13. Letter from Bryan Moore, NJDEP, to John Sandstedt, Sybron Chemicals, re: Administrative Consent Order (ACO) in the Matter of Sybron Chemicals, Inc., Pemberton Twp., Burlington County, Response to NJDEP's 12/22/97 Letter Dated March 16, 1998, ISRA Case E86097. Dated May 5, 1998.
14. Letter from Robert North, Environ, to Steve Myers, NJDEP, re: AOC 2 and Deed Notice. Dated November 19, 1999.
15. Letter from Bryan Moore, NJDEP, to John Sandstedt, Sybron, re: Response Letter Dated November 19, 1999. Dated December 16, 1999.
16. Letter from Bryan Moore, NJDEP, to John Sandstedt, Sybron Chemicals, re: Administrative Consent Order (ACO) in the Matter of Sybron Chemicals, Inc., Pemberton Twp., Burlington County, Response to NJDEP's August 15, 2000 Letter, Dated November 29, 2000, ISRA Case E86097. Dated April 4, 2001.
17. Letter from Robert North, Environ Corporation, to Stephen Myers, NJDEP, re: Sybron Chemicals, Inc., Pemberton Twp., Burlington County, ISRA Case E86097. Dated July 31, 2001.
18. Letter from Robert North, Environ Corporation, to Stephen Myers, NJDEP, re: Sybron Chemicals, Inc., Pemberton Twp., Burlington County, ISRA Case E86097. Dated April, 12, 2002.
19. Letter from NJDEP, Bryan Moore, to John McPeak, Sybron, re: Remediation Agreement Amendment in the Matter of the Pemberton Site Sybron Chemicals, Inc., Birmingham Road, Pemberton Twp., Burlington County. Documents including: Response to NJDEP's April 4, 2001 Letter Dated May 11, 2001; Document Summarizing Outstanding Issues, Dated July 31, 2001; Technical Basis for Water-Quality Based Effluent Limit for 1,2-Dichloropropane, resubmitted September 5, 2001; Results from October 2001 Sampling Event, Dated December 3, 2001; and Former T-1 Tank Area Report, Dated April 2, 2002. ISRA Case E86097. Dated November 26, 2002.
20. Letter from Robert North, Environ, to Stephen Myers, NJDEP, re: Response to NJDEP's November 26, 2002 Letter. Dated March 26, 2003.
21. Letter from Michael Kozar, O'Brien & Gere Engineers, Inc., to Stephen Myers, NJDEP, re: Response to Environmental Indicator (EI) Data Needs. Dated September 22, 2003.

22. Remedial Investigation Data Summary Package (April 2003 - February 2004 Activities).  
Prepared by O'Brien & Gere Engineers, Inc. Dated March 2004.

2. Are groundwater, soil, surface water, sediments, or air **media** known or reasonably suspected to be “**contaminated**”<sup>4</sup> above appropriately protective risk-based levels (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

Media	Yes	No	?	Rationale/Key Contaminants
Groundwater	X			VOCs
Air (Indoors) <sup>5</sup>		X		
Surface Soil (e.g., <2 ft)	X			PAHs
Surface Water	X			PDC
Sediment		X		
Subsurface Soil (e.g., >2 ft)	X			PDC, zinc, beryllium, PAHs
Air (Outdoor)		X		

\_\_\_\_\_ If no (for all media) - skip to #6, and enter YE, status code after providing or citing appropriate levels, and referencing sufficient supporting documentation demonstrating that these levels are not exceeded.

**X** If yes (for any media) - continue after identifying key contaminants in each contaminated medium, citing appropriate levels (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation.

\_\_\_\_\_ If unknown (for any media) - skip to #6 and enter IN status code.

**Rationale:**

**Groundwater:** Three aquifers are present at the site: a shallow unconfined aquifer and two confined aquifers (Ref. 1). The shallow aquifer consists of up to 12 feet of recent alluvial deposits and from 18 feet to 28 feet of the uppermost portion of the Hornerstown Sand, which is the unit formerly mined for glauconite supply to the Sybron facility. Depth to groundwater ranges from approximately 3 feet to 11 feet below ground surface (bgs). The Mount Laurel-Wenonah (MLW) aquifer underlies the shallow

<sup>4</sup> “Contamination” and “contaminated” describe media containing contaminants (in any form, nonaqueous phase liquid (NAPL) and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriately protective risk-based “levels” (for the media, that identify risks within the acceptable risk range).

<sup>5</sup> Recent evidence (from the Colorado Department of Public Health and Environment, and others) suggests that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air (in structures located above (and adjacent to) groundwater with volatile contaminants) does not present unacceptable risks.

aquifer and is comprised of grey, calcareous, medium to fine-grained sands interbedded with clay layers. The thickness of the MLW aquifer is approximately 83 feet. Depth to the top of the MLW aquifer varies from 47 feet to 70 feet bgs. A third aquifer, referred to as the Potomac-Raritan-Magothy (PRM) aquifer, occurs below the MLW aquifer. Although the depth to the top of the aquifer is not provided in file materials, it is known that on-site production wells that have been completed in this aquifer extended to depths ranging from 521 feet to 839 feet bgs (Ref. 8). The shallow aquifer and MLW aquifer are separated by a confining unit that is comprised of the base of the Hornerstown Sand and the underlying Navesink Formation (Ref. 1). This low permeability confining unit is continuous across the site and has a thickness of 40 feet to 60 feet.

Groundwater flow in a majority of the shallow aquifer south of the NBRC generally flows towards and discharges completely into the NBRC (Ref. 1). Flow direction in the Neck Field area (AOC 23) is radial towards the north, east, and west. Flow direction in the southern portion of the facility is generally towards the northeast, except for the area of wells MW5, MW25, and MW32 (in the vicinity of AOC 2 and 34) where flow is to the south and southeast towards well MW32 and the storm water ditch (Ref. 9). Refer to Figure 4 in the March 2004 Remedial Investigation Data Summary Package (April 2003 - February 2004 Activities) (Ref. 12) for a graphical depiction of groundwater flow. Although there is a southerly component of groundwater flow from impacted areas in the vicinity of AOCs 2 and 34, water quality results from a recently installed downgradient well (MW-38) indicate that groundwater impacts have not extended to off-site areas to the south.

Quarterly groundwater monitoring of the shallow aquifer began in 1988 under the former NJPDES permit. Following the termination of this permit, a site-wide groundwater monitoring program was implemented in October 2001. The program includes groundwater sampling and water level measurement of 10 on-site monitoring wells (MW06, MW08, MW17, MW19, MW20, MW23, MW24, MW25, MW32, MW33) completed in the shallow aquifer. During recent RI activities in 2003/early 2004, eight additional monitoring wells were installed (MW-35 through MW-42). Well locations are presented in Figure 2 of the March 2004 Remedial Investigation Data Summary Package (April 2003 - February 2003 Activities) (Ref. 12). The most recent quarterly sampling event occurred in January 2004. Table 1 identifies the maximum concentration of all constituents detected at the site above NJ GWQC in the January 2004 sampling event. Table 1 also identifies each well where contamination was detected above NJ GWQC.

**Table 1. Maximum Concentrations Detected in the Shallow Aquifer, January 2004 - µg/L**

Contaminant	Maximum Concentration	Well I.D.	NJ GWQC
<b>VOCs</b>			
1,2-DCA	3,000	MW-6, MW-7, MW-8, <i>MW-17</i> , MW-37, <b>MW-41</b>	2
PDC	240,000	MW-6, MW-7, MW-8, MW-15, MW-17, <i>MW-23</i> , <i>MW-24</i> , <i>MW-25</i> , <i>MW-32</i> , <i>MW-33</i> , <i>MW-35</i> , <i>MW-36</i> , <i>MW-37</i> , <i>MW-39</i> , <i>MW-40</i> , <b>MW-41</b>	1
Benzene	31	<i>MW-6</i> , <b>MW-17</b> , <i>MW-23</i> , <i>MW-33</i> , <i>MW-36</i> , <i>MW-37</i> , <i>MW-39</i>	1
Chlorobenzene	1,300	MW-6, MW-15, MW-17, <i>MW-23</i> , <i>MW-33</i> , <b>MW-41</b>	50*
Ethyl Benzene	10,000	<b>MW-32</b> , MW-40	700
Styrene	12,000	<b>MW-32</b> , MW-40	100
TCE	140	<i>MW-6</i> , <b>MW-17</b> , <i>MW-33</i>	1
<b>Inorganics</b>			
Aluminum (total)	13,500	<i>MW-32</i> , <i>MW-35</i> , <b>MW-36</b> , <i>MW-37</i> , <i>MW-38</i> , <i>MW-39</i> , <i>MW-40</i> , <i>MW-42</i>	200
Aluminum (dissolved)	6,820	<i>MW-32</i> , <b>MW-36</b> , <i>MW-37</i> , <i>MW-39</i> , <i>MW-40</i>	

Well locations in **bold** reported the maximum detected concentration.

Well locations in *italics* were reported as non-detects, but the detection limits were the NJ GWQC.

\* NJDEP Interim Specific groundwater criterion.

Sybron has historically argued that vertical downward migration of contaminated groundwater is prevented by the confining layer of low conductivity (often less than  $10^{-8}$  cm/s) that is continuous across the site, and by upward hydraulic gradients from the MLW aquifer across the confining layer to the shallow aquifer (Refs. 2,11). A majority of the historical sampling results that have been performed in this aquifer indicated that water quality in this aquifer has not been impacted by facility activities (Ref. 5). However, elevated concentrations of PDC have historically been detected in well MW25, and NJDEP has raised concern over the possibility of DNAPL based on the elevated occurrence of PDC in well MW25.

Sybron historically had several production wells on site that extracted water from the MLW aquifer. Historically, sporadic detections of PDC were reported. Production well PW01 is the only production well that remains at the site. The most recent sampling of this well occurred in March and May of 2001 as part of their Safe Drinking Water Act (SDWA). In March 2001, PDC was detected at a concentration of 0.9 µg/L, which is below the NJ GWQC for PDC of 1.0 µg/L. In May 2001, no detection of PDC was reported. Thus, based on the occurrence of upward vertical gradients, coupled with the existence of a thick (40 to 60 feet), continuous, low hydraulic conductivity confining layer across

the site, and recent water quality results in the MLW aquifer below NJ GWQC,, only the shallow aquifer is being considered currently impacted above relevant criteria. The MLW and PRM aquifers are not considered currently impacted and will not be evaluated further in this EI determination.

**Air (Indoors)**

To evaluate the potential for VOCs to migrate into indoor air at the Sybron site, recently detected VOC concentrations were compared to the State of Connecticut Proposed Revisions to the Groundwater Volatilization Criteria for the Industrial/Commercial Scenario (CT I/C GWVC) (March 2003). The proposed values were used because they have been revised to be more consistent with EPA’s 2002 Draft Guidance “Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soil.” Thus, these updated values are based on the most up-to-date Johnson-Ettinger Model, toxicity information, and exposure assumptions. Table 2 identifies the monitoring wells that are located within 100 feet of on-site buildings (either vertically or laterally) where contaminant concentrations were recently detected (January 2004) above the CT I/C GWVC (Ref. 12).

**Table 2. Contaminants Detected Above CT I/C GWVC - January 2004**

Contaminant	Well Locations	Maximum Concentration (µg/L)	CT I/C GWVC (µg/L)
1,2-DCA	MW-6	370	68
PDC	MW-6, MW-17, MW-25, MW-32, MW-35, MW-36, MW-37, MW-39, MW-40	15,000	58
TCE	MW-17	140	67

Although exceedances of the CT I/C GWVC are noted in the table above, potential indoor air exposure to workers at the Sybron site are not currently a concern. Sybron indicates that all buildings in the areas with elevated VOC impacts are used for industrial purposes, including resin manufacturing, warehousing and laboratory uses. Sybron conducts routine air monitoring required to ensure worker safety and acceptable indoor air quality, in accordance with Occupational Health and Safety Administration (OSHA) regulations. Recent indoor air monitoring results meet the OSHA standards for worker exposure for all three contaminants. Thus, indoor air is not considered a medium of concern in this EI determination (Ref. 11).

**Surface/Subsurface Soil**

Historical operations have impacted both surface and subsurface soil on site. No off-site impacts have been reported. Soil investigations at the site have evaluated contamination against both the NJ RDCSCC and NJ NRDCSCC. Based upon all investigations completed to date, there are several AOCs where residual levels of contaminants remain above NJ RDCSCC and NJ NRDCSCC. These are AOC 2, AOC 21, AOC 23 and AOC 30. Specific information on the residual contamination in these areas is

discussed below. The facility is currently an active industrial facility; thus, NJ NRDCSCC are relevant for direct exposure to on-site receptors for purposes of this EI determination.

- *AOC 2, Tank (T-1) Containment Area* - PDC is present in soil in numerous sample locations above the NJ NRDCSCC (43 mg/kg). Sample results define a 105 foot by 150 foot area that has been impacted above the NJ NRDCSCC. The highest PDC concentration is 15,000 mg/kg, detected in samples P01 and 0207 at depths of 8.5 to 9 feet bgs and 6 to 6.5 feet bgs, respectively. The highest concentrations are present in the area immediately beneath the former containment area. Soil impacted above NJ NRDCSCC ranges from 4 feet bgs to 15 feet bgs; however, the majority of the significant contamination ranges from 7 to 10 feet bgs, which is below the water table in this area (approximately 5 feet bgs) (Ref. 8).
- *AOC 21, Two Abandoned Settling Basins* - Three sample locations (2126, 2126N, 2126W) contain zinc contamination above NJ NRDCSCC (1,500 mg/kg). Sample 2126 (2.0 to 2.7 feet bgs) contained 8,000 mg/kg zinc; sample 2126N (2.0 to 2.5 feet bgs) contained 4,940 mg/kg zinc; and sample 2126W (2.0 to 2.5 feet bgs) contained 1,970 mg/kg zinc (Refs. 6, 7).
- *AOC 23, Neck Field* - One sample location (PE02) contains residual levels of beryllium (5.10 mg/kg) above the NJ NRDCSCC (2 mg/kg). Contamination in PE02 is present at a depth of 3.5 to 4.0 feet bgs.
- *AOC 30, Former Pilot Plant Lagoon and Section of Storm Sewer* - Many sample locations contained PAH contamination above the NJ NRDCSCC. Contamination above NJ NRDCSCC ranges from 0.5 to 6.5 feet bgs. The maximum detected concentration for each contaminant was detected in sample 0101A-3018-SB01 as follows:

<b>Contaminant</b>	<b>Conc.</b>	<b>NJ NRDCSCC</b>
Benzo(a)anthracene	36.0	4.0
Benzo(a)pyrene	29.1	0.66
Benzo(b)fluoranthene	29.1	4.0
Benzo(k)fluoranthene	24.7	4.0
Chrysene	43.7	40
Dibenzo(a,h)anthracene	9.43	0.66
Indeno(1,2,3-cd)pyrene	26.4	4.0

\*All concentrations in mg/kg

Additional soil and groundwater investigations are also planned at several AOC locations (AOCs 2, 4, 30, and 34) to further characterize groundwater impacts and ensure that all source areas are identified. Thus, additional subsurface soil contamination may be identified through planned remedial investigations.

### **Surface Water and Sediment**

The NBRC meanders through the Sybron site with a westerly flow. The NBRC is classified by NJDEP as a FW2-NT (Freshwater Class 2 - Non-trout) waterway (Ref. 1). FW2 indicates that designated uses include primary and secondary contact recreation, and maintenance, migration and propagation of the natural and established biota. NT indicates the waterway is not designated for trout production or trout maintenance. Sediment samples were historically collected from the NBRC, while surface water sampling is ongoing.

A total of 17 sediment samples were collected as part of the Phase I and II investigations. A few samples contained contaminants (including PDC, EDC, chromium, beryllium, and silver) above informal ECRA guidelines for soil. Methanol was also detected in one sample location at 145 mg/kg (no ECRA guideline was presented). However, Sybron argued that detected concentrations were relatively low and were not shown to impact surface water quality; thus, no further actions were recommended for sediment at the time. In 1994, per NJDEP request, additional sediment samples were collected for methanol and sample results were non-detect (Ref. 3). Per a February 21, 1995, NJDEP letter, a stream sampling program was required for NBRC; however, no additional sediment sampling was required (Ref. 9). Thus, no further assessment of sediment has been required by NJDEP at this time.

Sybron is currently sampling surface water in the NBRC on a semi-annual frequency, with the most recent sampling events having been conducted in October 2003 and February 2004 (Ref. 12). See Figure 5 of the March 2004 Remedial Investigation Data Summary Package (April 2003 - February 2004 Activities) for surface water sample locations (Ref. 12). The highest levels of PDC (4.3 µg/L in October 2003 and 26 µg/L in February 2004) were detected in sample location STR-5, which is located immediately downstream of the storm water bypass line outfall. These concentrations exceed the recommended SWQC (1.0 µg/L) recently provided by NJDEP<sup>6</sup> (Ref. 35). PDC concentrations downstream of STR-5 ranged from non-detect to 1.2 µg/L (October 2003 data). Only one upstream sample location (STR-8) detected PDC in October 2003 (1.4 µg/L) and February 2004 (2.2 µg/L) sampling events.

As mentioned in Question 1, TDS has also been identified as a concern in NBRC. However, elevated TDS levels are not associated with releases from regulated units at the site. Although NJDEP has identified TDS as a concern relative to its impacts on aquatic biota in the NBRC, TDS is not a concern for human exposure and will not be discussed further in this EI determination.

### **Air (Outdoors)**

No assessment of the impacts to outdoor air has been conducted at the site. All documented soil contamination located at the surface (AOC 30) has been capped. Thus, contaminated particulate migration is not a concern at the Sybron site. Migration of contaminants into outdoor air from the subsurface may be possible at this site given the high levels of PDC detected in shallow groundwater and subsurface soil (AOC 2). However, given that PDC is not being reported in indoor air above applicable OSHA guidelines,

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<sup>6</sup> No NJ SWQC is available for PDC. Thus, NJDEP asked Sybron to calculate a health-based SWQC for PDC for NJDEP review. Sybron proposed a SWQC of 4.8 µg/L; however, NJDEP did not approve this criterion. NJDEP selected a criterion of 0.5 µg/L, based on exposure factors used by NJ in developing human health-based water quality criteria and the bio-concentration factor and cancer slope factor provided by EPA. NJDEP indicated that the higher of the 0.5 µg/L criterion and the practical quantitation limit for PDC (1.0 µg/L) can be used. Thus, the site-specific SWQC for PDC is 1.0 µg/L (Ref. 35).

it is unlikely that elevated levels would be reported in outdoor air given the natural dispersion of contaminants at the surface. Additionally, OSHA monitoring is conducted at the site on a routine basis to ensure worker safety (Ref. 11). Thus, elevated levels of contaminants in outdoor air are not expected.

**References:**

1. Summary Report of Ground Water, Surface Water and Sediment Quality Data for Sybron Chemicals, Inc., Volume I of IV. Prepared by Environ Corporation. Dated June 1991.
2. Letter from John Cherry, Geoflux, Ltd., to John Sandstedt, Sybron Chemicals, Inc. Dated June 11, 1991.
3. Letter from Wayne Howitz, NJDEP, to John Sandstedt, Sybron, re: Remedial Investigation Workplan Approval and Report on Additional Remedial Investigations and Addendum to Cleanup Plan. Dated December 16, 1994.
4. Letter from Douglas Stuart, NJDEP, to John Sandstedt, Sybron, re: Report on Additional Remedial Investigation and Addendum to Cleanup Plan. Dated February 21, 1995.
5. Restated and Supplemental Remedial Action Workplan. Prepared by Environ Corporation. Dated June 1995.
6. Letter from Norman Spindel, Lowenstein Sandler, PC, re: In the Matter of Sybron Chemicals, Inc., Pemberton Township, Burlington County, ISRA Case No. E86097. Dated July 21, 1999.
7. Letter from Robert North, Environ, to Steve Myers, NJDEP, re: AOC 2 and Deed Notice. Dated November 19, 1999.
8. Letter from Robert North, Environ Corporation, to Stephen Myers, NJDEP, re: Sybron Chemicals, Inc., Pemberton Twp., Burlington County, ISRA Case E86097. Dated July 31, 2001.
9. Letter from Robert North, Environ Corporation, to Stephen Myers, NJDEP, re: Sybron Chemicals, Inc., Pemberton Twp., Burlington County, ISRA Case E86097. Dated April, 12, 2002.
10. Letter from NJDEP, Bryan Moore, to John McPeak, Sybron, re: Remediation Agreement Amendment in the Matter of the Pemberton Site Sybron Chemicals, Inc., Birmingham Road, Pemberton Twp., Burlington County. Documents including: Response to NJDEP's April 4, 2001 Letter Dated May 11, 2001; Document Summarizing Outstanding Issues, Dated July 31, 2001; Technical Basis for Water-Quality Based Effluent Limit for 1,2-Dichloropropane, resubmitted September 5, 2001; Results from October 2001 Sampling Event, Dated December 3, 2001; and Former T-1 Tank Area Report, Dated April 2, 2002. ISRA Case E86097. Dated November 26, 2002.
11. Letter from Michael Kozar, O'Brien & Gere Engineers, Inc., to Stephen Myers, NJDEP, re: Response to Environmental Indicator (EI) Data Needs. Dated September 22, 2003.
12. Remedial Investigation Data Summary Package (April 2003 - February 2004 Activities). Prepared by O'Brien & Gere Engineers, Inc. Dated March 2004.

3. Are there **complete pathways** between “contamination” and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table  
*Potential **Human Receptors** (Under Current Conditions)*

“Contaminated” Media	Residents	Workers	Day-Care	Construction	Trespasser	Recreation	Food <sup>7</sup>
Groundwater	No	No	No	Yes	–	–	No
<del>Air (indoor)</del>							
Surface Soil (e.g. < 2 ft)	No	No	–	No	No	No	–
Surface Water	Yes	Yes	–	–	No	Yes	No
Sediment			–	–			
Subsurface Soil (e.g., > 2 ft)	–	–	–	Yes	–	–	–
<del>Air (outdoors)</del>							

Instruction for Summary Exposure Pathway Evaluation Table:

1. Strike out specific Media including Human Receptors’ spaces for Media which are not “contaminated” as identified in #2 above.
2. Enter “yes” or “no” for potential “completeness” under each “Contaminated”Media -Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations some potential “Contaminated” Media - Human Receptor combinations (Pathways) do not have check spaces. These spaces instead have dashes (“--”). While these combinations may not be probable in most situations, they may be possible in some settings and should be added as necessary.

- \_\_\_ If no (pathways are not complete for any contaminated media-receptor combination) - skip to #6, and enter “YE” status code, after explaining and/or referencing condition(s) in place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional Pathway Evaluation Work Sheet to analyze major pathways).
- X If yes (pathways are complete for any “Contaminated” Media - Human Receptor combination) - continue after providing supporting explanation.
- \_\_\_ If unknown (for any “Contaminated” Media - Human Receptor combination) - skip to #6 and enter “IN” status code

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<sup>7</sup> Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish)

## **Rationale:**

### **Groundwater**

As mentioned in response to Question 2, the shallow aquifer is currently impacted with VOCs above the NJ GWQC. Sybron has demonstrated that groundwater in the shallow aquifer fully discharges to the NBRC (Ref. 1), with the minor exclusion of groundwater in AOC 2 and AOC 34, which groundwater elevation data show is migrating towards the south and southeast (in the direction of the storm water ditch located along the southern property boundary). The lateral extent of contaminant migration in the shallow aquifer is therefore limited, for the most part, by the NBRC. Flow direction in the area of wells MW5, MW25, and MW32 is to the south and southeast towards well MW32 and the storm water ditch. High levels of VOCs have historically been reported in both wells MW25 and MW32. Well MW32 is located approximately 100 feet from the southern property boundary and reported 1,000 µg/L of PDC in January 2004 (Ref. 4). During the most recent RI investigations, Sybron installed an additional well along the southern property boundary (MW-38) and sampled an additional well (MW-29) to assess the potential for off-site migration of contaminants along the southern property boundary in the vicinity of AOC 2 and AOC 34. Both wells reported no detections of VOC contamination (Ref. 4). Based upon these results it appears that VOC contamination is not migrating across the southern property boundary. As mentioned above, sample results confirm that groundwater contamination in the shallow aquifer on the northern portion of the site discharges to the NBRC. Thus, there is currently no concern for off-site receptor exposure to shallow groundwater in the vicinity of the site.

The shallow aquifer is located at a depth ranging from approximately 3 to 11 feet bgs at the site. Thus, construction worker exposure to impacted shallow groundwater is considered a potentially complete exposure pathway.

As mentioned in Question 2, production well PW-01 is located on site and is used for potable purposes. PW01 extracts groundwater from the MLW aquifer, which is not currently identified as a concern at the Sybron site. In addition, as mentioned in Question 2, Sybron monitors PW-01 through its SDWA requirements. The most recent documented sample results indicate that PDC concentrations were below NJ GWQC. Thus, potential exposure to on-site receptors (e.g., workers) from production well water is not currently considered a complete exposure pathway at Sybron.

### **Surface/Subsurface Soil**

As mentioned in Question 2, areas of surface and subsurface soil contamination are present on site. Areas with soil contamination above NJ NRDCSCC include AOC 2, AOC 21, AOC 23, and AOC 30. AOC 30 is the only location with surface soil contamination. All impacted surface soil at AOC 30 has been covered by a multi-layer asphalt cap to prevent exposure to on-site workers. Thus, exposure to impacted on-site surface soil is not currently a concern at the Sybron site. AOC 2, AOC 21, AOC 23, and AOC 30 all contain subsurface soil contamination above NJ NRDCSCC. Sybron is an active industrial facility, thus intrusive construction activities could occur on site within impacted areas. In addition, many of the impacted areas are part of the ongoing remedial activities and investigations. Thus,

on-site construction workers and on-site remedial workers (classified as construction workers for the purpose of this EI determination) could potentially be exposed to impacted subsurface soil contamination.

### **Surface Water**

As mentioned in Question 2, shallow groundwater discharge from the Sybron site has impacted surface water quality in the NBRC. Recent sample results indicate that exceedances of the SWQC for PDC stretch along the facility boundary (STR8) to over one and one-half miles downstream of the facility (STR26) (Ref. 4). According to Sybron, observed recreational uses of the NBRC in the area of the site include fishing and wading (Ref. 3). Thus, it is possible that off-site receptors (including recreators and residents) may potentially become exposed to PDC in surface water.

Sybron also maintains a storm water bypass line outfall that discharges directly to the NBRC in the vicinity of sample location STR5. Thus, a potential exists for on-site workers to contact impacted surface water in the event that the workers conduct maintenance on the outfall or in the outfall area.

Given that PDC is a volatile contaminant, uptake and bioaccumulation into fish populations is not considered a concern. Additionally, although one sample location (STR5) adjacent to the storm water bypass outfall contained 26 µg/L of PDC, the maximum detected concentrations reported in the remaining surface water samples during recent sample events was 2.2 µg/L, which is only slightly above the recommended SWQC (1.0 µg/L) recently provided by NJDEP (Ref. 2).

### **References:**

1. Letter from John Cherry, Geoflux, Ltd., to John Sandstedt, Sybron Chemicals, Inc. Dated June 11, 1991.
2. Letter from NJDEP, Bryan Moore, to John McPeak, Sybron, re: Remediation Agreement Amendment in the Matter of the Pemberton Site Sybron Chemicals, Inc., Birmingham Road, Pemberton Twp., Burlington County. Documents including: Response to NJDEP's April 4, 2001 Letter Dated May 11, 2001; Document Summarizing Outstanding Issues, Dated July 31, 2001; Technical Basis for Water-Quality Based Effluent Limit for 1,2-Dichloropropane, resubmitted September 5, 2001; Results from October 2001 Sampling Event, Dated December 3, 2001; and Former T-1 Tank Area Report, Dated April 2, 2002. ISRA Case E86097. Dated November 26, 2002.
3. Letter from Michael Kozar, O'Brien & Gere Engineers, Inc., to Stephen Myers, NJDEP, re: Response to Environmental Indicator (EI) Data Needs. Dated September 22, 2003.
4. Remedial Investigation Data Summary Package (April 2003 - February 2004 Activities). Prepared by O'Brien & Gere Engineers, Inc. Dated March 2004.

4. Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be **significant**<sup>8</sup> (i.e., potentially “unacceptable” because exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable “levels” (used to identify the “contamination”); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable “levels”) could result in greater than acceptable risks?

\_\_\_ If no (exposures cannot be reasonably expected to be significant (i.e., potentially “unacceptable”) for any complete exposure pathway) - skip to #6 and enter “YE” status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to “contamination” (identified in #3) are not expected to be “significant.”

X If yes (exposures could be reasonably expected to be “significant” (i.e., potentially “unacceptable”) for any complete exposure pathway) - continue after providing a description (of each potentially “unacceptable” exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to “contamination” (identified in #3) are not expected to be “significant.”

\_\_\_ If unknown (for any complete pathway) - skip to #6 and enter “IN” status code

#### **Rationale:**

#### **Groundwater**

As discussed in response to Question 3, the potential for on-site construction workers and/or remedial workers to come in direct contact with contaminated shallow groundwater is being considered a potentially complete exposure pathway. However, exposures are not expected to be significant because all intrusive activities at the site are conducted by workers properly trained for Hazardous Waste Operations (HAZWOPER), in accordance with OSHA regulations (40 CFR 1910.120) (Ref. 2). Workers are aware of the groundwater impacts at the site and are required to wear the necessary personal protective equipment (PPE) to minimize exposure to impacted groundwater. Thus, exposure to contaminated groundwater for construction workers and/or remedial workers conducting remedial activities is not expected to pose a significant risk.

#### **Subsurface Soil**

As discussed in response to Question 3, the potential for on-site construction workers and/or remedial workers to come in direct contact with contaminated subsurface soil is being considered a potentially complete exposure pathway. However, exposures are not expected to be significant because all intrusive activities at the site are conducted by workers properly trained for HAZWOPER, in accordance with

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<sup>8</sup> If there is any question on whether the identified exposures are “significant” (i.e., potentially “unacceptable”) consult a human health risk assessment specialist with appropriate education, training and experience.

OSHA regulations (40 CFR 1910.120) (Ref. 2). Workers are aware of the soil impacts at the site and are required to wear the necessary personal protective equipment (PPE) to minimize exposure to impacted soil. Thus, exposure to contaminated subsurface soil for construction workers and/or remedial workers conducting remedial activities is not expected to pose a significant risk.

### **Surface Water**

As discussed in the response to Question 3, the potential for on-site workers to come in direct contact with contaminated impacted surface water in the NBRC is being considered a potentially complete exposure pathway. However, Sybron indicates that all site workers are properly trained for HAZWOPER, in accordance with OSHA regulations (40 CFR 1910.120) (Ref. 2). Workers are also aware of the surface water impacts and would be required to wear the necessary personal protective equipment (PPE) to minimize exposure to impacted surface water. In addition, exposures to surface water would only occur during possible maintenance of the storm water outfall. Exposures would be infrequent and short in duration. Therefore, exposures to contaminated surface water for on-site workers conducting maintenance activities in the NBRC are not expected to pose significant risk.

The potential for off-site receptors (e.g., residents and recreators) to come in direct contact with contaminated surface water is also being considered a potentially complete exposure pathway. As discussed in the response to Question 3, one sample location (STR5) adjacent to the storm water bypass outfall contained 26 µg/L of PDC. The maximum detected concentrations reported in the remaining surface water samples during recent sample events was 2.2 µg/L, which is only slightly above the recommended SWQC (1.0 µg/L). Given that fishing and wading have been observed in the NBRC along the facility boundaries, and given that the maximum detected concentration (STR5 = 26 µg/L) is 26 times the recommended SWQC (1.0 µg/L) recently provided by NJDEP (Ref. 1), exposures to recreators and off-site residents could be considered potentially significant.

### **References:**

1. Letter from NJDEP, Bryan Moore, to John McPeak, Sybron, re: Remediation Agreement Amendment in the Matter of the Pemberton Site Sybron Chemicals, Inc., Birmingham Road, Pemberton Twp., Burlington County. Documents including: Response to NJDEP's April 4, 2001 Letter Dated May 11, 2001; Document Summarizing Outstanding Issues, Dated July 31, 2001; Technical Basis for Water-Quality Based Effluent Limit for 1,2-Dichloropropane, resubmitted September 5, 2001; Results from October 2001 Sampling Event, Dated December 3, 2001; and Former T-1 Tank Area Report, Dated April 2, 2002. ISRA Case E86097. Dated November 26, 2002.
2. Letter from Michael Kozar, O'Brien & Gere Engineers, Inc., to Stephen Myers, NJDEP, re: Response to Environmental Indicator (EI) Data Needs. Dated September 22, 2003.

5. Can the “significant” **exposures** (identified in #4) be shown to be within acceptable limits?

- If yes (all “significant” exposures have been shown to be within acceptable limits) - continue and enter “YE” after summarizing and referencing documentation justifying why all “significant” exposures to “contamination” are within acceptable limits (e.g., a site-specific Human Health Risk Assessment).
- If no (there are current exposures that can be reasonably expected to be “unacceptable”)- continue and enter “NO” status code after providing a description of each potentially “unacceptable” exposure.
- If unknown (for any potentially “unacceptable” exposure) - continue and enter “IN” status code

**Rationale:**

**Surface Water**

As discussed in Question 4, potential exposures to recreators and off-site residents to PDC in the NBRC are being considered potentially significant. Thus, quantitative risk calculations were conducted to assess whether or not exposures could be shown to be within acceptable limits.

Cancer and non-cancer risks associated with ingestion, inhalation, and dermal contact with surface water for both adults and children were evaluated to consider both the recreator and off-site resident receptor. Complete risk calculations are provided in Attachment 1, including detail of the parameters utilized to calculate the carcinogenic and non-carcinogenic risk values. Risk results are presented in Table 3.

**Table 3. Calculated Risk Values Associated with Exposure to PDC in the NBRC (Using the Maximum Detected Concentration - February 2004)**

<b>Adult RME Exposures*</b>			
<b>Carcinogenic</b>			
<b>Ingestion</b>	<b>Dermal</b>	<b>Inhalation</b>	<b>Total Cancer Risk</b>
3.08E-08	1.99E-07	1.88E-06	<b>2.11E-06</b>
<b>Non-Carcinogenic</b>			
<b>Ingestion</b>	<b>Dermal</b>	<b>Inhalation</b>	<b>Total Hazard Index</b>
4.44E-04	3.95E-03	4.62E-02	<b>5.06E-02</b>
<b>Child RME Exposures</b>			
<b>Carcinogenic</b>			
<b>Ingestion</b>	<b>Dermal</b>	<b>Inhalation</b>	<b>Total Cancer Risk</b>
1.66E-08	7.25E-08	6.93E-07	<b>7.82E-07</b>
<b>Non-Carcinogenic</b>			
<b>Ingestion</b>	<b>Dermal</b>	<b>Inhalation</b>	<b>Total Hazard Index</b>
2.59E-03	1.13E-02	1.08E-01	<b>1.22E-01</b>

\*Adult cancer risk is adult exposure duration of 24 years, plus the child cancer risk with an exposure duration of 6 years, for a total of 30 year exposure duration.

As demonstrated in Table 3, and supported in Attachment 1, calculated risks to both adult and child receptors using EPA's recommended reasonable maximum exposure (RME) parameters are within or below EPA's acceptable risk range of 1.0E-6 to 1.0E-4 for carcinogens, and a hazard index of 1.0 for non-carcinogens. Thus, based upon the current maximum contaminant concentration detected in the NBRC, and current potential receptor populations identified, risks associated with exposure to PDC are within acceptable limits.

6. Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility):

- YE - Yes, "Current Human Exposures Under Control" has been verified.  
Based on a review of the information contained in this EI determination, "Current Human Exposures" are expected to be "Under Control" at the Sybron Chemicals, Inc. site, EPA ID #NJD002339406, located on Birmingham Road in Birmingham, New Jersey, under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.
- NO - "Current Human Exposures" are NOT "Under Control."
- IN - More information is needed to make a determination.

**Completed by:** \_\_\_\_\_ Date: \_\_\_\_\_  
Kristin McKenney  
Risk Assessor  
Booz Allen Hamilton

**Reviewed by:** \_\_\_\_\_ Date: \_\_\_\_\_  
Kathy Rogovin  
Senior Risk Assessor  
Booz Allen Hamilton

**Also Reviewed by:** \_\_\_\_\_ Date: \_\_\_\_\_  
Alan Straus, RPM  
RCRA Programs Branch  
USEPA Region 2

\_\_\_\_\_  
Barry Tornick, Section Chief  
RCRA Programs Branch  
USEPA Region 2

**Approved by:** original signed by: Date: 6/29/2004  
Adolph Everett, Chief  
RCRA Programs Branch  
USEPA Region 2

**Locations where references may be found:**

References reviewed to prepare this EI determination are identified after each response. Reference materials are available at the USEPA Region 2, RCRA Records Center, located at 290 Broadway, 15<sup>th</sup> Floor, New York, New York, and the New Jersey Department of Environmental Protection Office located at 401 East State Street, Records Center, 6<sup>th</sup> Floor, Trenton, New Jersey.

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**FINAL NOTE: THE HUMAN EXPOSURES EI IS A QUALITATIVE SCREENING OF EXPOSURES AND THE DETERMINATIONS WITHIN THIS DOCUMENT SHOULD NOT BE USED AS THE SOLE BASIS FOR RESTRICTING THE SCOPE OF MORE DETAILED (E.G., SITE-SPECIFIC) ASSESSMENTS OF RISK.**

**Attachment - Summary of Media Impacts Table  
 Sybron Chemicals Inc.**

	<b>GW</b>	<b>AIR (Indoors)</b>	<b>SURF SOIL</b>	<b>SURF WATER<sup>1</sup></b>	<b>SED<sup>2</sup></b>	<b>SUB SURF SOIL</b>	<b>AIR (Outdoors)</b>	<b>CORRECTIVE ACTION MEASURE</b>	<b>KEY CONTAMINANTS</b>
AOC 2. Tank (T-1) and Containment Area	Yes	No	No	NA	NA	Yes	No	<ul style="list-style-type: none"> <li>▸ Tank cleaned, dismantled, and demolished</li> <li>▸ Soil and groundwater investigations (ongoing)</li> <li>▸ Deed notice (planned)</li> </ul>	VOCs (Groundwater) PDC (Soil)
AOC 4. Aboveground Tank Containments	Yes	No	No	NA	NA	No	No	<ul style="list-style-type: none"> <li>▸ Impacted soil removal (TMA tank)</li> <li>▸ In-situ bioremediation (No. 2 Fuel Oil Tank)</li> <li>▸ Soil and groundwater investigations (ongoing)</li> </ul>	VOCs
AOC 23. Neck Field	Yes	No	No	NA	NA	Yes	No	<ul style="list-style-type: none"> <li>▸ Waste removal</li> <li>▸ Source area investigations</li> <li>▸ Remedial action (planned)</li> <li>▸ Deed notice (planned)</li> </ul>	VOCs (Groundwater) Beryllium (Soil)
AOC 30. Former Pilot Plant Lagoon and Section of Storm Sewer	Yes	No	Yes	NA	NA	Yes	No	<ul style="list-style-type: none"> <li>▸ Soil excavation, ex-situ bioremediation and off-site disposal</li> <li>▸ Asphalt cap installed</li> <li>▸ Deed notice (planned)</li> <li>▸ Soil and groundwater investigations (ongoing)</li> </ul>	VOCs (Groundwater) PAHs (Soil)
AOC 31. Underground Process Wastewater Lines	Yes	No	No	NA	NA	No	No	<ul style="list-style-type: none"> <li>▸ Soil and groundwater investigations</li> </ul>	VOCs
AOC 33. North Branch of Rancocas Creek	NA	NA	NA	Yes	No	NA	NA	<ul style="list-style-type: none"> <li>▸ Sediment sampling</li> <li>▸ Surface water sampling (ongoing)</li> <li>▸ Ecological Risk Assessment (underway)</li> </ul>	PDC

	<b>GW</b>	<b>AIR (Indoors)</b>	<b>SURF SOIL</b>	<b>SURF WATER<sup>1</sup></b>	<b>SED<sup>2</sup></b>	<b>SUB SURF SOIL</b>	<b>AIR (Outdoors)</b>	<b>CORRECTIVE ACTION MEASURE</b>	<b>KEY CONTAMINANTS</b>
AOC 34. Low pH Discharge Area	Yes	No	No	NA	NA	No	No	• Soil and groundwater investigations (ongoing)	pH

1. Surface water impacts are included in AOC 33.

2. Sediment impacts are included in AOC 33.

Note: Subsurface soil contamination is also present in AOC 21. However, AOC 21 has received a NFA designation from NJDEP and thus is not included in table above.