DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA725)
Current Human Exposures Under Control

Facility Name: **Fisher Scientific Company**
Facility Address: **One Reagent Lane, Fair Lawn, New Jersey 07410**
Facility EPA ID#: **NJD004362059**

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) 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 RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

Facility Information

Fisher Scientific Company's Chemical Division (Fisher) began manufacturing operations at its Fair Lawn, New Jersey, facility in 1955. The facility is situated on nine acres of land in the northeastern corner of the Fair Lawn Industrial Park, and is bounded by Nevins Road to the north, Reagent Lane and Industrial facilities to the west, Henderson Brook and industrial facilities to the south, and Conrail railroad tracks to the east. To the north and west of the railroad track, approximately 200 feet from the site, there are

residential properties. Surrounding industrial facilities include Road-Con Systems, Sandvik, Syntron Systems, Kodak, Nabisco, and Lea & Perrins.

The Fisher facility includes ten major buildings that are used for various purposes, including offices, production activities, and storage/warehousing. Production activities are performed in Buildings 2 and 3, and include repackaging, formulating, purifying, chemical distillation, drying processes, and warehousing industrial chemicals. Fisher's products include prepackaged, preassayed inorganic reagents and organic solvents. Solid and liquid materials are purchased in bulk quantities, and are then analyzed, processed, and packaged at the Fair Lawn facility before shipment and distribution. Fisher does not synthesize organic solvents. Hazardous wastes are generated, treated, and stored at the site.

In 1978, the Borough of Fair Lawn detected volatile organic compounds (VOCs) in four municipal supply wells located within and adjacent to the Fair Lawn Industrial Park. Studies showed that the contaminants were derived from the Industrial Park and some of the VOCs detected were known to be handled by Fisher between approximately 1955 and 1974. The New Jersey Department of Environmental Protection (NJDEP) issued a directive to Fisher on May 12, 1983, to conduct a hydrogeologic evaluation at the site. The hydrogeologic evaluation, conducted in 1983, concluded that groundwater contamination consisting of VOCs was present beneath the Fisher site. Based upon these results, NJDEP issued an Administrative Consent Order (ACO) on March 21, 1984. The ACO required that a Remedial Investigation and Feasibility Study (RI/FS) be performed at the site to determine the source of contamination and to evaluate remedial alternatives to minimize further impacts to public health and the environment.

Groundwater and soil investigations have been conducted over the past 17 years to define site conditions. Fisher has performed soil remediation and has been operating an overburden groundwater recovery and treatment system and a bedrock groundwater recovery and treatment system in accordance with the Industrial Site Recovery Act (ISRA). In addition, Fisher has also been cooperating with both NJDEP and the USEPA regarding the Fair Lawn Well Fields Superfund National Priorities List (NPL) Site.

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 (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

   _X_ 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

Summary of Areas of Environmental Concern (AEC): Based upon the knowledge of site activities relating to handling of volatile organics and conversations with Fisher personnel, six AECs at the Fisher site were selected for initial investigation as identified in the 1984 RI (Ref. 1). A brief description of each AEC is outlined below. Groundwater has been generally investigated on a site-wide basis, and has thus been identified as its own AEC (AEC 7). A site plan is provided in Attachment 1.

AEC 1, Dry Well Area South of Building 6: This AEC was the site of a former acid neutralization pit. According to the RI, the dry well was constructed over 35 years ago as an excavation area that was partially backfilled with limestone. A floor drain in Building 3 was connected by buried sewer line to the dry well for the purpose of neutralizing and disposing of waste acid. Building 3 was utilized for distillation activities when the dry well was in operation and, thus, VOCs may have entered the floor drain and discharged to the dry well. The system was abandoned by plugging the pipeline to the dry well in the 1970s. As part of the RI, soil samples were collected in this area and analyzed for VOCs. No VOCs were detected above the detection limit of 1.0 mg/kg. Therefore, no further action was required by NJDEP to address soil contamination at this AEC (Ref. 2).

AEC 2, Drum Storage and Adjacent Areas South of Building 2: The drum storage area south of Building 2, including the area between Buildings 2 and 3, has been used for temporary holding of spent or expired organic materials returned from consumers or other Fisher plants. The RI indicated that a variety of VOCs could have been released onto the ground in this AEC. In addition, the area immediately south of and adjacent to Building 2 is the location of a distillation system which processes acetonitrile. Based upon initial RI results, two excavations were conducted in this AEC, one between Buildings 1 and 2, and one between Buildings 2 and 3, which extended into AEC 3 (See Attachment 2) between August 1986 and February 1987. Soil was excavated to an NJDEP approved site-specific cleanup level of 10 mg/kg for total VOCs. In December 1992, NJDEP required that Fisher re-examine all residual soil concentrations and compare them to the newly promulgated NJ Soil Cleanup Criteria. Based upon initial soil sampling conducted during the RI, and post-excavation sample results collected during 1986, VOCs (chloroform, 1,2-dichloroethane [DCA], and trichloroethane [TCA]) remain in soil at three locations above the New Jersey Impact to Groundwater Soil Cleanup Criteria (NJ IGWSCC). Remaining soil concentrations did not exceed any other New Jersey soil cleanup criteria. Despite these elevated detections, Fisher recommended that no further action be required because the average concentrations of these compounds are well below the NJ IGWSCC of 1.0 mg/kg, the maximum concentrations of these compounds are less than 10 times the NJ IGWSCC, and fewer than 10 percent of the samples contain VOCs at concentrations exceeding the NJ IGWSCC

(Ref. 2). NJDEP approved the no further action determination for soil at this area on August 24, 1993 (Ref. 9).

AEC 3, Bulk Transfer Area, East and South of Building 3: This AEC was formerly used for unloading solvents and other organic chemicals from rail tank cars to a packaging facility in the southeast corner of Building 3. Overhead piping, which has since been abandoned, connected the railroad siding with the building. In some cases, the solvents were filtered during the transfer operation from the tank cars to on-site storage tanks. The RI indicates that small volumes of VOCs may have been routinely discharged from pumps, hoses, and filter changing activities to surrounding soil. This area, including some newer solvent tanks south of Building 3, continues to be used for handling and packaging solvents, although the railroad siding is no longer used. Based upon initial RI sampling results, a large area of soil was excavated in this area between August 1986 and February 1987. These excavations removed soil that exceeded an NJDEP approved site-specific cleanup level of 10 mg/kg for total VOCs. In December 1992, NJDEP required that Fisher re-examine all residual soil concentrations and compare them to the newly promulgated NJ Soil Cleanup Criteria. The RI and post-excavation sampling results indicated that residual VOCs (tetrachloroethylene [PCE], trichloroethene [TCE], and chloroform) remain in several locations above the NJ IGWSCC. Despite these elevated detections, Fisher recommended that no further action be required because the average concentrations of the contaminants are well below the NJ IGWSCC of 1.0 mg/kg, the maximum concentrations of these compounds are less than 10 times the NJ IGWSCC, and fewer than 10 percent of the samples exceed a specific VOC guideline for TCE and PCE. Approximately 15 percent of the samples exceeded the NJ IGWSCC for chloroform. However, because the levels detected are well below the New Jersey Residential Direct Contact Soil Cleanup Criteria (NJ RDCSCC) and given that groundwater beneath this area is within the capture zone of the active groundwater extraction system, residual chloroform contamination in this area was not expected to be of concern (Ref. 2). NJDEP approved the no further action determination for soil at this site on August 24, 1993 (Ref. 9).

AEC 4, Manholes Along West and North Perimeter of Property: The sewer lines along Nevins Road and Reagent Lane, on the north and west sides of the site, are connected to a series of five manholes that were initially believed by NJDEP to have soil exposed at the bottom, rather than concrete. Subsequent inspection by Fisher documented that there were concrete bottoms at all manholes, but concluded that some improvements were required. The inspection showed the concrete bottoms to be corroded and cracked at Manholes 4 and 5. Also, the joints were not watertight where sewer lines connected to the manholes. Corrective measures were taken by Fisher in January 1984, and included refinishing all manhole bottoms and sealing sewer line joints. Based upon initial RI sample results, two small soil excavations were conducted in this AEC in March 1988, in the southwestern corner of the site and at the northern border of the site along Nevins Road. Soil was excavated to an NJDEP approved site-specific cleanup level of 10 mg/kg for total VOCs. In December 1992, NJDEP required that Fisher re-examine all residual soil concentrations and compare them to the newly promulgated NJ Soil Cleanup Criteria. Based upon initial RI sampling results and post-excavation sample results, residual VOCs (TCE and chloroform) remain in several areas above the NJ IGWSCC. Despite these elevated detections, Fisher recommended that no further action be required because the average concentrations of the contaminants are well below NJ IGWSCC of 1.0 mg/kg, the maximum concentration of these compounds are less than 10 times the NJ IGWSCC, and fewer than 10 percent of the samples exceed a specific VOC guideline for chloroform. Approximately 10.5 percent of the samples exceeded the NJ IGWSCC for TCE, which only marginally exceeds the 10 percent guideline. In addition, the detected levels of TCE were well below the NJ RDCSCC, thus direct exposure is

not expected to be of concern (Ref. 2). NJDEP approved the no further action determination for soil at this site on August 24, 1993 (Ref. 9).

AEC 5, Shed Area South of Building 1: Two potential sources of contamination were identified at the Fisher site south of Building 1. Several laboratories located in the southwestern portion of Building 1 are served by a lateral that discharges to the sewer at Manhole 2 near the entrance gate. This lateral was included in the investigation of potential sewer-related sources because VOCs were detected in this vicinity in earlier preliminary soil analyses performed by NJDEP. A waste compactor located at the shed area south of Building 1 was used in the past for crushing of empty containers. Small amounts of organic chemicals could have been introduced into the compactor and then discharged onto the ground at the compactor area. Based upon initial RI sample results, a small excavation was conducted in AEC 5 in March 1988, to an NJDEP approved site-specific cleanup level of 10 mg/kg for total VOCs. In December 1992, NJDEP required that Fisher re-examine all residual soil concentrations and compare them to the newly promulgated NJ Soil Cleanup Criteria. Based upon initial RI sample results and post-excavation results, no residual VOC contamination remains in this AEC above the most stringent NJ soil cleanup criteria. Thus, Fisher recommended no further action for soil in this AEC (Ref. 2). NJDEP approved the no further action determination for soil at this site on August 24, 1993 (Ref. 9).

AEC 6, Background and All Other Plant Areas: An area in the extreme southeastern corner of the site was designated as a background area during the RI. This area was within property boundaries and had not been documented as an area of historical industrial activity. One sample was collected in this area during the RI and analyzed for VOCs to represent background conditions. PCE was detected at a concentration between one and 10 mg/kg, which is above the NJ IGWSCC of 1.0 mg/kg. According to Fisher, data from other AECs indicate that PCE concentrations across the site are low, if detected, and that no other VOCs were detected in this sample. Thus, Fisher recommended no further action for soil in this AEC (Ref. 2). NJDEP approved the no further action determination for soil at this site on August 24, 1993 (Ref. 9).

AEC 7, Groundwater: Groundwater has been investigated on a site-wide basis and has been shown to be impacted by VOCs. Historically, groundwater contamination associated with Fisher operations was detected in on- and off-site locations; however, under current conditions, groundwater contamination is maintained within site boundaries. Groundwater has been impacted in the overburden (glacial deposits) zone, the shallow (bedrock) zone, and the intermediate (bedrock) zone. In general, groundwater in the glacial deposits contains a larger number of contaminants at significantly higher concentrations than groundwater from the bedrock aquifer zones. Analytical sample results from all three zones show the presence of VOCs, with acetonitrile and aromatic hydrocarbons (benzene, toluene, ethylbenzene, and xylene [BTEX]) predominating in the glacial deposits and higher concentrations of chlorinated solvents in the shallow bedrock zone. VOCs in the overburden are concentrated in the area between AECs 1 and 3 (in the area of wells FS-23 and FS-27R) just north of the recovery trench for overburden groundwater. VOCs in the shallow bedrock are primarily concentrated in the area east of Building 1 (near well FS-14); however, the location of the highest concentrations varies by contaminant. Concentrations of VOCs in the intermediate bedrock are generally highest along the southern boundary of Building 1 (in the vicinity of well FS-18) (Refs. 5, 6, 7, and 8). Groundwater is currently undergoing remediation by operation of two treatment systems. Overburden groundwater is being extracted via two recovery trenches located northeast and southwest of Building 6 and by a series of seven extraction wells (TPW-1 through TPW-7)

located in the central, north-central and northeastern parts of the site. Extracted groundwater from the overburden zone is treated via air stripping/carbon adsorption and is then discharged to the Passaic Valley Sewer Commission (PVSC) under a New Jersey Pollutant Discharge Elimination System (NJPDES) permit. Deep groundwater (from the shallow and intermediate bedrock zones) is extracted via three production wells (PW-2, PW-4, and PW-5), is used as non-contact cooling water at the facility, is subsequently treated by carbon adsorption, and is then discharged to Henderson Brook under a NJPDES-Discharge to Surface Water (DSW) permit (Refs. 3 and 4). Fisher is required to submit quarterly Remedial Action Reports which detail the results of water level data collected each quarter, and groundwater quality monitoring results which Fisher must collect semi-annually during the second and fourth quarters. Fisher is in the process of installing additional monitoring wells to further define the capture zones of the extraction wells and trenches in order to achieve no further action status from NJDEP (Ref. 5). NJDEP has also directed Fisher to prepare a proposal for a Classification Exception Area (CEA), which delineates areas of groundwater contamination that exceed New Jersey Groundwater Quality Criteria (NJ GWQC). NJDEP requested that Fisher provide information on the extent of contamination above applicable standards in each of the three groundwater zones beneath the site (Ref. 5). Based upon available file materials, the CEA has not yet been established.

In summary, NJDEP has approved no further action for soil in AECs 1 through 6. Residual levels of contamination do exist in several of these AECs above NJ Soil Cleanup Criteria and will be discussed further in subsequent responses. Investigations and remedial actions associated with contaminated groundwater (AEC 7) at the site are currently ongoing.

References:

1. Remedial Investigation, Fisher Scientific Company, Fair Lawn, New Jersey Facility. Prepared by Weston Consultants. Dated September 28, 1984.
2. Letter from Thomas Fusillo, ENVIRON Corporation, to Jacqueline Bobko, NJDEP, re: Area of Environmental Concern Review, Comparison to Soil Cleanup Guidelines. Dated July 16, 1993.
3. Evaluation of the Overburden Remediation System. Prepared by ENVIRON Corporation. Dated August, 1994.
4. Packer Test Report. Prepared by ENVIRON Corporation. Dated February, 1996.
5. Letter from Sharon Burkett, ENVIRON Corporation, to Jacqueline Bobko, NJDEP, re: Remedial Action Report, First Quarter 2000. Dated April 21, 2000.
6. Remedial Action Report, Second Quarter 2000. Prepared by ENVIRON Corporation. Dated August, 2000.
7. Modified Remedial Action Report, Third Quarter 2000. Prepared by ENVIRON Corporation. Dated November, 2000.
8. Remedial Action Report, Fourth Quarter 2000. Prepared by ENVIRON Corporation. Dated February, 2001.
9. Teleconference between Elizabeth Butler, USEPA, and Phillip Barnes, ENVIRON, re: Fisher Scientific. June 10, 2001.

2. Are groundwater, soil, surface water, sediments, or air **media** known or reasonably suspected to be "**contaminated**"[1] 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)[2]		X		
Surface Soil (e.g., <2 ft)	X			VOCs
Surface Water		X		
Sediment		X		
Subsurface Soil (e.g., >2 ft)	X			VOCs
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

The Fisher site is underlain by approximately 10 to 30 feet of unconsolidated sediment consisting of medium to low permeability glacial deposits. The glacial deposits are known as the overburden zone at the site, and these unconsolidated sediments are underlain by the reddish brown sandstones and shales of the Brunswick Formation, Newark Group. In the eastern part of the site, the water table occurs within the unconsolidated glacial deposits. In the western part of the site, the bedrock elevation is higher and the water table lower; thus, the water table is situated in fractured bedrock rather than in the glacial deposits.

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[1] "Contamination" and "contaminated" describes media containing contaminants (in any form, 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).

[2] Recent evidence (from the Colorado Dept. of Public Health and Environment, and others) suggest 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.

Water level monitoring and pumping test data indicate that there are hydraulic interconnections between the bedrock and glacial deposits (Ref. 1).

The highest water table elevations at the site occur southeast of Building 3, in the same general area as the major historical contaminant source in the unsaturated soil zone. From this high, groundwater flows south and southwest to Henderson Creek, west toward Building 1, and northwest toward Nevins Road, under natural flow conditions. At the western half of the site, natural groundwater flow becomes almost uniformly westward toward Reagent Lane (Refs. 1, 6, 7, and 11).

Groundwater contamination consists of VOCs in the overburden, shallow bedrock, and intermediate bedrock zones. VOCs in the overburden are concentrated in the area between AECs 1 and 3 (in the area of wells FS-23 and FS-27R) just north of the recovery trenches for overburden groundwater. VOCs in the shallow bedrock are primarily concentrated in the area east of Building 1 (in the area of well FS-14); however, the highest area of concentration varies by contaminant. VOCs in the intermediate bedrock are generally highest along the southern boundary of Building 1 (in the area of well FS-18). In general, groundwater in the overburden (glacial deposits) contains a larger suite of chemical contaminants, at significantly higher concentrations, than groundwater from the bedrock aquifer. Analytical sample results from both zones show the presence of VOCs, with acetonitrile and BTEX predominately in the overburden (glacial deposits), and chlorinated solvents predominately in the bedrock zones (Refs. 8, 9, 10, and 11). Table 1 presents the maximum level of constituents present in groundwater at each zone that exceed the GWQC for Class II-A potable water during the Fourth Quarter, 2000 groundwater monitoring event (Ref. 11). Figures identifying the locations of monitoring wells in the different groundwater zones are provided in Attachments 3, 4, and 5.

**Table 1 - Maximum Concentration for Each Contaminant
Detected above the NJ GWQC in the Various Groundwater Zones Beneath the Site
Fourth Quarter, 2000 (µg/L) [1]**

Contaminant	NJ GWQC [2]	Overburden Zone	Shallow Zone	Intermediate Zone	Production Wells
1,1,1-TCA	30	1,500 (FS-23)	BS*	BS	BS
1,1,2,2-Tetrachloroethane	2	240 (FS-23)	ND	ND	ND
1,1-DCA	70	130 (FS-27R)	BS*	BS	BS
1,1-Dichloroethene (DCE)	2	140 (FS-23)	4.1* (FS-05)	BS*	2.9* (PW-05)
1,2-DCA	2	75 (FS-29)	7,700 (FS-14)	29 (FS-18)	6.6 (PW-04)
Acetonitrile	40	9,700 (FS-03R)	220,000 (FS-14)	ND	ND
Benzene	1	7,700 (FS-23)	140* (FS-15R)	56 (FS-18)	ND
Carbon Tetrachloride	2	4,800 (FS-23)	790* (FS-15R)	120 (FS-18)	220 (PW-04)
Chlorobenzene	4	540 (FS-23)	48* (FS-17)	69 (FS-18)	ND
Chloroform	6	4,100 (FS-23)	51,000 (FS-14)	160 (FS-42)	89 (PW-04)
cis-1,2-DCE	10	13,000 (FS-23)	120* (FS-17)	110 (FS-18)	25 (PW-04)
Ethyl Benzene	700	7,600 (FS-23)	BS*	ND	ND
Methylene Chloride	2	4,000 (FS-23)	58,000 (FS-14)	2.6J* (FS-42)	ND
PCE	1	290 (FS-23)	36* (FS-15R)	11 (FS-18)	120 (PW-05)
Toluene	1,000	30,000 (FS-23)	BS*	ND	ND
TCE	1	29,000 (FS-23)	730 (FS-15R)	140 (FS-18)	87 (PW-05)
Vinyl Chloride	5	2,900 (FS-27R)	54* (FS-12)	53 (FS-18)	ND
Xylenes (total)	40	38,000 (FS-23)	86* (FS-15R)	ND	ND

[1] Well locations where maximum detected concentrations were found are in parentheses.
[2] The NJ GWQC is the higher of the NJ GWQC or the Practical Quantitation Level (PQL).
* Indicates that there may be potentially higher concentrations present in groundwater due to elevated detection limits in wells sampled.
BS - Below Standard
ND - Not Detected

Air (Indoors)

The depth to water table (overburden) varies from 6 to 14 feet below land surface. The upper zone, known as the shallow bedrock zone, is present at the bedrock-overburden contact, and extends from approximately 20 feet to 50 feet below land surface across the site. Given the depth to these contaminated units, the maximum concentrations of VOCs detected in the overburden and shallow bedrock zone during the recent groundwater monitoring (Fourth Quarter, 2000) event were compared to the State of Connecticut Groundwater Standards for Protection of Indoor Air under the Industrial/Commercial (CT I/C VC) scenario. This comparison is used to identify constituents that may be a concern for potential migration into indoor air. Table 2 displays those contaminants that exceed CT I/C VC and their maximum detected concentrations.

Table 2 - Groundwater Exceedences of the Connecticut Groundwater Standards for the Protection of Indoor Air - Industrial Scenario (µg/L)

Contaminant	CT I/C VC	Concentration	
		Overburden Zone	Shallow Zone
1,1-DCE	6	140 (FS-23)	BS
1,2-DCA	90	BS	7,700 (FS-14)
Benzene	530	7,700 (FS-23)	BS
Carbon Tetrachloride	40	4,800 (FS-23)	790 (FS-15R)
Chloroform	710	4,100 (FS-23)	51,000 (FS-14)
Methylene Chloride	50,000	BS	58,000 (FS-14)
TCE	540	29,000 (FS-23)	730 (FS-15R)
Vinyl Chloride	2	2,900 (FS-27R)	54 (FS-12)

As identified in Table 2, several VOCs are present in both the overburden zone and shallow bedrock zone at levels up to three orders of magnitude above the CT I/C VC. In addition, the facility is active with workers currently using on-site buildings, indicating the potential for indoor air exposures. Thus, the maximum VOC concentrations detected above the CT I/C VC in both overburden and shallow bedrock groundwater were used to calculate the incremental risk value (IRV) and hazard quotients (HQ) associated with the potential migration of volatile contaminants into indoor air using the Johnson-Ettinger (JE) Model. It should be noted that the concentrations at these monitoring well locations have not been detected directly under buildings. However, the wells are located in close proximity (approximately 100 feet for overburden, approximately 25 feet for shallow bedrock) to on-site industrial buildings (Ref. 1). Site-specific input parameters used in the model include: the depth below grade to bottom of enclosed space floor, depth below grade to water table, soil type, and soil/groundwater temperature. Conservative default values were used for the remaining parameters for which site-specific values were not readily available. In addition, industrial exposure assumptions (i.e., exposure duration and exposure frequency) were used in the calculations due to the current industrial nature of the property.

Table 3 - Calculated Incremental Risk Values and Hazard Quotients

Constituent	Calculated IRVs/HQs	
	Overburden Zone	Shallow Zone
1,1-DCE	8.9E-07 (IRV)	NA
1,2-DCA	NA	8.0E-07 (IRV)
Benzene	1.5E-06 (IRV)	NA
Carbon Tetrachloride	9.2E-06 (IRV)	1.5E-06 (IRV)
Chloroform	1.6E-06 (IRV)	1.9E-05 (IRV)
Methylene Chloride	NA	2.7E-07 (IRV) 5.4E-04 (HQ)
TCE	2.0E-06 (IRV)	4.9E-08 (IRV)
Vinyl Chloride	3.7E-05 (IRV)	6.6E-07 (IRV)

The calculated IRVs and HQ for the eight volatile constituents, as seen in Table 3 above, are below or within the USEPA acceptable risk range of 1.0E-4 to 1.0E-6 and below the target HQ of 1.0. In addition, cumulative risk (5.2E-05 [overburden], 2.2E-05 [shallow zone]) associated with exposure to carcinogenic compounds is within the USEPA acceptable risk range of 1.0E-4 to 1.0E-6. Based upon the current information available and considering the results of the JE Model, volatilization of groundwater contaminants into indoor air at the Fisher facility does not appear to pose an unacceptable risk at this time. See Attachment 6 for JE Model results for the two risk-driving compounds (i.e., vinyl chloride [overburden], chloroform [shallow]).

Surface/Subsurface Soil

Primary constituents detected in soil during the RI included BTEX, chlorobenzene, TCE, 1,2-DCA, 1,1,2-TCA, PCE, carbon tetrachloride, methylene chloride, and chloroform. Excavations were performed in AECs 2 and 3 between August 1986 and February 1987. Additional excavations were performed in AECs 4 and 5 during March 1988. All initial soil investigations were conducted based upon a screening level of 1.0 mg/kg for individual VOCs, with an NJDEP designated site-specific cleanup level of 10 mg/kg for total VOCs. On December 2, 1992, NJDEP required that Fisher review the sampling data from all present and past AECs and compare the sampling results to the NJ soil cleanup criteria promulgated on February 3, 1992 (last revised May 12, 1999). Fisher performed this evaluation and the results were documented in a letter dated July 16, 1993 (Ref. 5). Based upon this evaluation, residual levels of VOCs remain in soil in several AEC sample locations at the site, as listed in Table 4.

Table 4 - Residual Contamination Present at Fisher Site above NJ Soil Cleanup Criteria (mg/kg)

AEC	Contaminant	Sample Location (Depth in feet)	Year	Conc.	NJ RDCSCC	NJ NRDCSCC[1]	NJ IGWSCC
2	Chloroform	B-20 (3.1-3.6)	1984	1 to <10	19	28	1
	1,2-DCA	E-4 (1.5-2.0)	1986	2.4	6	24	1
	TCE	K-5 (1.5-2.0)	1986	2.1	23	54	1
3	PCE	B-1 (11.0- 11.5)	1984	**1 to <10**	4[2]	6[2]	1
	TCE	J-2 (1.5-2.0)	1986	5.2	23	54	1
	Chloroform	L-4 (1.5-2.0) J-2 (1.5-2.0) I-6 (1.5-2.0) B-1 (11.0-11.5)	1986 1986 1986 1984	1.6 2 4.01 1 to <10	19	28	1
4	Chloroform	B-27 (1.0-1.5)	1984	1 to <10	19	28	1
	TCE	SB-28 (2.5-3.0) SB-30 (4.0-4.5)	1984 1984	1 to <10 1 to <10	23	54	1
6	PCE	B-5 (2.5-3.0)	1984	**1 to <10**	4[2]	6[2]	1

Bold indicates that detected concentrations exceed the specific soil quality criterion.

[1] New Jersey Non-Residential Direct Contact Soil Cleanup Criteria.

[2] The detected concentration range exceeds the specific direct contact soil cleanup criterion.

As identified in Table 4, although residual surface soil contamination exceeds the NJ IGWSCC, it does not exceed the NJ residential and non-residential direct contact criteria. Thus, direct exposure to elevated levels of contaminants in surface soil is not of concern at the Fisher site based upon detected residual concentrations. Subsurface soil contamination may exceed the NJ residential and non-residential direct contact criteria. Potential exposure to residual contaminant levels in subsurface soil is discussed in Questions 3 and 4.

Surface Water/Sediment

Henderson Brook is located just outside the southern property fence line. Henderson Brook is extremely small with a drought flow of 50,000 gallons per day (Ref. 3). The brook flows from east to west (Ref. 2) and passes through residential neighborhoods approximately one mile downstream of the Fisher site. The brook is hydraulically connected to the overburden aquifer system. The brook also receives storm water and surface runoff from the Fisher property. Under non-pumping conditions groundwater typically flows from beneath the site to Henderson Brook, providing water to the brook. However, under current pumping/extraction conditions as shown by the water levels collected quarterly at the site, Henderson Brook is acting as a source of recharge to the overburden zone at the southeast and south-central parts of the site. Contaminated groundwater in the overburden is not discharging to Henderson Brook, because surface water in Henderson Brook acts as a hydraulic boundary for the overburden extraction and treatment system. Thus, surface water in Henderson Brook is actually being captured by the on-site groundwater treatment system. Treated groundwater from the overburden is subsequently discharged to the PVSC.

No surface water or sediment data was available in the file materials for Fisher. However, it should be noted that Fisher planned to conduct water quality studies in Henderson Brook in 1992 to determine whether or not discharge of treated groundwater from the deep bedrock zone into the brook was feasible. However, the Water Quality Study of Henderson Brook was not performed because NJDEP subsequently decided that water quality studies were no longer required for groundwater remediation projects with existing discharges (Ref. 4).

Discharge of treated groundwater from the bedrock aquifer is currently discharged into Henderson Brook and monitored by the NJPDES program. The discharge provides a significant source of water for this relatively small flow brook. No documented notice of violations were found in the file materials and according to representatives for Fisher there have been no violations of the NJPDES-DSW permit (Ref. 12).

Thus, based upon all current information, it can be concluded that surface water and sediment in Henderson Brook have not been adversely impacted by activities at the Fisher site at this time.

Air (Outdoors)

Based upon previous investigation results and the excavations that took place between 1986 and 1988, all surface soil (0-2.5 feet below ground surface (bgs)) impacted above NJ RDCSCC and NJ NRDCSCC has been excavated and disposed off site. In addition, a majority of the site is covered by buildings or asphalt. With respect to VOCs in groundwater, it is unlikely that contaminants detected in groundwater would be present at significant levels in outdoor air based upon the natural mixing that occurs when volatile constituents migrate from groundwater to the outdoor environment. Thus, based upon the limited extent of exposed surface contamination and the natural mixing associated with any volatile migration from groundwater, volatile emissions and/or the migration of contaminated particulates are not expected to be significant exposure pathways at the Fisher site.

References:

1. Remedial Investigation, Fisher Scientific Company, Fair Lawn, New Jersey Facility. Prepared by Weston Consultants. Dated September 28, 1984.
2. Letter from Peter Puglionesi, Weston Consultants, to Fisher Scientific Company, re: NJDEP Comments on Remedial Action Plans. Dated September 26, 1986.
3. Letter from Samuel Moulthrop, Riker, Danzig, Scherer, Hyland & Perretti, to John Ambrosio, Esq., Office of Gabriel Ambrosio, Esq., re: Fisher Scientific Company. Dated June 15, 1992.
4. Letter from Edward J. Enright, First Environment, to Tessie Fields, NJDEP, re: Fisher Scientific Company Remedial Action Plan/Cleanup Plan Progress Report. Dated January 15, 1993.
5. Letter from Thomas Fusillo, ENVIRON Corporation, to Jacqueline Bobko, NJDEP, re: Area of Environmental Concern Review, Comparison to Soil Cleanup Guidelines. Dated July 16, 1993.
6. Evaluation of the Overburden Remediation System. Prepared by ENVIRON Corporation. Dated August, 1994.
7. Packer Test Report. Prepared by ENVIRON Corporation. Dated February, 1996.
8. Letter from Sharon Burkett, ENVIRON Corporation, to Jacqueline Bobko, NJDEP, re: Remedial Action Report, First Quarter 2000. Dated April 21, 2000.
9. Remedial Action Report, Second Quarter 2000. Prepared by ENVIRON Corporation. Dated August, 2000.
10. Modified Remedial Action Report, Third Quarter 2000. Prepared by ENVIRON Corporation. Dated November, 2000.

11. Remedial Action Report, Fourth Quarter 2000. Prepared by ENVIRON Corporation. Dated February, 2001.
12. Teleconference between Elizabeth Butler, USEPA, and Phillip Barnes, ENVIRON, re: Fisher Scientific. June 10, 2001.

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[3]
Groundwater	No	No	No	No	–	–	No
Air (indoor)							
Surface Soil (e.g. < 2 ft)	No	No	No	No	No	No	No
Surface Water							
Sediment							
Subsurface Soil (e.g., > 2 ft)	–	–	–	Yes	–	–	No
Air (outdoors)							

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

[3] Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish, etc.)

Rationale:

Groundwater

Historical groundwater monitoring and measurement data has shown the current extraction and treatment systems in place at this site are providing sufficient hydraulic control and capturing contaminated groundwater beneath the site. Contaminated groundwater beneath the site is not currently migrating beyond property boundaries. Thus, exposure for off-site receptors to contaminated groundwater associated with this site is not considered a complete exposure pathway.

Contaminated groundwater at the Fisher site is treated via several methods. Groundwater is extracted from the overburden zone by the two trenches in the south-central and southeastern part of the site, and by the pumping of seven extraction well points (TPW-1 through TPW-7) in the central, north-central and northeastern parts of the site. Water level and groundwater quality monitoring show that the extraction systems control the contamination in the overburden zone, and that Henderson Brook provides recharge to the overburden zone at the southeastern and south-central parts of the site. Extracted groundwater from the overburden zone is treated via air stripping/carbon adsorption and discharged to the PVSC under a NJPDES Permit. Contaminant concentrations have reduced at most locations in the overburden zone in response to operation of the pump and treat system, and in response to removal of highly contaminated soil at the site that acted as secondary sources of contamination to groundwater (Refs. 4, 7, 8, 9 and 10).

Groundwater from the bedrock zones is extracted via three production wells (PW-2, PW-4, and PW-5), used for non-contact cooling water, subsequently treated by granular activated carbon (GAC) adsorption, and then discharged to Henderson Brook under a NJPDES-DSW permit. Water level monitoring conducted in shallow and intermediate bedrock zones indicates that the pumping wells have a radius of influence that extends across the site, and captures some groundwater flow from off-site areas west and southwest of the site that would be downgradient of the Fisher property under natural flow conditions (Refs. 6, 7, 8, 9 and 10).

Groundwater beneath the site is not used on-site for potable purposes, and is only used for non-contact cooling water (Ref. 1). Thus, there is no potential for exposure of on-site receptors to contaminated groundwater. While past releases may have migrated off site, the active extraction systems are currently controlling groundwater contamination present within the property boundaries of the Fisher site. Fisher is in the process of installing additional monitoring wells to further define the capture zones of the extraction wells and trenches in order to achieve no further action status from NJDEP (Ref. 7). In addition, NJDEP has directed Fisher to prepare a CEA proposal, which will delineate areas of groundwater contamination where constituent concentrations exceed NJ GWQC. The CEA becomes a public record and will allow NJDEP to monitor and prevent exposure in the CEA area until the contaminant concentrations have been reduced to levels below the NJ GWQC (Ref. 7). Based upon available file materials, the CEA has not yet been established.

There are several well fields in the area of the Fair Lawn Industrial Park, some of which were historically impacted by area-wide sources of contamination. Groundwater contamination that has impacted off-site municipal wells is suspected to have emanated from the Fisher site and other surrounding industrial properties. This area has had numerous potential historical sources of VOC contamination in groundwater which has made it difficult to distinguish responsible parties for certain impacted areas (Refs. 3 and 5). Steps have been taken to address the area-wide contamination and the impact to these wells, including designating the Fair Lawn Well Fields as a Superfund National Priorities List (NPL) site, closing of some municipal well fields, and the installation of monitoring and treatment systems on other municipal well fields (Ref. 11). Thus, given the controls at these municipal wells, exposure to potential

contamination in these wells is not expected to be of concern. In addition, under current site conditions, contaminated groundwater associated with the Fisher site is not migrating beyond site boundaries and thus has no potential to impact these municipal wells.

Surface/Subsurface Soil

All of the residual soil contamination at the Fisher site (AEC 3 and AEC 6) is present within fenced/secured site boundaries. Also, based upon the remaining contaminant concentrations presented in Table 4, no constituents are present in surface soil (0-2 feet bgs) above the NJ RDCSCC or the NJ NRDCSCC. Residual levels are only above the NJ IGWSCC. Thus, exposure to off-site receptors (i.e., tresspassers) to contaminated soil associated with the Fisher site is not considered a potentially complete exposure pathway; and direct exposure of on-site receptors (i.e., workers, construction) to elevated levels of constituents in surface soil is not of concern at this site.

As presented in Table 4, contamination in subsurface soil may exceed the NJ RDCSCC and/or the NJ NRDCSCC in AEC 3 and AEC 6. PCE was detected in AEC 3 in 1984 at a level between 1.0 and 10.0 mg/kg in subsurface soil (11.0 to 11.5 feet bgs) which is potentially above the NJ RDCSCC (4.0 mg/kg) and the NJ NRDCSCC (6.0 mg/kg). PCE was also detected in AEC 6 in 1984 at a level between 1.0 and 10.0 mg/kg in subsurface soil (2.5 to 3.0 feet bgs) which is potentially above the NJ RDCSCC (4.0 mg/kg) and the NJ NRDCSCC (6.0 mg/kg). Thus, given that the Fisher site is an active industrial facility where construction activities may occur, exposure to these residual levels of VOCs is considered a potentially complete exposure pathway (Ref. 2).

All of the residual VOCs identified in Table 4 were detected above the NJ IGWSCC. The NJ IGWSCC is not a direct contact criteria, but rather is an evaluation of levels in soil that may migrate and adversely impact groundwater. The levels detected in soil did not exceed the NJ IGWSCC by an order of magnitude. Groundwater at this site is currently considered controlled and is being remediated by several methods. Thus, the residual VOC levels present in soil are not considered a concern at this time. In addition, the soil samples were collected between 1984 and 1986. Given the volatile nature of the residual contaminants, and the time elapsed since the samples were collected, it is likely that the levels detected in soil at that time have naturally attenuated and reduced from the levels present in the previously collected samples.

References:

1. Remedial Investigation, Fisher Scientific Company, Fair Lawn, New Jersey Facility. Prepared by Weston Consultants. Dated September 28, 1984.
2. Letter from Thomas Fusillo, ENVIRON Corporation, to Jacqueline Bobko, NJDEP, re: Area of Environmental Concern Review, Comparison to Soil Cleanup Guidelines. Dated July 16, 1993.
3. Preliminary Assessment of the Potential Sources and Circumstances of Release to the Fair Lawn Well Fields National Priorities List Site, Borough of Fair Lawn, Bergen County, New Jersey. Prepared by ENVIRON Corporation. Dated October, 1993.
4. Evaluation of the Overburden Remediation System. Prepared by ENVIRON Corporation. Dated August,1994.
5. Feasibility Analysis Relating to Groundwater Contamination in the Vicinity of the Fisher Scientific Company, Fair Lawn, New Jersey. Prepared by ENVIRON Corporation. Dated September, 1994.
6. Packer Test Report. Prepared by ENVIRON Corporation. Dated February, 1996.
7. Letter from Sharon Burkett, ENVIRON Corporation, to Jacqueline Bobko, NJDEP, re: Remedial Action Report, First Quarter 2000. Dated April 21, 2000.

8. Remedial Action Report, Second Quarter 2000. Prepared by ENVIRON Corporation. Dated August, 2000.
9. Modified Remedial Action Report, Third Quarter 2000. Prepared by ENVIRON Corporation. Dated November, 2000.
10. Remedial Action Report, Fourth Quarter 2000. Prepared by ENVIRON Corporation. Dated February, 2001.
11. Teleconference between Elizabeth Butler, USEPA, and Phillip Barnes, ENVIRON, re: Fisher Scientific. June 10, 2001.

4. Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be **significant**[4] (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?

__X__ 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."

____ 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:

Subsurface Soil

The exposures for on-site construction workers to residual VOC levels in subsurface soil is not expected to be significant for several reasons. First, the levels detected are only potentially slightly above the NJ direct contact soil cleanup criteria and were only detected in one sample location at both AEC 3 and AEC 6. Second, these samples were collected in 1984 and the constituents of concern are VOCs. Given the nature of VOCs, it is likely that the concentrations of PCE at these two locations have naturally attenuated and reduced from the previously detected concentrations. Third, it is assumed that construction workers at the facility will use the appropriate personal protective equipment while conducting intrusive activities at the site. Additionally, NJDEP has issued a NFA determination for soil at the Fisher site indicating that no additional characterization or remedial actions are necessary regarding the AECs identified in the RI. Thus, exposure to these discrete contamination locations at the levels detected is considered insignificant.

References:

1. Remedial Action Report, Fourth Quarter 2000. Prepared by ENVIRON Corporation. Dated February, 2001.

[4] 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.

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:

This question is not applicable. See response to question #4.

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):

_X_ 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 Fisher Scientific Company Facility, EPA ID# NJD004362059, located at One Reagent Lane, Fair Lawn, 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:_____

Elizabeth Butler, RPM
RCRA Programs Branch
USEPA Region 2

_____ Date:_____

Barry Tornick, Section Chief
RCRA Programs Branch
USEPA Region 2

Approved by: Original signed by: _____ Date:September 27, 2001

Raymond Basso, 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, 15th Floor, New York, New York, and the New Jersey Department of Environmental Protection Office located at 401 East State Street, Records Center, 6th Floor, Trenton, New Jersey.

Contact telephone and e-mail numbers:

Elizabeth Butler, USEPA RPM
(212) 637-4163
butler.elizabeth@epa.gov

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.

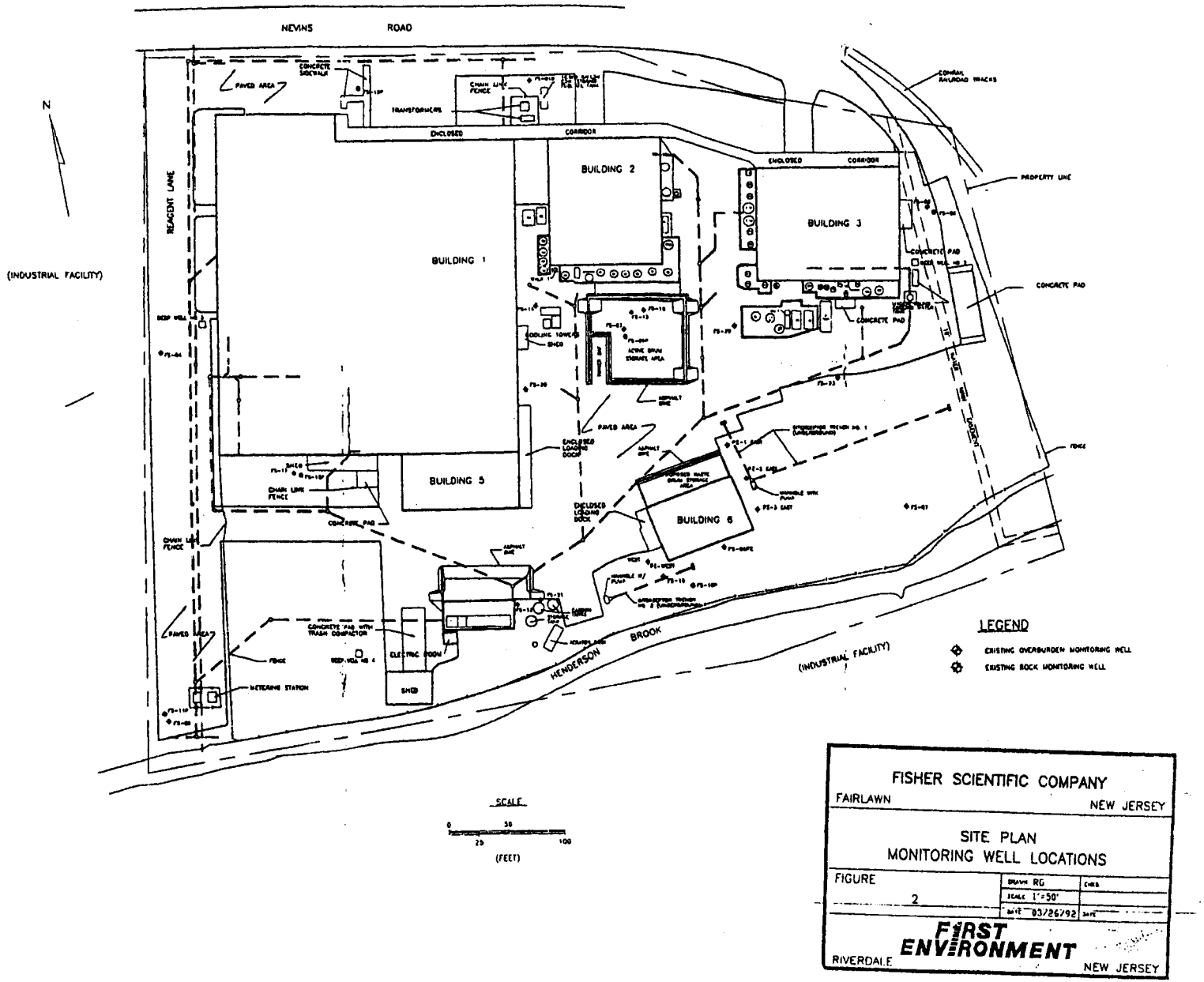
Attachments

The following attachments have been provided to support this EI determination.

- Attachment 1 - Site Plan Map
- Attachment 2 - Locations of AECs, Excavated Areas, and Soil Samples
- Attachment 3 - Monitoring Well Locations and Groundwater Elevation Contours - Overburden (11/27/00)
- Attachment 4 - Monitoring Well Locations and Groundwater Elevation Contours - Shallow Bedrock (11/27/00)
- Attachment 5 - Monitoring Well Locations and Groundwater Elevation Contours - Intermediate Bedrock (11/27/00)
- Attachment 6 - JE Model Results
- Attachment 7 - Summary of Media Impacts Table

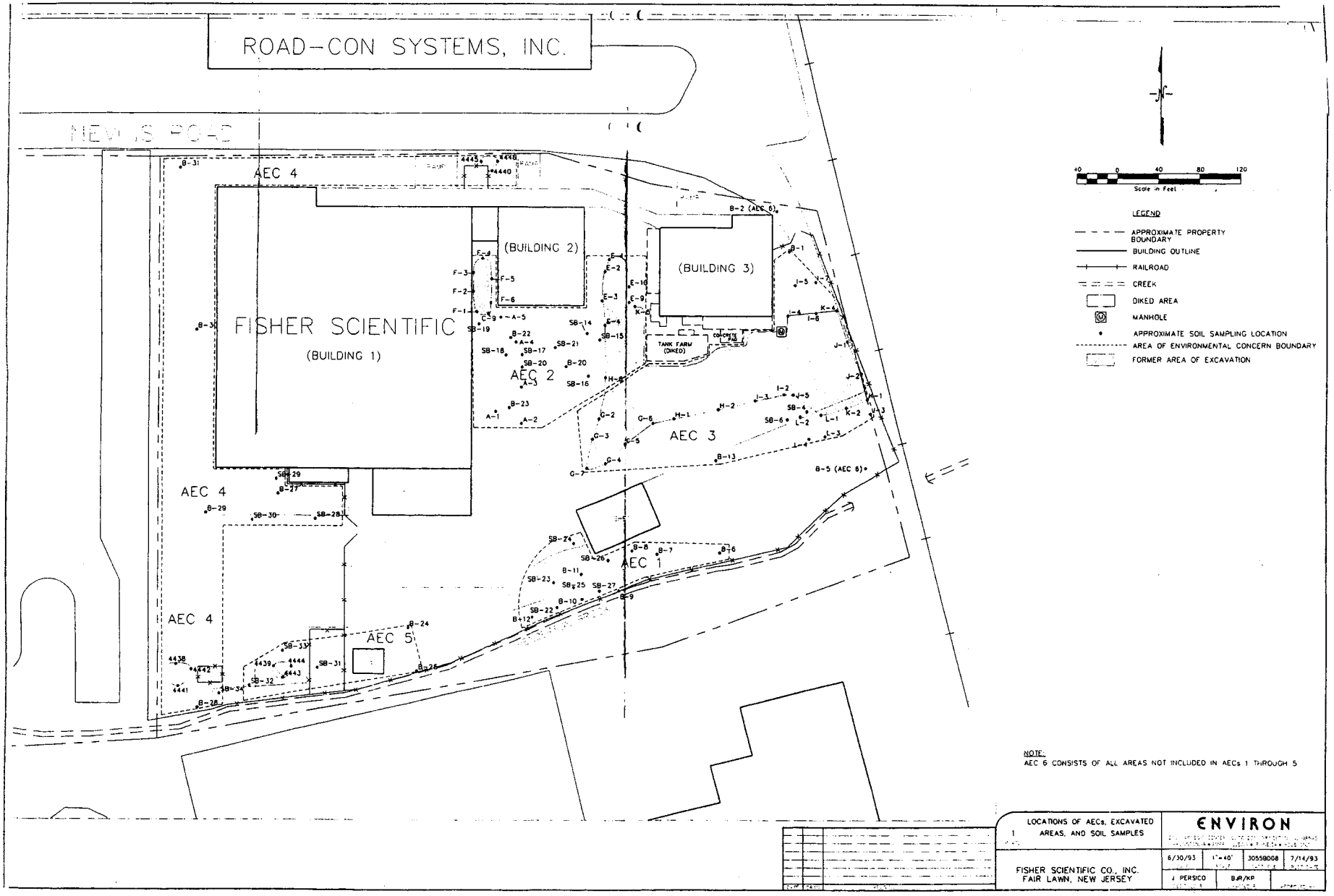
Attachment 1 - Site Plan Map

(Source: Feasibility Study of Discharge Alternatives for the Fisher Scientific Company, Fair Lawn, New Jersey Facility. Prepared by First Environment, Inc. Dated May, 1992.)

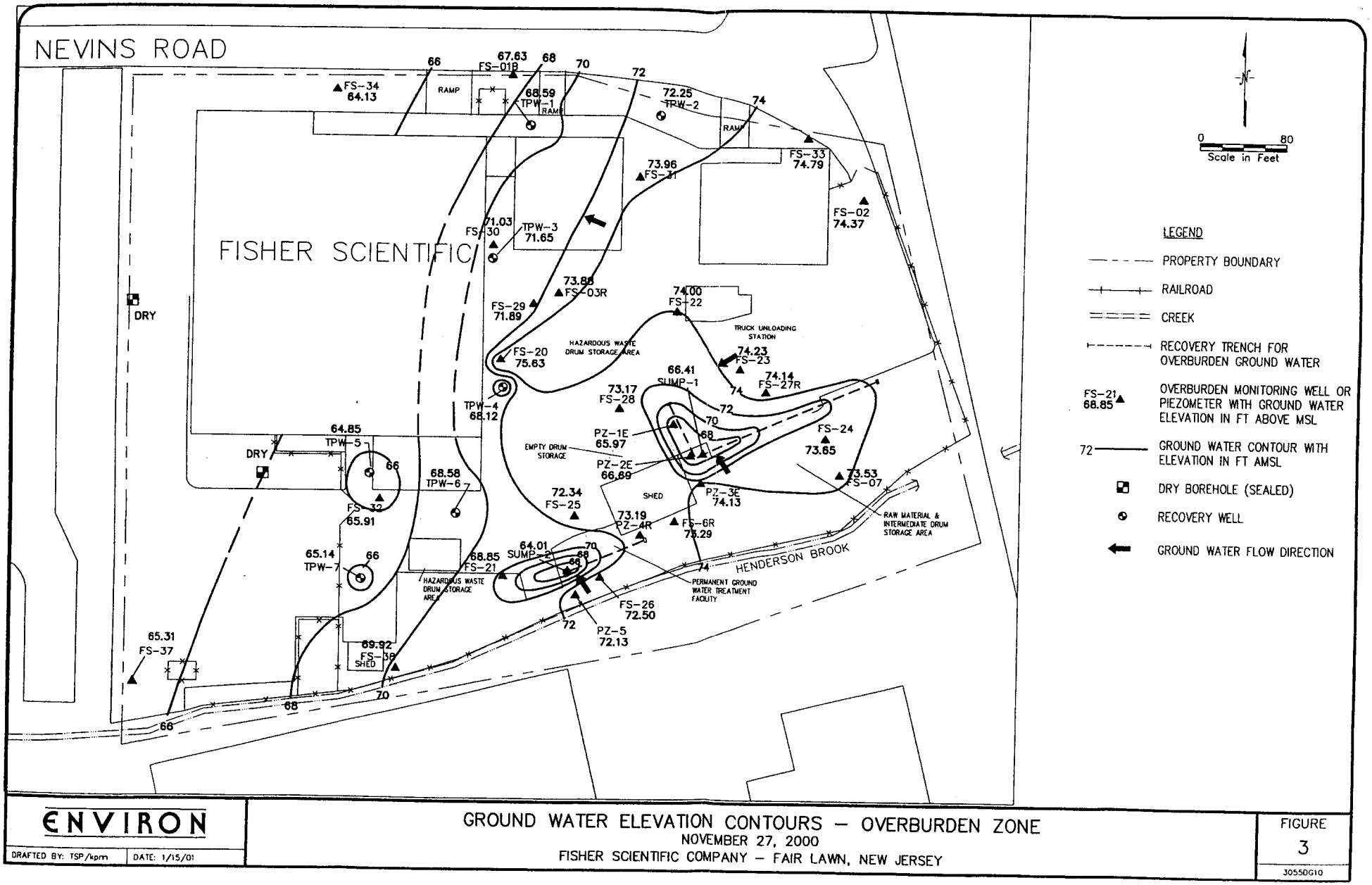


Attachment 2 - Locations of AECs, Excavated Areas, and Soil Samples

(Source: Letter from Thomas Fusillo, ENVIRON Corporation, to Jacqueline Bobko, NJDEP, re: Area of Environmental Concern Review, Comparison to Soil Cleanup Guidelines. Dated July 16, 1993.)



Attachment 3 - Monitoring Well Locations and Groundwater Elevation Contours - Overburden (11/27/00)
(Source: Remedial Action Report, Fourth Quarter 2000. Prepared by ENVIRON Corporation. Dated February, 2001.)



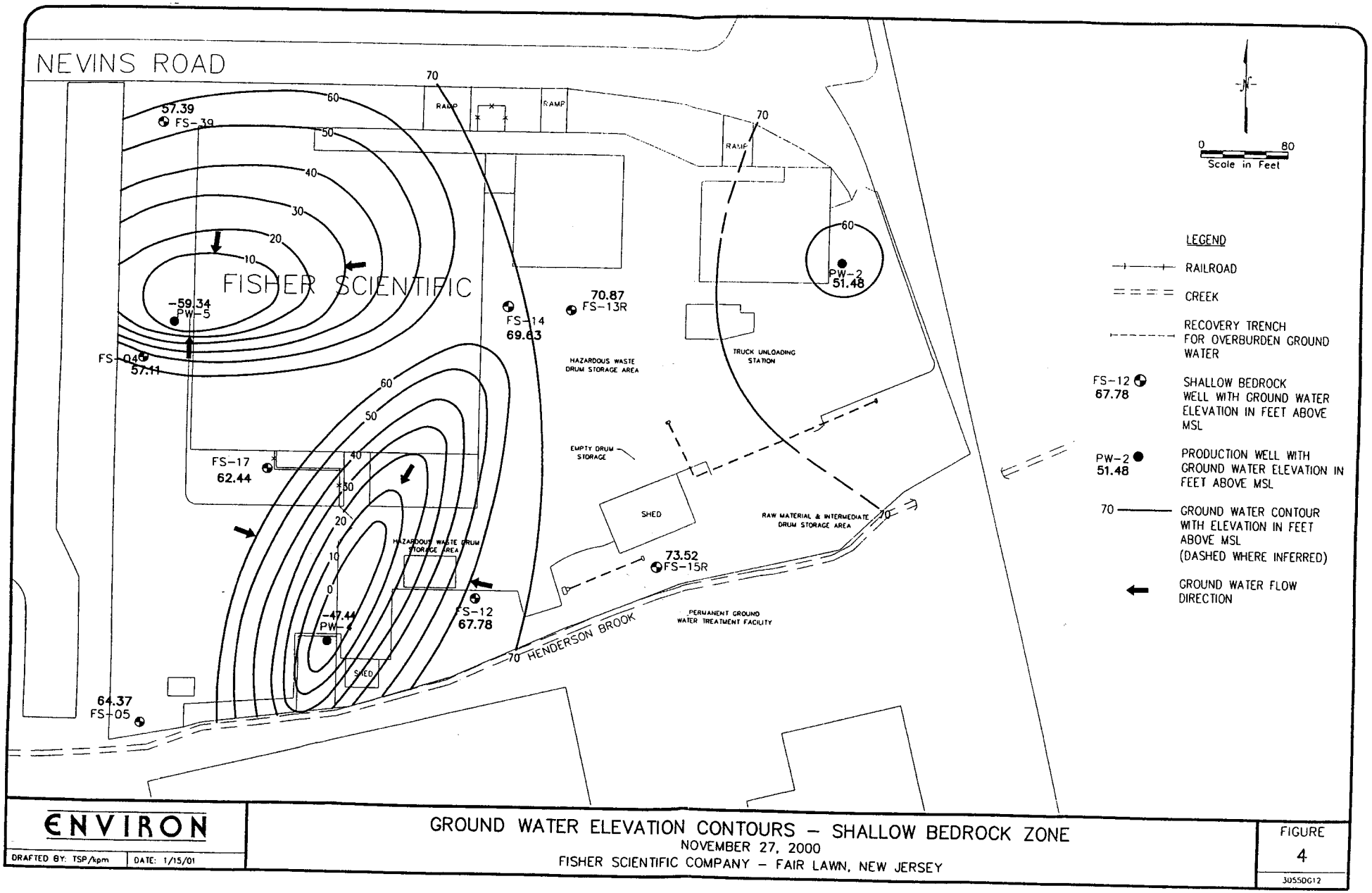
ENVIRON

DRAFTED BY: TSP/kpm | DATE: 1/15/01

GROUND WATER ELEVATION CONTOURS – OVERBURDEN ZONE
NOVEMBER 27, 2000
FISHER SCIENTIFIC COMPANY – FAIR LAWN, NEW JERSEY

FIGURE 3
3055DG10

Attachment 4 - Monitoring Well Locations and Groundwater Elevation Contours - Shallow Bedrock (11/27/00)
(Source: Remedial Action Report, Fourth Quarter 2000. Prepared by ENVIRON Corporation. Dated February, 2001.)



ENVIRON

DRAFTED BY: TSP/kpm | DATE: 1/15/01

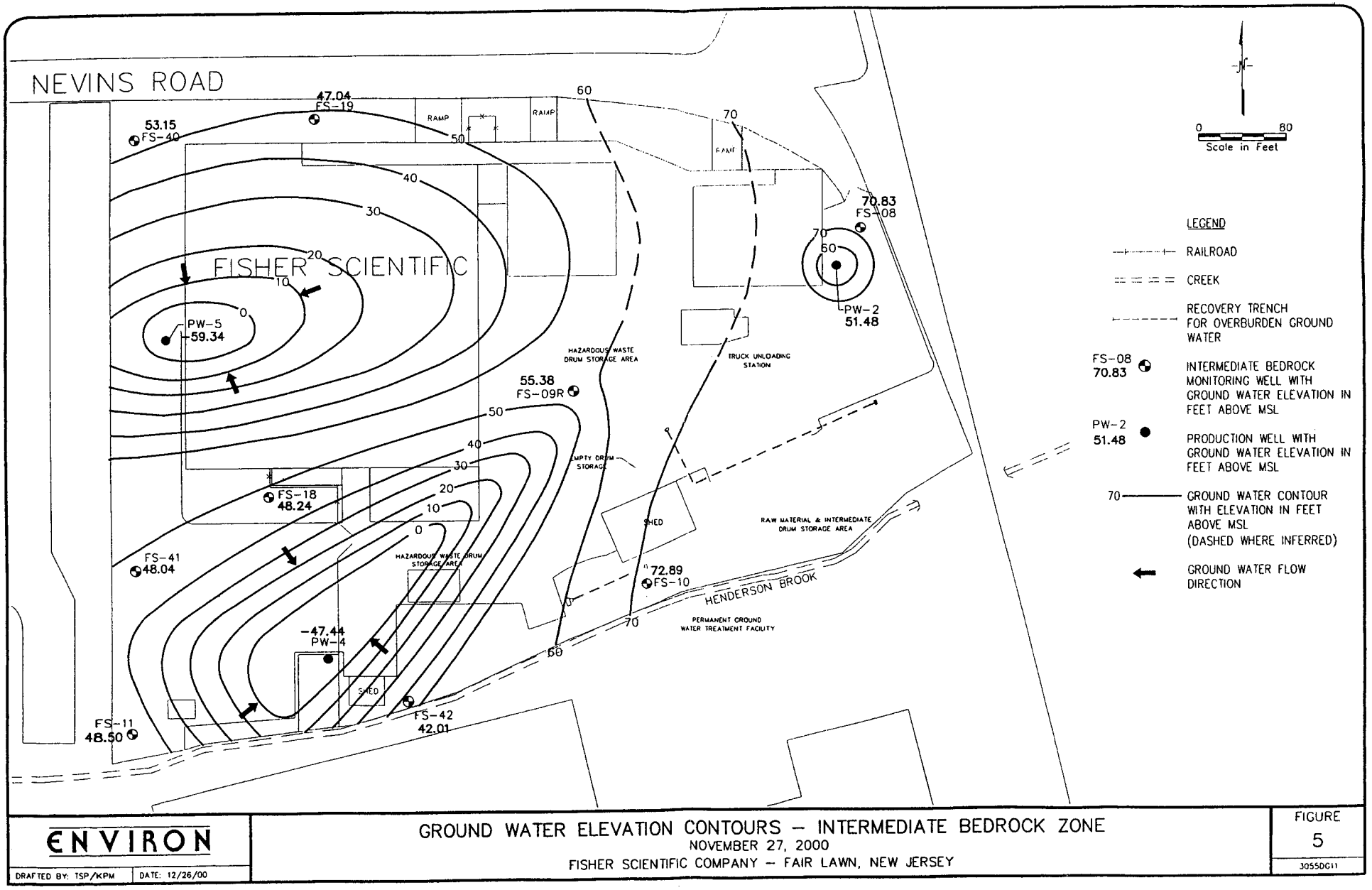
GROUND WATER ELEVATION CONTOURS – SHALLOW BEDROCK ZONE
NOVEMBER 27, 2000
FISHER SCIENTIFIC COMPANY – FAIR LAWN, NEW JERSEY

FIGURE 4

30550G12

Attachment 5 - Monitoring Well Locations and Groundwater Elevation Contours - Intermediate Bedrock (11/27/00)

(Source: Remedial Action Report, Fourth Quarter 2000. Prepared by ENVIRON Corporation. Dated February, 2001.)



ENVIRON

DRAFTED BY: TSP/KPM | DATE: 12/26/00

GROUND WATER ELEVATION CONTOURS – INTERMEDIATE BEDROCK ZONE
NOVEMBER 27, 2000
FISHER SCIENTIFIC COMPANY – FAIR LAWN, NEW JERSEY

FIGURE 5

3055DG11

Attachment 6 - JE Model Results

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES	

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES	X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_w (µg/L)	Chemical
75014	2,900	Vinyl chloride (chloroethene)

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)
15	335	SIC	11

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3)	ENTER Vadose zone soil total porosity, n^v (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3)
SIC			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	NA	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
3.7E-05	NA

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES	

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES	X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_w (µg/L)	Chemical
67663	51.000	Chloroform

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)
15	775	SIC	11

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3)	ENTER Vadose zone soil total porosity, n^v (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3)
SIC			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	NA	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
1.9E-05	NA

Attachment 7 - Summary of Media Impacts Table

Fisher Scientific Company

AEC	GW *	AIR (Indoors)	SURF SOIL	SURF WATER	SED	SUB SURF SOIL	AIR (Outdoors)	CORRECTIVE ACTION MEASURE	KEY CONTAMINANTS
AEC 1. Dry Well Area South of Building 6	Yes	No	No	No	No	No	No	▸ Groundwater extraction, treatment and discharge	VOCs
AEC 2. Drum Storage and Adjacent Areas South of Building 2	Yes	No	Yes	No	No	Yes	No	▸ Groundwater extraction, treatment and discharge ▸ Soil Excavation ▸ Fencing	VOCs
AEC 3. Bulk Transfer Area, East and South of Building 3	Yes	No	Yes	No	No	Yes	No	▸ Groundwater extraction, treatment and discharge ▸ Soil Excavation ▸ Fencing	VOCs
AEC 4. Manholes Along West and North Perimeter of Property	Yes	No	Yes	No	No	Yes	No	▸ Groundwater extraction, treatment and discharge ▸ Soil Excavation	VOCs
AEC 5. Shed Area South of Building 1	Yes	No	Yes	No	No	Yes	No	▸ Groundwater extraction, treatment and discharge ▸ Soil Excavation ▸ Fencing	VOCs
AEC 6. Background and All Other Plant Areas	No	No	No	No	No	Yes	No	▸ Fencing	PCE
AEC 7. Groundwater *	NA								

*Groundwater is being evaluated on a site-wide basis by evaluating constituents present in the three impacted zones at the site (overburden, shallow, intermediate). However, this table identifies AECs at the site in which groundwater contamination above relevant standards has been detected.

NA - Not applicable