DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA725)

Current Human Exposures Under Control

Facility Name:	Firestone Industrial Products Company
Facility Address:	Noblesville, Indiana
Facility EPA ID #:	IND 006 418 263

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.

BACKGROUND

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 EI 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 objective of the RCRA Corrective Action program the EI 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 are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do 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 Determinations status codes should remain in 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).

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)?

	Yes	No	?	Rationale / Key Contaminants
Groundwater	X			Tetrachloroethene (PCE), Trichloroethene (TCE), 1,1-Dichloroethene (1,1-DCE), 1,2-Dichloroethene (1,2-DCE), Vinyl Chloride (VC)
Air (indoors)[2]	X			VC
Surface Soil (e.g., <2 ft)	X			PCE, TCE, 1,1-DCE, 1,2-DCE, VC
Surface Water		X		Polychlorinated Biphenyls (PCBs), per November 2003 sampling, all locations below MCL
Sediment	X			Polychlorinated Biphenyls (PCBs)
Subsurf. Soil (e.g., >2 ft)	X			Arsenic, Chromium, Lead, PCE, TCE, Toluene, PAHs
Air (outdoors)		X		Air stripper emissions were modeled below the risk factor of 10^{-6}

____ 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 and Reference(s):

A Phase I Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) was conducted at Firestone Industrial Products Company from July 1990 to June 1991, in accordance with the Administrative Order on Consent (AOC) signed on June 20, 1990. Areas of investigation included the Main Plant area, the West Landfill, the South Landfill, and Wilson Ditch. Releases for which evaluation of corrective measures were warranted based on potential risk included chlorinated solvent releases and polychlorinated biphenyl releases. Interim Measures and Phase II investigations have been conducted from October 1991 to present. Firestone implemented interim corrective measures to stabilize the site and provide early protection to human health and the environment; including the installation of the groundwater extraction and treatment system, off-site residential well sampling program, oil/solvent mixture removal, and contaminated residential soil removal. Firestone described the nature and extent of the releases of hazardous waste and hazardous constituents at or from the facility, including an evaluation of the

[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.

risks, in the RCRA Facility Investigation (RFI) Report. The RFI Report included chemical analyses of soil, groundwater, stream sediment and stream water for a variety of hazardous constituents which may have been released from the facility. Firestone submitted the RFI Report in April 1993. U.S. EPA Approved the RFI Report in May 1994. Firestone submitted the Corrective Measure Study (CMS), which proposed appropriate risk screening criteria, cleanup objectives, and points of compliance under current and reasonably expected future land use scenarios, and provided the basis and justification for these decisions, in July 1998. The U. S. EPA approved the CMS in July 1999.

On-Site Shallow* Monitoring Wells

Groundwater Contaminant	Maximum Concentration(ppb) 1990-1991	Maximum Concentration (ppb) 2001	Maximum Contaminant Levels (ppb)
Tetrachloroethene (PCE)	100,000	12,000	5.0
1,2-Dichloroethene (1,2-DCE)	300,000 (total)	3500 (cis-) 33 (trans-)	70 (cis-) 100 (trans-)
Trichloroethene (TCE)	7,900	1,200	5.0
Vinyl Chloride (VC)	19,000	500**	2.0

On-Site Deep* Monitoring Wells

Groundwater Contaminant	Maximum Conc. (ppb) 1990-1991	Maximum Conc. (ppb) 2001	MCLs (ppb)
PCE	23	N/A***	5.0
1,2-DCE	66 (cis-)	100 (cis-)	70
TCE	0.45	N/A	5.0
VC	91	77	2.0

Off-Site Shallow Monitoring Wells

Groundwater Contaminant	Maximum Conc. (ppb) July 2003	Maximum Conc. (ppb) Nov 2003	Maximum Conc. (ppb) Feb 2004	Maximum Conc. (ppb) May 2004	MCLs (ppb)
Cis-1,2-DCE	770	740	820	750	70
Trans-1,2-DCE	32	5.6	N/D	N/D	100
VC	280	150	42	30	2.0

Off-Site Deep Monitoring Wells

Groundwater Contaminant	Maximum Conc. (ppb) July 2003	Maximum Conc. (ppb) Nov 2003	Maximum Conc. (ppb) Feb 2004	Maximum Conc. (ppb) May 2004	MCLs (ppb)
Cis-1,2-DCE	35	37	45	29	70
VC	170	170	180	160	2.0

*shallow wells are screened at the water table
*deep wells are screened at bedrock which varies from 30'-150' below ground level
**a geoprobe sample near MW-6SR, taken adjacent to the Main Plant in Nov. '03, indicated VC <1ppb
***not detected in those wells which were sampled, not all wells were resampled due to groundwater draw down
MCLs: Maximum Contaminant Levels (Action Levels)

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	Trespassers	Recreation	Food[3]
Groundwater	N	N	N	Y	N	N	N
Air (indoors)	Y	N	N	N	N	N	N
Soil (surface, e.g., <2 ft)	N	N	N	N	Y	N	N
Surface Water							
~~Sediment~~	~~Y~~	~~N~~	~~N~~	~~N~~	~~Y~~	~~N~~	~~Y~~
Soil (subsurface e.g., >2 ft)	N	N	N	Y	N	N	N
Air (outdoors)							

Instructions 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 ("___"). 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

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

and enter "IN" status code.

Rationale and Reference(s):
The groundwater/human receptor pathway has been eliminated for residents primarily through a private well sampling program which has determined a Well Sampling Area within a ¼-mile radius of the facility. To determine whether the wells within the Well Sampling Area have been affected by released constituents, Firestone has sampled these wells semi-annually. Initial sampling results for these wells were included in the Phase I RFI (Chapter 6) and in the Phase II RFI (Section 3.4 and Appendix A-1), and resampling results are provided to state and federal regulatory agencies. Most of the wells within the study area did not detect constituents related to the facility, however, Firestone provided owners of groundwater wells with connections to the municipal water supply. Since these connections to the municipal water supply were established, Firestone has worked with well owners to close permanently most of the wells within the Well Sampling Area. The wells that remain in use are not used for potable water supply. Currently, a car wash utilizes groundwater, which is sampled semiannually. Per the November 2003 sampling, all constituents of concern at that facility are below detection limit. Additionally, Firestone has advised local permitting officials that the private well program is being conducted, so the officials will not issue permits to drill new wells within the study area. (CMS p.16, Appendix R) Institutional controls have been implemented at the facility itself which prohibit the use of contaminated groundwater for potable purposes. The facility is currently operating a pump and treat system to contain the contaminated groundwater and intends on doing so until the water has reached potable levels as defined by the Maximum Contaminant Levels set forth by the National Primary Drinking Water Regulations . The potential pathway between contaminated groundwater and construction worker is open in the event of cover removal due to maintenance activities.

Indoor air contamination through the vapor intrusion pathway has been evaluated. The potential for indoor air volatilization based on the properties of Vinyl Chloride was examined through the use of the Johnson-Ettinger Model. Although the pathway is complete, there are several factors preventing it from being significant. Building structure, geography, and contaminant properties were all factors taken into consideration with the model. No risks are projected for the resident that exceed EPA's de minimis risk criterion.

In regards to the soil, the Main Plant Area was extensively analyzed for chlorinated solvent constituents during the Phase I and II RFI. Additionally, a separate soil investigation was conducted as part of the RCRA Area closure: the RCRA Area exists within the Main Plant Area and includes a former hazardous waste storage pad and building. (CMS Figure 1) The sampling locations and analytical results are included in the CMS Appendix B. Quantitative human risk assessment was conducted to evaluate the potential for the soil constituents in the RCRA Area and the rest of the Main Plant Area to produce significant risks in three exposure scenarios: long-term facility workers, construction workers, and trespassers on the facility (CMS p.27). No risks are projected for the trespasser or construction worker that exceed EPA's de minimis risk criterion (one-in-one-million additional lifetime cancer risk). The facility worker is projected to have risks in excess of the criterion for direct exposure to surface soils in the RCRA area.

Wilson Ditch sediment exposure is currently a potential pathway. Potential receptors are limited to trespassers and residents of the surrounding area. Due to institutional controls required by Administrative Order Section VIII, workers and construction crews are not potential receptors because all new construction including excavation, in, and adjacent to, Wilson Ditch is prohibited. Additionally, the roof drainage system which was historically the source of PCB contamination is currently monitored as part of the plant's NPDES permit and has indicated no further release of PCBs.

Soils at a depth of and greater than two feet below ground level do not pose a risk as a potential pathway at this time. As the order requires, the entire facility south of Division Street has been restricted to industrial use only. Additionally, discussions with Noblesville land use planning officials and review of planning documents have revealed that there is no intent to consider any change in the "heavy industrial" zoning of the property and that future residential development is expected to occur primarily at the outskirts of the city, rather than in the area of the

facility. (CMS p.27) Consequently, the risk of exposure to residents or trespassers has been essentially eliminated. With respect to the Main Plant area, Section VIII of the Order has required Bridgestone/Firestone to maintain the existing impermeable covers. Therefore, in addition to exposure-reducing precautions likely to be taken when working in an area with documented releases (CMS p.28), this source isolation will further reduce the possibility of worker exposure to any soils. In the event of deep excavation on-site due to maintenance requirements, construction workers would be required to wear the appropriate personal protective equipment.

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 can not 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 and Reference(s):
The potential pathway between construction workers and groundwater is not significant because, in the event of deep excavation due to maintenance, workers will be required to wear certain personal protective equipment.

Indoor air contamination through the vapor intrusion pathway has been evaluated. Based on the Johnson-Ettinger Model it has been determined that there is not a risk at the calculated 10^{-5} de minimis risk criterion (one-in-one-million additional lifetime cancer risk). Based on the local geography, residential home structure, and the characteristics of Vinyl Chloride, the Johnson-Ettinger Model predicted a risk at 194ppb. Groundwater samples taken from local monitoring wells, however, have a maximum shallow aquifer VC level of 30ppb. Therefore, there is no significant risk associated with indoor air.

Regarding the facility worker exposure scenario to soils, the pathway is not complete because the risk assessment does not consider the present Main Plant cover. The area, including all soil, is completely covered by asphalt,

[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.

concrete, and gravel cover, inaccessible to any facility worker. Figure 8A of the Corrective Measure Study illustrates the approximate locations of cover within the Main Plant Area. As required in the Administrative Order, docket number R8H-5-01-002, Section VIII paragraph 19, Firestone will maintain the existing impermeable covers at the main plant area. Part of this required cover includes a paved area located directly south of Plant no. 1, where in the past, raw materials were received and off-loaded at the former railroad spur. The rail spur was removed in 1985 and is no longer a potential source of contamination nor is it a potential exposure pathway. Additionally, as required by the AOC Section VIII paragraph 22b, Firestone shall restrict to industrial use only that portion of the facility property extending south of Division Street. Consequently, areas including the West and South Landfills will remain inaccessible and fully fenced just as the Main Plant area currently is.

Wilson Ditch sediment exposure to trespassers and residents would not be considered significant due to several factors. First, the highest observed levels of polychlorinated biphenyls found in the ditch occur only in on-site portions, which are inaccessible to the public. Worker exposures to these sediments are limited, in addition to the restrictive covenant imposed by the order, by health and safety precautions. Second, the highest off-site PCB levels are present in stretches of the Ditch which are not adjacent to residences. Third, the presence of PCBs in the Ditch has been publicized and awareness of the situation among local residents would serve to minimize use of the Ditch. In regards to bioaccumulation of PCBs in the aquatic food chain, leading to the potential pathway of fish consumption by humans, three departments of Indiana government (Natural Resources, Health and Environmental Management) have maintained advisories not to consume any fish from the affected portion of Wilson Ditch/Stony Creek. If contact with the sediments were to occur, the potential for dermal absorption would be relatively small because the sediments are generally sandy and unlikely to adhere to the skin after leaving the water. (CMS p.32) Finally, the proposed remedy of relocation and excavation of on-site portions combined with the lining of off-site portions of Wilson Ditch will essentially eliminate any exposure risks associated with the Ditch. The remediation plan has been deemed protective of human health with the following PCB exposure scenarios being taken into consideration (as indicated in a 1999 memo from Paula Williams, Toxicologist, to Joseph Boyle, Branch Chief):

PCB Exposure Scenario	Expectation
On-site industrial soil ingestion, dermal contact, soil inhalation	Incomplete pathway because of clean surface soil and engineered cap.
On-site construction soil ingestion, dermal contact, soil inhalation	Incomplete pathway because of deed restrictions, Indiana State construction restrictions
On-site industrial groundwater	Incomplete pathway because groundwater is not used
Off-site residential groundwater	Below MCL as shown by modeling
Off-site recreational sediment ingestion and dermal contact	1 in 1,000,000 calculated in risk assessment
Off-site recreational fish consumption	Incomplete pathway with reliance on Indiana Fish Consumption Advisory

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 and Reference(s):

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 _____ _____facility, EPA ID # _____, located at _____ 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 (signature) _____ Date _____
(print) _____
(title) _____

Supervisor (signature) _____ Date _____
(print) _____
(title) _____

(EPA Region or State) EPA Region 5

Locations where References may be found:

Contact telephone and e-mail numbers

(name) _____
(phone #) _____
(e-mail) _____

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.