DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

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

Current Human Exposures Under Control

Facility Name:	**R & D Chemical**
Facility Address:	**7576 Township Road 235 Mansfield, OH 44904**
Facility EPA ID #:	**OHD080930050**

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 enterÿÿNÿÿ(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 ÿÿCurrent Human Exposures Under Controlÿÿ EI

A positive ÿÿCurrent Human Exposures Under Controlÿÿ EI determination (ÿÿYÿÿ status code) indicates that there are no ÿÿunacceptableÿÿ human exposures to ÿÿcontaminationÿÿ (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 ÿÿcontaminationÿÿ 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 ÿÿCurrent Human Exposures Under Controlÿÿ 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 programÿÿs 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 ÿÿcontaminatedÿÿ above appropriately protective risk-based ÿÿlevelsÿÿ (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		**All COCs* < MDLs or Not Detected**
Air (indoors) [2]		X		**N/A**
Surface Soil (e.g., <2 ft)		X		**All COCs < Region 5 Human Health DQLs**
Surface Water		X		**Not Detected**
Sediment		X		**N/A**
Subsurf. Soil (e.g., >2 ft)		X		**All COCs < Region 5 Human Health DQLs and OEPA Human Health Risk Assessment Calculations**
Air (outdoors)		X		**N/A**

***COC = Compound of Concern used at the facility**

***DQL = Data Quality Level for Human Health Risk**

X If no (for all media) - skip to #6, and enter ÿÿYE,ÿÿ status code after providing or citing appropriate ÿÿlevels,ÿÿ and referencing sufficient supporting documentation demonstrating that these ÿÿlevelsÿÿ are not exceeded.

If yes (for any media) - continue after identifying key contaminants in each ÿÿcontaminatedÿÿ medium, citing appropriate ÿÿlevelsÿÿ (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 ÿÿNÿÿ status code.

Rationale and Reference(s):
Soil concentrations of compounds of concern, including Chromium, Barium, Cadmium, Nickel and Cyanide showed concentrations that were less than risk-based levels, as determined by Ohio State site-specific risk assessments. Contaminant concentrations in soil associated with the former chromium recycling operations also were less than the risk-based levels. All risk assessments were reviewed and approved by the Ohio EPA. Please refer to; Certification of Closure for the Hazardous Waste Drum Storage Area; Closure Plan for the R &D Chemical Company, produced by Smalley and Associates, Inc.

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

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[1] ÿÿContaminationÿÿ and ÿÿcontaminatedÿÿ 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 ÿÿlevelsÿÿ (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.

NOT APPLICABLE

Summary Exposure Pathway Evaluation Table

Potential **Human Receptors** (Under Current Conditions)

ÿÿ**Contaminatedÿÿ Media**	Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food[3]
~~Groundwater~~					___	___	___
~~Air (indoors)~~	___	___	___	___	___	___	___
~~Soil (surface, e.g., <2 ft)~~	___	___	___	___	___	___	___
~~Surface Water~~	___	___	___	___	___	___	___
~~Sediment~~	___	___	___	___	___	___	___
~~Soil (subsurface e.g., >2 ft)~~	___	___	___	___	___	___	___
~~Air (outdoors)~~	___	___	___	___	___	___	___

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strike-out specific Media including Human Receptorsÿÿspaces for Media which are not ÿÿontaminatedÿÿas identified in #2 above.

2. enter ÿÿesÿÿor ÿÿoÿÿfor potential ÿÿompletenessÿÿunder each ÿÿContaminatedÿÿMedia -- Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations some potential ÿÿContaminatedÿÿMedia - Human Receptor combinations (Pathways) do not have check spaces (ÿÿ__ÿÿ). 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 ÿÿEÿÿstatus 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).

If yes (pathways are complete for any ÿÿContaminatedÿÿMedia - Human Receptor combination) - continue after providing supporting explanation.

If unknown (for any ÿÿContaminatedÿÿMedia - Human Receptor combination) - skip to #6 and enter ÿÿNÿÿstatus code.

4. Can the exposures from any of the complete pathways identified in #3 be reasonably expected to be

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

ÿÿsignificantÿÿ[4] (i.e., potentially ÿÿunacceptableÿÿ 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 ÿÿlevelsÿÿ used to identify the ÿÿcontaminationÿÿ; or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable ÿÿlevelsÿÿ could result in greater than acceptable risks)?

NOT APPLICABLE

If no (exposures can not be reasonably expected to be significant (i.e., potentially ÿÿunacceptableÿÿ for any complete exposure pathway) - skip to #6 and enter ÿÿEÿÿ status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to ÿÿcontaminationÿÿ (identified in #3) are not expected to be ÿÿsignificant.ÿÿ

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

If unknown (for any complete pathway) - skip to #6 and enter ÿÿNÿÿ status code

Rationale and Reference(s):

[4] If there is any question on whether the identified exposures are ÿÿsignificantÿÿ (i.e., potentially ÿÿunacceptableÿÿ) consult a human health Risk Assessment specialist with appropriate education, training and experience.

5. Can the ÿÿsignificantÿÿexposures (identified in #4) be shown to be within acceptable limits?

NOT APPLICABLE

If yes (all ÿÿsignificantÿÿexposures have been shown to be within acceptable limits) - continue and enter ÿÿYEÿÿafter summarizing and referencing documentation justifying why all ÿÿsignificantÿÿexposures to ÿÿcontaminationÿÿare within acceptable limits (e.g., a site-specific Human Health Risk Assessment).

If no (there are current exposures that can be reasonably expected tobeÿÿunacceptableÿÿ- continue and enter ÿÿNOÿÿstatus code after providing a description of each potentially ÿÿunacceptableÿÿexposure.

If unknown (for any potentially ÿÿunacceptableÿÿexposure) - continue and enter ÿÿINÿÿstatus 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 **Based on a review of the information contained in this EI Determination, Current Human Exposuresÿÿare expected to be ÿÿUnder Controlÿÿat the R&D Chemical facility, EPA ID OHD 080930050, located at COMPANY NAME/ADDRESS 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 - ÿÿCurrent Human Exposuresÿÿare NOT ÿÿUnder Control.ÿÿ

IN - More information is needed to make a determination.

Completed by	**(signature)**		**Date**	**11/14/01**
	(print)	**Brian P. Freeman**		
	(title)	**Sr. Chemist & Project Manager**		

Supervisor	**(signature)**		**Date**	
	(print)			
	(title)			

	(EPA Region or State)		

Locations where References may be found:
7th Floor File Room, RCRA Side, 77 W. Jackson, Chicago, IL 60604

Contact telephone and e-mail numbers

(name)	**Brian P. Freeman**
(phone #)	**(312) 353-2720**
(e-mail)	**freeman.brian@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.

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA750)

Migration of Contaminated Groundwater Under Control

Facility Name:	**R & D Chemical**
Facility Address:	**7576 Township Road 235, Mansfield, OH 44904**
Facility EPA ID #:	**OHD080930050**

1. Has all available relevant/significant information on known and reasonably suspected releases to the groundwater media, 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 ïïNïï (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 ïïMigration of Contaminated Groundwater Under Controlïï EI

A positive ïïMigration of Contaminated Groundwater Under Controlïï EI determination (ïïYEïï status code) indicates that the migration of ïïcontaminatedïï groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original ïïarea of contaminated groundwaterïï (for all groundwater ïïcontaminationïï 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 ïïMigration of Contaminated Groundwater Under Controlïï EI pertains ONLY to the physical migration (i.e., further spread) of contaminated ground water and contaminants within groundwater (e.g., non-aqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

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. **Is groundwater known or reasonably suspected to be ÿÿontaminatedÿÿ[5] above appropriately protective ÿÿevelsÿÿ(i.e., applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility?**

If yes - continue after identifying key contaminants, citing appropriate ÿÿevels,ÿÿand referencing supporting documentation.

X **If no - skip to #8 and enter ÿÿEÿÿstatus code, after citing appropriate ÿÿevels,ÿÿand referencing supporting documentation to demonstrate that groundwater is not ÿÿontaminated.ÿÿ**

If unknown - skip to #8 and enter ÿÿNÿÿstatus code.

Rationale and Reference(s):

Groundwater sampling and analysis of monitoring wells installed at the R&D site for all compounds of concern yielded non-detectable concentrations, or yielded concentrations far below the Maximum Contaminant Limit (MCL) for Drinking Water

3. **Has the migration of contaminated groundwater stabilized (such that contaminated groundwater is**

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[5] ÿÿContaminationÿÿand ÿÿontaminatedÿÿdescribes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriate ÿÿevelsÿÿ(appropriate for the protection of the groundwater resource and its beneficial uses).

expected to remain within ÿÿxisting area of contaminated groundwaterÿÿ[6] as defined by the monitoring locations designated at the time of this determination)?

NOT APPLICABLE

If yes - continue, after presenting or referencing the physical evidence (e.g., groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the ÿÿxisting area of groundwater contaminationÿÿ[3].

If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the ÿÿxisting area of groundwater contaminationÿÿ[3]) - skip to #8 and enter ÿÿNOÿÿstatus code, after providing an explanation.

If unknown - skip to #8 and enter ÿÿINÿÿstatus code.

Rationale and Reference(s):

4. Does ÿÿontaminatedÿÿroundwater discharge into surface water bodies?

NOT APPLICABLE

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[6] ÿÿxisting area of contaminated groundwaterÿÿs an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of ÿÿontaminationÿÿhat can and will be sampled/tested in the future to physically verify that all ÿÿontaminatedÿÿroundwater remains within this area, and that the further migration of ÿÿontaminatedÿÿroundwater is not occurring. Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.

If yes - continue after identifying potentially affected surface water bodies.

If no - skip to #7 (and enter a ÿÿEÿÿstatus code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater ÿÿontaminationÿÿdoes not enter surface water bodies.

If unknown - skip to #8 and enter ÿÿNÿÿstatus code.

Rationale and Reference(s):

5. **Is the discharge of ÿÿontaminatedÿÿgroundwater into surface water likely to be ÿÿinsignificantÿÿ(i.e., the maximum concentration[7] of each contaminant discharging into surface water is less than 10 times their appropriate groundwater ÿÿlevel,ÿÿand there are no other conditions (e.g., the nature, and number, of discharging contaminants, or environmental setting), which significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations)?**

NOT APPLICABLE

If yes - skip to #7 (and enter ÿÿEÿÿstatus code in #8 if #7 = yes), after documenting:

1) the maximum known or reasonably suspected concentration[3] of key contaminants discharged above their groundwater ÿÿlevel,ÿÿthe value of the appropriate ÿÿlevel(s),ÿÿand if there is evidence that the concentrations are increasing; and 2) provide a statement of professional judgement/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or eco-system.

If no - (the discharge of ÿÿontaminatedÿÿgroundwater into surface water is potentially significant) - continue after documenting: 1) the maximum known or reasonably suspected concentration[3] of each contaminant discharged above its groundwater ÿÿlevel,ÿÿthe value of the appropriate ÿÿlevel(s),ÿÿand if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations[3] greater than 100 times their appropriate groundwater ÿÿlevels,ÿÿthe estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing.

If unknown - enter ÿÿNÿÿstatus code in #8.

Rationale and Reference(s):

6. **Can the discharge of ÿÿontaminatedÿÿgroundwater into surface water be shown to be ÿÿurrently**

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[7] As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

acceptableÿÿ(i.e., not cause impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented[8])?

NOT APPLICABLE

If yes - continue after either: 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the siteÿÿsurface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR 2) providing or referencing an interim-assessment,[9] appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment ÿÿlevels,ÿÿas well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.

If no - (the discharge of ÿÿcontaminatedÿÿgroundwater can not be shown to be ÿÿcurrently acceptableÿÿ - skip to #8 and enter ÿÿNOÿÿstatus code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or eco-systems.

If unknown - skip to 8 and enter ÿÿINÿÿstatus code.

Rationale and Reference(s):

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[8] Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

[9] The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments or eco-systems.

7. Will groundwater monitoring / measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary) dimensions of the ÿÿexisting area of contaminated groundwater?ÿÿ

NOT APPLICABLE

If yes - continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify the well/measurement locations which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the ÿÿexisting area of groundwater contamination.ÿÿ

If no - enter ÿÿNOÿÿstatus code in #8.

If unknown - enter ÿÿINÿÿstatus code in #8.

Rationale and Reference(s):

Groundwater monitoring will continue at PLM in accordance with the Post-Closure Plan for the Hazardous Waste Drum Storage Area for 5 years from the start of remediation at the facility. The Plan was revised and approved by the Ohio EPA in 1998. Groundwater monitoring includes sampling locations upgradient and dowgradient of the former Waste Drum storage area. Groundwater monitoring is used to evaluate the horizontal and vertical extent of TCE contamination and to evaluate progress of the remediation.

8. Check the appropriate RCRIS status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the

facility).

X **YE - Yes, ÿÿMigration of Contaminated Groundwater Under Controlÿÿhas been verified. Based on a review of the information contained in this EI determination, it has been determined that the ÿÿMigration of Contaminated Groundwaterÿÿis ÿÿUnder Controlÿÿat the R & D Chemical Facility, EPA ID #_OHD 080930050 , located at Mansfield Ohio. Specifically, this determination indicates that the migration of ÿÿontaminatedÿÿgroundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the ÿÿxisting area of contaminated groundwaterÿÿThis determination will be re-evaluated when the Agency becomes aware of significant changes at the facility.**

NO - Unacceptable migration of contaminated groundwater is observed or expected.

IN - More information is needed to make a determination.

Completed by	**(signature)**		**Date**	**Nov 14, 2001**
	(print)	**Brian P. Freeman**		
	(title)	**Senior Chemist & Project Manager**		

Supervisor	**(signature)**		**Date**	
	(print)			
	(title)			

	(EPA Region or State)	**Region 5**	

Locations where References may be found:
7th Floor File Room, RCRA Side, 77 W. Jackson, Chicago, Illinois, 60604

Contact telephone and e-mail numbers

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