RCRA Corrective Action
Environmental Indicator (EI) RCRIS Code (CA725)
CURRENT HUMAN EXPOSURES UNDER CONTROL

Facility Name: ATOFINA Chemicals, Inc., East Plant, West Plant, West Brine Field
Facility Address: 17168 West Jefferson Ave.
Riverview, MI 48192
Facility EPA ID #: MID 005 363 114

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)?

Media	Yes	No	?	Rationale/Key Contaminants	Note
Groundwater	Yes			Groundwater data exceeded screening criteria for some constituents at each of the three sites (see note).	(1)
Air (indoors)[2]		No		On-Site: Contaminants do not exceed OSHA PELs. Off-Site: Contaminants do not exceed Part 201 Generic Industrial Groundwater Volatilization to Indoor Air Inhalation Criteria.	(2)
Surface Soil (e.g., <2 ft)	Yes			Surface soil data exceeded screening criteria for some constituents at each of the three sites (see note).	(3)
Surface Water	Yes			Surface water is present at the East Plant. West Plant surface water data exceeded screening criteria for some constituents. Surface water data for the West Brine Field did not exceed screening criteria (see note).	(4)
Sediment	Yes			Sediment is present at the East Plant. West Plant sediment data exceeded screening criteria for some constituents. West Brine Field sediment data did not exceed screening criteria (see note).	(5)
Subsurface Soil (e.g., >2 ft)	Yes			Subsurface soil data exceeded screening criteria for some constituents at each of the three sites (see note).	(6)
Air (outdoors)	Yes			Soil data exceeded ambient air screening criteria for some constituents at each of the three sites (see note).	(7)

_____ 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):

(1) Maximum concentrations of constituents detected in groundwater samples were collected for the RFI and in 2004 in support of the Environmental Indicator determinations. The groundwater samples were screened

[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.

against Region IX PRGs for tap water or, for constituents lacking PRGs, Michigan Part 201 Direct Contact groundwater screening criteria. The following site-related COPCs were identified as having maximum concentrations in exceedance of screening criteria:

East Plant:

Dioxins - 2,3,7,8-TCDD TEQ

Inorganics -, antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, cyanide, iron, manganese, mercury, nickel, selenium, thallium, vanadium, zinc

PCBs/Pesticides - Aroclor 1254, 2,4-D, 4,4'-DDE, aldrin, alpha-BHC, beta-BHC, delta-BHC, endrin aldehyde, gamma-BHC (lindane), gamma chlordane, heptachlor, heptachlor epoxide

SVOCs - 1,2,4-trichlorobenzene, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 1-chloronaphthalene, 2,4,6-trichlorophenol, 2,4-dimethylphenol, 2-chloronaphthalene, 2-chlorophenol, 2-nitroaniline, 3-methylphenol, 4-methylphenol, acetophenone, benzo(b)fluoranthene, benzo(k)fluoranthene, bis(2-chloroethyl)ether, bis(2-ethylhexyl)phthalate, fluoranthene, hexachlorobenzene, hexachlorobutadiene, hexachloroethane, naphthalene, nitrobenzene, pentachlorophenol, phenanthrene

VOCs - 1,1,1,2-tetrachloroethane, 1,1,2,2-tetrachloroethane, 1,1,2-trichloroethane, 1,2,3-trichloropropane, 1,2-dichloroethane, 1,2-dichloropropane, acetone, benzene, bromodichloromethane, carbon disulfide, carbon tetrachloride, chlorobenzene, chloroethane, chloroform, dibromochloromethane, ethyl benzene, methylene chloride, tetrachloroethene, trichloroethene, vinyl chloride

West Plant :

Dioxins - 2,3,7,8-TCDD TEQ

Inorganics - antimony, arsenic, chromium, iron, lead, manganese, nickel, thallium

Pesticides – 4, 4'-DDT, endothall, heptachlor

SVOCs – 1, 4-dioxane, 3&4 –methylphenol, 4-methylphenol, aniline, bis(2-ethylhexyl)phthalate, n-nitrosodiethylamine, n-nitrosodimethylamine, phenol

VOCs - 1,2-dichloroethane, 1,2-dichloroethene, 1,2-dichloropropane, 2-butanone, acetone, benzene, carbon disulfide, chloroform, naphthalene, tetrachloroethene, trichloroethene

West Brine Field:

Inorganics - antimony, arsenic, cadmium, chromium, thallium
SVOCs –bis(2-ethylhexyl)phthalate
VOCs - chloroform

(2) The East Plant property currently does not contain buildings or structures that are used on a regular basis for occupational or recreational purposes.

VOCs in exceedance of US EPA Region 9 PRGs have been detected in West Plant soil and groundwater. VOCs may migrate in vapor form to the indoor air of existing buildings.

The West Brine Field property currently does not contain buildings or structures that are used on a regular basis for occupational or recreational purposes.

Constituent concentrations in perimeter wells at the West Plant, West Brine Field and East Plant do not exceed the Part 201 Generic Industrial Groundwater Volatilization to Indoor Air Inhalation Criteria (GVIIC).

(3) Maximum concentrations of constituents detected in surface soil samples collected for the RFI were screened against US EPA Region IX PRGs or, for constituents lacking PRGs, Michigan Part 201 Direct Contact Commercial/Industrial II screening criteria. The following COPCs were identified as having maximum concentrations in exceedance of screening criteria:

East Plant:

Dioxins – 2,3,7,8-TCDD TEQ

Inorganics – arsenic, chromium, iron, lead

PCBs – Aroclor 1254, Aroclor 1260, 4,4'-DDT, aldrin, delta-BHC, dieldrin, heptachlor

SVOCs – 1,4-dichlorobenzene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, hexachlorobenzene, indeno(1,2,3-cd)pyrene,

West Plant:

Dioxins – 2,3,7,8-TCDD TEQ

Inorganics – arsenic

PCBs – Aroclor 1254

SVOCs – naphthalene

West Brine Field:

Inorganics – arsenic

SVOCs – benzo(a)pyrene, naphthalene, n-nitrosodiethylamine, n-nitrosodiphenylamine

(4) The East Plant property is adjacent to the Trenton Channel of the Detroit River. The Detroit River has been identified as an Area of Concern (AOC) by the United States and Canadian governments because degraded water quality conditions impair certain beneficial uses as defined by the Great Lakes Water Quality Agreement of 1978 (as amended) (Michigan Department of Natural Resources [MDNR] and OME, 1991). An AOC is a "geographic area that fails to meet the general or specific objectives of

the GLWQA where such failure has caused or is likely to cause impairment of beneficial use of the area's ability to support aquatic life," (GLWQA 1978).

Maximum concentrations of constituents detected in West Plant surface water samples collected for the West Plant RFI were screened against US EPA Region IX tap water PRGs or, for constituents lacking PRGs, Michigan Part 201 Direct Contact groundwater screening criteria. The following COPCs were identified as having maximum concentrations in exceedance of screening criteria:

Inorganics – arsenic, lead, zinc

SVOCs – bis(2-ethylhexyl)phthalate

VOCs – bromomethane, carbon tetrachloride, chloroform, chloromethane

Surface water is present at the West Brine Field only in the Huntington Drain, which ultimately discharges into the Trenton Channel of the Detroit River. Maximum concentrations of constituents detected in West Brine Field surface water samples collected for the West Brine Field RFI were screened against US EPA Region IX tap water PRGs or, for constituents lacking PRGs, Michigan Part 201 Direct Contact groundwater criteria. No constituents were found to exceed screening criteria.

(5) The East Plant property is adjacent to the Trenton Channel of the Detroit River. The Detroit River has been identified as an Area of Concern (AOC) by the United States and Canadian governments because degraded water quality conditions impair certain beneficial uses as defined by the Great Lakes Water Quality Agreement of 1978 (as amended) (Michigan Department of Natural Resources [MDNR] and OME, 1991).

The Michigan Department of Environmental Quality (MDEQ) performed a sediment investigation in the Trenton Channel. The results of this investigation are present in a Report entitled Results of the Trenton Channel Project Sediment Surveys 1993-1996, dated July 1997. This report documents the presence of metals, PAHs, PCBS, oil and grease, and other contaminants in sediments throughout the Trenton Channel.
Trenton Channel sediment issues will be addressed separately from this RFI in conjunction with U.S. EPA and MDEQ.

Maximum concentrations of constituents detected in West Plant sediment samples collected for the West Plant RFI were screened against US EPA Region IX industrial soil PRGs or, for constituents lacking PRGs, Michigan Part 201 Direct Contact Commercial/Industrial II screening criteria. The following COPCs were identified as having maximum concentrations in exceedance of screening criteria:

Dioxins – 2,3,7,8-TCDD TEQ

Inorganics – arsenic, chromium

SVOCs – benzo(a)pyrene, naphthalene

Sediment is present at the West Brine Field site only in the Huntington Drain. Maximum concentrations of constituents detected in West Brine Field sediment samples collected for the West Brine Field RFI were screened against US EPA Region IX industrial soil PRGs or, for constituents lacking PRGs, Michigan Part 201 Direct Contact Commercial/Industrial II screening criteria. No constituents detected in sediments exceeded screening criteria.

(6) Maximum concentrations of constituents detected in subsurface soil samples collected for the RFI were screened against US EPA Region IX industrial soil PRGs or, for constituents lacking PRGs, Michigan Part 201 Direct Contact Commercial/Industrial II screening criteria. The following COPCs were identified as having maximum concentrations in exceedance of screening criteria:

East Plant:

Dioxins – 2,3,7,8-TCDD TEQ

Inorganics - arsenic, chromium, cyanide, iron, lead, mercury

PCBs/Pesticides - Aroclor 1254, Aroclor 1260, 4,4-DDT, aldrin, alpha-BHC, delta-BHC, dieldrin, heptachlor

SVOCs - 1,4-dichlorobenzene, 2,6-dichlorophenol, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, hexachlorobenzene, hexachlorobutadiene, hexachloroethane, indeno(1,2,3-cd)pyrene, naphthalene

VOCs – benzene, carbon tetrachloride, chloroform, methylene chloride, trichloroethene

West Plant:

Inorganics – arsenic,

PCBs – Aroclor 1254

VOCs – naphthalene

West Brine Field:

Dioxins – 2,3,7,8-TCDD TEQ

Inorganics – arsenic

SVOCs – benzo(a)pyrene, naphthalene, n-nitrosodiethylamine, n-nitrosodiphenylamine

(7) The US EPA Region IX PRGs used to screen soil at each of the three sites account for the inhalation of VOC vapors and the inhalation of constituents adsorbed onto particulate matter. The COPCs for ambient air exposures to VOC vapors and non-VOCs adsorbed onto particulate matter are the same as those presented in comment (6) above.

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	Maintenance Workers	Day-Care	Construction	Trespassers	Recreation	Food[3]
Groundwater	No	Yes	No	Yes	No	No	No
~~Air (indoors)~~	__	___	___				
Soil (surface)	No	Yes	No	Yes	Yes	No	No
Surface Water	No	Yes	No	Yes	Yes	Yes	No
Sediment	No	Yes	No	Yes	Yes	No	Yes
Soil (subsurface)	No	No	No	Yes	No	No	No
Air (outdoors)	No	Yes	No	Yes	Yes	No	No

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 and enter "IN" status code

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

Rationale and references:

- Groundwater

The hydrogeology of the Site is characterized by a shallow groundwater zone, an intermediate aquitard, and a deep water bearing zone within the limestone bedrock:

1. The shallow groundwater in Wayne County is naturally nonpotable.

2. The intermediate aquitard does not yield water at a sufficient rate to be used as a drinking water source.
3. The deep water-bearing zone is not a suitable drinking water source because it yields groundwater of highly variable quality, typically containing naturally high concentrations of calcium, bicarbonate, sulfate, sodium, chloride, iron, and/or hydrogen sulfide gas.

Following the Phase I investigation, it was discovered that the Halowax area (SWMU17) of the East Plant has DNAPL (Chlorinated naphthalene and chlorinated benzene) free phase product at the northern property line and the northeast corner of the Site. An interim remedial measure was implemented to prevent further migration of the DNAPL off-site into the Trenton Channel. The interim measure consisted of the following:

- Containment wall at the northeast corner of the East Plant;

- A groundwater extraction system for the DNAPL;

- Enhanced groundwater extraction via Phytoremediation. The phytoremediation involved planting over 200 willow and poplar trees to aid control of flow gradient;

- Groundwater pretreatment system; and

- Groundwater monitoring system.

Details of the Halowax area interim remedial measure are presented in the Halowax Area Construction Certification Report provide in Appendix N of the RFI Investigation Report, July 2004. The effectiveness of the IRM will be evaluated in the forthcoming Corrective Measures Study.

Additionally, a water well survey was conducted to determine if any properties within a 1-mile radius of the Riverview sites are using groundwater from the limestone bedrock aquifer underlying the area. Although the water well survey found one operating irrigation well approximately one mile from the sites and situated side gradient of the direction of groundwater flow, no wells were in use within 1 mile downgradient (to the west or southwest) of the Riverview properties. A summary of the water well survey is presented in Appendix A of the Groundwater Investigation Report (CRA, 2004a).

Nevertheless, groundwater at the East Plant, West Plant and West Brine Field is restricted from use by a Declaration of Restrictions and Notice of Statutory Obligations that were executed on November 15, 2001 and January 2, 2002, respectively. Specifically, the deed restriction on the three properties states that "The use of any groundwater located on the Property for any purpose shall be prohibited."

Currently, the City of Riverview Department of Public Works supplies potable water to the city of Riverview. The City of Riverview Department of Public Works provides potable water from the City of Detroit. Therefore, an exposure of maintenance workers and others at and around the Site via potable and non-potable

groundwater use is not expected.

Potential exposure to groundwater is possible for construction workers engaging in subsurface activities at all three parcels of the site. Currently, there are no construction activities on site.

- Soil: Surface and Subsurface

Exposure to surface soil at the West Plant, West Brine Field and East Plant is possible only for on-site maintenance workers, construction workers and trespassers.

Exposure to subsurface soil is possible only for construction workers engaged in subsurface activities.

Although exposures to impacted areas are possible at the site, Atofina has implemented interim measures that have prevented further exposure to constituents in soil on the West Brine Field. The interim remedial measures were:

- SWMU 2 was closed by excavation (under a temporary structure) of approximately 1000 drums of non-hazardous waste;
- Performed initial clean-up of the majority of laboratory glassware in SWMU3;
- Closed SWMU 4 by excavating and disposing of waste.
- Closed SWMU 7 by excavating and disposing of waste.

More detailed information about these IRMs can be found in the respective reports for each project, as well as the RFI Report for the West Brine Field, February, 2002.

In addition, surface soil having high concentrations in the West Plant area have been covered with gravel to prevent industrial workers from coming in direct contact with the contaminated soils.

- Surface Water and Sediment

Exposure to surface water and sediment at the West Plant was considered a complete pathway only for on-site maintenance workers, construction workers and trespassers. Exposure to surface water and sediment at the East Plant was considered a complete pathway for recreational users and food via fish in the Detroit River.

Although exposures to impacted areas are possible at the site, Atofina has implemented interim measures that have prevented further exposure to constituents in sediment on the West Plant. The interim remedial measures were:

- SWMU 4 was closed (Ponds 1, 2 and 3) by draining water, excavating, solidifying and removing sediment under a temporary structure with negative air pressure and emission controls.
- SWMU 20 (West Trunk Ditch) by excavating, solidifying, and removing sediment.
- Led a multi-party remediation of sediments in the Monguagon Creek.

More detailed information about these IRMs can be found in the respective reports for each project, as well as the RFI Report for the West Plant, June, 2002.

- Air: Indoor and Outdoor

Exposure to constituents in outdoor air is possible for maintenance workers, and trespassers at the East Plant West Plant, and West Brine Field.

Exposure to constituents that might volatize and potentially migrate into indoor air is possible at West Plant for office workers.

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 References:

Human health risk assessments were conducted for each of the three sites and included in the RFI reports (Appendix K of the East Plant RFI Report [CRA, 2004b], Appendix J of the West Plant RFI report [CRA, 2002a], and Appendix J of the West Brine Field RFI Report [CRA, 2002b]). The risk assessments, conducted in accordance with US EPA, indicated no unacceptable risks for the maintenance worker at the West Plant and the adolescent trespasser at the East Plant, West Plant, and West Brine Field. Full documentation and discussion of the risk assessment methodology can be obtained from the RFI reports (references provided at the end of this document).

A summary of the noncarcinogenic hazards and carcinogenic risks for the office worker, maintenance worker, and adolescent trespassers are presented on Table 1.

For the East Plant, risk characterization revealed no estimated cancer risk levels exceeding the 1×10^{-5} benchmark and no total hazard indices exceeding the 1.0 hazard quotient for the office worker exposure to soil VOC vapors and adolescent trespasser scenarios. The maintenance worker scenario resulted in a risk level of 3×10^{-4} for oral exposures to surface soil. This level is attributable to the presence of dioxin in surface soil at multiple locations (17) sample locations. Additionally, three hits of benzo (a) pyrene at sample locations soil boring (SB)-05 in SWMU-01, SB-09 in SWMU-20, and SB-15 in SWMU-11 results in a cancer risk level of 1×10^{-5}. Remediation of these three sample locations and the dioxin sample locations will bring maintenance worker scenario risks to below an acceptable level. Remedial actions to address this scenario will be proposed in the forthcoming CMS. Additionally, elevated levels of Arsenic at SWMU15 and SWMU 16 will be evaluated in the CMS. Current exposures to these areas before future remedial action is prevented by personal protective equipment (PPE) worn by workers.

[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.

The construction worker scenario at the East Plant resulted in an HI of 3.0 and a risk level of $2\times10^{-5.}$ The HI value was driven by dermal contact with chloroform in groundwater in a utility trench setting. The ingestion of dioxin in soil also contributed to the construction worker risk level. Remediation of the sample locations proposed to remedy potential maintenance worker exposure will likely result in potential construction worker soil exposures meeting acceptable levels.

The office worker exposure to groundwater VOC vapor scenario at the East Plant resulted in a risk level of 8×10^{-4} and a hazard index of 2. These levels are solely attributable to the presence of chloroform in groundwater at MW-17. A remedial action to address these construction worker and office worker groundwater exposure scenarios will be presented in the forthcoming Corrective Measures Study for the final remedy at the site. Currently there are no construction workers or office workers on the East Plant. If construction work were to occur on the East Plant before remedial action takes place, workers would have wear PPE.

For surface soil exposures, the overall hazard for the trespasser at the East Plant was 0.05 (below US EPA's acceptable benchmark level of 1.0) and the overall cancer risk was 1×10^{-5} (within US EPA's acceptable risk range of 1×10^{-6} to 1×10^{-4}). These results indicate no unacceptable exposures to the adolescent trespasser at the East Plant.

For surface soil, sediment, and surface water exposures, the overall hazard for the maintenance worker at the West Plant was 1.0 (at US EPA's acceptable benchmark level) and the overall cancer risk was 9×10^{-6} (within US EPA's acceptable risk range of 1×10^{-6} to 1×10^{-4}). These results indicate no unacceptable exposures to the maintenance worker at the West Plant. Personal Protective Equipment (PPE) will be used by workers in areas with soil contamination until they are addressed.

For surface soil, sediment, and surface water exposures, the overall hazard for the trespasser at the West Plant was 0.06 (below US EPA's acceptable benchmark level of 1.0) and the overall cancer risk was 3×10^{-7} (below US EPA's acceptable risk range of 1×10^{-6} to 1×10^{-4}). These results indicate no unacceptable exposures to the adolescent trespasser at the West Plant.

For exposures to groundwater and soil VOC vapors infiltrating into indoor air for the office worker scenario at the West Plant, the overall hazard was 0.06 (below US EPA's acceptable benchmark level of 1.0) and the overall cancer risk was 3×10^{-7} (below US EPA's acceptable risk range of 1×10^{-6} to 1×10^{-4}). These results indicate no unacceptable exposures to office workers at the West Plant.

For surface soil exposures, the overall hazard for the trespasser at the West Brine Field was 0.01 (below US EPA's acceptable benchmark level of 1.0) and the overall cancer risk was 1×10^{-7} (below US EPA's acceptable risk range of 1×10^{-6} to 1×10^{-4}). These results indicate no unacceptable exposures to the adolescent trespasser at the West Brine Field.

In summary, the human health risk assessments for the East Plant, West Plant, and West Brine Field, conducted in conjunction with the RFIs for the three sites, indicated no unacceptable hazards or risks to receptors exposed to affected site media under current land-use conditions.

Lead was identified as a COPC in East Plant surface soil. The mean concentration of total lead in East Plant surface soils (0-2.5 ft bgs) is 286.09 mg/kg, which is less than the Region IX PRG of 750 mg/kg indicating that human exposures are within acceptable levels for lead and were not considered "significant."

Lead was identified as a COPC in West Plant surface water. The maximum concentration of lead in West Plant surface water, .0142 mg/L, is less than the MDEQ Rule 57 human non-cancer surface water value for

non-drinking water exposures [calculated to be protective of humans] of 0.190 mg/L indicating that human exposures are within acceptable levels for lead and were not considered "significant."

Fish consumption from the Detroit River is very limited due to several fish advisories. There are currently advisories banning consumption of carp, and there are fish consumption advisories for freshwater drum, northern pike (for women and children), redhorse sucker (for women and children), walleye, and yellow perch (for women and children). These fish consumption advisories are size-dependant. Consult the *Michigan Fish Advisory* guide for species lengths.

Recreational use of the Detroit River has been limited due to bacteria levels, and not specific constituents that may be present in the surface water. To evaluate any current impact of chemicals migrating from the site into the Trenton Channel of the Detroit River, Atofina performed a loading evaluation for constituents that are exceededing generic GSI criteria in onsite wells. The results of this evaluation show negligible loading to the Trenton Channel (See Table 2). None of the chemicals resulted in exceedances of PRGs, MCLs, or Michigan Act 451, Part 201 Generic GSI criteria.

The East Plant and West Plant have several locations with Tentatively Identified Compounds (TICs). TICs are organic compounds that are not included on the target compound list (TCL) and, therefore, are not included in the instrument calibrations standards for TCL analyses. A remedial action to address the TICs will be presented in the forthcoming Corrective Measures Study for the final remedy at the site.

The remaining potentially complete exposure pathways at each of the three sites represent hypothetical future scenarios that are not included in the scope of this evaluation.

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 **ATOFINA Chemicals, Inc., East Plant, West Plant, and West Brine Field properties**, EPA ID **#MID 005 363 114**, located at **17168 West Jefferson Ave., Riverview, MI 48192** 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) Tammy Moore

(title) Environmental Scientist

Supervisor (signature) _____ Date _____

(print) George Hamper

(title) Section Chief

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Locations where References may be found:

US EPA Region 5 Headquarters
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Chicago, IL 60604

All material referenced in this document can be found in the following reports:

CRA, 2004a. Groundwater Investigation Report In Support of Environmental Indicator (EI) Determinations for the East Plant, West Plant, and West Brine Field. August, 2004.

CRA, 2004b. *Revised Final RCRA Facility Investigation Report - East Plant*. Prepared for ATOFINA Chemicals, Inc. (formerly Elf Atochem North America, Inc.), July 2004.

CRA, 2002a. *Final RCRA Facility Investigation Report - West Plant*. Prepared for ATOFINA Chemicals, Inc. (formerly Elf Atochem North America, Inc.), June 2002.

CRA, 2002b. *Final RCRA Facility Investigation Report - West Brine Field*. Prepared for ATOFINA

Chemicals, Inc. (formerly Elf Atochem North America, Inc.), February 2002.

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

ACRONYM LIST

bgs	below ground surface
COPCs	chemicals of potential concern
MDEQ	Michigan Department of Environmental Quality
OSHA	Occupational Safety and Health Administration
PCBs	polychlorinated biphenyls
PELs	permissible exposure levels
PRG	Preliminary Remediation Goal
RCRA	Resource Conservation and Recovery Act
RFI	RCRA facility investigation
SVOC	semivolatile organic compound
TCDD	tetrachlorodibenzo-*p*-dioxin
TEQs	toxicity equivalents
US EPA	United States Environmental Protection Agency
VOC	volatile organic compound