DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA750)
Migration of Contaminated Groundwater Under Control

Facility Name: **Omark Caribbean, Inc. (Formely a subsidiary of Oregon Chain Saw)**
Facility Address: **88-90 Street D, Minillas Industrial Park, Bayamon, Puerto Rico**
Facility EPA ID#: **PRD090038092**

<u>Definition of Environmental Indicators (for the RCRA Corrective Action)</u>

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.

<u>Definition of "Migration of Contaminated Groundwater Under Control" EI</u>

A positive "Migration of Contaminated Groundwater Under Control" EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original "area of contaminated groundwater" (for all groundwater "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

<u>Relationship of EI to Final Remedies</u>

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 "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (i.e., further spread) of contaminated groundwater 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.

<u>Duration / Applicability of EI Determinations</u>

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).

<u>Facility Information</u>

Site Description and Manufacturing Process: Omark Caribbean Inc. (OC), a subsidiary of Oregon Saw Chain Division, is located in Minillas Industrial Park in Bayamon, Puerto Rico. According to a topography map, the Rio Bayamon is located approximately 500 feet from the facility. The facility is bounded to the northeast by Street E., to the northwest by Banda Fria, Inc., to the south by an unnamed creek enbankment, to the east by Novoa Manufacturing Forms,Inc., and to the west by Street D. The manufacturing operation began on May 3, 1965 and ended on October 4, 1985. Omark manufactured saw chains used in power chain saws to cut trees. The OC facility was also involved in the electroplating and metal finishing processes. Metal parts were stamped, heated, treated, chrome plated, ground and cleaned. Following these processes, chain part components were assembled and packaged. The OC facility included several departments used in the manufacturing processes: A Tool and Die Department; a Chrome Plating Department; a Chrome Treatment Area; a Punch Press Department; a Heat Treatment Department; an Automatic Assembly Department; Parts Washing Department; a Maintenance Shop and Tool Department; a Warehouse; Electrochemical Milling (ECM) Department, Parts Washing; and a Wastewater Treatment Plant (WWTP) located adjacent to the Bayamon River.

Permit History: Omark submitted a Part A application as a treatment and disposal facility (TSDF) and a generator on November 19, 1980 for two (2) regulated units: A hazardous waste container storage area (S01), and a storage tank (T04). A revised Part A application was submitted in December 1985. The facility decided to cease operation in 1985 instead of submitting a required Part B RCRA Permit application. A closure plan was submitted for the container storage area on January 17, 1986 and approved by EPA on December 17, 1988. The Closure plan was public noticed on December 28, 1988. The closure certification (clean closure) was approved by EPA on June 16, 1989. The storage tank was later determined to have protective filer status during the same year.

The EQB issued a national pollutant discharge elimination system permit (NPDES) (PR0001678) to Omark for discharge of wastewater effluent from its WWTP. The EQB's Air Emission Programs issued an Air Emissions permit (PFE-1105850372) to Omark for managing air emissions sources from the fume scrubber.

The hazardous wastes generated from the manufacturing processes were as follows: Trivalent chromium (Cr^{+3}), hexavalent chromium (Cr^{+6}) (F006); Activated charcoal, and spent oils (D001); Chromic hydroxide solution, chrome duct deposits, washwaters, chrome plate resins, ECM duct deposits (D007); Spent 1,1,1-trichloroethane (F001); Still bottoms 1,1,1-trichloroethane (F002); Filter cake from electroplating (F006); Chromic acid solution (U032); Mercury (Hg) liquid metal (U151); reagent 1,1,1-trichloroethane (1,1,1-TCA); washwaters, (U226); and Ferric chloride and Lead (D008).

Site Responsibility and Legal Instrument: Facility was an Interim Status facility. No Order of Consent was signed. Corrective action activities were conducted voluntarily.

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

<u>Summary of Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs)</u>: Solid Waste Management Units (SWMUs): A RCRA Facility Assessment (RFA) was performed on December 31, 1987, and amended in 1991. The RFA identified three (3) solid waste management units (SWMUs) and the three (3) Areas of concern (AOCs) which are briefly described below. The SWMUs and AOCs are as follows: A Hazardous waste container storage area (SWMU-1), a Chrome Treatment Area (SWMU-2), a Wastewater Treatment plant (WWTP) (SWMU-3), a Chrome Plating Department (AOC-1), a Tool and Die Department (former chrome plating department) (AOC-2), and Automatic Assembly Department (AOC #3). The RFA was approved by EPA on September 25, 1991, Based on the RFA's findings, supported by visual site inspection along with sampling sampling and analyses, it was evident that SWMU-2, SWMU-3, AOC-1, AOC-2, and AOC-3 were contaminated. Therefore, the RFA concluded, and recommended that a RCRA facility investigation (RFI) be performed to fully characterize the site and to determine the extent (vertical and horizontal) of hazardous waste contaminants site wide.

SWMU # 1, Hazardous waste container storage area (CSA): The hazardous waste container storage area had been storing wastes since 1978, and closed on April 19, 1988. This CSA , which is located outside of the main building, consisted of a storage shed, and occupied a total area of 340 square feet. This area had a total storage capacity to contain 100 drums (55-gallons each) and several five-gallon containers. The container storage area floor slab was constructed of reinforced concrete blocks, cemented to the slab and lined with sand cement coating. The hazardous wastes were stored in 55-gallon drums or containers. The hazardous wastes managed were as follow: Spent 1,1,1-trichloroethane, chromic hydroxide, zinc hydroxide, chromic acid, mercury, activated charcoal, spent oils, chrome plate resins, EMC chrome duct deposits, chromium sulfate, sodium nitrate mixture, and filter cake from electroplating. The filter cake produced by the fliter press was placed in 55-gallon drums for storage in the hazardous waste container storage area and shipped to the CECOS Livingston, Louisiana Hazardous waste Landfill, an authorized hazardous waste landfill.

No releases was reported for this unit, however, an inspection conducted on February 25, 1982 identified 53 unlabeled, and corroded drums containing sludge of chrome hydroxide.

SWMU # 2, Chrome Treatment Area (CTA): The CTA commenced operations in 1970, and ceased to operate on October 4, 1985. The CTA was used to treat wastewaters and residues originating from plating operations, scrubbing solution used for collecting chromic acid fumes in the chrome treatment department, sludges, precipitated chromium slurry, and filter cake produced by the filter press. The chrome treatment area consisted of a total of six (6) rectangular shaped concrete tanks. Three (3) tanks were used as receiving tanks for materials coming from the plating department and for recycle materials, and the remaining three (3) tanks were used to treat chromium. The chromium treatment consisted of the reduction of hexavalent chromium (Cr^{+6}) into trivalent chromium (Cr^{+3}). The treatment used sulfuric acid, sulfur dioxide gas and sodium hydroxide. The wastes generated were as follows: wastewaters and residues originated from the plating operations which were conducted in the chrome plating department; chrome compounds such as chromium hydroxide, chromic acid, and chrome sulfate; scrubbing solution (a scrubber was used for scrubbing the chromic acid fumes collected from the plating tanks) used for collecting chromic acid fumes in the chrome treatment area; sludge, and/or filter cake which contained Cr^{+6}. The precipitated chromium slurries (sludges), which contained Cr^{+6}, were removed from the treatment tanks and pumped to a filter press. The filter cakes produced by the fliter press were placed in 55-gallon drums for storage in the Hazardous Waste Container Storage Area and shipped to the CECOS Livingston, Louisiana Hazardous waste Landfill, an authorized hazardous waste landfill. The treated effluents were sent to an equilization tank and then treated in the Wastewater Treatment Plant (WWTP).

SWMU # 3, Wastewater Treatment Plant (WWTP): The WWTP commenced operations in 1970 and ceased to operate in 1988. This unit is located adjacent to the Bayamon River. The WWTP consisted of ten (10) treatment phases as follows: 1) Equalization, aeration, and oil removal from various intermittent flows of wastewater; 2) A lime treatment for removal of contaminants; 3) Aeration of clarifier feed; 4) Coagulation/flocculation; 5) Clarification by settling; 6) Filtration by sand and anthracite; 7) Carbon adsorption; 8) Final pH adjustment (post neutralization); 9) Sludge collection and concentration; and 10) Dewatering of concentrated clarifier sludge with recycling of filtrate water to the front end of the treatment system. The wastewaters managed were coming from the equalization tank of the Chromium Treatment Area. The equalization tank received wastes coming from Parts Department, the Electro-Chemical Milling (EMC) Department, the EMC fume scrubber emission control residual liquid, and the chrome treatment system's treated effluent. The filter cake sludges generated from treated wastewater was accumulated in drums, and were disposed off site at CECOS, a treatment and disposal facility

(TSDF) located in Livington, Louisiana which was owned and operated by Browning- Ferris Ind. Treated wastewater effluent was discharged directly into the unnamed creek that feeds into the Bayamon River until September 4, 1985. Thereafter, the wastewater effluent was discharged to the Puerto Rico Aqueduct and Sewer Authority (PRASA).

On September 30, 1981, the EPA issued an order (order # CWA-II-81-75) to show cause for vilotations of the Clean Water Act. The complaint was filed on April 30, 1975, by the PRASA authority as a result of release that had occurred from the Omark's WWTP. This release had a direct impact on the Santa Rosa Reservoir which is used as a source of drinking water.

A Compliance Sampling Report dated 1982 revealed some violation of various parameters including: pH, total chromium, hexavalent chromium, TSS, and iron. Sampling and analytical results of discharge monitoring report dated January 1986 show high concentrations of hexavalent chromium, iron, zinc, cadmium etc.. at a NEPDES discharge point.

AOC # 1, Chrome Plating Department (CPD): The CPD commenced operations in 1970 and ceased to operate on October 4, 1985. The CPD was involved in the plating manufacturing process. The operations included a total of six (6) plating tanks that contained chromic acid solutions necessary for plating chain saw parts. The tanks operated in parallel and were connected to a chrome treatment area located next to the CPD. Of the six tanks, three (3) were used as receiving tanks for the materials coming from the plating department and for recycled materials. A scrubber was used for scrubbing the chromic acid fumes collected from the plating tanks inside the CPD. The scrubbing solution from the scrubber's bottom container drained into one of the collection tanks in the treatment area. A seventh (7^{th}) tank, which is located below the chrome plating area, received chrome wastewaters, and was used to reduce the chrome wastewaters from hexavalent chromium (Cr^{+6}) to trivalent chromium (Cr^{+3}) in a batch process. The drainage and ventillation systems for the plating operations included ducts and pipes that were located inside trenches in the building's floor. The trenches were directed toward the south wall of the CPD leading the pipes and ducts into the Chrome Treatment Area. The raw materials used in the plating operations were chromic acid, barium carbonate or barium salts, lead anodes, and chromic acid solutions. The CPD managed wastewaters which contained chromium hydroxide, chrome duct deposits, chrome plate resins, chromic acid, ECM duct deposits, and chromium sulfate.

A spill originating from this manufacturing process area was reported on June 18, 1987. The spill was caused by a broken pipe that allowed water to pour into the chrome plating area. Waters contaminated with chromium were drained into the unnamed creek located at the south end of the Omark facility. Visual site inspections conducted by EQB on November 9, 1987, followed-up by sampling and analytical results during the same year, revealed that total chromium concentrations of 270 mg/l, and 3,300 mg/l, respectively, were above background. At the conclusion of Omark's operations, the tanks were sold to another electroplating company in Puerto Rico, and the chromic acid solutions were treated at the chrome treatment area.

AOC # 2, Tool and Die Department (Former Chrome Plating Department) (TDD): The TDD commenced operations in 1964 and ceased oprations on October 4, 1985. During 1970, the plating operatons were moved to a New Chrome Plating Department (AOC #1). Tool and Die operations were conducted to provide support for the rest of the production departments. Apart from metal cutting, no other major operations were conducted in this department. This unit also produced steel metal scrap and cutting oil from the machinery operations. The major raw materials used in this department were cutting oil and sheet metals. Prior to 1970, the wastes generated at this facility were wastewaters containing chrome and chromic acid. After 1970, additional wastes managed consisted mainly of spent oils. After Omark ceased operations in 1985, the major machineries were sold to a third company.

Visual site inspections conducted by EQB in June 1986 revealed the presence of stain within the concrete wall and floor of the TDD. As a follow-up, samples were collected. Reported analytical results confirm that chromium contamination was present underneath the concrete.

AOC #3, Automatic Assembly Department (AAD): The AAD commenced operations in 1965 and closed in 1985. This department was involved in the assembly of different parts of the chain saws. The assembly was automatically done by specialized machineries. No wastes were managed in this unit. Based on the RFA, chromimum contaminations in this area were coming from the Chrome Plating Department. Sampling and analytical results revealed that chromium concentration was reported at concentration (710 mg/kg) above the background level. After operation ceased in 1985, all machineries were shipped to other Omark facilities.

Clean Closure: A Closure Plan (CP) was submitted for the container storage area on January 23, 1986 and approved on December 17, 1988. The closure certification (clean closure) was submitted on February 24, 1988, and approved by EPA on June 16, 1989. A determination of "No Further Action" was recommended for this unit. At closure, the concrete tanks were demolished as part of the decontamination phase. The equipment was dismantled and disposed off-site with the rest of hazardous wastes generated during the treatment activities.

The CPD, the WWTP, and the TDD areas were dismantled, contaminated soils and materials were removed, and remediated to background level.

Remedial Action Plan (RAP) and Report: Omark submitted a voluntary remedial action workplan (RAP) on September 18, 1987, in lieu of a RFI, to investigate and remove contaminated soils from all identified SWMUs and AOCs, and to remove contaminated sediments in all affected areas. The RAP was also submitted to minimize contamination liabilities at the facility by cleaning the contaminated areas (i.e. concrete walls and floors, remove all machineries, and fill material) encountered in all manufacturing buildings. A separate sampling workplan was submitted on August 7, 1991, as part of the RAP, to investigate and remove contaminanted sediments from the unnamed creek and an embankment of the creek, which were located off-site, adjacent to the former chrome treatment area. The RAP Workplan was approved by EQB on October 30, 1995. The RAP Report was approved by EQB with a recommendation of "No Further Action" determination on July 24, 1996.

Table 1 - Hexavalent Chromium (Cr^{+6}), Lead (Pb), Barium (Ba), 1,1,1-trichloroethane Soils Contamination Areas and Relevant Actions Taken

SWMUs Area	Area Description	Remedial Action
1	Hazardous waste container storage area	Area was decontaminated, and clean closed with a recommendation of “No Further determination.
2	Chrome Treatment Area	Area was dismantled, contaminated soils were excavated and removed, and remediated to background level, and/or action level.
3	Wastewater Treatment plant (WWTP)	Area was dismantled, contaminated soils excavated and materials were removed and remediated to background level, and/or action level.
AOCs	**Area Description**	**Remedial Action**
1	Chrome plating department	Area was dismantled, contaminated soils excavated and materials were removed and remediated to background level, and/or action level.
2	The Tool and die department	Area was dismantled, contaminated soils excavated and materials were removed and remediated to background level, and/or action level.
3	Automatic assembly department	Area was dismantled, contaminated soils were excavated and removed, and remediated to background level,and/or action level..

Table 2 - Hexavalent Chromium (Cr^{+6}), Lead (Pb), Barium (Ba), 1,1,1-trichloroethane Soils Contamination Areas and Relevant Actions Taken

Others	Area Description	Remedial Action
1	unnamed Creek	Sediments were excavated and removed, and remediated to background level, and/or action level..
2	embankment	Sediments were excavated and removed, and remediated to background level, and/or action level..

Soil and Sediment Contaminations : In accordance with the RFA Report dated December 27, 1988, visual site inspections show evidence of stains at the surface soils and concrete at several areas that required investigation. Soil and sediment samples were collected from these areas to characterize the waste, and to determine whether the hazardous waste concentrations were above background levels, and/or action levels. Analytical results, revealed that total chromium (Cr^{+6})), which was the primary hazardous waste of concern, was reported at concentrations of 270 mg/kg, 3,300 mg/kg, 3, 000 mg/kg, 710 mg/kg, 1,000mg/kg, above background levels, and/or action levels, respectively.

Soil and Sediment Contaminations Removal: Soil and sediment remedial actions were undertaken on February 14, 1989 and completed on July 24, 1996. In accordance with the RAP Report, all contaminated fill materials, soils, and sediments which were identified at all SWMUs, AOCs, unnamed Creek, and embankment were excavated and removed. Final excavations and soil removal activities were undertaken at the surface and subsurface soils at depths of 1 to 15 ft in the areas of all SWMUs and AOCs. Following the removal, confirmatory samples were collected and analyzed for EP Toxicity, primarily Cr^{+3}, Cr^{+6}, Ba, Pb, Hg to characterize the waste, and to determine whether the hazardous wastes were above background levels, and/or action levels. Reported analytical results revealed that total chromium concentration, which was the primary hazardous waste of concern, and other concentrations of contaminants were below background levels, and/or action levels. Subsequent to excavation and removal activities, all SWMUs' areas were repaired and covered with new concrete. A determination of "No Further Action" was recommended by EQB for all SWMUs, AOCs, the unnamed creek; and the embankment.

Site visit perfromed by EQB on February 19, 1991 confirmed that all excavated and decontaminated areas were repaired and covered with new concrete.

Air (Indoors): No assessment of indoor air has been conducted at this property. There was no existing incinerator at the site. Air emissions from this facility did not constitute a significant threat to human health and the environment. A fume scrubber, which was located at a roof in the mezzanine on tap of the Chrome Treatment Area, was used for srubbing the chromic acid fumes collected from the plating tanks. The scrubbing solution from the scrubber's buttom container drained into one of the collection tanks in the treatment area. The EQB Air Quality Programs issued an Air Emissions Sources permit (PFE-1105850372) which authorized Omark to manage the fume srubber.

Migration of contaminants into indoor air is not expected to be a concern at this site given that contaminants in the surafce and subsurface soils nearly the entire site had been removed. There are no existing drinking water wells, no groundwater monitoring wells on site. The groundwater does not appear to be impacted, therefore, the groundwater contamination is not a concern for potential migration into indoor air.

Air (Outdoors): No assessment of outdoor air has been conducted at this property. However, migration of contaminants into outdoor air is not expected to be a concern at this site given that contaminants in the surafce and subsurface soils nearly the entire site had been removed.

Subsurface Gas: No subsurface gas was likely to be generated at this facility.

Site Wide Groundwater Investigation: There is an existing on-site groundwater well which is approximately 185 feet in depth. The well, which is located behind the Tool and Die Department was used for cooling air compressors and boiler, and for rinsing steels parts. Groundwater samples were collected from the on-site groundwater well in March, April, and May 1985, respectively. Reported analytical results reveal that the concentration of several parameters including total chromium (Cr^{+6}), lead (Pb) and barium (Ba) were below the maximum concentration limit (MCL).

References:

Original Part A application application submitted to USEPA. Dated November 18, 1980.

NEPDES Compliance Sampling Report submitted to Environmental Quality Board (EQB) for the Wastewater Treatment Plant (WWTP). Dated 1982.

Compliance Sampling Report submitted to EQB. Dated 1982

Revised Part A application submitted to EPA. Dated January 8, 1986.

NEPDES discharge Monitoring Report submitted to EQB. Dated January 1986.

Closure Plan submitted to EPA for the Container Storage Area. Dated January 17, 1986.

Omark Caribbean, Inc.'s RCRA Facility Assessment Report prepared by the EQB submitted to EPA. Dated December 28, 1987.

Letter from O'Neill and Borges, Attorneys for Omark Caribbean Inc,. to EPA/EQB. Dated July 10, 1987.

Remedial Action Workplan (RAP) prepared by UNIPRO- Architects, Engineering and Planners for Omark Caribbean, Inc submitted to EPA/EQB. Dated September 18, 1987.

Closure Certification (Closure Report) was submitted to EPA for the Container Storage Area. Dated February 24, 1988

Closure Certification (Closure Report) was approved by EPA for the Container Storage Area. Dated June 16, 1989.

Remedial Action Report (RAR) prepared by UNIPRO- Architects, Engineering and Planners for Omark Caribbean, Inc submitted to EPA/EQB. Dated February 14, 1989.

Revised Remedial Action Report (RAR) prepared by UNIPRO- Architects, Engineering and Planners for Omark Caribbean, Inc submitted to EPA/EQB. Dated October 2, 1990

Revised RCRA Facility Assessment Report prepared by the Environmental Quality Board (EQB) submitted to EPA. Dated September 25, 1991.

Sediment Sampling Worplan for unnamed Creek and Creek's enbankment. Prepared by Geraghty and Miller. Dated January 1992.

Remedial Action Report prepared by UNIPRO- Architects, Engineering and Planners for Omark Caribbean, Inc was conditionally approved by EQB. Dated October 30, 1995.

Letter from EQB to Omark to request appropiate QA/QC data to support validity of RAP Report. Dated June 27, 1996.

Final decision of "No Further Action " determination, letter from EQB to Omark Caribbean. Dated July 24, 1996.

"Atlas of Groundwater Resources in Puerto Rico and U.S. Virgin Islands " / U.S. Geological Survey - Water-Resources Investigations Report 94- 4198, San Juan Puerto Rico prepared by Thalia D. Veve and Bruce E. Taggart (Editors) in cooperation with the U.S. Environmental Protection Agency. Dated 1996.

2. Is **groundwater** known or reasonably suspected to be "**contaminated**"[1] above appropriately protective "levels" (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 "levels," and referencing supporting documentation.

_______ If no - skip to #8 and enter "YE" status code, after citing appropriate "levels," and referencing supporting documentation to demonstrate that groundwater is not "contaminated."

_______ If unknown - skip to #8 and enter "IN" status code.

Rationale:

Geologic Setting: Volcanic rocks, consolidated sedimentary rocks, and unconsolidated Quaternary surficial deposits are the three major rock types that occur within the Bayamón-Loiza region. The locations of the three major rock types are as follows: Volcanic rocks of Cretaceous age are the most abundant rock type, and are exposed in more than half the region; Consolidated sedimentary rocks of Tertiary age overlie the volcanic rocks in the northern part of the Bayamón-Loiza region; and Unconsolidated surficial deposits overlie the sedimentary rocks in the San Juan to Carolina area.

The northern section of the Bayamón-Loiza region consists of a costal plain composed of deposits of sand, silt, clay, and sand muck overlying limestone formations, which form the principal aquifer. The elevation of the land surface in the coastal plain ranges from mean sea level to about 100 feet above mean sea level. An almost continuous strip of swamps and lagoons lies near the coast. The principal coastal lagoons are Laguna San José, Laguna La Torrecilla, and Laguna de Piňones. The southern part of the region is comprised mostly of the foothills of the inner uplands, which range in elevation from about 100 to 1,300 feet above mean sea level.

In accordance with the soil survey of San Juan Area of Puerto Rico, soils in the area of near this facility are classified as Urban-land Vega Complex. The permeability of the soils is 0.6- 2.0 in/hr with a low shrink swell potential. Depth to bedrock is 0- 84 inches .

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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 appropriate "levels" (appropriate for the protection of the groundwater resource and its beneficial uses).

Hydrogeologic Setting: Two principal water-bearing units are present in the Bayamón-Loiza region: an upper water-table aquifer comprised of sedimentary rocks of Tertiary age and surficial deposits of Quaternary age; and a lower confined aquifer comprised mainly of sedimentary rocks of tertiary age. The two units are separated by the upper member of the Cibao Formation, which act as a confining unit.

The upper aquifer occurs in the uppermost rocks overlying the upper member of the Cibao Formation, the Aguada and Aymamón limestone, and alluvial deposits. The Aguada and Aymamón limestones are eroded and covered with alluvial deposits, and the upper part of the Cibao becomes thinner near San Juan. As a consequence, the available freshwater in the upper aquifer around San Juan largely resides in surficial deposits. The transmissivity of the upper aquifer ranges from less than 500 to 3,000 ft^2/d.

The lower aquifer occurs in the Mucarabones Sand and minor limestone lenses within the Cibao Formation. The lower aquifer is confined from Bayamón to San Juan, but east of Rio Piedras, the formations that comprise this hydrologic unit punch out. The transmissivity of the lower aquifer ranges from less than 150 to 2,000 ft^2/d. The quality of the water in the lower aquifer range between fresh to brackish in the San Juan metropolitain area.

Groundwater Levels and Movement: Regional groundwater flow in the upper and lower aquifers within the Bayamón-Loiza region is northward from surficial exposures of the formations of Tertiary age, where the recharge occurs, to eventually discharge into swamps and lagoons along the coast. Groundwater also moves locally towards the main stream systems of the Rio Bayamón, Rio Piedras, and Rio Grande de Loiza.

Recharge to the water-bearing formations in the area is primarily from rainfall, but also from infiltration of streamflow. the Rio Bayamón recharges the alluvium and the Tertiary age aquifers when groundwater levels are low, generally from January to April. During the rest of the year the aquifer either is in balance with the stream or contributes water to it.

Population and Estimated Groundwater Use: The Bayamón-Loiza region includes the San Juan metropolitain area, which is comprised of the capital city of San Juan, and the municipios of Bayamón, Guaynabo, Carolina, and Cataňo. It also includes the municipios of Trujillio Alto, Loiza, and Canóvanas. A small area of the municipio of Cidra falls within the southern limits of the Bayamón-Loiza region. The population of the region was about 1.1 million in 1990. About 89 percent of the total population of the Bayamón-Loiza region live in urban areas, and the remaining 11 percent live in rural areas.

Estimated total groundwater withdrawals of 0.94 Mgal/d were a small fraction of the total of about 158 Mgal/d of surface water distributed for public-water supply in the Bayamón-Loiza region in 1987 (Puerto Rico Aqueduct and Sewer Authority (PRSA), 1988). Groundwater withdrawals for public use accounted for 0.17 Mgal/d during 1987. Public-water supply wells located throughout the San Juan metropolitain area were in stand-by status most of the time, and were activated only during emergency situations.

Estimated groundwater withdrawals for industrial, agricultural, and domestic use were 0.59, 0.14 and 0.04 Mgal/d, respectively. Industrial wells are located principally in the coastal plain, but most agricultural and domestic wells are located south of Trujillo Alto and Carolina.

Surface Water: The principal streams flowing through the region are the Rio Bayamón and Rio Piedras which flow north, and Rio Grande de Loiza which flows northeast. The Rio Bayamón has its headwaters in the mountainous interior of the island and flows across a wide alluvial valley surrounded by swamp deposits near the coast. The Rio Piedras, a relatively short river that has its headwaters in the foothills, flows across a wide alluvial plain and discharges into Bahia de San Juan. The Rio Grande de Loiza, with headwaters in the interior of the island, is the primary source of water filling Lago Loiza (the principal water-supply reservoir for the San Juan metropolitain area), on its course to the Atlantic Ocean.

Surface Water has not generally been investigated. An unnamed creek is located at the south end of the fence out-side the Omark's property boundary. The unnamed creek flows directly to the Bayamon River. Sediment sampling indicated that runnoff or spills originating from Omark operations in the past had drained into the unnamed creek.

According to a topography map, the Rio Bayamon is located approximately 500 feet from the facility.

Site Wide Groundwater Investigation: There is one existing on-site groundwater well which is approximately 185 feet in depth. The well, which is located behind the Tool and Die Department was used for cooling air compressors and boiler, and for rinsing steels parts. Groundwater samples were collected from the on-site groundwater well in March, April, and May 1985, respectively. Reported analytical results revealed that the concentration of several parameters including total chromium (Cr^{+6}), lead (Pb) and barium (Ba) were below the maximum concentration limit (MCL).

Soil and sediment remedial actions were undertaken and completed on July 24, 1996. All contaminated fill materials, soils, and sediments which were identified at all SWMUs, AOCs, unnamed Creek, and embankment were excavated and removed. Final excavations and soil removal activities were undertaken at the surface and subsurface soils at depths of 1 to 15 ft in the areas of all SWMUs and AOCs. Following the removal, confirmatory samples were collected and analyzed for EP Toxicity, primarily Cr^{+3}, Cr^{+6}, Ba, Pb, Hg to characterize the waste, and to determine whether the hazardous wastes were above background levels, and/or action levels. Reported analytical results revealed that total chromium concentration, which was the primary hazardous waste of concern, and other concentrations of contaminants were below background levels, and/or action levels. Subsequent to excavation and removal activities, all SWMUs' areas were repaired and covered with new concrete. As a result, the potential for further groundwater contamination migration due to soil contamination was no longer present. It was , therefore, determined that further characterization of the groundwater beneath the site was not necessary.

The nearest off-site groundwater well, which belongs to the PRASA, is located 1 mile north in Santa Rosa and.

3. Has the **migration** of contaminated groundwater **stabilized** (such that contaminated groundwater is expected to remain within "existing area of contaminated groundwater"[2] as defined by the monitoring locations designated at the time of this determination)?

_______ 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 "existing area of groundwater contamination"[2].

_______ If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination"[2]) - skip to #8 and enter "NO" status code, after providing an explanation.

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[2] "existing area of contaminated groundwater" is 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 "contamination" that can and will be sampled/tested in the future to physically verify that all "contaminated" groundwater remains within this area, and that the further migration of "contaminated" groundwater 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 unknown - skip to #8 and enter "IN" status code.

Rationale: This question is not applicable

4. Does "contaminated" groundwater **discharge** into **surface water** bodies?

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

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

________ If unknown - skip to #8 and enter "IN" status code.

Rationale: This question is not applicable

5. Is the **discharge** of "contaminated" groundwater into surface water likely to be **"insignificant"** (i.e., the maximum concentration[3] of each contaminant discharging into surface water is less than 10 times their appropriate groundwater "level," and 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 ecosystems at these concentrations)?

________ If yes - skip to #7 (and enter "YE" status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration[3] of key contaminants discharged above their groundwater "level," the value of the appropriate "level(s)," and 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 ecosystem.

________ If no - (the discharge of "contaminated" groundwater 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 "level," the value of the appropriate "level(s)," and 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 "levels," the 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 "IN" status code in #8.

Rationale: This question is not applicable.

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

6. Can the **discharge** of "contaminated" groundwater into surface water be shown to be "**currently acceptable**" (i.e., not cause impacts to surface water, sediments or ecosystems that should not be allowed to continue until a final remedy decision can be made and implemented[4])?

________ 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 site=s surface water, sediments, and ecosystems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR 2) providing or referencing an interim-assessment[5], appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialist, including an ecologist) adequately protective of receiving surface water, sediments, and ecosystems, 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 "levels," as 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 "contaminated" groundwater can not be shown to be "**currently acceptable**") - skip to #8 and enter "NO" status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or ecosystem.

________ If unknown - skip to 8 and enter "IN" status code.

Rationale:

This question is not applicable. See response to question #5.

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 "existing area of contaminated groundwater?"

________ 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 "existing area of groundwater contamination."

________ If no - enter "NO" status code in #8.

________ If unknown - enter "IN" status code in #8.

Rationale: This question is not applicable.

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[4] 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.

[5] 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.

Groundwater beneath the site was not characterized.

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, "Migration of Contaminated Groundwater Under Control" has been verified. Based on a review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater" is "Under Control" at the Omark Carribbean Inc., (Formerly a subsidiary of Oregon Chain Saw) EPA ID# PRD090038092. Located at 88-90 street, Minillas Industrial Park, Puerto Rico. Specifically, this determination indicates that the migration of "contaminated" groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the "existing area of contaminated groundwater" This 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.).

Reviewed by: ______________________________ Date:____________________

Jean Robert Jean, RPM
RCRA Programs Branch
EPA Region 2

______________________________ Date:____________________

Dale Carpenter, Section Chief
RCRA Programs Branch
EPA Region 2

Approved by: Original signed by: Date: April 12, 2006

Adolph Averett, Chief
RCRA Programs Branch
EPA 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.

Contact telephone and e-mail numbers: Jean Robert Jean, USEPA RPM

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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.