JUNE 5, 2001

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

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

Current Human Exposures Under Control

Facility Name: HOVENSA L.L.C.
Mailing Address: 1 Estate Hope, Christiansted, St. Croix, U.S. V.I. 00820-5652
Facility Location: Limetree Bay, St. Croix V.I.
Facility EPA ID #: VID980536080

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.

*** Note: The above determination does not include consideration of possible human health impacts from:**

a) vapors sourced from solid or hazardous wastes contained inside (i.e., that have not been released to soil, groundwater, or surface waters) the RCRA permitted, operating RUs [one hazardous waste container storage unit, two Landfarms, and three Surface Impoundments] at the facility; or

b) vapors sourced from the processing units and numerous massive crude & product storage tanks at the facility, which are not classified as SWMUs, AOCs, or RUs; or

c) the massive crude oil and product terminaling and ocean tanker operations, which could adversely impact both indoor and out-door air quality and also crude oil and product releases to the surface waters and/or sediments of the Carribean Sea. However, the terminaling and ocean tanker operations are not classified as SWMUs, AOCs, or RUs.

Other than requirements given at 40 C.F.R. Part 264 "Subparts AA, BB, and CC", and the requirements of Module VIII [Organic Air Emission Standards] of the 1999 RCRA Permit, those releases are not subject to RCRA. EPA is aware of no information that the facility is not in compliance with the requirements given at 40

C.F.R. Part 264 "Subparts AA, BB, and CC", and the requirements of Module VIII of the 1999 RCRA Permit.

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).

Facility Information

HOVENSA L.L.C., (HOVENSA) FORMERLY OWNED BY HESS OIL VIRGIN ISLANDS CORP. (HOVIC), OPERATES A PETROLEUM REFINERY AT LIMETREE BAY IN THE VIRGIN ISLANDS (FIGURE 1). THE FACILITY IS SITUATED ON 1,500 ACRES ON THE SOUTH CENTRAL COAST OF ST. CROIX. OPERATIONS BEGAN IN 1965, AND THE CURRENT DESIGN CAPACITY IS APPROXIMATELY 545,000 BARRELS OF CRUDE OIL PER DAY. OVER 60 DIFFERENT TYPES OF CRUDE OIL HAVE BEEN PROCESSED, AND BY MEANS OF DISTILLATION CRUDE OIL IS SEPARATED INTO COMPONENTS SUCH AS FUEL GAS, NAPHTHA, JET FUEL, KEROSENE, AND NO.2 OIL. THE CARIBBEAN SEA FORMS THE SOUTHERN BORDER OF THE FACILITY. HOVENSA OPERATES A 60 FOOT DEEP HARBOR WHICH CAN ACCOMMODATE SUPER TANKERS AT TWO OF NINE BERTHS. ALL TRANSPORTATION OF CRUDE AND FINISHED PRODUCTS IS ACCOMPLISHED BY MEANS OF TANKER SHIPS.

THE EPA CONDUCTED A RCRA FACILITY ASSESSMENT (RFA) AT THE FACILITY IN 1988 WHICH IDENTIFIED SOLID WASTE MANAGEMENT UNITS (SWMU) AND THE AREAS OF CONCERN (AOC) (FIGURE 2). ADDITIONAL SWMUS WERE ALSO

IDENTIFIED AT THE FACILITY SINCE 1988. A TOTAL OF 29 SWMUS AND 4 AOCS WERE IDENTIFIED, AND GROUNDWATER IN AREAS ASSOCIATED WITH THESE SWMUS WAS EVALUATED TO DETERMINE IF CONTAMINATED GROUNDWATER IS UNDER CONTROL. THE SWMUS AND AOCS ARE SUMMARIZED BELOW ALONG WITH IMPORTANT INFORMATION REGARDING CORRECTIVE MEASURES AND CURRENT GROUNDWATER MONITORING ACTIVITIES.

Summary of Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs): All SWMUs and AOCs are described below. A map of the SWMU locations is provided in Figure 1. See Figure 2 for the approximate areal extents of AOC #1 and #4, and Figures 4.1and 4.2 for the approximate areal extent of AOC #2, the dissolved hazardous constituent plumes. AOC #3 comprises 9 areas within the facility where MTBE or other oxygenated ethers or oxygenated fuels have been or are currently being handled. The AOC #3 areas are shown on Figure 5B.

SWMU 1, CONSTRUCTION LANDFILL 1 (CLOSED): NO FURTHER ACTION REQUIRED PER NOVEMBER 1, 1999 RCRA OPERATING PERMIT WITH EXCEPTION OF AREAS AROUND WELLS CL1-2 AND CL1-6, WHICH ARE ADDRESSED AS PART OF SWMU 29 AND THE CORRECTIVE MEASURES MANAGEMENT UNIT (CMMU) 1 CORRECTIVE MEASURES STUDY.

SWMU 2, CONSTRUCTION LANDFILL 2 (CLOSED): CHROMIUM HAS BEEN DETECTED IN SHORELINE WELLS AT SWMU 2, IN THE SOUTHEAST PORTION OF THE FACILITY. COMMENCING IN 1997, EPA REQUIRED THREE YEARS OF SEMI-ANNUAL GROUNDWATER MONITORING TO DETERMINE IF THE CHROMIUM LEVELS DECREASED. RECENT RESULTS [MARCH AND SEPTEMBER 1999] HAVE STILL RECORDED ELEVATED CONCENTRATIONS [WELLS CL2-2 (160 MG/L), CL2-3 (194 MG/L), CL2-4 (174 MG/L), AND CL2-5 (99.8 MG/L)] ABOVE THE HEALTH BASED CONCENTRATION LEVEL (HBCL) FOR CHROMIUM. HOVENSA MAINTAINS THE DETECTIONS ARE DUE TO LEACHING FROM THE STAINLESS STEEL CASINGS AND SCREENS IN THOSE WELLS. EPA HAS RECENTLY APPROVED A PROGRAM, AS PART OF THE CMS FOR SWMU 2, TO REPLACE THOSE STAINLESS STEEL WELLS WITH PVC WELLS, AND THEN MONITOR THOSE NEW PVC WELLS FOR THREE YEARS. HOWEVER, GROUNDWATER IS NOT UTILIZED FOR ANY PURPOSES DOWNGRADIENT OF THIS SWMU, AND BETWEEN 1997 AND 2000, THE CHROMIUM MEASURED IN THE GROUNDWATER IN SWMU 2 WELLS HAS BEEN DETECTED AT CONCENTRATIONS LESS THAN TEN TIMES ITS HBCL, INDICATING ANY DISCHARGES TO THE SURFACE WATERS OF THE CARIBBEAN SEA WOULD BE "INSIGNIFICANT", AS DISCUSSED UNDER QUESTION 5 BELOW.

SWMU 3, ASBESTOS STAGING AREA: THE 1988 RFA DID NOT INDICATE SUSPECTED RELEASES AND THERE HAVE BEEN NO SUBSEQUENT RELEASES. THEREFORE, NO CORRECTIVE ACTION REQUIRED.

SWMU 4, CONSTRUCTION LANDFILL 3 (CLOSED): APPROXIMATELY 5200 CUBIC YARDS OF SPENT CATALYST MATERIAL WERE DISPOSED OF IN THIS LANDFILL AS A NON-HAZARDOUS SOLID WASTE [IT WAS NOT LISTED WHEN DISPOSED OF, AND REPORTEDLY PASSED EP TOXICITY TESTING AT THAT TIME]. SUBSEQUENTLY, EFFECTIVE FEBRUARY 1999, THAT MATERIAL BECAME CLASSIFIED AS A NEWLY LISTED HAZARDOUS WASTE (K171 & K172); HOWEVER, PER EPA REQUIREMENTS, MATERIAL THAT HAS BEEN DISPOSED PRIOR TO BEING LISTED AS A HAZARDOUS WASTE CAN REMAIN IN THE GROUND. IF IT IS SUBSEQUENTLY EXCAVATED, HOWEVER, IT MUST BE MANAGED AS A HAZARDOUS WASTE. IN JUNE 1999 THE BURIED CATALYST MATERIAL WAS SAMPLED FOR ALL INORGANIC AND ORGANIC CONSTITUENTS GIVEN IN 40 CFR PART 268.40, THE LAND DISPOSAL TREATMENT STANDARDS FOR K171 & K172. NICKEL AND VANADIUM WERE FOUND TO EXCEED THEIR 40 CFR PART 268.40 REGULATORY LIMITS (11 MG/L TCLP AND 1.6 MG/L TCLP, RESPECTIVELY). IN

OCTOBER 1999 GROUNDWATER WAS SAMPLED FOR ALL INORGANIC AND ORGANIC CONSTITUENTS GIVEN IN 40 CFR PART 268.40. ANTIMONY, NICKEL, AND VANADIUM (BUT NO ORGANICS) WERE DETECTED IN THE GROUNDWATER IN WELLS IMMEDIATELY SOUTH OF SWMU 4 AT CONCENTRATIONS ABOVE THEIR RESPECTIVE HBCL. HOWEVER, THE CONCENTRATIONS WERE LESS THAN TEN TIMES THEIR RESPECTIVE HBCL, INDICATING ANY DISCHARGES TO THE SURFACE WATERS OF THE CARIBBEAN SEA, LOCATED APPROXIMATELY 1500 FEET TO THE SOUTH, WOULD BE "I N S I G N I F I C A N T", AS DISCUSSED UNDER QUESTION 5 BELOW. THE CMS FOR SWMU 4 INCLUDED AN EVALUATION OF RISK, AND CONCLUDED THAT NO UNACCEPTABLE HUMAN HEALTH OR ECOLOGICAL RISKS ARE POSED BY THE CONTAMINATED GROUNDWATER AND/OR LEAVING THE BURIED SPENT CATALYST MATERIAL IN PLACE. THE PROPOSED CM I REMEDY INCLUDES AN INITIAL 5 YEARS OF SEMI-ANNUAL GROUNDWATER MONITORING OF 7 DOWNGRADIENT WELLS FOR ANTIMONY, NICKEL, VANADIUM, AND IN ADDITION, ARSENIC AND BENZENE, WHICH ALTHOUGH NOT DETECTED ABOVE THEIR HBCLS, ARE ALSO HAZARDOUS CONSTITUENTS FOR THE SPENT CATALYST LISTED WASTES K171 & K172. IN ADDITION, THE PROPOSED CM I INCLUDES ONGOING INSTITUTIONAL CONTROLS. THESES RELEASES ARE LOCATED WITHIN THE "EXISTING AREA OF CONTAMINATED GROUNDWATER". GROUNDWATER IS NOT UTILIZED FOR ANY PURPOSES DOWNGRADIENT OF THIS SWMU.

SWMU 5, LANDFARM I (CLOSED): IS A CLOSED HAZARDOUS WASTE MANAGEMENT UNIT SUBJECT TO 40 CFR PART 264 SUBPART F AND G GROUNDWATER MONITORING (AND CORRECTIVE ACTION IF NECESSARY), AND CLOSURE/POST-CLOSURE REQUIREMENTS UNDER THE 1990 POST-CLOSURE PERMIT. SEMI-ANNUAL GROUNDWATER MONITORING OF 8 WELLS SURROUNDING THIS UNIT HAVE RECORDED DETECTIONS OF HAZARDOUS CONSTITUENTS; HOWEVER, THROUGH "OUTSIDE SOURCE DEMONSTRATIONS" REVIEWED AND APPROVED BY EPA, PURSUANT TO PART 264 PROCEDURES, THOSE DETECTIONS HAVE BEEN ASCRIBED TO RELEASES FROM OTHER SWMUS OR AOCS AT THE FACILITY. THOSE RELEASES ARE BEING DEALT WITH UNDER THE FACILITY'S 1999 RCRA OPERATING PERMIT, AND ARE LOCATED WITHIN THE "EXISTING AREA OF CONTAMINATED GROUNDWATER". GROUNDWATER IS NOT UTILIZED FOR ANY PURPOSES DOWNGRADIENT OF THIS SWMU.

SWMU 6, LANDFARM II: CONSISTS OF OPERATING LANDFARM II, A REGULATED HAZARDOUS WASTE MANAGEMENT UNIT FOR TREATMENT/DISPOSAL OF HAZARDOUS WASTE. THE UNIT IS SUBJECT TO 40 CFR PART 264 SUBPART F GROUNDWATER MONITORING AND CORRECTIVE ACTION REQUIREMENTS UNDER MODULE X OF FACILITY'S 1999 RCRA OPERATING PERMIT. SEMI-ANNUAL GROUNDWATER MONITORING OF WELLS SURROUNDING THIS UNIT HAVE RECORDED DETECTIONS OF HAZARDOUS CONSTITUENTS; HOWEVER, THROUGH "OUTSIDE SOURCE DEMONSTRATIONS" REVIEWED AND APPROVED BY EPA, PURSUANT TO PART 264 PROCEDURES, THOSE DETECTIONS HAVE BEEN ASCRIBED TO RELEASES FROM OTHER SWMUS OR AOCS AT THE FACILITY. THOSE RELEASES ARE BEING DEALT WITH UNDER THE FACILITY'S 1999 RCRA OPERATING PERMIT, AND ARE LOCATED WITHIN THE "EXISTING AREA OF CONTAMINATED GROUNDWATER". GROUNDWATER IS NOT UTILIZED FOR ANY PURPOSES DOWNGRADIENT OF THIS SWMU.

SWMU 7, LANDFARM III: CONSISTS OF OPERATING LANDFARM III, A REGULATED HAZARDOUS WASTE MANAGEMENT UNIT FOR TREATMENT/DISPOSAL OF HAZARDOUS WASTE. THE UNIT IS SUBJECT TO 40 CFR PART 264 SUBPART F GROUNDWATER MONITORING AND CORRECTIVE ACTION REQUIREMENTS UNDER MODULE X OF FACILITY'S 1999 RCRA OPERATING PERMIT. SEMI-ANNUAL GROUNDWATER MONITORING OF WELLS SURROUNDING THIS UNIT HAVE RECORDED DETECTIONS OF HAZARDOUS CONSTITUENTS; HOWEVER, THROUGH "OUTSIDE SOURCE DEMONSTRATIONS" REVIEWED AND APPROVED BY EPA, PURSUANT TO PART 264 PROCEDURES, THOSE DETECTIONS HAVE BEEN ASCRIBED TO RELEASES FROM OTHER SWMUS OR AOCS AT THE

FACILITY. THOSE RELEASES ARE BEING DEALT WITH UNDER THE FACILITY'S 1999 RCRA OPERATING PERMIT, AND ARE LOCATED WITHIN THE "EXISTING AREA OF CONTAMINATED GROUNDWATER". GROUNDWATER IS NOT UTILIZED FOR ANY PURPOSES DOWNGRADIENT OF THIS SWMU.

SWMU 8, INCINERATOR (CLOSED): CONSISTS OF THE FORMER NON-HAZARDOUS INCINERATOR, WHICH HAS BEEN REMOVED. THE 1988 RFA DID NOT INDICATE ANY SUSPECTED RELEASES, NOR HAVE SUBSEQUENT RELEASES BEEN DOCUMENTED. NO CORRECTIVE ACTION IS REQUIRED.

SWMU 9, WASTEWATER LAGOON 1: CONSISTS OF SURFACE IMPOUNDMENT 1, A WASTEWATER TREATMENT LAGOON, WHICH FORMERLY OPERATED AS AN INTERIM STATUS HAZARDOUS WASTE MANAGEMENT UNIT, BUT IS NO LONGER AUTHORIZED TO MANAGE HAZARDOUS WASTE. THE UNIT IS SUBJECT TO 40 CFR PART 264 SUBPART F GROUNDWATER MONITORING AND CORRECTIVE ACTION REQUIREMENTS UNDER MODULE X OF FACILITY'S 1999 RCRA OPERATING PERMIT. SEMI-ANNUAL GROUNDWATER MONITORING OF WELLS SURROUNDING THIS UNIT HAVE RECORDED DETECTIONS OF HAZARDOUS CONSTITUENTS; HOWEVER, THROUGH "OUTSIDE SOURCE DEMONSTRATIONS" REVIEWED AND APPROVED BY EPA, PURSUANT TO PART 264 PROCEDURES, THOSE DETECTIONS HAVE BEEN ASCRIBED TO RELEASES FROM OTHER SWMUS OR AOCS AT THE FACILITY. THOSE RELEASES ARE BEING DEALT WITH UNDER THE FACILITY'S 1999 RCRA OPERATING PERMIT, AND ARE LOCATED WITHIN THE "EXISTING AREA OF CONTAMINATED GROUNDWATER". GROUNDWATER IS NOT UTILIZED FOR ANY PURPOSES DOWNGRADIENT OF THIS SWMU.

SWMU 10, WASTEWATER LAGOON 2: CONSISTS OF SURFACE IMPOUNDMENT 2, A WASTEWATER TREATMENT LAGOON, WHICH FORMERLY OPERATED AS AN INTERIM STATUS HAZARDOUS WASTE MANAGEMENT UNIT, BUT IS NO LONGER AUTHORIZED TO MANAGE HAZARDOUS WASTE. THE UNIT IS SUBJECT TO 40 CFR PART 264 SUBPART F GROUNDWATER MONITORING AND CORRECTIVE ACTION REQUIREMENTS UNDER MODULE X OF FACILITY'S 1999 RCRA OPERATING PERMIT. SEMI-ANNUAL GROUNDWATER MONITORING OF WELLS SURROUNDING THIS UNIT HAVE RECORDED DETECTIONS OF HAZARDOUS CONSTITUENTS; HOWEVER, THROUGH "OUTSIDE SOURCE DEMONSTRATIONS" REVIEWED AND APPROVED BY EPA, PURSUANT TO PART 264 PROCEDURES, THOSE DETECTIONS HAVE BEEN ASCRIBED TO RELEASES FROM OTHER SWMUS OR AOCS AT THE FACILITY. THOSE RELEASES ARE BEING DEALT WITH UNDER THE FACILITY'S 1999 RCRA OPERATING PERMIT, AND ARE LOCATED WITHIN THE "EXISTING AREA OF CONTAMINATED GROUNDWATER". GROUNDWATER IS NOT UTILIZED FOR ANY PURPOSES DOWNGRADIENT OF THIS SWMU.

SWMU 11, WASTEWATER LAGOON 3: CONSISTS OF SURFACE IMPOUNDMENT 3, A WASTEWATER TREATMENT LAGOON, WHICH FORMERLY OPERATED AS AN INTERIM STATUS HAZARDOUS WASTE MANAGEMENT UNIT, BUT IS NO LONGER AUTHORIZED TO MANAGE HAZARDOUS WASTE. THE UNIT IS SUBJECT TO 40 CFR PART 264 SUBPART F GROUNDWATER MONITORING AND CORRECTIVE ACTION REQUIREMENTS UNDER MODULE X OF FACILITY'S 1999 RCRA OPERATING PERMIT. SEMI-ANNUAL GROUNDWATER MONITORING OF WELLS SURROUNDING THIS UNIT HAVE RECORDED DETECTIONS OF HAZARDOUS CONSTITUENTS; HOWEVER, THROUGH "OUTSIDE SOURCE DEMONSTRATIONS" REVIEWED AND APPROVED BY EPA, PURSUANT TO PART 264 PROCEDURES, THOSE DETECTIONS HAVE BEEN ASCRIBED TO RELEASES FROM OTHER SWMUS OR AOCS AT THE FACILITY. THOSE RELEASES ARE BEING DEALT WITH UNDER THE FACILITY'S 1999 RCRA OPERATING PERMIT, AND ARE LOCATED WITHIN THE "EXISTING AREA OF CONTAMINATED GROUNDWATER". GROUNDWATER IS NOT UTILIZED FOR ANY PURPOSES DOWNGRADIENT

OF THIS SWMU.

SWMU 12, SLOP OIL TANK: CONSISTS OF RECOVERABLE OIL TANKS WHICH ACCUMULATE OIL RECOVERED FROM THE FACILITY'S OIL/WATER SEPARATORS. THE RECOVERED OIL IS THEN RECYCLED BACK TO THE FACILITY'S PROCESS STREAMS. THE 1988 RFA DID NOT INDICATE ANY SUSPECTED RELEASES AND NO RFI WAS REQUIRED UNDER THE FACILITY OPERATING PERMIT. THERE HAVE BEEN NO SUBSEQUENT RELEASES, AND NO CORRECTIVE ACTION IS REQUIRED.

SWMU 13, PROCESS SEWERS (THROUGHOUT FACILITY): CONSISTS OF OILY-WATER SEWER LINES. RELEASES, IF THEY OCCUR, ARE REPORTED TO EPA AND ADDRESSED AS DESCRIBED IN THE PERMIT. NO RFI OR OTHER CORRECTIVE ACTION IS REQUIRED.

SWMU 14, SETTLING BASIN: CONSISTS OF THE FORMER BALLAST WATER SETTLING BASIN, WHICH WAS SUBSEQUENTLY FILLED WITH CONSTRUCTION DEBRIS AND OTHER SOLID WASTE MATERIAL, INCLUDING SPENT SAND-BLASTING MATERIAL (WHICH HAS A HIGH LEAD CONTENT). ELEVATED LEAD CONCENTRATIONS WERE FOUND IN SOILS AND A RFI AND CORRECTIVE MEASURES STUDY (CMS) WERE COMPLETED. A CORRECTIVE MEASURES INVESTIGATION (CMI) was required and a CMI remedy was approved, which included an initial 1 year of semi-annual groundwater sampling for all RCRA metals; followed by 2 years of semi-annual sampling for any constituents found above their HBCLs (i.e., lead and chromium). [Both were LESS THAN TEN TIMES THEIR RESPECTIVE HBCL, INDICATING ANY DISCHARGES TO THE SURFACE WATERS OF THE CARIBBEAN SEA WOULD BE "INSIGNIFICANT", AS DISCUSSED UNDER QUESTION 5 BELOW.] During those subsequent 2 years, i.e. 4 semi-annual sample events (March 1998 - September 1999), BOTH LEAD AND CHROMIUM CONCENTRATIONS IN THE GROUNDWATER WERE BELOW THEIR RESPECTIVE HBCLS. GROUNDWATER IS NOT UTILIZED FOR ANY PURPOSES DOWNGRADIENT OF THIS SWMU.

SWMU 15, SPENT CATALYST STAGING AREA: CONSISTS OF AN AREA FOR TEMPORARY STORAGE OF USED CATALYST MATERIAL PRIOR TO RECYCLING OR DISPOSAL. AN RFI WAS COMPLETED, NO RELEASES WERE DETECTED, AND NO FURTHER CORRECTIVE ACTION IS REQUIRED.

SWMU 16, BUNDLE WASH AREA & FLARES 2 & 3 KNOCK-OUT DRUMS: GROUNDWATER UNDERLYING SWMU 16 CONTAINED PHASED SEPARATED HYDROCARBON AND DISSOLVED BENZENE PLUMES. AN RFI AND CMS WERE COMPLETED, AND CMI REMEDY APPROVED. CMS ACTIVITIES HAVE INCLUDED COLLECTION OF POTENTIOMETRIC AND FLUID LEVEL DATA. RECENT DATA IS CONTAINED IN THE BI-MONTHLY PROGRESS REPORT FOR FEBRUARY-MARCH 2000.

SWMU 17, SALVAGE YARD: THE SALVAGE YARD IS USED TO ACCUMULATE MISCELLANEOUS METAL EQUIPMENT. THE 1988 RFA DID NOT INDICATE ANY SUSPECTED RELEASES, NOR HAVE SUBSEQUENT RELEASE BEEN DETECTED. THEREFORE, NO CORRECTIVE ACTION IS REQUIRED.

SWMU 18, EAST STORM DRAIN CANAL: CONSISTS OF THE EAST STORMWATER DRAINAGE CANAL. AS PER THE PERMIT, NO RFI OR OTHER CORRECTIVE ACTION IS REQUIRED FOR THIS SWMU. THE BASIS FOR THIS DETERMINATION IS THAT THE ORIGINAL SOURCES OF ANY RELEASES FROM THE DRAINAGE CANAL ARE:

(I) RELEASES FROM OTHER UNITS WHICH ALREADY HAVE BEEN IDENTIFIED AS SWMUS, OR IF NOT, WILL BE PURSUANT TO REQUIREMENTS OF THE FACILITY'S 1999 RCRA OPERATING PERMIT.

(II) NON-POINT SOURCE RELEASES (I.E., RELEASES OTHER THAN THOSE THROUGH PERMITTED OUTFALLS UNDER THE CLEAN WATER ACT) FROM DRAINAGE CANALS WILL BE DEALT WITH UNDER AOCS 1 AND 2, AS DISCUSSED BELOW; OR

(III) RELEASES FROM SPECIFIC LOCALES IN DRAINAGE CANALS WHICH HAVE BEEN, OR WILL BE, CONFIRMED AS DEFINITE RELEASE SITES AND WILL BE DESIGNATED AS SEPARATE SWMUS.

SWMU 19, WEST STORM DRAIN CANAL: CONSISTS OF WEST STORMWATER DRAINAGE CANAL AS PER THE PERMIT, NO RFI OR OTHER CORRECTIVE ACTION IS REQUIRED FOR THIS SWMU. THE BASIS FOR THIS DETERMINATION IS DISCUSSED UNDER SWMU 18 ABOVE.

SWMU 20, MAIN STORM DRAIN CANAL: CONSISTS OF MAIN STORMWATER DRAINAGE CANAL AS PER THE PERMIT, NO RFI OR OTHER CORRECTIVE ACTION IS REQUIRED FOR THIS SWMU. THE BASIS FOR THIS DETERMINATION IS DISCUSSED UNDER SWMU 18 ABOVE.

SWMU 21, FLARE 3 LOW POINT DRAINS & STRUCTURES: THIS SWMU DRAINS CONDENSED LIQUIDS FROM THE BASE OF THE FLARE NO. 3 STACK INTO A CURBED CONCRETE PAD FROM WHICH HISTORIC RELEASES TO SOILS AND GROUNDWATER HAVE BEEN DOCUMENTED. AN RFI AND CMS WERE COMPLETED. A CMI REMEDY WAS ALSO APPROVED, AND IS BEING IMPLEMENTED. THE REMEDY BEING IMPLEMENTED IS VACUUM-ENHANCED RECOVERY (VER).

SWMU 22, OILY WATER SEWERS PIPING BETWEEN LAGOON 3 AND LANDFARM 2: THIS SWMU CONSISTS OF THAT PORTION OF THE OILY WATER SEWER (OWS) LINES BETWEEN SURFACE IMPOUNDMENT 3 AND LANDFARM 2 WHERE CONFIRMED RELEASES FROM THE PROCESS SEWERS HAVE OCCURRED. A FINAL RFI REPORT WAS APPROVED BY EPA IN 1997. FURTHER ASSESSMENT IS NOT REQUIRED FOR THIS SWMU, SUBJECT TO NO FURTHER RELEASES FROM THE OWS LINE, OR EXPANSION OF THE PSH PLUME. EITHER WOULD TRIGGER RESUMED INVESTIGATION. UNDER INTERIM CORRECTIVE MEASURES, WELLS ARE PUMPED TO CONTAIN CONTAMINANTS. IN ADDITION, SWMU 22 VER PILOT TESTS HAVE COMMENCED, AND RECOVERY OPERATIONS WILL CONTINUE UNTIL PSH LEVELS DECREASE SIGNIFICANTLY IN AREA WELLS.

SWMU 23, LAGOON 1; AREA UNDERGROUND OILY WATER SEWER PIPING: SWMU 23 CONSISTS OF A PORTION OF THE OWS LINES LOCATED ON THE SOUTH SIDE OF SURFACE IMPOUNDMENT 1, AND IS A LOCATION OF CONFIRMED PAST RELEASES. AN RFI WAS COMPLETED, AND THE CMS IS CURRENTLY IN PROGRESS WHICH INCLUDES SOIL AND GROUNDWATER SAMPLING. IN ADDITION, ENHANCED FLUID RECOVERY (EFR) PUMPING AND USE OF OXYGEN RELEASE COMPOUNDS (ORC) AT LOCATIONS CL23-1 AND CL23-2 HAVE REDUCED DISSOLVED VOLATILE CONSTITUENTS IN GROUNDWATER. NO FURTHER ACTION AT THESE WELLS IS PROPOSED BY HOVENSA UNDER THE CMS FOR SWMU 23. ONGOING EFR USING A VACUUM TRUCK AT WELL LW-5A IS IN PROGRESS, AND WILL BE EVALUATED AFTER THE 6-MONTH TRIAL. A DECREASING TREND IN CONCENTRATION WAS DOCUMENTED AT LW-5A DURING THE SEPTEMBER 1999 AND FEBRUARY 2000 SAMPLING EVENTS.

SWMU 24, LAGOON 1 NORTHERN DRAINAGE DITCH: CONSISTS OF THE ABOVE GROUND DRAINAGE DITCH ADJACENT TO THE NORTH SIDE OF SURFACE IMPOUNDMENT 1, AND IS A LOCATION WHERE SEVERAL CONFIRMED RELEASES OCCURRED. IMPLEMENTATION OF THE CMS IS CURRENTLY IN PROGRESS. ONGOING INTERIM CORRECTIVE MEASURES INCLUDE VACUUM TRUCK PUMPING OF WELLS CL24-3 AND CL24-4 TO REMOVE PSH. WELLS 650 AND 271 ARE ALSO VACUUM PUMPED. A VER PILOT TEST WILL BE COMPLETED FOR SWMU 24.

SWMU 25, CONSTRUCTION DEBRIS BURIAL AREA: CONSISTS OF THE CONSTRUCTION DEBRIS BURIAL AREA LOCATED NEAR FLARE NO.1, AND IS AN AREA WHERE CONSTRUCTION DEBRIS AND OTHER SOLID WASTE HAS BEEN BURIED IN THE PAST. AN RFI HAS BEEN COMPLETED AND APPROVED BY EPA. A CMS AND, IF REQUIRED, A CMI WOULD BE IMPLEMENTED FOR SWMU 25. IMPLEMENTATION OF THE CMS FOR SWMU 25 IS IN PROGRESS. HOVENSA CONTINUES TO VACUUM PUMP WELL CL25-4 WITH A VACUUM TRUCK AS PART OF THE INTERIM CORRECTIVE MEASURES FOR THIS UNIT, AND PUMPS WELL WD-2 VIA A SUBMERSIBLE PUMP. PUMPING WILL CONTINUE UNTIL PRODUCT THICKNESSES DECREASE TO RESIDUAL LEVELS, OR THE VER PILOT TEST IS INITIATED.

SWMU 26, FIRE TRAINING GROUNDS AREA: CONSISTS OF THE FIRE FIGHTING TRAINING AREA AND ASSOCIATED STRUCTURES. AN RFI HAS BEEN COMPLETED AND APPROVED BY EPA. A CMS AND, IF REQUIRED, A CMI WOULD BE IMPLEMENTED FOR SWMU 26. IMPLEMENTATION OF THE CMS FOR SWMU 26 IS IN PROGRESS. HOVENSA CONTINUES TO VACUUM PUMP WELL CL25-4 WITH A VACUUM TRUCK AS PART OF THE INTERIM CORRECTIVE MEASURES FOR THIS UNIT, AND PUMPS WELL WD-2 VIA A SUBMERSIBLE PUMP. PUMPING WILL CONTINUE UNTIL PRODUCT THICKNESSES DECREASE TO RESIDUAL LEVELS, OR THE VER PILOT TEST IS INITIATED.

SWMU 27, LAGOON NO. 1 DREDGE SPOIL AREA: CONSISTS OF AN OFF-SITE AREA WHERE NON-HAZARDOUS WASTEWATER TREATMENT SLUDGES FROM SURFACE IMPOUNDMENT 1 WERE FORMERLY DISPOSED. AN RFI was conducted. A total of 25 soil borings and 9 shallow wells were installed. Elevated total petroleum hydrocarbon (TPH) concentrations were detected in surface and shallow subsurface soils. Groundwater, which is very shallow at this SWMU was analyzed for the "Skinner List" of constituents, broad list of organic and inorganic constituents associated with petroleum refining activities. No constituents were measured in the groundwater at concentrations exceeding their respective HBCLs. Nevertheless, EPA did not fully approve the CMS' conclusion that natural attenuation is an effective remedy for constituents at SWMU 27. The final remedy has not yet been determined. However, as an Interim Corrective Measure, EPA REQUIRED FIVE YEARS OF ANNUAL SOIL SAMPLING AT SEVERAL LOCATIONS TO CONFIRM THE EFFECTIVENESS OF NATURAL ATTENUATION. THREE SAMPLING EVENTS HAVE BEEN CONDUCTED SINCE JANUARY 1998, AND THE RESULTS APPEAR TO INDICATE A DECREASE IN SOIL TPH CONCENTRATIONS, BUT NOT AT ALL SAMPLE LOCATIONS.

SWMU 28, AREA C: CONSISTS OF AN AREA OUTSIDE THE SOUTHWESTERN CORNER OF THE FACILITY IN THE KRAUSE LAGOON POTENTIALLY IMPACTED BY OVERLAND FLOW AND/OR NON-PERMITTED DISCHARGES FROM THE WEST SIDE DRAINAGE CANAL. AN RFI WAS COMPLETED AND APPROVED, AND NO FURTHER CORRECTIVE ACTION IS REQUIRED.

SWMU 29, ABANDONED UNDERGROUND CULVERTS: CONSISTS OF ABANDONED

UNDERGROUND CULVERTS LEADING TO FORMER OUTFALL NO 5, AND IS AN ON-SITE AREA WHERE RELEASES OF PSH HAVE BEEN OBSERVED AN RFI AND CMS WERE COMPLETED A CMI WORKPLAN WAS APPROVED IN NOVEMBER 1999. HOVENSA IS CURRENTLY PERFORMING INTERIM CORRECTIVE MEASURES AT THE SWMU 29 AREA CONSISTING OF PSH AND GROUNDWATER RECOVERY. MEASURES INCLUDE VACUUMING GAUGING POINTS PB-N AND PB-S TO REMOVE FLUIDS FROM THE PLUGGED AND ABANDONED UNDERGROUND CULVERTS AND DEEP OF WELL CL-6 THE FREQUENCY OF VACUUMING AND DEEP WAS RECENTLY CHANGED FROM WEEKLY TO MONTHLY. THE CMI REMEDY FOR THIS SWMU IS BEING IMPLEMENTED, AND FLUID RECOVERY IS ONGOING AT WELL 560

The AOCs are listed below:

AOC #1. AOC #1 consists of the PSH plume(s) floating on the groundwater underlying the facility, that cannot be clearly linked to releases from a specific, individual SWMU. AOC #1 also includes all areas impacted, or potentially impacted, by the PSH plumes. No RFI is required, contingent on fully delineating all PSH plumes as part of the Hydrocarbon Recovery Project (HRP) already in progress. In addition, an Interim Corrective Measures Study (ICMS) is being implemented that consists of a recurring program of tightness testing, repair, and/or upgrading of the facility's process sewers and underground hydrocarbon pipelines, as needed. It also includes a recurring program of visual and static head testing for the facility's atmospheric storage tanks. Lastly, the facility is implementing the HRP, and progress reports are submitted on a semi-annual basis.

AOC #2. AOC #2 consists of any dissolved phase hydrocarbon (DPHC) plumes within the groundwater underlying the facility that may pose threats to human health and/or the environment, that cannot be clearly linked to releases from a specific, individual SWMU. AOC #2 also includes all groundwater and/or areas impacted, or potentially impacted, by dissolution of hazardous constituents from the PSH plume(s) into a dissolved phase within the groundwater. No RFI is required contingent on continued sampling of specific monitoring wells, analysis of sampling results, and delineation of plumes that may pose threats to human health and/or the environment. ICMs are also being implemented as a condition of the final permit. Lastly, a CMS is required for AOC #2 to delineate, on a site-wide basis, all DPHC plumes in the groundwater to determine what corrective measures are required to adequately protect human health and/or the environment, and to select the corrective measures to be implemented as the CMI to achieve the final remedy for the DPHC plumes in the groundwater. The CMS includes implementation of a site-wide groundwater flow, PSH flow, and DPHC transport model.

AOC #3. AOC #3 consists of a plume of dissolved methyl tertbutyl ether (MTBE) in the groundwater on the south side of Tankfield 6. No RFI is required. Corrective measures for this AOC consist of additional quarterly monitoring of groundwater, semi-annual hydrostatic pressure testing of specific underground lines, and tank testing every 2 years. The final remedy for AOC #3 also includes remediation of MTBE-contaminated areas to approved clean-up levels.

AOC #4. THE PSH AND DISSOLVED CONSTITUENTS ON THE ST. CROIX ALUMINA PROPERTY ("THE ALUMINA FACILITY") CORRESPOND TO AOC 4 OF THE 1999 RCRA PERMIT, ARE EXCLUDED FROM THIS CAZ25 ANALYSIS AS THEY ARE BEING ADDRESSED UNDER A RCRA 7003 ADMINISTRATIVE ORDER INVOLVING SEVEN CURRENT AND FORMER OWNERS AND OPERATORS OF BOTH THE ALUMINA FACILITY AND THE HOVENSA OIL REFINERY. However, no human exposures to the PSH AND DISSOLVED CONSTITUENTS ON THE ST. CROIX ALUMINA

PROPERTY are occuring, as discussed in the April 26, 2001 "EPA Responses to Public Comments RCRA 7003 Administrative Order on Consent (AOC) St. Croix Alumina [et. al.]."

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2. Are groundwater, soil, surface water, sediments, or air **media** known or reasonably suspected to be **"contaminated"**[1] above appropriately protective risk-based "levels" (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

	Yes	No	?	Rationale / Key Contaminants
Groundwater	_X__	___	___	**Free phase hydrocarbons ["oil"] as LNAPL, and dissolved volatile and semi-volatile petroleum constituents, and certain oxygenated ethers (e.g., MTBE); and/or dissolved inorganic constituents (metals, e.g. Chromium, Vanadium, Nickel, and Antimony).**
Air (indoors)[2]	___	_X__	___	**Risk Assessment Evaluation (August 1998) indicated no unacceptable in-door vapor impacts [from contamination subject to RCRA clean-up authorities] at on-site residential housing (Estate Figtree), which is taken as the worst-case scenario.**
Surface Soil (e.g., <2 ft)	__X_	___	___	**Residual free phase hydrocarbons ["oil"] as interstitial NAPL, and/or volatile and semi-volatile petroleum constituents and/or inorganic constituents (metals).**
Surface Water	_____	____	X___	**Hydraulic Control now maintained around facility perimeter to prevent discharge of contaminated groundwaters to the surface water. Past discharges of contaminated groundwaters and/or overland flow of either contaminated stormwater run-off, or liquid petroleum spills, likely occurred. However, surface water sampling has not been implemented to determine whether such discharges have impacted the surface waters and/or sediments of the Carribean Sea. In addition the facility is an active major oil refinery and has massive crude oil and product terminaling and ocean tanker operations which could adversely impact the surface waters and/or sediments of the Carribean Sea, but are not caused by RCRA wastes or contamination subject to RCRA.**
Sediment	___	___	_X__	**Same rationale/basis as for surface waters.**

Subsurfe. Soil (e.g., >2 ft)	_X__	___	___	**Free phase hydrocarbons ["oil"] as interstitial NAPL, and/or volatile and semi-volatile petroleum constituents, and inorganic constituents (metals, e.g. Lead, Vanadium, Nickel, and Antimony).**
Air (outdoors)	___	_X__	____	**Risk Assessment Evaluation (August 1998) indicated no unacceptable outdoor vapor impacts [from contamination subject to RCRA clean-up authorities] at on-site residential housing, which is taken as the worst-case scenario.**

_____ 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):

For Rationale, see above.

References

1. August 1998 "Focused Risk Assessment for Estate Figtree Area of Interest". Submitted as part of the August 1998 "Status Report Hydrocarbon Recovery Project, 1st Semi-Annual Report, 1998"

2. February 2001 "Status Report Hydrocarbon Recovery Project, 2nd Semi-Annual Report, 2000"

3. November 30, 2000 "Site-Wide Dissolved-Phase Transport Model Draft Report"

4. March 21, 2000 "Site-Wide PSH Model Development, Final Report"

5. April 16, 2001 [Draft] "Determination of Risk-Based Screening Level (RBSL) Values for AOC #1"

6. March 30, 2001 "Interim Corrective Measures (ICM) and Corrective Measures Study (CMS) Status Report AOC #3 (MTBE Impacted Areas)"

7. September 18, 2000 "Final Corrective Measures Study (CMS) Report" for SWMU #4, as revised by November 21, 2000 revised pages [Attachment 2 of HOVENSA's November 27, 2000 letter].

8. November 1, 1999, Module III (Corrective Action Requirements for Solid Waste Management Units and Areas of Concern) of the Final RCRA Operating Permit

9. May 11, 2000 "Corrective Measures Study Comprehensive Work Plan for AOC #1 (Phase Separated Hydrocarbon) and AOC #2 (Dissolved Phase Hydrocarbon)".

10. August 15, 2000 "Comprehensive Investigation and Corrective Measures Study Work Plan for AOC #3 (MTBE Impacted Areas).

11. August 11, 2000 "Final Corrective Measures Implementation (CMI) Report for SWMU #14.

12. April 30, 2001 "Bimonthly Progress Report RCRA Facility Investigations and Corrective Measures Study Status Report".

13. April 26, 2001 "EPA Responses to Public Comments RCRA 7003 Administrative Order on Consent (AOC) St. Croix Alumina [et. al.]."

14. September 26, 2000 "DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION, RCRA Corrective Action Environmental Indicator (EI) RCRIS code (CA750) Migration of Contaminated Groundwater Under Control."

Footnotes:

[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.

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

Summary Exposure Pathway Evaluation Table

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

"Contaminated" Media	Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food[3]
Groundwater	No___	No**__	NA	No**__	No*_	No*	No***
Air (indoors)	Yes***	Yes***	NA ___	Yes***	No*	No*	No
Soil (surface, e.g., <2 ft)	No*___	No**	NA ___	No**	No*	No*	No
Surface Water	NC___	NC	NC___	NC	NC	NC	NC
Sediment	NC___	NC	NC___	NC	NC	NC	NC
Soil (subsurface e.g., >2 ft)	No*	No**	NA	No**	___ No*	No *	No ___
Air (outdoors)	Yes ***	Yes ***	NA	Yes ***	No*	No*	No

* Incomplete exposure pathway as a result of secure physical controls (fence and monitored access) preventing site access.

** Incomplete exposure pathway as a result of HOVENSA implemented institutional controls.

*** Refer to August 1998 "Focused Risk Assessment for Estate Figtree Area of Interest"

NA = not applicable [no day care centers known to exist inside the facility or outside the facility boundaries but adjacent to contaminated areas.]

NC = No known contamination of these media from RCRA wastes or contamination subject to RCRA clean-up authorities.

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).

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

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

Rationale and Reference(s):

Rationale: Groundwater is not currently utilized for potable or non-potable usages at, or down-gradient of, the facility. Nor is it considered potentially usable for potable or non-potable usages at, or down-gradient of, the facility, due to natural water quality conditions (high salinity and high dissolved solids). Refer to April 16, 2001 [Draft] "Determination of Risk-Based Screening Level (RBSL) Values for AOC #1, August 1998 "Focused Risk Assessment for Estate Figtree Area of Interest", and April 26, 2001 "EPA Responses to Public Comments RCRA 7003 Administrative Order on Consent (AOC) St. Croix Alumina [et. al.]." For contaminated surface and/or subsurface soils at the facility, secure physical controls (fence and monitored access) preventing site access, and/or HOVENSA implemented institutional controls, preclude complete exposure pathway for human health impacts from those contaminated surface and/or subsurface soils. Also

HOVENSA implemented institutional controls preclude complete exposure pathway for human health impacts to workers [including construction] from contaminated groundwater. Refer to November 1, 1999, Module III (Corrective Action Requirements for Solid Waste Management Units and Areas of Concern) of the Final RCRA Operating Permit.

References

1. August 1998 "Focused Risk Assessment for Estate Figtree Area of Interest". Submitted as part of the August 1998 "Status Report Hydrocarbon Recovery Project, First Semi-Annual Report, 1998"

2. February 2001 "Status Report Hydrocarbon Recovery Project, 2nd Semi-Annual Report, 2000"

3. November 30, 2000 "Site-Wide Dissolved-Phase Transport Model Draft Report"

4. March 21, 2000 "Site-Wide PSH Model Development, Final Report"

5. April 16, 2001[Draft] "Determination of Risk-Based Screening Level (RBSL) Values for AOC #1"

6. March 30, 2001 "Interim Corrective Measures (ICM) and Corrective Measures Study (CMS) Status Report AOC #3 (MTBE Impacted Areas)"

7. September 18, 2000 "Final Corrective Measures Study (CMS) Report" for SWMU #4, as revised by November 21, 2000 revised pages [Attachment 2 of HOVENSA's November 27, 2000 letter].

8. November 1, 1999, Module III (Corrective Action Requirements for Solid Waste Management Units and Areas of Concern) of the Final RCRA Operating Permit

9. May 11, 2000 "Corrective Measures Study Comprehensive Work Plan for AOC #1 (Phase Separated Hydrocarbon) and AOC #2 (Dissolved Phase Hydrocarbon)".

10. August 15, 2000 "Comprehensive Investigation and Corrective Measures Study Work Plan for AOC #3 (MTBE Impacted Areas).

11. August 11, 2000 "Final Corrective Measures Implementation (CMI) Report for SWMU #14.

12. April 30, 2001 "Bimonthly Progress Report RCRA Facility Investigations and Corrective Measures Study Status Report".

13. April 26, 2001 "EPA Responses to Public Comments RCRA 7003 Administrative Order on Consent (AOC) St. Croix Alumina [et. al.]."

14. September 26, 2000 "DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION, RCRA Corrective Action Environmental Indicator (EI) RCRIS code (CA750) Migration of Contaminated Groundwater Under Control."

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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)?

_____ 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."

__X___ 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

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[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.

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5 Can the "significant" **exposures** (identified in #4) be shown to be within **acceptable** limits?

__X___ 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): In-door and outdoor air [vapor] risks were evaluated for on-site residential housing at Estate Figtree, which overlies a portion of the underground phase separated hydrocarbon plume, and worker exposure as a result of excavation of septic drain fields [present at Estate Figtree] which were identified as the most likely pathway of exposure to volatile constituents from the underground phase separated hydrocarbon plume. Under this residential scenario,

for both an in-door and outdoor exposure, and the worker excavation scenario, the calculated air [vapor] exposure point concentrations for the volatile constituents associated with the underground phase separated hydrocarbon plume were found to be below unacceptable screening levels. The evaluated exposure scenarios are considered the worst case scenarios for possible vapor impacts from contamination at HOVENSA that is subject to RCRA. [Refer to August 1998 "Focused Risk Assessment for Estate Figtree Area of Interest". Submitted as part of the August 1998 "Status Report Hydrocarbon Recovery Project, First Semi-Annual Report, 1998".]

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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 __**HOVENSA**___ facility, EPA ID #_**VID980536080**_, located at **Limetree Bay, St. Croix, V.I.**_ 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.

References

1. August 1998 "Focused Risk Assessment for Estate Figtree Area of Interest". Submitted as part of the August 1998 "Status Report Hydrocarbon Recovery Project, 1st Semi-Annual Report, 1998"

2. February 2001 "Status Report Hydrocarbon Recovery Project, 2nd Semi-Annual Report, 2000"

3. November 30, 2000 "Site-Wide Dissolved-Phase Transport Model Draft Report"

4. March 21, 2000 "Site-Wide PSH Model Development, Final Report"

5. April 16, 2001 [Draft] "Determination of Risk-Based Screening Level (RBSL) Values for AOC #1"

6. March 30, 2001 "Interim Corrective Measures (ICM) and Corrective Measures Study (CMS) Status Report AOC #3 (MTBE Impacted Areas)"

7. September 18, 2000 "Final Corrective Measures Study (CMS) Report" for SWMU #4, as revised by November 21, 2000 revised pages [Attachment 2 of HOVENSA's November 27, 2000 letter].

8. November 1, 1999, Module III (Corrective Action Requirements for Solid Waste Management Units and Areas of Concern) of the Final RCRA Operating Permit

9. May 11, 2000 "Corrective Measures Study Comprehensive Work Plan for AOC #1 (Phase Separated Hydrocarbon) and AOC #2 (Dissolved Phase Hydrocarbon)".

10. August 15, 2000 "Comprehensive Investigation and Corrective Measures Study Work Plan for AOC #3 (MTBE Impacted Areas).

11. August 11, 2000 "Final Corrective Measures Implementation (CMI) Report for SWMU #14.

12. April 30, 2001 "Bimonthly Progress Report RCRA Facility Investigations and Corrective Measures Study Status Report".

13. April 26, 2001 "EPA Responses to Public Comments RCRA 7003 Administrative Order on Consent (AOC) St. Croix Alumina [et. al.]."

14. September 26, 2000 "DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION, RCRA Corrective Action Environmental Indicator (EI) RCRIS code (CA750) Migration of Contaminated Groundwater Under Control."

Completed by (signature) Original signed by_____ Date ___06/05/01__
(print) Timothy Gordon
(title) Project Manager

Supervisor (signature) Original signed by Date ___06/05/01___
(print) R. Basso
(title) Chief, RPB
(EPA Region or State) II

Locations where References may be found:

US EPA Region 2
RCRA File Room
290 Broadway, 15th floor
New York, NY

Contact telephone and e-mail numbers

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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.

Attached Figures:

1. Figure 1 - Generalized SWMU location map.

2. Figure 2 - Generalized Phase Separated Hydrocarbon Isopach (thickness) map showing AOCs #1 and #4.

3. Figure 4.1 - Site-Wide Ground Water Model Dissolved Transport Model Predicted Dissolved Benzene distribution, showing AOC #2.

4. Figure 4.2 - Site-Wide Ground Water Model Dissolved Transport Model Predicted Dissolved composite Toluene, Ethylbenzene, and Xylene ["TEX"] distribution, showing AOC #2.

5. Figure 5B - Map showing nine MTBE and other oxygenated ether handling or storage areas that comprise AOC #3.

Attachments truncated, see facility file (MSS, 03/06/02)