ENTERED

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final
2/5/99

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

Current Human Exposures Under Control

Facility Name: Western Refining Southwest, Inc. (Formerly Giant Industries Arizona, Inc.)
Facility Address: 50 County Road 4990, Bloomfield, NM 87413
Facility EPA ID #: NMD089416416

1. Has **all** available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

   X If yes - check here and continue with #2 below.

   _____ If no - re-evaluate existing data, or

   _____ if data are not available, skip to #6 and enter"IN" (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Current Human Exposures Under Control" EI

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no "unacceptable" human exposures to "contamination" (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives that are currently being used as Program measures for the Government Performance and Results Act of 1993, (GPRA). The "Current Human Exposures Under Control" EI are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program's overall mission to protect human health and the environment requires that Final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

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

	Yes	No	?	Rationale / Key Contaminants
Groundwater	X	___	___	VOCs, SVOCs, TPH, Ba, Cr, Pb (Totals), Ba, Fe, Mn, Se, U (Dissolved)
Air (indoors)[2]	___	___	NA	___
Surface Soil (e.g., <2 ft)	X	___	___	BTEX, SVOCs and TPH, As, Co
Surface Water	X	___	___	Ba, Cr, Pb (Totals), Fe (Dissolved)
Sediment	___	___	NA	___
Subsurf. Soil (e.g., >2 ft)	X	___	___	BTEX, SVOCs and TPH
Air (outdoors)	___	___	NA	___

___ 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):

On November 23, 2009, Western Refining Southwest, Inc. (formerly Giant) indefinitely suspended refining operations at Western Refining Southwest, Inc.'s (Western's) Bloomfield Refinery; however, the crude unloading and product loading racks, storage tanks and other supporting equipment remain in operation. Groundwater contamination as phase-separated hydrocarbons (SPH) and dissolved-phase benzene, toluene, ethylbenzene, and xylenes (BTEX), and other volatile organic compounds (VOCs), naphthalene and other semivolatile organic compounds (SVOCs), methyl tertiary butyl ether (MTBE), diesel- gasoline- and oil-range organics (DRO, GRO, and ORO) and chromium are present beneath the refinery facility. Based on information provided in Western's *2013 Groundwater Remediation and Monitoring Annual Report*, the refinery continues to conduct ongoing total fluids recovery to contain the migration of contaminants in the groundwater. Product has been detected in groundwater prior to suspension of refining operations in November 2009. There are four general areas of the facility that SPH is present, the Terminal Area, Tank Farm Areas, Former Refinery Process Area, and North Boundary Barrier Area. The contaminant plumes in these areas appear to fluctuate seasonally.

Historically, hydrocarbon contamination was observed in riverbank deposits along the San Juan River located adjacent to the north of the refinery. Western (formerly Giant) constructed a barrier wall along the riverbank in March 2005, consisting of sheet piles to depths of approximately 15 feet below surface grade and extended by a slurry wall to depths of approximately 30 feet below grade, at the locations where hydrocarbon contamination was observed in the riverbank sediments. Evidence of hydrocarbon contamination was observed in seeps along the riverbank since installation of the barrier wall and in wells located on the river side of the barrier. However, in January 2006, the River Terrace Bioventing System was put on-line to target the contaminated subsurface soils and enhance the groundwater remediation efforts through pumping and air sparging. The system has since been upgraded in 2012 to target the most impacted groundwater area in the southwest corner of the River Terrace area.

Petroleum-related contaminants present in the northwest portion of the facility, the riverbank sediments discussed above, at SWMUs discussed below, and at three seeps located along a cliff face and in low lying areas located on undeveloped land located north and west of the refinery present in various media pose

potential exposures to construction workers, and refinery personnel. The information presented below identifies the events from 2006 to present which indicate current human exposures are under control. Since the November 2006 CA725 determination, contaminants in the water table aquifer that migrated to the northwest portion of the facility and discharged at the contact between unconsolidated sand and gravel deposits and the Nacimiento Formation, into drainages that connect with the San Juan River have been contained and are currently being recovered by the 19 recovery wells currently in operation at the facility.

Groundwater contaminants detected beneath the facility include SPH and dissolved-phase BTEX and other VOCs, naphthalene and other SVOCs, MTBE, GRO, DRO and ORO, chromium, lead, and barium. Surface water contaminants include dissolved-phase BTEX and have been detected in the San Juan River and the Raw Water Ponds (process water supply). However, there is a decreasing trend in groundwater in several areas of the facility as well as stabilization of other contaminants in others. This information is documented in the analytical laboratory results from Western's annual groundwater monitoring reports. Since the refinery is no longer operating, outdoor air is no longer subject to VOCs and hydrogen sulfide contamination released from process vents, valves, API separator, tanks, and the surface impoundments.

In October 2003, Western informed the New Mexico Environment Department (NMED) of the discovery of hydrocarbons in the #1 East Outfall located northeast of Tanks 13 and 14. Since the discovery of hydrocarbons, Western has pumped the discharge from the #1 East Outfall to a collection tank (Tank #38) where the water is then routed to a separator tank (Tank #33), which separates emulsified hydrocarbons by gravitation. The underflow is then routed for discharge to the raw water ponds. During monthly sampling from November through March 2005, effluent from the #1 East Outfall recovery system entering the raw water ponds exceeded the New Mexico Water Quality Control Commission (WQCC) standard for benzene of 10 micrograms per liter (µg/L) at concentrations ranging from 25 µg/L to 99.7 µg/L. However, groundwater sample results from the *2007 Groundwater Remediation and Monitoring Annual Report* submitted April 2008 reported concentrations of 0.003 mg/L for the third quarter sampling event and non-detect results for the first, second and fourth quarter sampling events.

The shallow water table aquifer is present within the Quaternary sediments. The Nacimiento Formation acts as an aquitard and prevents site related contaminants from migrating to deeper aquifers. Hydrocarbons have historically been detected in soils and groundwater at several of the seeps. The seeps are remote and difficult to access. Groundwater discharged from the seeps is sampled periodically by refinery personnel. Benzene was not detected in Seeps #1, #2, #3, #6, and #9 in August 2013 and analytical results have been "non-detect" since 2007. There is difficulty accessing the seeps and not enough groundwater to sample all of the seeps during each monitoring and sampling event, their location in remote locations and the proximity of the seeps to the refinery; therefore, the possibility of human exposure at the seep locations is considered unlikely and NMED considers human exposures to be controlled at these locations.

Surface soil contamination has been observed at the facility at several locations. Human exposures are controlled by restricting access and activities at the units, implementation of Western's health and safety standard operating procedures (SOPs) and by monitoring work activities at the loading rack locations as well as throughout the facility.

Petroleum-related subsurface soil contamination is known to be present beneath the refinery process areas and tank farms. In addition, petroleum-related subsurface soil contamination is suspected to be present at the Transportation Terminal locations, at the Fire Training Area and downgradient (north and west) of the refinery. The areas north and west of the refinery consist of undeveloped land that is considered unlikely to be developed due to the long, narrow dimensions and inaccessibility. NMED will require monitoring of construction activities and corrective action if development is anticipated in the areas located north and west of the refinery before corrective action is completed at the Bloomfield Refinery. Western continues to evaluate corrective measures for the refinery process areas, the tank farm, the Transportation Terminal, the Fire Training Area and those areas located off site that have been impacted by historical petroleum releases. Corrective Measures Studies have been submitted to NMED for review and since the Bloomfield Refinery is no longer operating, areas that were once inaccessible have been included with the ongoing investigation at the facility. Human exposures are controlled at these locations by restricting access to these locations,

implementation of health and safety SOPs and by monitoring work activities throughout the facility.

REGULATED UNIT SUMMARY

NMED has determined that Western's Bloomfield Refinery has one regulated unit in interim status consisting of the North and South Oily Water Ponds, a surface impoundment system now designated as the North Aeration Lagoon (NAL) and the South Aeration Lagoon (SAL). The NAL and SAL are located in the northwest portion of the facility, north of the API Separator and south of Hammond Ditch. The NAL and SAL operate as a hazardous waste treatment unit that is regulated under the authority of the Hazardous Waste Act due to the treatment of benzene (hazardous waste Code D018). The NAL and SAL were utilized to treat refinery wastewater effluent discharged from the API Separator by aeration which meets the definition of aggressive biological treatment as defined in 20.4.1.200 NMAC (incorporating 40 CFR 261.31 (b)). Potential worker and construction worker are not at risk of exposure because the facility is now a terminal and is no longer operating.

Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) Summary
NMED has identified the following SWMUs and AOCs at the facility:

SWMU #2 The Former Drum Storage Area North Bone Yard was identified as a SWMU during a RCRA Facility Assessment (RFA) conducted in June 1987 by EPA and is located north of the former evaporation ponds (raw water ponds) on the northeast corner of the Facility. In July 1987, drums were removed from the North Bone Yard to the Warehouse Yard. The number and contents of the relocated drums is not clear. Monitoring well MW-1, located in the North Bone Yard, was sampled during both of the Phase III RFA events, and no targeted VOCs and SVOCs were detected. The North Bone Yard temporarily stores empty drums; however, no waste materials are currently managed in this area. It is not known if the North Bone Yard was used for waste storage in the past and it is not known whether any of these drums leaked because there are no reports of releases. An investigation conducted at this site in 2008 determined that additional corrective action may be warranted, depending on the results of the background study. Potential refinery and construction worker exposures could occur via construction and other activities in this area; however, human exposures are controlled at this site.

SWMU #3 The Underground Piping is considered to be still in use even though petroleum refining operations have been suspended and the property is currently used as a petroleum terminal. Terminal operations still include most of the same or similar transfer and storage operations of refined products and crude oil that took place during active refining operations. There are several underground piping systems at the Facility and due to the age of the refinery (operating since the 1950s), operating activities, and age of piping at the Facility, it is likely the piping has contributed to releases of hazardous and other petroleum constituents into the environment in the past. Most of the current underground piping is associated with the transport and loading product areas, the Above Ground Storage Tank (AST) Farm, and the wastewater collection system. The wastewater collection system includes a network of curbing, paving, catch basins, and refinery sumps associated with the storm water collection system, loading terminal sumps, drains, and underground piping that collects rainwater and other effluent from various process areas within the refinery. The wastewater is conveyed to the API separator. The Groundwater Technology Incorporation (GTI) 1993 Report states, "[f]rom previous investigations, a separate-phase hydrocarbon (SPH) plume has been partially delineated at the BRC [Bloomfield Refining Company] site, extending from the western area of the site (near the offices) to the eastern portion of the AST Farm. The sources of this plume are believed to be product releases which have occurred from AST's and associated piping over many years of the facility's operation as a petroleum refinery." An investigation in 2012 demonstrated that impacted groundwater may be the source of constituents of concern (COC) and not a soil source as the shallower soil samples did not detect COCs above screening levels. Potential refinery and construction worker exposures could occur via construction and other activities in this area; however, human exposures are controlled at this site.

SWMU #4 The Transportation Terminal Sump (TTS) is located in the southern portion of the refinery, south of Sullivan Road and south of the liquid propane gas (LPG) bullet tanks. The TTS was an earthen sump used as a truck cleaning area. In 1986, the sump was backfilled with soil. An investigation in 2009 determined that surface and subsurface contamination is present at the site; however, groundwater samples

indicate that the groundwater is impacted by an upgradient source. Additional investigation may be required at the site depending on the background study. Potential refinery and construction worker exposures could occur via construction and other activities in this area; however, human exposures are controlled at this site.

SWMU #5 The Heat Exchanger Bundle Cleaning Area (HEB) is located in the southern portion of the Facility. The HEB is used to clean scale deposits from heat exchangers. Historically, this area was used as an empty container storage area and the heat exchangers were cleaned in the process area of an abandoned truck terminal. The west portion of the old abandoned truck terminal has been converted to the Auxiliary Warehouse, and the east portion has been converted to the 90-day storage area. The heat exchanger hydro blast pad is attached to the 90-day storage area. The HEB cleaning takes place in an enclosed room with sheet metal walls, a concrete floor, and an attached outdoor concrete pad. Attached to the concrete pad is a sump approximately four feet wide, 50 feet long, four feet deep, and covered by perforated steel plates. The sump is intended to collect the sludge generated during the cleaning bundle process. An asphalt curb was installed around the perimeter of the concrete pad in 2001. The pad and sump contained K050 listed sludge waste, was removed, containerized and sent off-site for disposal as hazardous waste in accordance with the 90-day on-site storage regulations. An investigation in 2009 determined that additional assessment of the site is warranted. Potential refinery and construction worker exposures could occur via construction and other activities in this area; however, human exposures are controlled at this site.

SWMU #6 The Abandoned Underground Piping consists of two pipelines; one pipeline ran from the discharge at the aeration lagoons to the former South Evaporation Pond and carried wastewater to the evaporation pond. The second pipeline ran along the north side of Tanks 35 and 18 and was used to move product within the Tank Farm. There are no documented historical releases from these pipelines. During the 2012 investigation, Western could not locate the abandoned pipeline near Tanks 11, 12, 13, and 14. Refinery personnel determined that the pipeline was located 200 feet further south and had previously been removed; however, the exact location could not be confirmed. Chromium was the only constituent detected above the soil screening level at the second pipeline. The 2012 investigation demonstrated that impacted groundwater may be the source of COC and not a soil source as the shallower soil samples did not detect COCs above screening levels. Additional investigation may be warranted, depending on the background study. Potential refinery and construction worker exposures could occur via construction and other activities in this area; however, human exposures are controlled at this site.

SWMU #7 Raw Water Ponds (Fresh Water Ponds) historically, were known as the North and South Evaporation Ponds (N & S EP) and functioned as refinery wastewater treatment ponds. Currently the ponds are referred to as the Raw Water Ponds or the Fresh Water Ponds. The Ponds are located northeast of the process area and west of the Fire Training Area. The Raw Water Ponds are lined with four to six inches of bentonite clay. Historically, treated wastewater from the North Oily Water Pond (North aeration lagoon) w transferred to the Raw Water Ponds. From the Raw Water Ponds, the water was evaporated or transferred to the spray irrigation area to enhance evaporation. The Raw Water Ponds were decommissioned in 1994 or 1995 after the construction of the Class I injection well, which currently receives treated refinery wastewater. Upon decommissioning, the Evaporation Ponds were converted to the Raw Water Ponds for storage of river water pumped from the San Juan River prior to treatment for use in refinery operations. In July 2003, hydrocarbons were found in the #1 East Outfall located northwest of the Raw Water Ponds on the north side of Hammond Ditch. In order to prevent hydrocarbon constituents from entering into the San Juan River, the Respondents installed a recovery system that employed a collection tank and a pump at the #1 East Outfall. The water/hydrocarbon mixture from #1 East Outfall is routed to Tank #38. The effluent from Tank #38 is routed to a separator tank set up for gravitational separation of the mixed hydrocarbon effluent. The recovered oil is routed to a 25,000-gallon vessel (V-610) and the water underflow is routed to the refinery's Raw Water Ponds. The effluent entering the Raw Water Ponds has contained concentrations of benzene that exceeded the WQCC standards and MCL. Due to benzene exceedances and historical use of the ponds, petroleum contamination may be present in the pond water and pond sediments. An investigation in 2010 confirmed that metals and VOCs are present in the soil near the site; however, only the former south EP was investigated because the Raw Water Ponds were still in use at the time of the investigation. It was recommended that the Raw Water Ponds be investigated after they are no longer operational and a risk assessment must be performed to determine if another investigation is warranted at

the south EP. Potential refinery and construction worker exposures could occur via construction and other activities in this area; however, human exposures are controlled at this site.

SWMU #8 The Inactive Landfill (formally called the Landfill) is a low-lying area located east of the Tank Farm and south of the Fire Training Area; its dimensions are unknown. The Inactive Landfill is currently not in use. It is unlined and does not have a waterproof cover, although it has been covered with soil. In October of 1984, visually contaminated soil from the aeration ponds (classified as K051 API separator sludge) was removed and disposed of in the Inactive Landfill. In November 1989, approximately 2,000 cubic yards of contaminated soil was stockpiled at the landfill area. In April 1991, the refinery operators petitioned EPA for a delisting determination for the soil, which was granted by EPA. The actual date of landfill closure is unclear. An investigation conducted at this site in 2008 determined that additional corrective action may be warranted, depending on the results of background study. Potential refinery and construction worker exposures could occur via construction and other activities in this area; however, human exposures are controlled at this site.

SWMU #9 The Landfill Pond was an unlined, low-lying natural depression that resulted from blockage of an existing arroyo during the construction of the Hammond Ditch. The Landfill Pond was located east of the Fire Training Area and northeast of MW-8. The Landfill Pond collected water from the Hammond Ditch, storm water drainage from the surrounding area, and possibly other fluids associated with the Inactive Landfill. The Landfill Pond no longer exists and the low-lying area was filled in and the site has been graded to conform to the general contours of the surrounding arroyo. A closure plan was submitted in 1986, NMED approved the closure plan in a letter dated January 25, 1994 from NMED to Giant titled *Bloomfield Refining Company Landfill Pond Closure Plan Approval*; however, no closure report, closure certification or closure verification documentation is in NMED's administrative record. An investigation conducted at this site in 2008 determined that additional corrective action may be warranted, depending on the results of background study. Potential refinery and construction worker exposures could occur via construction and other activities in this area; however, human exposures are controlled at this site.

SWMU #10 The Fire Training Area is located in the northeast portion of the Facility, north of the Inactive Landfill and east of the Raw Water Ponds. The Fire Training Area was utilized from 1981 through 2009 to train employees and the Bloomfield New Mexico Fire Department to fight fires that may occur at the Facility. This area stores holding tanks that contain diesel, gasoline, and other fuels used to set fires for training purposes. In the 1987 RCRA RFA, black oily stains were noted on the ground around several of the fuel holding tanks. During the 1993 and 2010 investigations, diesel-range hydrocarbon contamination was detected in surface and subsurface soils as well as some metals and VOCs. The 2010 investigation determined that additional investigation may be warranted, depending on the results of the background study. Potential refinery and construction worker exposures could occur via construction and other activities in this area; however, human exposures are controlled at this site.

SWMU #11 The Spray Irrigation Area is a 10-acre parcel of land located in the southeast portion of the refinery. The 1984 Discharge Plan submitted to OCD identified the Spray Irrigation Area as an area bordered by an earthen berm to prevent surface drainage into nearby drainage channels. It was used to dispose of refinery wastewater by evaporation. A four-inch aluminum pipe was used to carry wastewater from the evaporation ponds (Raw Water Ponds) to sprinkler heads located across the 10-acre parcel. Spray irrigation took place primarily between the months of March and October. OCD required the Facility to conduct soil sampling at the unit and to install a groundwater monitoring well, MW-5, as part of a site investigation. Petroleum contamination was not detected during the investigation. MW-5 is located in the irrigation plot and is currently dry. Use of the Spray Irrigation Area was discontinued in 1994. A Notice of Disapproval (NOD) letter from June 11, 2011 states "[a]t this time, NMED does not require further investigation of this area." An office building and an asphalt parking lot currently occupy the site; therefore, human exposures are controlled at this site.

SWMU #12 The API Separator is located in the process area of the refinery, south of the aeration lagoons. Fluids from the Facility's wastewater collection system, tank farm sumps, and sewer lines within the process areas are sent to the API Separator. The API Separator generates listed hazardous waste (API Separator Sludge (K051). The API Separator is a large double chambered steel-reinforced concrete tank that uses

gravity to separate the wastewater into three components: a sludge layer that sinks to the bottom of the separator, a scum layer containing oil that floats to the top and is returned back to the refinery process, and a clarified effluent in the middle that contains characteristic listed hazardous waste (D018). This last component is discharged from the API separator and sent to the aeration lagoons for treatment. In April 1994, a floating roof was installed on the API Separator consisting of a liquid mounted primary seal and secondary wiper seal. There have not been any documented historical releases from the API Separator and an investigation at the site is currently in progress. Potential refinery and construction worker exposures could occur via construction and other activities in this area; however, human exposures are controlled at this site.

SWMU # 13 The Process Area is located in the northwest portion of the refinery and houses most of the refinery's process units. The Process Area includes the crude unit, reforming unit, fluidized catalytic cracking unit, sulfur recovery unit, poly unit, merox treater unit, diesel hydrotreating unit, and the wastewater treatment system, including the API Separator and aeration lagoons (surface impoundments). The Process Area also incorporates pumps, valves, and piping systems used throughout the Facility to transfer various liquids among tanks and process units. The Process Area is documented as a suspected spill area. The crude unit is the site of a documented spill that occurred in 1986. Bordering the process area to the north is Hammond Ditch and monitoring wells MW-45 and MW-47. SPH has collected in the french drain system constructed beneath the ditch and was discovered in substantial quantities in the monitoring wells since 2011; however, the seasonal fluctuation of groundwater has an effect on the thickness of the product in several monitoring wells along Hammond Ditch. An investigation at this site is currently in progress. Potential refinery and construction worker exposures could occur via construction and other activities in this area; however, human exposures are controlled at this site.

SWMU # 14 Tanks 3, 4, and 5 are located in the Process Area, south of recovery well (RW-9) and north of the merox treater unit. In March 2000, 500 barrels of reformate spilled from the tanks and was contained by berms in the vicinity of the tanks. Currently, Tanks 3 and 4 contain mid-grade gasoline; Tank 5 contains isomerate. The recovery wells located north of these tanks (located in the direction of groundwater flow) RW-22, RW-9, and RW-23 have all contained SPH since 2004; however, RW-22 did not contain product from August 2011 through August 2013, RW-9 appears to be experiencing fluctuations in product with no product in April 2011, 0.01 feet of product in August 2011, no product in 2012 and 0.32 feet of product in April 2013 and 0.034 feet of product in August 2013. In addition, RW-23 appears to be experiencing seasonal fluctuation of product with product appearing in the August monitoring events and no product present in the April events for 2011, 2012, and 2013. An investigation at this site is currently in progress. Potential refinery and construction worker exposures could occur via construction and other activities in this area; however, human exposures are controlled at this site.

SWMU # 15 The Tank Farm Area, constructed in the 1950s, is located east of the El Paso Pipeline and north of Sullivan Road in the central portion of the Facility. The Tank Farm Area consists of aboveground storage tanks that store crude oil, intermediate feedstocks, finished-products, chemicals, and water. The tank sizes range from 1,000 barrels to 110,000 barrels. Over the years of operation, various releases have occurred due to spills and leaks from the tanks. Tanks 19, 22, and 26 have historically released diesel, gasoline, and kerosene of which an estimated 141 barrels were not recovered. The following tanks have documented leak repairs: 17, 18, 19, 20, 23, 24, 25, 26, 29, 30, and 31. During the 2010 investigation, there were exceedances in soil sample results for metals, organic constituents, and TPH. Additional delineation is warranted at the site including reassessing analytical data once the background study has been completed. Potential refinery and construction worker exposures could occur via construction and other activities in this area; however, human exposures are controlled at this site.

SWMU # 16 The Active Landfill, which began operation in 1983, is located east of the Fire Training Area. The Active Landfill is unlined and the dimensions and volume are unknown. The Active Landfill operation is regulated by OCD and is currently used to dispose of fluidized catalytic cracking fines and sulfur. During the investigation in 2010, the impacts from the process catalysts were found to extend to 18 feet below ground surface, four metals (arsenic, iron, manganese, and mercury) in soil samples along with seven organic constituents (1,2,4-trimethylbenzene, 1,5,3-trimethylbenzene, 1-methylnaphthalene, 2-methylnaphthalene, naphthalene, xylenes, and DRO) were detected. Groundwater samples collected from

these soil borings detected several metals and three organic constituents (1,2,4-trimethylbenzene, 1-methylnaphthalene, and naphthalene). As a result of the investigation, monitoring well MW-70 was installed in 2012 within the vicinity of SWMU 16. However, groundwater samples collected in June 2013 did not detect TPH, VOCs or SVOCs, but three metals (iron, manganese, and nickel) exceeded groundwater screening levels. Additional investigation may be warranted at this site depending on the results from the background study. Potential refinery and construction worker exposures could occur via construction and other activities in this area; however, human exposures are controlled at this site.

SWMU # 17 The River Terrace Area is located adjacent to the San Juan River north of the refinery process units. In 1999, the Facility installed sheet pilings and a bentonite slurry wall adjacent to the San Juan River. The bentonite slurry and sheet pile barrier wall extends around the perimeter of the riverbank from the base of the bluff east of the refinery process area to the refinery river water supply inlet station. The bentonite slurry and sheet pile barrier wall was installed to prevent SPH and dissolved-phased hydrocarbons from migrating into the San Juan River. Between October 2004 and April 2005, the Facility completed another investigation in the riverbank area to evaluate the presence of petroleum contamination in groundwater on the refinery side of the bentonite slurry and sheet pile barrier wall. The investigation determined that petroleum contamination is present in the vicinity of the sheet pile/bentonite slurry wall barrier adjacent to the San Juan River and extending toward the refinery to the temporary wells east of the river inlet station. The River Terrace Bioventing Project was initiated in 2005 and the system was constructed to provide oxygen to the subsurface to support aerobic biodegradation of petroleum hydrocarbons. Hydrocarbons had been detected in monitoring well MW-49 located on the river side of the barrier; however, from 2006 through 2013, there have been two TPH-DRO exceedances in the first and second quarter of 2010. From the third quarter of 2010 through 2013, VOCs, SVOCs, TPH, and metals groundwater results have been non-detect. The system has since been upgraded in 2012 to target the most impacted groundwater area in the southwest corner of the River Terrace area. Potential refinery and construction worker exposures could occur via construction and other activities in this area; however, human exposures are controlled at this site.

SWMU # 18 The Warehouse Yard is a fenced-in area situated west of the refinery offices and identified as a SWMU during the June 1987 RFA. The Warehouse Yard was upgraded in 1988 to include a metal frame storage shed with concrete flooring, curbing, and a collection trench. Currently the Warehouse Yard stores drums containing lube oils and other products used in refinery processes. Recovery well, RW-1, is located in the Warehouse Yard, where SPH has been detected historically; however, this well is located downgradient of a larger area of groundwater contamination that extends from the refinery tank farm to the processing units. An investigation conducted at this site in 2008 determined that additional corrective action may be warranted, depending on the results of background study. Potential refinery and construction worker exposures could occur via construction and other activities in this area; however, human exposures are controlled at this site.

AOC #19 The Seeps North of MW-45 (Seeps No. 1, 2, 5, and 9) are located north of monitoring well MW-45 and were discovered in August 2004 during a site visit by NMED. SPH was discovered seeping from the bluff and migrating toward the San Juan River. Currently, only Seeps No. 1 and 9 have very limited discharge of groundwater. During an investigation in 2011, evaluation of historical data reported an exceedance of MTBE in 2008 but below the screening level in 2009. In the *Groundwater Remediation and Monitoring Annual Report* from 2010 through 2013, all detections have been below the groundwater screening levels. Potential refinery and construction worker exposures could occur via construction and other activities in this area; however, human exposures are controlled at this site.

AOC # 20 The Seeps North of MW-46 (Seeps No. 6 and 7) were discovered in November 2004. SPH and a water/hydrocarbon mixture were discovered seeping from the bluff and migrating toward the San Juan River. A containment structure was installed and recovered contaminated water is sent back through the wastewater treatment system. Currently, only Seep No. 6 has very limited discharge of groundwater. Potential refinery and construction worker exposures could occur via construction and other activities in this area; however, human exposures are controlled at this site.

AOC # 21 The Seep North of MW-47 (Seep No. 8) was discovered in December 2004. SPH and a water/hydrocarbon mixture were discovered seeping from the bluff and migrating toward the San Juan

River. A containment structure was installed and recovered contaminated water is sent back through the wastewater treatment system. Currently, there is no groundwater discharge at Seep No. 8. Potential refinery and construction worker exposures could occur via construction and other activities in this area; however, human exposures are controlled at this site.

AOC # 22 The Product Loading Rack and Crude Receiving Loading Racks are located in the southeastern portion of the Facility south of Sullivan Road. The loading and receiving racks are the location of known and suspected releases. The crude loading area was the site of a spill in April 1986, in which 200 barrels of diesel fuel spilled near the crude unit; 150 barrels were not recovered. The product loading rack and underground piping are potential sources of contamination. Petroleum contamination is present in monitoring wells located directly downgradient of the Product Loading Rack and Crude Receiving Rack. In August 2004, MW-25 contained 0.97 feet of SPH; however, in August 2014, MW-25 contained 0.02 feet of SPH. The reduction of product at the site coincides with the decrease in concentration of constituents of concern (COCs) in groundwater. In August 2004, the groundwater sample from MW-26 reported a benzene concentration of 740 µg/L, and in August 2012, the benzene concentration was 29 µg/L. In August 2004, the groundwater sample from MW-31 reported a benzene concentration 3,700 µg/L, and in August 2013, the benzene concentration was 2,500 µg/L. An investigation conducted at this site in 2009 determined that an additional corrective action investigation must be conducted. Potential refinery and construction worker exposures could occur via construction and other activities in this area; however, human exposures are controlled at this site.

AOC # 23 The Southeast Holding Ponds are located in the far southeast portion of the Facility south of Sullivan Road. The Southeast Holding Ponds are double lined constructed with 60-milimeter high density polyethylene (60 mm HDPE). The ponds are used as a holding basin for excess treated wastewater reportedly utilized when the injection well is under repair or at capacity. An investigation conducted at this site in 2009 determined that additional corrective action may be warranted, depending on the results of background study. Potential refinery and construction worker exposures could occur via construction and other activities in this area; however, human exposures are controlled at this site.

AOC # 24 Tank Areas 41 and 43 are located in the southeastern portion of the Facility south of Sullivan Road and contain crude oil. This is an area of suspected releases. Contamination is present in monitoring wells located northwest of the tanks located generally downgradient from Tanks 41 and 43. During the 2009 investigation, soil sample AOC 24-6 exceeded the DAF screening level for DRO and ORO and the residential screening level for ORO. However, groundwater sampling results from monitoring well MW-64 installed during the 2009 investigation did not detect any VOCs, SVOCs, or TPH and SPH is not present in the monitoring well. Metals such as arsenic and manganese were detected in groundwater samples well below screening levels. Additional assessment is proposed at sample location AOC 24-6. Potential refinery and construction worker exposures could occur via construction and other activities in this area; however, human exposures are controlled at this site.

AOC # 25 The Auxiliary Warehouse and 90-Day Storage Area are located in the southern portion of the Facility abutting the Heat Exchange Bundle Cleaning Area to the west. The Auxiliary Warehouse and 90-Day Storage Area were constructed from a metal building that was a former abandoned truck terminal. A concrete lined sump located in the 90-day storage area was used to collect all wash water and any waste materials generated during cleaning operations. Sludge collected in the sump was removed upon completion of cleaning operations, containerized and sent off-site for disposal as hazardous waste in accordance with the 90-day on-site storage regulations. There have been no documented releases in this area; however, the potential constituents of concern include petroleum constituents and chlorinated solvents. Groundwater and soil samples were collected from the newly installed monitoring well MW-60 during the 2009 investigation and only manganese was detected over the groundwater screening level. Groundwater samples are intermittently collected at MW-60 because of insufficient volume of groundwater in the well; however, all constituents of concern with the exception of nitrate, sulfate and manganese are either not detected or below screening levels. Potential refinery and construction worker exposures could occur via construction and other activities in this area; however, human exposures are controlled at this site.

AOC # 26 The Tank Area 44 and 45 are located west of MW-5 in the southern portion of the facility, south of Sullivan Road. Tanks 44 and 45 store additives such as MTBE, naphtha, and ethanol which are blended at the product loading racks. Tanks 44 and 45 may be a source of MTBE which is detected in a majority of the monitoring wells at the Facility indicating that a release may have occurred from Tank 44 or its ancillary equipment. A documented spill of naphtha occurred in November of 1984 from an unspecified storage tank in this area. An investigation conducted in 2009 determined that constituents detected in soil samples at greater depths indicate that impacted groundwater, and not overlying soil sources, is responsible for contaminants at the site; however, additional investigation is warranted at this site. Potential refinery and construction worker exposures could occur via construction and other activities in this area; however, human exposures are controlled at this site.

SWMU #27 The Wastewater Collection System is comprised of concrete paving and curbing, concrete catch basins, and trenches, and buried concrete and carbon steel piping. The process wastewater flows by gravity to the API Separator where solid, sludge and floating scum are removed, and the effluent then flows to the aeration lagoons. An investigation at this site is currently in progress. Potential refinery and construction worker exposures could occur via construction and other activities in this area; however, human exposures are controlled at this site.

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.

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	Yes	No	Yes	No	No	No
~~Air (indoors)~~	___	___	___	___	___	___	___
Soil (surface, e.g., <2 ft)	No	Yes	No	Yes	Yes	No	No
Surface Water	No	Yes	No	Yes	Yes	Yes	No
Sediment	No	Yes	No	Yes	Yes	No	No
Soil (subsurface, e.g., >2 ft)	No	Yes	No	Yes	No	No	No
~~Air (outdoors)~~	___	___	___	___	___	___	___

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strike-out specific Media including Human Receptors' spaces for Media which are not "contaminated") as identified in #2 above.

2. Enter "yes" or "no" for potential "completeness" under each "Contaminated" Media -- Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations some potential "Contaminated" Media - Human Receptor combinations (Pathways) do not have check spaces ("___"). While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary.

_____ If no (pathways are not complete for any contaminated media-receptor combination) - skip to #6, and enter "YE" status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional Pathway Evaluation Work Sheet to analyze major pathways).

__X__ If yes (pathways are complete for any "Contaminated" Media - Human Receptor combination) - continue after providing supporting explanation.

_____ If unknown (for any "Contaminated" Media - Human Receptor combination) - skip to #6 and enter "IN" status code

Rationale and Reference(s):

There is potential for refinery and construction worker exposure during excavation activities at the following SWMUs and AOCs: the Process Areas, the Tank Farms, the Aeration Ponds, underground piping active and inactive, Transportation Terminal Sump, Raw Water Ponds, Fire Training Area, API Separator, Tanks 3, 4, and 5, Tank Farm Area, Inactive Landfill, River Terrace Area, Seep North of MW-45, Seep North of MW-46, Seep North of MW-47, Product Loading Rack and Crude Receiving Loading Racks, Tank Area 41 and 43, Auxillary Warehouse and 90-Day Storage Area, and the Tank Area 44 and 45. There is also a possibility for residual contaminants from the bluff and drainages to migrate to the San Juan River and potential for exposure to recreational users of the San Juan River. In particular, if the recreational users were to exit the river on the river bank side of the refinery.

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

4. Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be **"significant"**[4] (i.e., potentially "unacceptable" because exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable "levels" (used to identify the "contamination"); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable "levels") could result in greater than acceptable risks)?

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

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

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

Rationale and Reference(s):

The potentially complete exposure pathway scenario is for refinery and construction workers exposed during construction activities. Human exposures are controlled during excavation and construction activities by restricting access and activities within the refinery facility, requiring work permits that limit excavation and construction activities, implementing procedures that require conformance with health and safety requirements and by monitoring work activities throughout the refinery. Proper notification of encounters with contaminated media are part of the facility SOPs. Interim measures and remedial action are required to be implemented if contamination in any media is encountered for performing work at the Western Refining Southwest Inc., Bloomfield Refinery. There is possible exposure to trespassers at the facility, but many locations are locked and monitored by security measures to prevent tampering with equipment. In addition, there is potential for exposure to recreational users of the San Juan River if the recreational users were to exit the river on the river bank side of the refinery. However, recent surface water and seep samples collected in the San Juan River Terrace reported results for VOCs and TPH less than screening levels.

Western Refining Southwest, Inc., April 2014, *2013 Groundwater Remediation and Monitoring Annual Report (January – December 2013)*, pages 21-23, Section 3.0 (Results Summary).

[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.

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

_____ If yes (all "significant" exposures have been shown to be within acceptable limits) - continue and enter "YE" after summarizing and referencing documentation justifying why all "significant" exposures to "contamination" are within acceptable limits (e.g., a site-specific Human Health Risk Assessment).

_____ If no (there are current exposures that can be reasonably expected to be "unacceptable")- continue and enter "NO" status code after providing a description of each potentially "unacceptable" exposure.

_____ If unknown (for any potentially "unacceptable" exposure) - continue and enter "IN" status code

Rationale and
Reference(s):_____

6. Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below

(and attach appropriate supporting documentation as well as a map of the facility):

_YE_ 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 Western Refining Southwest Inc., Bloomfield Refinery facility, EPA ID #NMD089416416, located at 50 County Road 4990, Bloomfield, New Mexico 87413 under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

____ NO - "Current Human Exposures" are NOT "Under Control."

____ IN - More information is needed to make a determination.

Completed by _____ Date 8/3/2015
Leona Tsinnajinnie
Environmental Scientist & Specialist

Supervisor _____ Date 8/3/15
Dave Cobrain
Program Manager, Permit's Management Program
New Mexico Environment Department – Hazardous Waste Bureau

Locations where References may be found:

Western Refining Southwest, Inc., Bloomfield Refinery
#50 County Road 4990, Bloomfield, New Mexico 87413

New Mexico Environment Department Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1, Santa Fe, New Mexico 87505

Contact telephone and e-mail numbers

Dave Cobrain
Phone: (505) 476-6055
E-mail: dave.cobrain@state.nm.us

Leona Tsinnajinnie
Phone: (505) 476-6057
E-mail: leona.tsinnajinnie@state.nm.us

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.