November 25, 2013

Wilbur Mayorga, P.E., Chief
Environmental Monitoring & Restoration Division
Miami-Dade County
Department of Regulatory and Economic Resources
Overtown Transit Village
701 NW 1st Court 4th floor
Miami, FL 33136

Dear Mr. Mayorga:

As requested, we have completed a review of the Site Assessment Report Addendum (SARA) for Blanche Park conducted by SCS ES Consultants. The SARA was completed October 29, 2013, and emailed to the Florida Department of Health (the Department) on October 30, 2013. The Department's review focuses on data from Tables 1, 2, and 3 in the SARA. Please see the enclosed report.

If I can be of further assistance, or if you have additional questions concerning this evaluation, please do not hesitate to contact me at (850) 245-4248.

Sincerely,

Kendra Goff, Ph.D., D.A.B.T.
State Toxicologist

JMH/jmh
Enclosure

cc: Samir Elmir

Evaluation of Site Assessment Report Addendum (SARA) Blanche Park data (SARA Tables 1, 2, and 3) from SCS ES Consultants, October 29, 2013, File No. 09213010.09

Soil samples of varying depths (from 0 up to 15 feet below land surface [bls]) were taken in a dog park and playground (SARA Tables 1 and 2) and groundwater samples from two monitoring wells (SARA Table 3) were also collected. Analyzed results are summarized in the SARA. Recovered soil and water samples were analyzed for polychlorinated biphenyls (PCBs), dioxins, and metals (antimony, arsenic, barium, cadmium, copper, iron and lead). Not all samples were analyzed for every contaminant. Some samples were used for visual inspection only.

The Florida Department of Health's (the Department's) toxicologists performed a human health risk assessment on the available data. A human health risk assessment is the process used to estimate the nature and probability of adverse health effects in humans who may be exposed to chemicals in contaminated environmental media, now or in the future. The scientific methods used in human health risk assessment cannot be used to link individual illnesses to past chemical exposures. Moreover, the reconstruction of past exposures is complicated by having to reconcile it with circumstances that are different than those in existence before an issue was detected. No data is available for past exposure levels at Blanche Park. Only current soil sampling data is provided.

The Department's toxicologists compare measured concentrations to chemical-specific screening values. In this case, the Florida Department of Environmental Protection's (FDEP's) residential Soil Cleanup Target Levels (SCTLs) are used as screening values. Although concentrations at or below the screening value are considered safe, exceeding a screening value does not imply adverse health effects. If contaminant concentrations are above screening values, a dose is calculated based upon a plausible exposure scenario which takes into account exposure duration, exposure frequency, body weight, averaging time and soil concentration.

Estimated exposure doses are then compared to health benchmark levels that are levels below which no harm to health is expected to occur. The Department did not calculate a cancer risk for this scenario because the duration of expected exposure was less than a lifetime.

Please refer to Attachment A for example child and adult calculations.

Groundwater

While monitoring wells showed some contamination of groundwater below the park, public exposure to groundwater is not expected. Water that is available in the park comes from the public water supply (not private wells). The public water supply is periodically tested for contaminants and must comply with drinking water standards.

Soil

Current Conditions

Records indicate that two different turf systems were installed in Blanche Park. One system covers the center of the playground (ForeverLawn®) and the other system covers the dog park and the perimeter of the playground. Prior to placement of the artificial turf system called ForeverLawn® in the central portion of the playground, soil within that portion of the playground was not removed and no clean fill (soil) was added. Soil borings in the central portion of the playground indicate that approximately twelve inches of sand/soil cover was found below the turf and above buried solid waste.

A. Center of Playground

The following conclusions apply to the review of four soil samples *0 to 0.5 feet bls* under the ForeverLawn® turf in the center of the playground. Four soil borings were completed in the center area of the playground [SB-40, SB-41, SB-42, and SB-43]. Samples at depths 0.5 feet or more bls are not considered an immediate health concern because the public does not have easy access to soil at that depth.

- Results for all analytes (dioxins and all metals) fell at or below the FDEP's residential SCTLs, and are unlikely to cause illness.

B. Perimeter of Playground and Dog Park

Prior to installation in 2012/2013 of an artificial turf called XGRASS® on the perimeter of the playground and throughout the dog park, four inches of clean fill was placed directly on top of the soil in Blanche Park. The following conclusions apply to the review of 30 soil samples (Table 1) *0 to 0.5 feet bls* under the perimeter of the playground, throughout the dog park and samples taken on

the periphery of Blanche Park (i.e., fence line and streets). As noted, the first four inches of soil borings under the perimeter of the playground and throughout the dog park would be expected to be clean fill. Samples at depths 0.5 feet or more bls are not considered an immediate health concern because the public does not have easy access to soil at that depth.

- Results for all PCBs fell below the FDEP's residential SCTL (0.5 milligrams total PCBs per kilogram soil [mg/kg]), and are unlikely to cause illness.

- Results for all dioxins fell below FDEP's residential SCTL (7.0 nanograms total dioxins per kilogram soil [ng/kg]), except for one sample [SB-34]. The concentration of total dioxins reported for this sample was 18 ng/kg. **For both children and adults** the calculated risk associated with 18 ng/kg total dioxins was found to be well below health benchmark values for dioxins and is unlikely to cause illness.

  Please note: Dioxin results are pending for four locations. However three of these locations are across the street from the playground. The remaining sample is located in the right of way southwest and outside the fence of the playground park area. These remaining results are not expected to change the above conclusions regarding dioxin.

- Results for all samples analyzed for cadmium fell below FDEP's residential SCTL (82 mg/kg) and is unlikely to cause illness.

- Results for all but one sample of iron [SB-49 – 83,000 mg/kg] fell below FDEP's residential SCTL (53,000 mg/kg), and are unlikely to cause illness. **For both children and adults** the calculated risk associated with 83,000 mg/kg iron was found to be below health benchmark values for iron and is unlikely to cause illness.

- Results for all samples analyzed for barium fell below FDEP's residential SCTL (120 mg/kg), except for three samples [SP-6(8) – 729 mg/kg, SB-29 – 334 mg/kg, and SB-31 – 201 mg/kg]. The highest concentration of barium reported was 729 mg/kg. **For both children and adults** the calculated risk associated with 729 mg/kg barium was found to be well below health benchmark values for barium and is unlikely to cause illness.

- Results for all samples analyzed for copper fell below FDEP's residential SCTL (150 mg/kg), except for four samples [SP-6(8) – 1,400 mg/kg, SB-29 – 206 mg/kg, SB-31 – 182 mg/kg, and SB-49 – 180 mg/kg]. The highest concentration of copper reported was 1,400 mg/kg. **For both children and adults** the calculated risk associated with 1,400 mg/kg copper was found to be below health benchmark values for copper and is unlikely to cause illness.

- Results for all samples analyzed for antimony fell below FDEP's residential SCTL (27 mg/kg), except for one sample [SP-6(8) – 48.6 mg/kg]. **For both children and adults** the calculated risk associated with 48.6 mg/kg antimony was found to be below health benchmark values for antimony and is unlikely to cause illness.

- Arsenic levels were reported above the FDEP residential SCTL level of 2.1 mg/kg in 22 of 30 samples analyzed. Of these 22 samples, the highest arsenic level reported was 46 mg/kg (SB-49). **For both children and adults** the calculated risk associated with 46 mg/kg

arsenic was found to be below health benchmark values for arsenic and is unlikely to cause illness.

- Results for all samples analyzed for lead within the dog park and perimeter of the playground fell below FDEP's residential SCTL (400 mg/kg).

  Please note: A sample location located adjacent to a fence and garbage can that the public passes upon entering the park from the parking lot was found above FDEP's residential SCTL for lead [SP-6(8) – 2080 mg/kg]. This sample is a mathematical outlier in the data set ($p<0.05$) (Table 2) and was not representative of the data.

Past Soil Exposures

As mentioned previously, a human health risk assessment is the process used to estimate the probability of adverse health effects in humans who may be exposed to chemicals in contaminated environmental media, now or in the future. Prediction of risks from past exposures is difficult without actual data. Actual levels of chemicals in the soil in the past may have been higher/lower than current levels indicate.

However, records indicate that, prior to installation in 2012/2013 of an artificial turf called XGRASS® on the perimeter of the playground and dog park, four inches of clean fill was placed directly on top of the soil in Blanche Park. Therefore, chemicals measured 0.5 to 1 feet bls could indicate past soil levels that the public would have encountered during recreational activities on the playground and dog park areas in the past. The following conclusions apply to the review of soil samples *0.5 to 1 feet bls* under the perimeter of the playground and in the dog park.

In reviewing the data, the chemical levels in the soil at the 0.5 to 1 feet bls depth are within the same order of magnitude as those in the 0 to 0.5 feet bls with the exception of arsenic and iron. Results for arsenic and iron in the 0.5 to 1 feet bls fall within one order of magnitude of the chemical exposure levels in the 0 to 0.5 feet bls. With this in mind, the public health conclusions would be the same for past exposures to the chemicals of concern measured in the park soil as those detailed in the body of this letter for the upper soil depths (0 to 0.5 feet bls).

Table 1. Samples (30) reviewed at 0-0.5 feet bls located at the perimeter of the playground, throughout the dog park, and on the periphery of the playground (i.e., fence line and bordering streets) in Blanche Park

SP-6	SB-29
SP-6(8)	SB-30
SB-13	SB-31
SB-15	SB-32
SB-17	SB-33
SB-18	SB-34
SB-19	SB-35
SB-21	SB-36
SB-22	SB-37
SB-23	SB-38
SB-24	SB-39
SB-25	SB-48
SB-26	SB-49
SB-27	SB-50
SB-28	SB-56

Table 2. Samples (29) reviewed for lead (Pb) at 0-0.5 feet bls located at the perimeter of the playground, throughout the dog park, and on the periphery of the playground (i.e., fence line and bordering streets) in Blanche Park

Sample Location	Lead (mg/kg)*	Sample Location	Lead (mg/kg)
SP-6(8)(0-0.5)	2080	SB-30(0-0.5)	17.8
SB-13(0-0.5)	218	SB-31(0-0.5)	370
SB-15(0-0.5)	8.1	SB-32(0-0.5)	205
SB-17(0-0.5)	25.9	SB-33(0-0.5)	251
SB-18(0-0.5)	17.9	SB-34(0-0.5)	157
SB-19(0-0.5)	11.9	SB-35(0-0.5)	279
SB-21(0-0.5)	6.4	SB-36(0-0.5)	25
SB-22(0-0.5)	9.9	SB-37(0-0.5)	79.5
SB-23(0-0.5)	14.5	SB-38(0-0.5)	125
SB-24(0-0.5)	29.5	SB-39(0-0.5)	65.1
SB-25(0-0.5)	130	SB-48(0-0.5)	180
SB-26(0-0.5)	9.3	SB-49(0-0.5)	350
SB-27(0-0.5)	16.6	SB-50(0-0.5)	270
SB-28(0-0.5)	82	SB-56(0-0.5)	230
SB-29(0-0.5)	361	average	194

*mg/kg = milligrams per kilogram

Attachment A. Example child and adult exposure dose calculations

The general formula for estimating a dose is:

D = (C x IR x EF x CF) / BW
D = exposure dose (milligrams per kilogram per day or mg/kg/day)
C = contaminant concentration (milligrams per kilogram or mg/kg)
IR = intake rate of contaminated sediment (milligrams per day or mg/day)
EF = exposure factor (unitless)
CF = conversion factor (10^{-6} kilograms per milligram or kg/mg)
BW = body weight (kilograms or kg)

EF = F x ED / AT
EF = exposure factor (unitless)
F = frequency of exposure (days/year)
ED = exposure duration (years)
AT = averaging time (days) (ED x 365 days/year for non-carcinogens; 70 years x 365 days/year for carcinogens)

Combining these two equations we get the following exposure dose equation:

D = [(C)(IR)(F)(ED)(CF)]/[(BW)(AT)]

Inputs for Child non-cancer calculations for soil ingestion exposure

Arsenic concentration	46 mg/kg (highest measured soil arsenic concentration 0-0.5' bls)
Ingestion rate	50 mg/day
Exposure frequency	250 day/year
Conversion factor	0.000001 kg/mg
Exposure duration	14 years
Body weight	45 kg
Averaging time	5110 days

Inputs for Adult non-cancer calculations for soil ingestion exposure

Arsenic concentration	46 mg/kg
Ingestion rate	20 mg/day
Exposure frequency	250 day/year
Conversion factor	0.000001 kg/mg
Exposure duration	30 years
Body weight	70 kg
Averaging time	10950 days

Dose equation

D = [(C)(IR)(F)(ED)(CF)]/[(BW)(AT)]

Dchild = [(46 mg/kg)(50 mg/d)(250 d/yr)(14 yr)(0.000001 kg/mg)]/[(45 kg)(5110 d)]

= 0.000035 mg/kg/d

Dadult = [(46 mg/kg)(20 mg/d)(250 d/yr)(30 yr)(0.000001 kg/mg)]/[(70 kg)(10950 d)]

= 0.000009 mg/kg/d

Health based Reference Dose (RfD) for arsenic = 0.0003 mg/kg/d. This RfD value is taken from a US EPA database. Exposure doses less than the RfD are considered unlikely to cause adverse health effects. Now we compare the calculated exposure dose for children and adults against this RfD and we see:

Child = (0.0003 mg/kg/d) / (0.000035 mg/kg/d) = 8.6 times below the RfD. We would consider this arsenic concentration (46 mg/kg) unlikely to cause adverse health effects.

Adult = (0.0003 mg/kg/d) / (0.000009 mg/kg/d) = 33 times below the RfD. We would consider this arsenic concentration (46 mg/kg) unlikely to cause adverse health effects.