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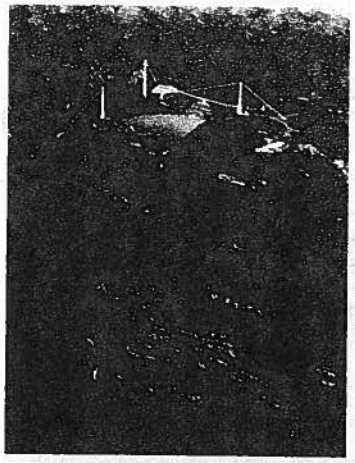
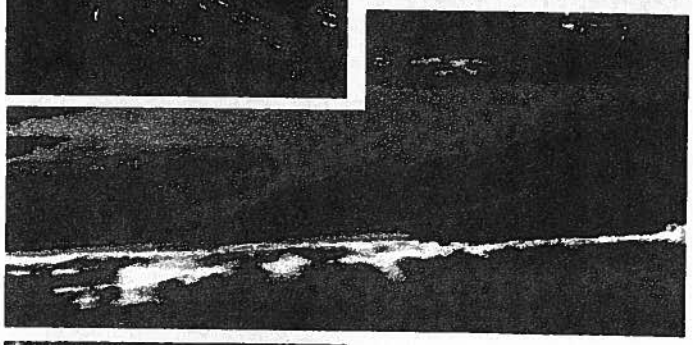
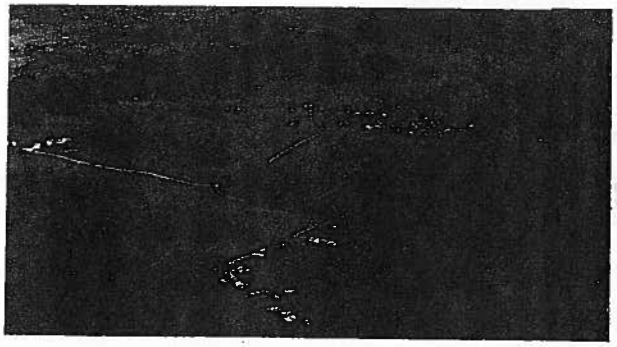
HYDROGEOLOGY OF THE NORTH COAST LIMESTONE AQUIFER SYSTEM OF PUERTO RICO







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Water-Resources
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94-4249

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P.1

Hydrogeology of the North Coast Limestone Aquifer System of Puerto Rico

By Jesús Rodríguez-Martínez

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AND ENVIRONMENTAL RESOURCES

San Juan, Puerto Rico
1995

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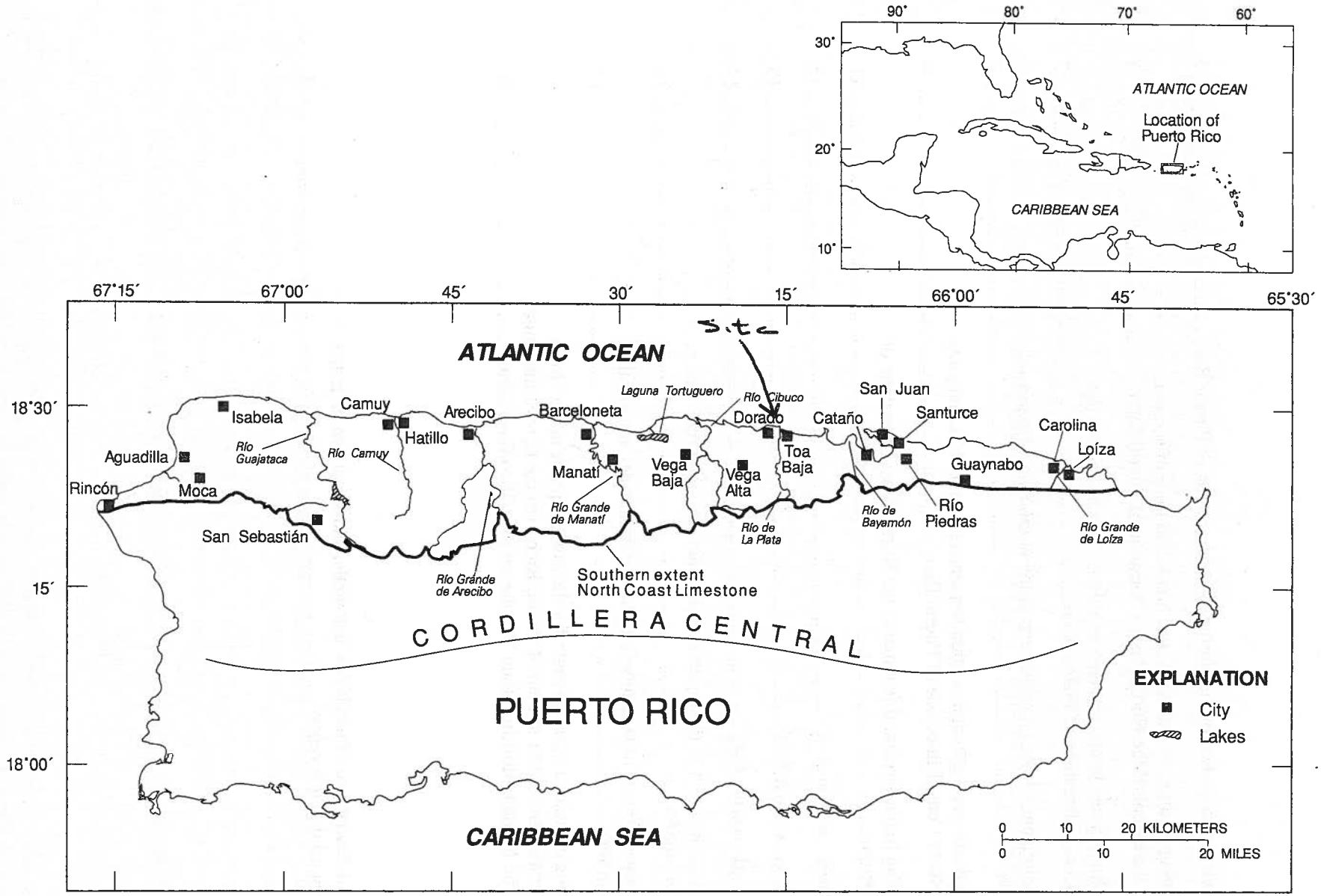

Figure 1. Areal extent of the North Coast Limestone of Puerto Rico.

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Purpose and Scope

The purpose of this report is to describe the regional hydrogeologic units and the hydrogeologic framework of the North Coast Limestone aquifer system. The regional aquifers and confining units have been mapped on the basis of relative permeability and hydraulic continuity of geologic materials penetrated by a series of deep test wells and test holes drilled during the study (fig. 2). Lithologic, geophysical, and hydraulic data for the test wells and test holes and from other wells in the area were also used to prepare a series of hydrogeologic sections showing the variations in the lithology and thickness of the main hydrogeologic units in the study area. These hydrogeologic sections are presented in this report, along with maps showing the distribution of estimated ranges of transmissivity for the major aquifers in the North Coast Limestone.

Geographic Setting

The North Coast Limestone of Puerto Rico underlies about 700 mi² in the northern one-third of Puerto Rico and extends eastward from Rincón in the western part of the island to Loíza (fig. 1), a distance of about 85 mi. The North Coast Limestone extends from the Atlantic Ocean southward to a central east-west ridge that is part of the Cordillera Central Mountain Region. The outcrop area of North Coast Limestone is approximately 11 mi wide near Camuy and narrows to 2.25 mi near San Juan.

The North Coast Limestone is drained by eight major rivers that originate in the mountainous volcanic terrane to the south. These rivers flow predominantly north to the Atlantic Ocean.

The surface exposure sequence of middle Tertiary age is characterized by tropical karst topography. In the northwestern part of Puerto Rico, the karst topography is characterized by high relief and deeply entrenched river channels or rivers with subterranean courses in some areas. In the north-central part of the island, the land surface is characterized by numerous karst features including sinkholes and limestone hills (mogotes). In this part of the island, dissolution processes generally are still very active in the intermogotal areas. The karst topography in the eastern part of the island, which includes the municipalities of San Juan and Loíza, is in an older stage of development. There, the karst development is characterized by low topographic relief with little or no active dissolution of limestone, and by surface, rather than underground drainage (Monroe, 1976).

Previous Hydrogeologic Studies

The first study of the North Coast Limestone was conducted by McGuinness (1948), as part of a general reconnaissance of the ground-water resources of Puerto Rico. Subsequent hydrogeologic studies in the North Coast Limestone, prior to 1973, are summarized by Giusti (1978). In his report, Giusti discussed the hydrogeology of the North Coast Limestone karst, placing emphasis on the upper aquifer. Since 1973, a series of hydrologic investigations in parts of the North Coast Limestone have been carried out by the USGS in cooperation with various agencies of the Commonwealth of Puerto Rico (Anderson, 1976; Gómez-Gómez, 1984; Torres-González and Wolansky, 1984; Torres-González, 1985a and 1985b; Quiñones-Aponte, 1986; Gómez-Gómez and Torres-Sierra, 1988). None of these studies, however, described the hydrogeologic framework of the lower part of the aquifer system in detail.

Method of Study

The geologic and hydrogeologic framework of Puerto Rico's North Coast Limestone belt is based largely on core and hydrologic data collected from 15 deep test wells, mostly drilled to depths exceeding 1,500 ft (fig. 2 and table 1), and on lithologic as well as hydrologic data from three other existing wells. These deep test wells were drilled as part of a cooperative Commonwealth of Puerto Rico-USGS investigation to evaluate the water-resources potential and to map the extent of an artesian limestone aquifer of northern Puerto Rico. Cores were collected using a reverse-air dual tube drilling method that can be used to collect continuous core samples of 10-cm diameter. Limestone core samples considered

Underlying basement rocks consist of Late Cretaceous and early Tertiary volcaniclastics (siltstone, sandstone, breccia, and conglomerate), minor limestone and minor amounts of igneous intrusive rocks (Monroe, 1980; Meyerhoff and others, 1983). Geophysical and geological evidence indicate that a number of structural highs have compartmentalized the middle Tertiary basin into a series of sub-basins (Meyerhoff and others, 1983; fig. 6). The vertical and lateral relations between the various sedimentary formations observed in the lower part sequence of middle Tertiary age; the San Sebastián Formation, the Lares Limestone, and the Cibao Formation seem to be controlled by the presence of these sub-basins (Meyerhoff and others, 1983; Hartley, 1989). The sedimentary facies of the Aguada (Los Puertos) and Aymamón Limestones and the Camuy Formation do not seem to be controlled by these sub-basins.

REGIONAL HYDROGEOLOGIC UNITS

The North Coast Limestone aquifer system is divided into three regional hydrogeologic units: an upper aquifer containing a basal saltwater zone in the coastal region, an intervening confining unit, and a lower aquifer. A local artesian zone also has been identified within the confining unit in some areas. The upper aquifer, which includes the freshwater part and the underlying saltwater zone near the coast, the confining unit, and the lower aquifer are discussed in the following sections.

Upper Aquifer

The upper aquifer mainly consists of the Aymamón Limestone and underlying Aguada (Los Puertos) Limestone, however, in some areas the upper aquifer also includes the uppermost permeable beds of the upper member of the Cibao Formation and overlying permeable surficial deposits (fig. 7). The upper aquifer contains water under unconfined conditions, except in coastal areas where it is locally confined by overlying silty and clayey surficial deposits. The upper aquifer contains a basal saltwater zone in much of the coastal areas of northern Puerto Rico (figs. 7 and 8).

The thickness of the upper aquifer along section A-A' (fig. 7) ranges from about 450 ft in the Arecibo and Barceloneta area to about 1,075 ft in the Isabela area to the west and about 925 ft near Manatí to the east. East of Vega Baja it decreases to about 650 ft in the Toa Baja area. The upper aquifer is absent in some parts of the Río Piedras area. In the San Juan metropolitan area, the upper aquifer where locally present, is thin and well yields are small. The Aymamón and the Aguada (Los Puertos) Limestones have been extensively eroded by karstification east of Toa Baja, and many of the thin erosional remnants have little hydrologic importance. In the area of Loíza, the upper aquifer is present as a continuous unit and has a thickness of about 750 ft.

The base of the upper aquifer is primarily defined by the uppermost strata of terrestrial clastics and argillaceous limestone of the upper member of the Cibao Formation. However, in the Hatillo-Isabela area the base of the upper aquifer seems to coincide with the lower boundary of the karstic zone located in the Aguada Limestone where this geologic unit is characterized by a significant decrease in porosity and increase in the clayey content of the rocks.

The freshwater zone on section A-A' of the upper aquifer is thickest in the area between the Río Grande de Arecibo and Río Grande de Manatí with a maximum thickness of about 500 ft (fig. 7). The freshwater part in the coastal zones of the San Juan metropolitan and Loíza areas is either absent or present with a thickness that does not exceed 30 ft. In the Guaynabo area, along section A-A', the upper aquifer is mostly brackish and saline. In north-south sections B-B' and C-C', the maximum thickness of the freshwater zone is greatest in the interstream areas of the southern extent of the freshwater-saltwater interface (figs. 8 and 9).

The freshwater zone of the upper aquifer is underlain by a basal zone of saltwater along the coast. The landward extent of this saltwater zone is not known for the entire north coast, but is about 6 mi in the Barceloneta area (fig. 8). In the Santurce-San Juan area, the landward extent could be about 3 mi (fig. 9). The position of the

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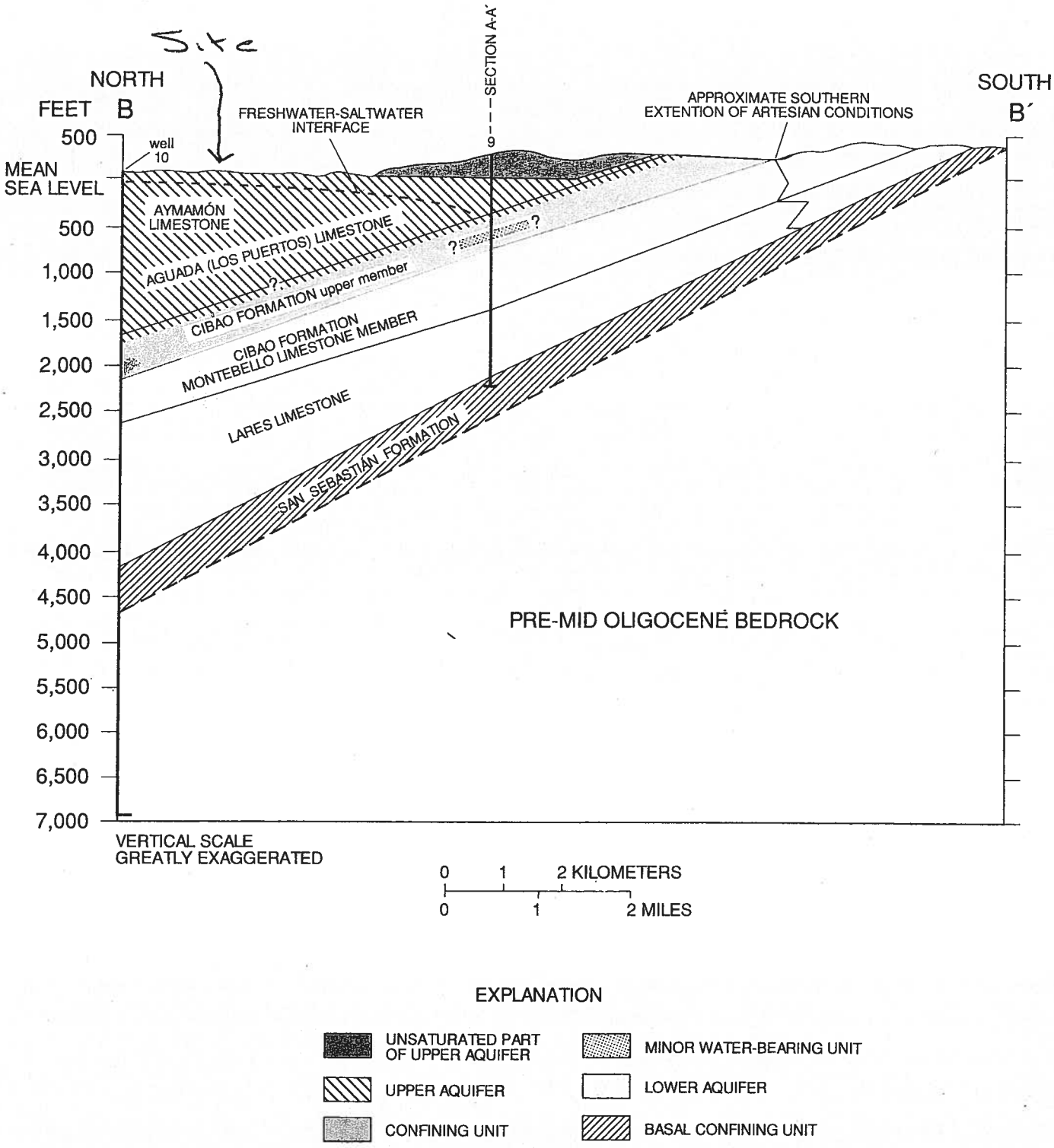

Figure 8. Hydrogeologic section B-B' (section line shown in figure 2).

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U.S. GEOLOGICAL SURVEY
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ATLAS OF GROUND-WATER RESOURCES IN PUERTO RICO AND THE U.S. VIRGIN ISLANDS

By Thalia D. Veve and Bruce E. Taggart (editors)

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CONVERSION FACTORS, ABBREVIATED WATER-QUALITY UNIT, AND AGENCY ABBREVIATIONS

Multiply	By	To obtain
	Length	
inch (in.)	25.4	millimeter
foot (ft)	0.3048	meter
mile (mi)	1.609	kilometer
	Area	
square mile (mi^2)	2.590	square kilometer
	Volume	
gallon (gal)	3.785	liter
gallon (gal)	0.003785	cubic meter
million gallons (Mgal)	3,785	cubic meter
	Flow	
foot per day (ft/d)	0.3048	meter per day
foot squared per day (ft^2/d)	0.09294	meter squared per day
cubic feet per second (ft^3/s)	0.02832	cubic meter per second
gallon per minute (gal/min)	0.06308	liter per second
million gallons per day (Mgal/d)	0.04381	cubic meter per day
gallons per day (gal/d)	0.003785	cubic meter per day
inch per hour (in/hr)	25.4	millimeter per hour
inch per year (in/yr)	25.4	millimeter per year
inch per inch (in/in)	25.4	millimeter per millimeter
gallon per minute per foot [(gal/min)/ft]	0.2070	liter per second per meter

Abbreviated water-quality unit

microgram per liter (μg/L)

Agency Abbreviations

Puerto Rico Aqueduct and Sewer Authority (PRASA)
Puerto Rico Department of Natural and Environmental Resources (PRDNER)
U.S. Geological Survey (USGS)

2.0 GROUND-WATER RESOURCES AREAS IN PUERTO RICO

2.1 North Coast Area

2.1.3 VEGA BAJA-TOA BAJA REGION

By Fernando Gómez-Gómez and Thalia D. Veve

2.1.3.A Location and Major Geographic Features

The Vega Baja-Toa Baja coastal aquifer area extends across a 9-miles wide segment of the North Coast area (fig. 2.1.3.A-1). It is bounded to the north by the Atlantic Ocean, to the west by the Río Cibuco, to the east by the Río de La Plata, and to the south by a karst tableland (fig. 2.1.3.A-1). Along the coast, sand dunes form an almost continuous ridge, except where the ridge has been breached by the Río Cibuco and Río de La Plata. The coastal dune ridge has an average elevation of about 30 feet above mean sea level and reaches its maximum elevation of 65 feet at Dorado. The dune ridge is less than 2-miles wide, draining to the ocean along its northern slope and to the coastal plain along its southern slope. The karst tableland is generally defined within the 170 feet topographic contour and is about 3-miles wide. This tableland has become the principal area of urban development, and also contains the major highway connecting the San Juan metropolitan area to the western part of the island. High relief topography, dominated by numerous ridges and sinks typical of an immature karst, occurs south of the tableland. The tableland is dissected to the east and west by northward flowing streams that form a well developed alluvial plain, extending inland as much as 6 miles from the coast. Little urban development has taken place within the alluvial plain except for a 0.25 mi^2 urban area within the town limits of Toa Baja. The municipio of Toa Baja, parts of suburban developments on the coastal plain, and parts of Vega Baja are within the flood plain of the Río Cibuco and Río de La Plata. The headwaters of both streams lie within the island's volcanic-rock interior (southern parts of the Vega Baja-Toa Baja region) and have a combined drainage area of 240 mi^2 at the point where they enter the coastal aquifer areas. Most of this drainage area is within the watershed of the 62-miles long Río de La Plata, which has its headwaters at an elevation of 2,960 feet.

2.1.3.B Population and Estimated Ground-Water Use

In 1980, the combined population in the municipios of Dorado and Vega Alta was about 54,200 (U.S. Department of Commerce, 1982). In the 1990 Census (U.S. Department of Commerce, 1991), the population within these municipios was 65,318. This represents an increase of 17 percent from 1980 to 1990. In 1980, 38 percent of the population in the municipios of Dorado and Vega Alta resided within the urban limits of both municipios. The remainder of the population resided within suburban communities (table 2.1.3.B-1). According to the 1980 census, 97 percent of the housing units in the municipios of Dorado, Toa Baja, Toa Alta, Vega Baja, and Vega Alta (approximately 14,800 houses) were served from public-water supply. However, only 38 percent of the housing units were served by public sewers.

Public-water supply within this geographic region is provided principally by ground water. In 1983, there were 24 public-supply wells yielding 12 Mgal/d. Because the Vega Baja-Toa Baja coastal aquifer area public-water supply distribution system is interconnected to the east with the San Juan metropolitan area and to the west with Manatí, part of the well production could have been transferred outside the region. In addition, during 1990 a major public-supply distribution pipeline was completed that connected Dorado with the Enrique Ortega filtration plant. This filtration plant is part of the San Juan Metropolitan area public-water supply and provides approximately 55 Mgal/d from Lago de La Plata. Since 1983, approximately seven public-water supply wells have been taken out of production, either as a result of contamination with organic chemicals (principally trichloroethylene and tetrachloroethylene) or saltwater encroachment. The production lost from these wells has been offset by increasing withdrawals from, and the rehabilitation of, the remaining wells, as well as the construction of new wells. Ground-water withdrawals of 13 Mgal/d in 1991, from a total of 20 public-supply wells, is equal to that estimated for 1983. Ground-water withdrawals for commercial, industrial, and agricultural use could represent less than 2.0 Mgal/d in 1991 (Senén Guzmán-Ríos, U.S. Geological Survey, written communication, 1991; table 2.1.3.B-2). This indicates that between 1983 and 1991 total withdrawals from the coastal aquifer area have remained essentially unchanged. Ground-water withdrawals for irrigation of rice in the vicinity of the Río Cibuco, which accounted for approximately 3 Mgal/d in 1983, were discontinued in 1985. The approximate location of wells in the Vega Baja-Toa Baja region is shown on figure 2.1.3.B-1.

Table 2.1.3.B-1 Population for the Vega Baja-Toa Baja region, Puerto Rico (U.S. Department of Commerce, 1982, table 1; U.S. Department of Commerce, 1991, table 1)

MUNICIPIO	1980 population TOTAL	1980 population URBAN	1980 population RURAL	1990 population TOTAL
Aibonito	22,167	9,331	12,836	24,971
Barranquitas	21,639	3,618	18,021	25,605
Cayey	41,099	23,305	17,794	46,553
Ciales	16,211	3,582	12,629	18,084
Cidra	28,365	6,069	29,532	35,601
Corozal	28,221	5,889	22,332	33,095
[1]Dorado	25,511	10,203	15,308	30,759
Morovis	21,142	2,637	18,505	25,288
Naranjito	23,633	2,849	20,784	27,914
Toa Alta	31,910	4,427	27,483	44,101
Toa Baja	78,246	1,992	76,254	89,454
[1]Vega Alta	28,696	10,582	18,114	34,559
Vega Baja	47,115	18,233	28,882	55,997
Total	413,955	102,717	318,474	491,981

[1] Municipio having geographic limits entirely within the limestone belt.

Table 2.1.3.B-2 Ground-water withdrawals during 1987 in the Vega Baja-Toa Baja region, Puerto Rico
[Mgal/d, million gallons per day; <, less than]

Water-use category	Ground-water withdrawals (Mgal/d)
Public-water supply	12.10
Irrigation	<3.30
Industrial	1.00
Commercial	0.40
Agricultural	0.20
Domestic	<0.05
Mining	0.50
Total	<17.55

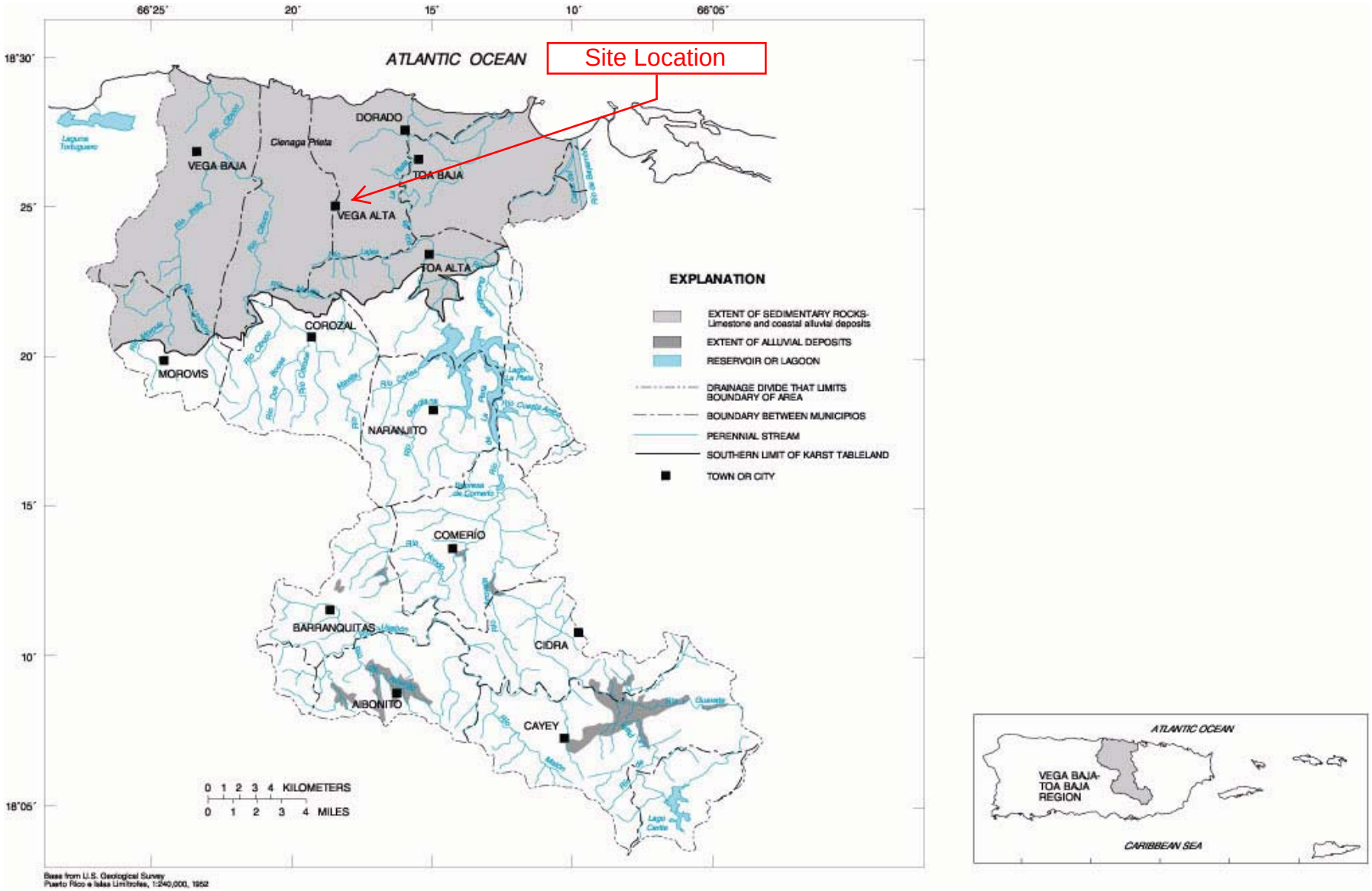

Figure 2.1.3.A-1 Location and major geographic features in the Vega Baja-Toa Baja region, Puerto Rico.

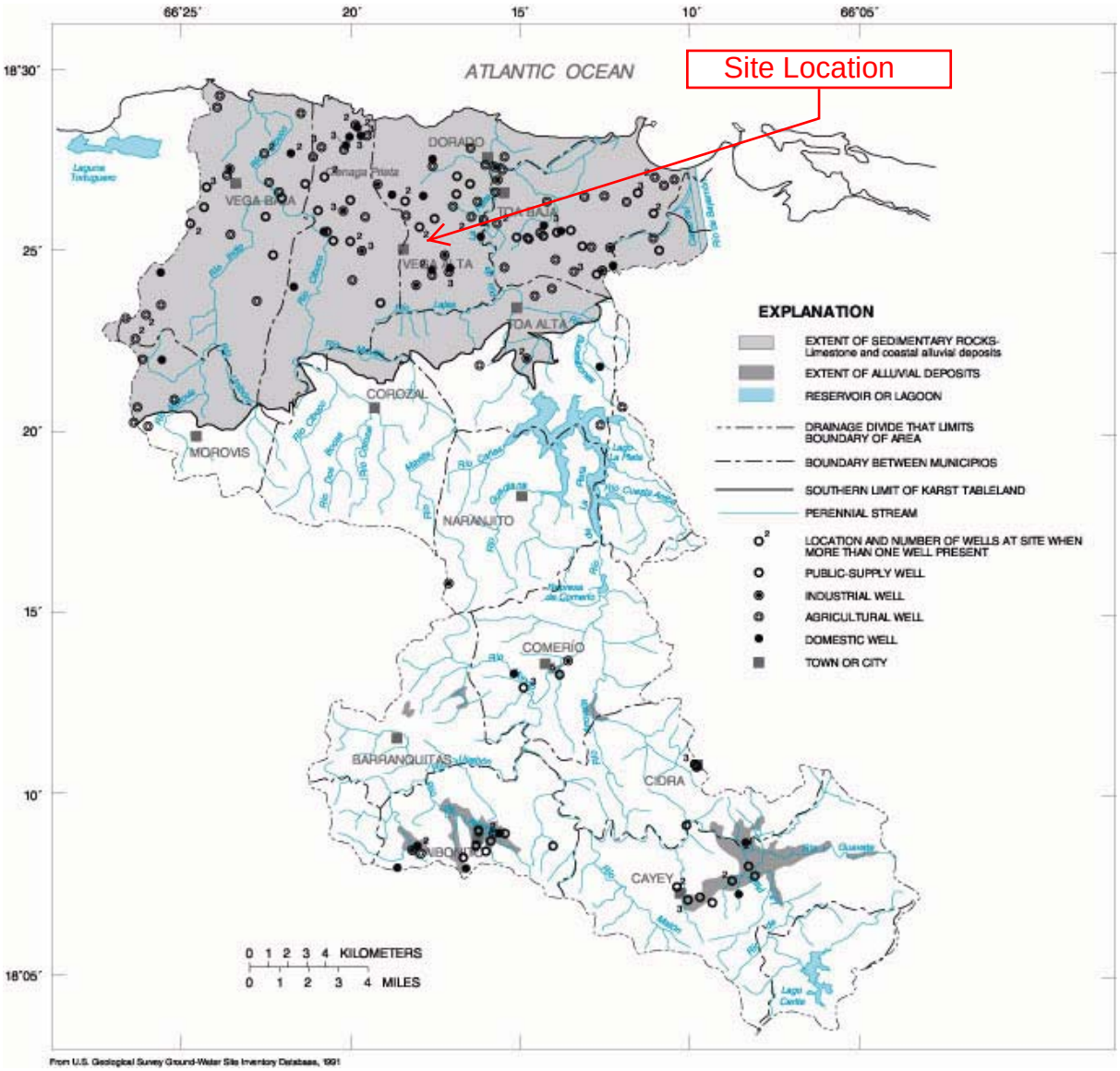

Figure 2.1.3.B-1 Approximate well locations in the Vega Baja-Toa Baja region, Puerto Rico.

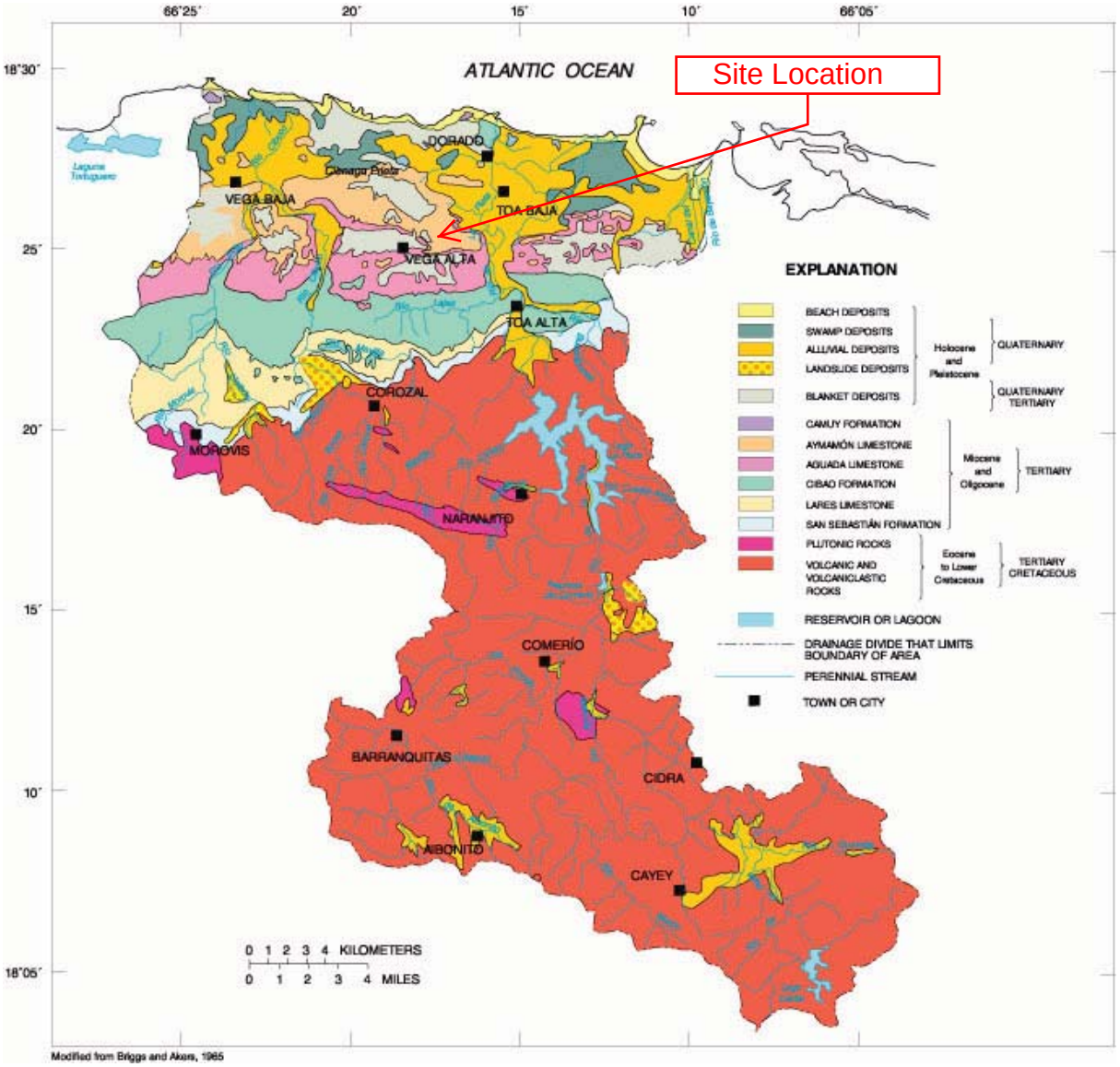

Figure 2.1.3.C-1 Generalized surficial geology in the Vega Baja-Toa Baja region, Puerto Rico.

2.1.3.C Geologic Setting

Sedimentary rocks of Tertiary age underlie the coastal aquifer areas in the Vega Baja-Toa Baja region (fig. 2.1.3.C-1). They are the San Sebastián Formation and Lares Limestone of Oligocene age; the Mucarabones Sand, the Río Indio Limestone, the Quebrada Arenas Limestone, the Miranda Sand Member, and the unnamed upper members of the Cibao Formation of Miocene to Oligocene age; and the Cibao Formation, Aguada Limestone, Aymamón Limestone, and Camuy Formation of Miocene age. Following are brief summaries of the lithology of these geologic units arranged in order from oldest to youngest.

The San Sebastián Formation consists of a sandy carbonaceous clay, locally containing pebbles and cobbles of older volcanic rocks, and beds of fossiliferous-earth limestone. Outcrops are mainly in the southeastern perimeter of the Cretaceous-Tertiary contact.

The Lares Limestone overlies the San Sebastián Formation and consists entirely of calcareous clay in the coastal aquifer areas of the Vega Baja-Toa Baja region. The Mucarabones Sand, overlying the Lares Limestone, is a cross-bedded fine- to medium-grained sand containing lenses of fossiliferous sandy limestone and sandy clay. The Río Indio Limestone Member of the Cibao Formation overlies the Mucarabones Sand and consists of chalky fragmented limestone, weakly bedded to massive, and locally glauconitic. The Quebrada Arenas Limestone Member of the Cibao Formation, overlying the Río Indio Limestone Member, is a finely crystalline to dense limestone locally containing grains of quartz sand and abundant fossil molds. Its main exposure is in the drainage basin of the Río Lajas. The Miranda Sand Member of the Cibao Formation overlies the Quebrada Arenas Limestone Member and consists of angular to subangular fine- to coarse-grained quartz sand in a noncalcareous silty clay matrix. Exposures near Vega Alta contain sand and gravel that grade upward into fossiliferous sand. Only minor exposures of the Miranda Sand Member (less than 0.5 mi^2) have been mapped and lie within the Río Lajas drainage basin. The unnamed upper member of the Cibao Formation, overlying the Miranda Sand Member, is considered to be typical of the Cibao Formation lithology, consisting of beds of calcareous clay, earthy

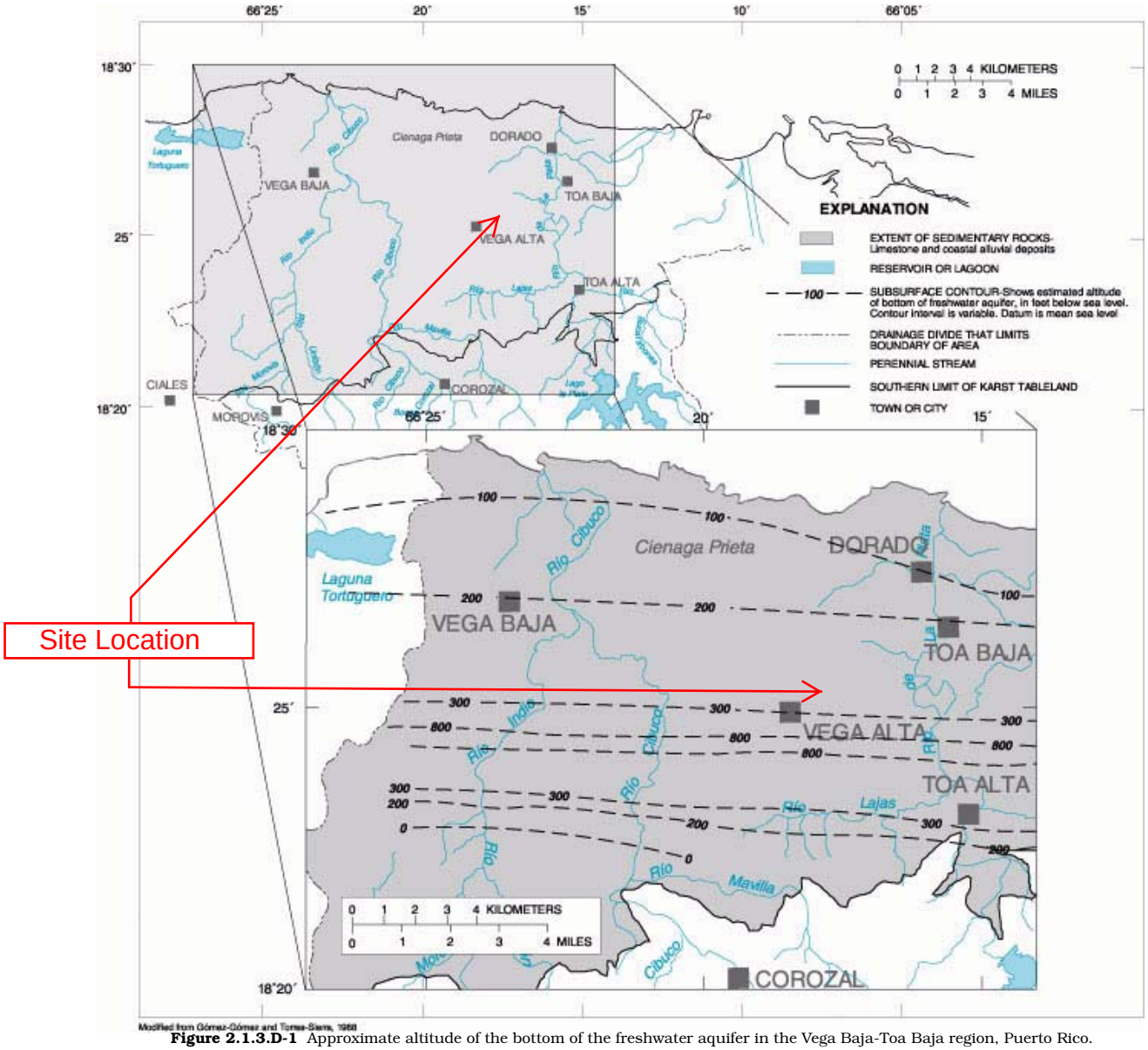

Figure 2.1.3.D-1 Approximate altitude of the bottom of the freshwater aquifer in the Vega Baja-Toa Baja region, Puerto Rico.

limestone, and marl. The Aguada Limestone overlies the unnamed upper member of the Cibao Formation and consists of hard calcarenite alternating with chalky and rubbly limestone. The Aymamón Limestone, overlying the Aguada Limestone, is a very pure fossiliferous limestone, massive to thick bedded. The Camuy Formation overlies the Aymamón Limestone and consists of chalk and limestone, commonly somewhat sandy and ferruginous. The Camuy Formation is found in isolated outcrops near the coast of less than 0.25 mi^2.

Unconsolidated deposits, regionally referred to as blanket sands, cover most flat areas throughout the outcrop areas of the Aguada and Aymamón Limestones. These deposits are thought to be of Quaternary to Tertiary age and to have an irregular thickness, typically not greater than 100 feet. Along stream valleys, alluvial deposits known to be as much as 280 feet thick in the Río Cibuco drainage basin and as much as 100 feet thick near the Río de La Plata near Toa Baja, interfinger with swamp and marsh deposits of the coastal plain. In the coastal plain area, between the Río Cibuco and Río de La Plata, the unconsolidated swamp and marsh deposits are typically less than 60 feet thick. Along the edges of the coastal plain, Pleistocene age silica sand deposits form most of the ridge of the coastal terrace deposits. Silica sand deposits are also found as terrace deposits along the northern perimeter of the karst tableland. These deposits are locally mined for the manufacture of glass (Briggs, 1965).

2.1.3.D Hydrogeology

Fresh ground water occurs within the carbonate rocks of Miocene and Oligocene age at areas generally inland of latitude 18°25'. Seaward of this latitude, ground water occurs mainly as a lens of freshwater above saltwater. Along a north-south line at approximately longitude 66°19', the depth to the bottom of this freshwater lens varies from about 300 feet at its inland point to about 100 feet at the coast (fig. 2.1.3.D-1). Since 1960, ground-water withdrawals from the coastal aquifer areas have increased significantly. In 1960, total withdrawals were estimated to be less than 2.6 Mgal/d. During 1991, ground-water withdrawals were estimated to be 15 Mgal/d. About 95 percent of this amount was withdrawn within an area that has a transmissivity greater than 10,000 ft^2/d (fig. 2.1.3.D-2). Transmissivity is estimated to be as high as 150,000 ft^2/d.

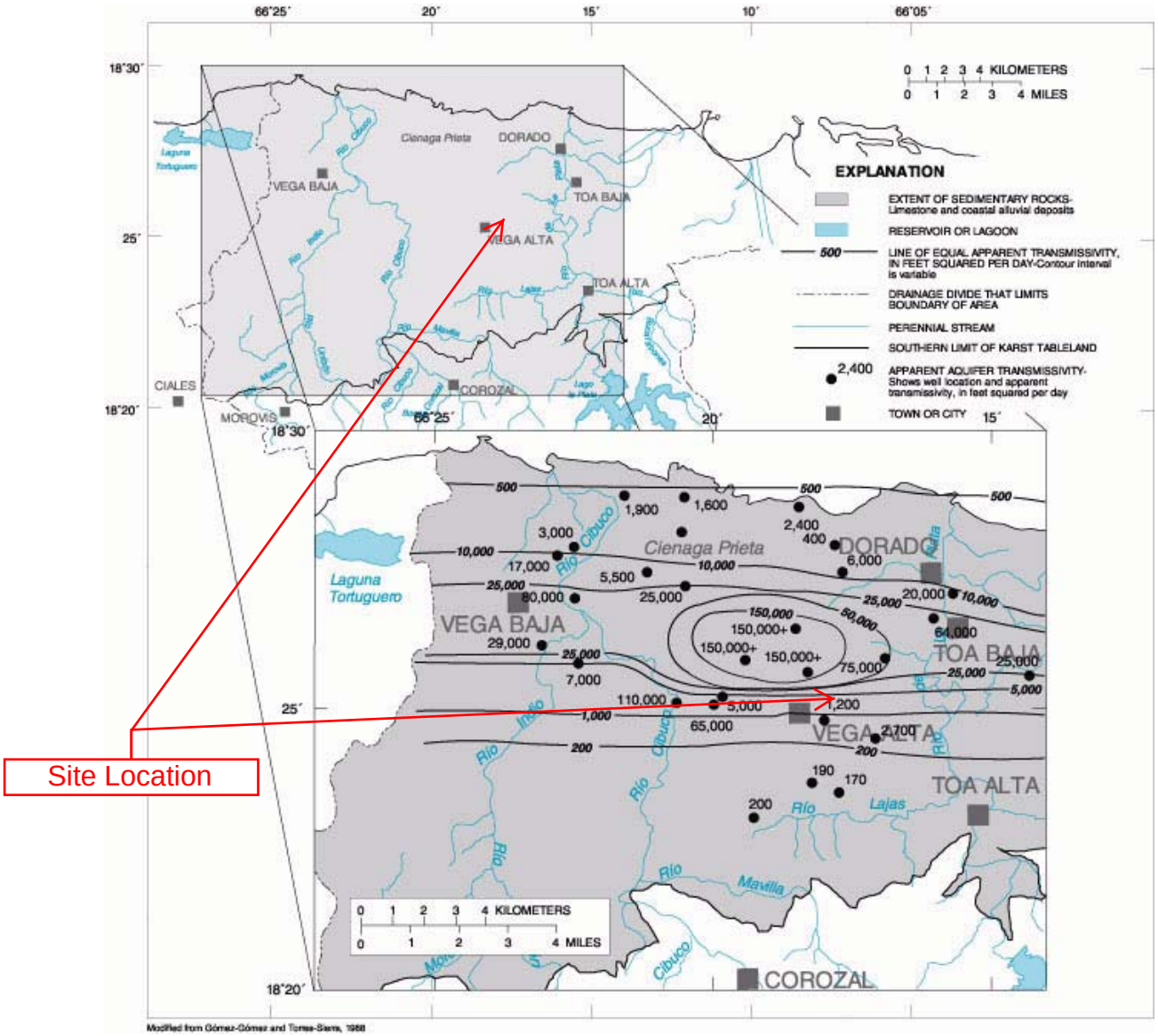

Figure 2.1.3.D-2 Transmissivity estimates at selected wells and the regionalized aquifer transmissivity distribution as obtained through model calibration for the freshwater part of the coastal aquifer in the Vega Baja-Toa Baja region, Puerto Rico.

Ground water within the confined aquifer, consisting of the Lares Limestone and Mucarabones Sand Member of the Cibao Formation (Rodríguez-Martínez, 1991), flows beneath the karst tableland and coastal plain. The total thickness of both units is unknown; however, the thickness of carbonate strata corresponding to the Lares Limestone penetrated by a test well near the coast (latitude 18°27'01", longitude 66°18'22") was 500 feet. A preliminary estimate of the transmissivity of the confined aquifer is 1,000 ft^2/d (Fernando Gómez-Gómez and Sigfredo Torres-González, U.S. Geological Survey, written communication, 1991). Potential for ground-water development from the artesian aquifer in this part of the Vega Baja-Toa Baja coastal aquifer area is limited by the depth at which freshwater is found (1,700 feet below land surface on the coastal plain north of Vega Alta), the lower quality of the ground water (dissolved-solids concentrations greater than 500 mg/L), and the availability of freshwater from the coastal water-table aquifer (fig. 2.1.3.D-3).

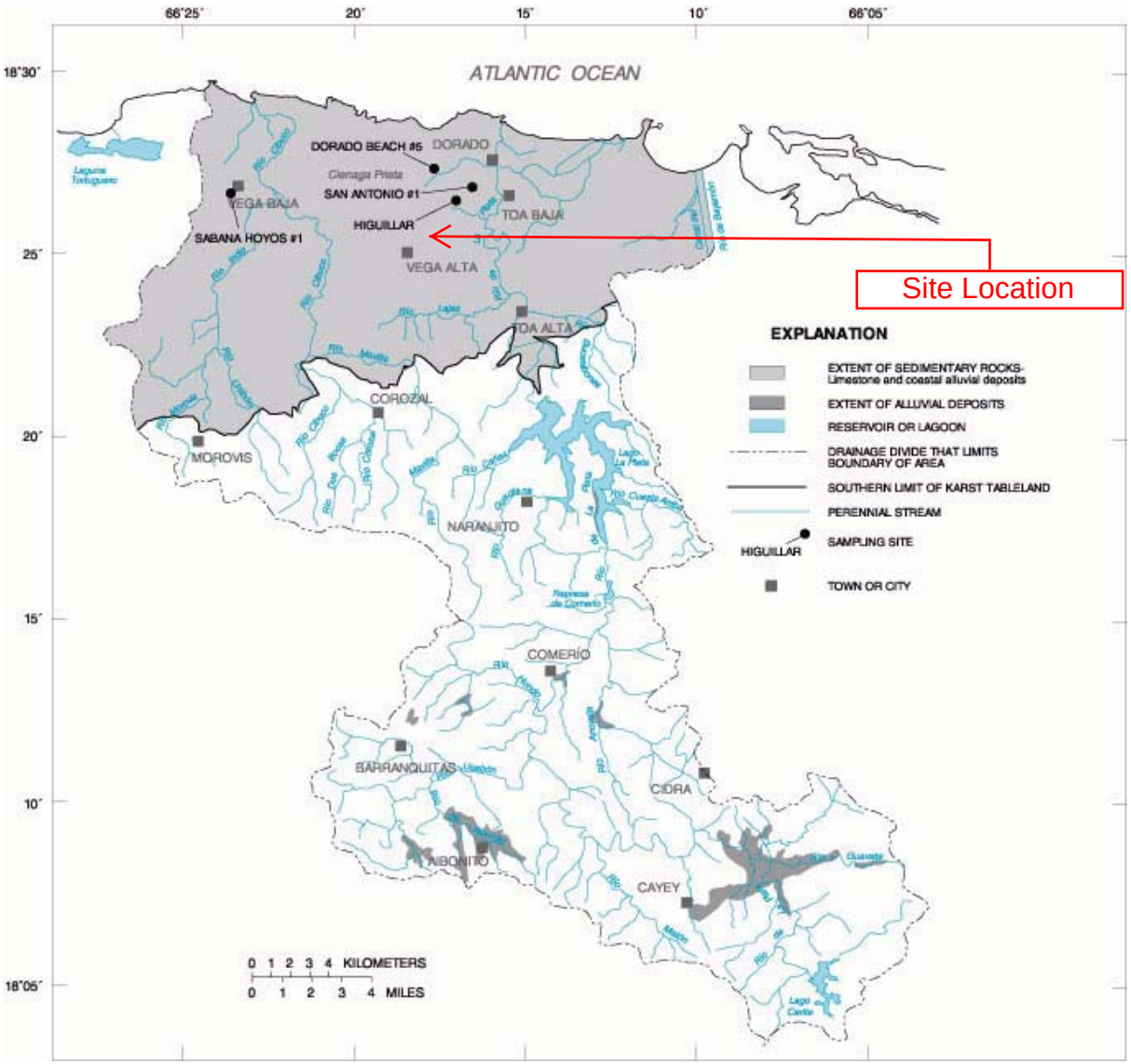

Figure 2.1.3.D-3 Approximate location of wells sampled for dissolved-solids concentration in the Vega Baja-Toa Baja region, Puerto Rico.

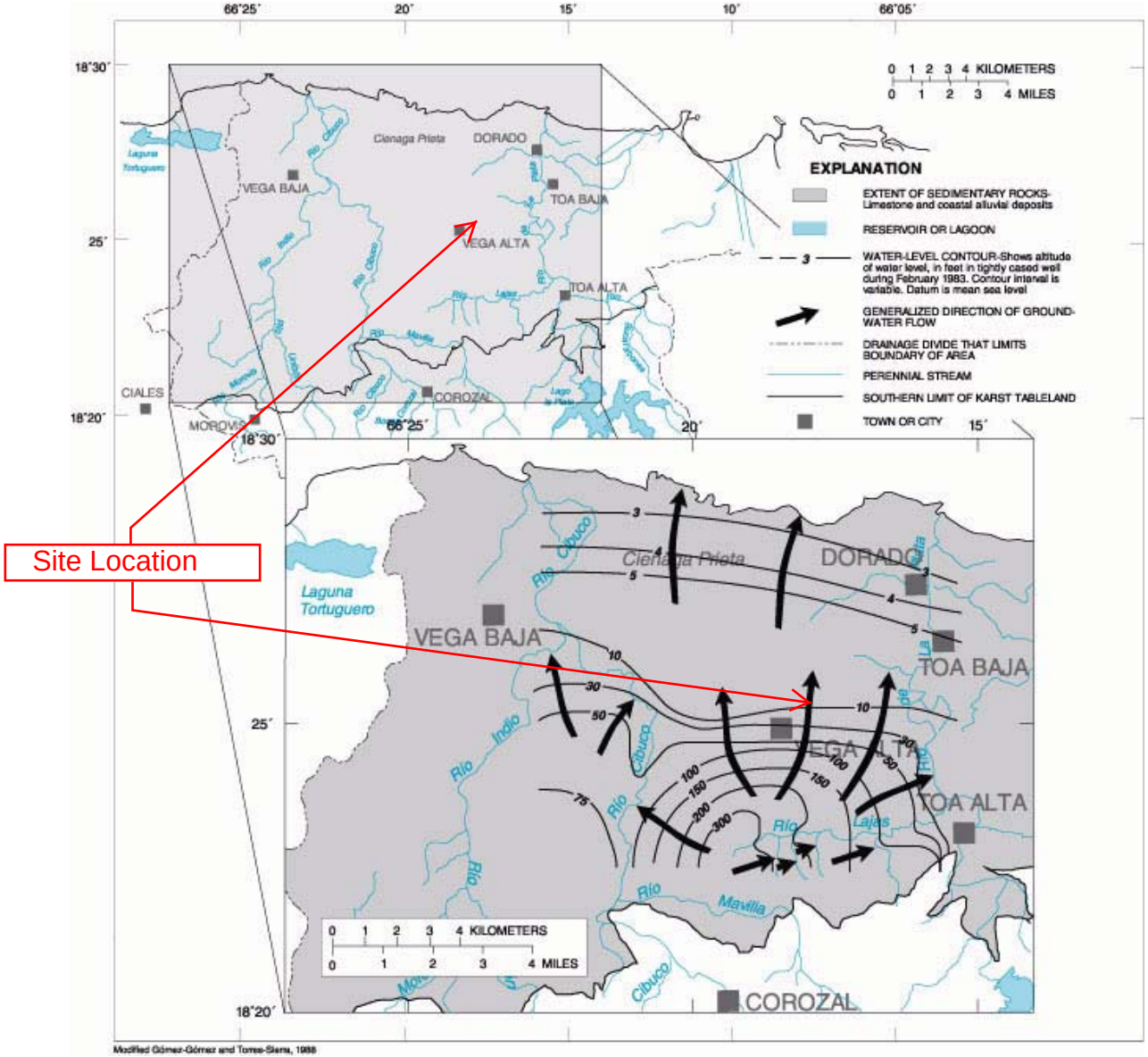

Figure 2.1.3.E-1 Altitude of water-level surface and direction of ground-water flow during February 1983 in the Vega Baja-Toa Baja region, Puerto Rico.

2.1.3.E Ground-Water Levels and Movement

Regional ground-water flow in the coastal water-table upper aquifer is generally toward the ocean coast in the Vega Baja-Toa Baja region (fig. 2.1.3.E-1). A smaller flow component, estimated at less than 3 ft^3/s, discharges toward the Río Cibuco, Río Indio, and Río de La Plata (Gómez-Gómez and Torres-Sierra, 1988). Under pre-development conditions (prior to 1930), most aquifer discharge may have been to the Ciénaga Prieta. Aquifer discharge to this marsh was estimated, by use of a digital ground-water flow model, to be 15 ft^3/s under pre-development conditions, and decreased to about 4 ft^3/s in 1985 (Gómez-Gómez and Torres-Sierra, 1988). Between 1960 and 1970, withdrawals increased from about 3 Mgal/d to about 13 Mgal/d. During this same period, the potentiometric surface throughout the coastal plain could have declined by as much as 10 feet (Gómez-Gómez and Torres-Sierra, 1988). Most of this drawdown could have resulted from increased aquifer withdrawals. However, in about 1960, a drainage channel was dredged from Ciénaga Prieta to the Río Cibuco and part of the decline in the water table could have been caused by dewatering the marsh.

Regional ground-water flow in the confined lower aquifer is toward the east (Fernando Gómez-Gómez and Sigfredo Torres-González, U.S. Geological Survey, written communication, 1991). The head in the lower aquifer was determined to be about 190 feet above mean sea level at a test well drilled about 0.5 miles east of Laguna Tortuguero, and about 10 feet above mean sea level at the possible regional discharge area located 12 miles east of the Río de La Plata.

Rainfall recharge to the upper aquifer occurs throughout the outcrop areas of the carbonate units. In 1983, rainfall recharge constituted about 85 percent of total aquifer recharge (average of 7 inches of rainfall recharge per year), and seepage from the Río Cibuco contributed about 6 ft^3/s (Gómez-Gómez and Torres-Sierra, 1988). Throughout the outcrop area of the lower aquifer, the estimated annual rainfall recharge rate is about 4 inches (Fernando Gómez-Gómez and Sigfredo Torres-González, U.S. Geological Survey, written communication, 1991).

2.1.3.F Soil Permeability

The dominant soil associations overlying the aquifers in this region are the Almirante-Espinosa-Vega Alta, Bayamón-Matanzas, Almirante-Vega Alta-Matanzas, Rock outcrop-Tanamá-San Sebastián, Tanamá-Colinas-Soller, Tiburones-Palmar-Garrochales, and the Toa-Coloso-Bajura (fig. 2.1.3.F-1). Also present to a minor extent are the Algarrobo-Corozo-Arecibo, Martín Peña-Saladar-Hydraquents, and the Pandura-Lirios. These soil associations belong to the humid coastal plains category, except for the Pandura-Lirios association, which is present in the humid uplands.

The Almirante-Espinosa-Vega Alta, Bayamón-Matanzas, and the Almirante-Vega Alta-Matanzas soil associations are composed of deep, gently sloping to sloping, well drained and clayey soils (Acevedo, 1982, p. 3; and Boccheciamp, 1978, p. 5). The Almirante-Espinosa-Vega Alta association is mainly located on limestone hills and on terraces along the coast. The Bayamón-Matanzas soils overlie small valleys between limestone hills and on the coastal plains. The Almirante-Vega Alta-Matanzas association is located on terraces and alluvial fans of the coastal plain. These soils formed mainly in clayey sediments of mixed origin and organic materials. The soils that form the Rock Outcrop-Tanamá-San Sebastián association, found in the uplands, are described as rock outcrop and shallow to deep, sloping to very steep, well drained, clayey soils (Acevedo, 1982, p. 4). The Tanamá-Colinas-Soller association is composed of shallow to moderately deep, moderately-to very-steep, well drained soils of the humid mountainous areas (Boccheciamp, 1978, p. 5). These soils are formed mainly in clayey materials weathered from the limestone. The Tiburones-Palmar-Garrochales association is composed of deep, nearly level, poorly drained, acid mucky soils (Acevedo, 1982, p. 4) that overlie flats and depressional areas along the coast and form in organic material. The Toa-Coloso-Bajura association is formed by deep, nearly level, well-to poorly-drained, loamy to clayey soils (Acevedo, 1982, p. 4).

The Algarrobo-Corozo-Arecibo soil association is composed of deep, gently sloping, excessively drained and well drained, sandy soils (Acevedo, 1982, p. 3). The Pandura-Lirios soil association is composed of shallow to deep, moderately- to very-steep, well drained soils of the humid mountainous areas (Boccheciamp, 1978, p. 4). These soils formed in the residuum of granitic rock that is part of the San Lorenzo Batholith. The Martín Peña-Saladar-Hydraquents is composed of deep, nearly level, very-poorly drained soils in low depressions and lagoons of the coastal plain (Boccheciamp, 1978, p. 6).

In general, soil permeability ranges from 0.60 to 2.00 in/hr throughout most of the Vega Baja-Toa Baja region. Only the Algarrobo-Corozo-Arecibo, Tiburones-Palmar-Garrochales, and Toa-Coloso-Bajura associations on the humid coastal plains and the Mabí-Río Arriba and Moca-Perchas associations in the humid upland valleys have lower permeabilities, ranging from 0.06 to 0.20 in/hr. These associations coincide mainly with the alluvium deposits along the main rivers in the region. All of the soil associations have very low available water capacities ranging from 0 to 0.25 in/in. Soil thicknesses range from 0 to 99 inches. Table 2.1.3.F-1 summarizes the information on thickness, permeability, and available water capacity for all the soil associations present in this drainage area including the ones not overlying the aquifers.

Table 2.1.3.F-1 Thickness, permeability, and available water capacity for the soil associations in the Vega Baja-Toa Baja region, Puerto Rico (Modified from Gierbolini, 1975)

Area and soil association	Thickness (inches)	Permeability (inch per hour)	Available water capacity (inch per inch)
Humid Coastal Plains			
Algarrobo-Corozo-Arecibo	0 to 99	0.06 to 0.20	0.02 to 0.20
Guerrero-Carrizales-Jobos	0 to 60	0.60 to 2.00	<0.04 to 0.20
Almirante-Espinosa-Vega Alta	0 to 70	0.60 to 2.00	0.06 to 0.20
Bayamón-Matanzas	0 to 65	0.60 to 2.00	0.10 to 0.20
Almirante-Vega Alta-Matanzas	0 to 70	0.60 to 2.00	0.06 to 0.20
Rock Outcrop-Tanamá-San Sebastián	0 to 55	0.60 to 2.00	0.00 to 0.20
Tanamá-Colinas-Soller	0 to 60	0.60 to 2.00	0.09 to 0.25
Martín Peña-Saladar-Hydraquents	0 to 63	0.60 to 2.00	0.12 to 0.20
Tiburones-Palmer-Garrochales	0 to 84	0.06 to 0.20	0.15 to 0.20
Swamps-Marshes	too variable to be estimated		
Toa-Coloso-Bajura	0 to 60	0.06 to 0.20	0.15 to 0.20
Humid Upland Valleys			
Mabí-Río Arriba	0 to 99	0.06 to 0.20	0.15 to 0.20
Moca-Perchas	0 to 60	0.06 to 0.20	0.15 to 0.24
Colinas-Naranjo-Juncal	0 to 60	0.60 to 2.00	0.09 to 0.20
Humid Uplands			
Múcara-Caguabo	0 to 30	0.63 to 2.00	0.05 to 0.17
Múcara-Morado-Maragüez	0 to 60	0.60 to 2.00	0.05 to 0.17
Humatas-Naranjito-Consumo	0 to 60	0.60 to 2.00	0.10 to 0.18
Humatas-Los Guineos-Alonso	0 to 62	0.60 to 2.00	0.10 to 0.20
Pandura-Lirios	0 to 60	0.60 to 2.00	0.02 to 0.20
Semiarid Uplands			
Descalabrado	0 to 17	0.60 to 2.00	0.10 to 0.20

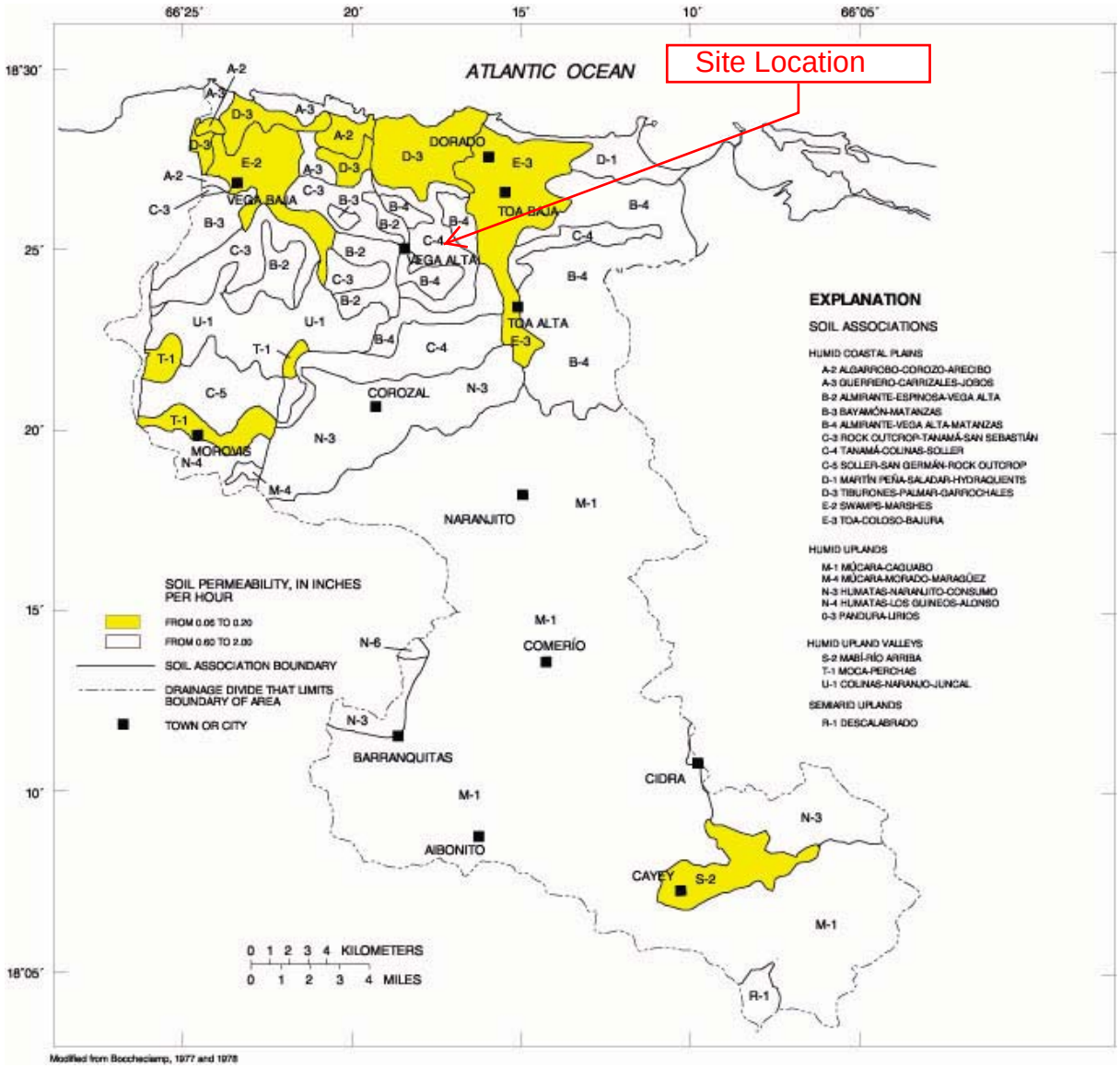

Figure 2.1.3.F-1 Soil associations and permeability in the Vega Baja-Toa Baja region, Puerto Rico.

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

COMMONWEALTH OF PUERTO RICO
DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS

VEGA ALTA QUADRANGLE
PUERTO RICO
7.5 MINUTE SERIES (TOPOGRAPHIC)

Mapped, edited, and published by the Geological Survey

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs taken 1941 and planetable surveys 1943 and 1950. Revised from aerial photographs taken 1967 and 1968. Field checked 1969

Selected hydrographic data compiled from NOS chart 903 (1970)
This information is not intended for navigational purposes

Polyconic projection. Puerto Rico Datum, 1940 adjustment
2000-meter grid ticks based on Puerto Rico coordinate system
1000-meter Universal Transverse Mercator grid, zone 19

Barrio and municipality boundaries by the Puerto Rico Planning Board

Kilometric reference distances shown in red

Revisions shown in purple and woodland compiled from aerial photographs taken 1977 and other sources. This information not field checked. Map edited 1982

MN GN
10° 178 MILS
0°51' 15 MILS
UTM GRID AND 1982 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:20 000

1 MILE
7000 FEET
1 KILOMETER

CONTOUR INTERVAL 10 METERS
DASHED LINES REPRESENT 5-METER CONTOURS
DOTTED LINES REPRESENT 1-METER CONTOURS
NATIONAL GEODETIC VERTICAL DATUM OF 1929
DEPTH CURVES AND SOUNDINGS IN FEET—DATUM IS MEAN LOW WATER
THE RELATIONSHIP BETWEEN THE TWO DATUMS IS VARIABLE
SHORELINE SHOWN REPRESENTS THE APPROXIMATE LINE OF MEAN HIGH WATER
THE MEAN RANGE OF TIDE IS APPROXIMATELY 0.3 METER

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
AND DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS, SAN JUAN, P. R. 00910
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

PUERTO RICO
QUADRANGLE LOCATION

ROAD CLASSIFICATION

Primary highway, all weather, hard surface
Light-duty road, all weather, improved surface
Secondary highway, all weather, hard surface
Unimproved road, fair or dry weather
Insular Route

VEGA ALTA, P. R.
18066-D3-TM-020

1969

PHOTOREVISED 1982
DMA 1323 III SE—SERIES E835

federal register

Friday
December 14, 1990

Part II

Environmental Protection Agency

40 CFR Part 300
Hazard Ranking System; Final Rule

P. 1

• Soil exposure—resident population threat.

–All hazardous substances that meet the criteria for observed contamination at the site (see section 5.0.1).

• Soil exposure—nearby population threat.

–All hazardous substances that meet the criteria for observed contamination at areas with an attractiveness/accessibility factor value greater than 0 (see section 5.2.1.1).

2.3 *Likelihood of release.* Likelihood of release is a measure of the likelihood that a waste has been or will be released to the environment. The likelihood of release factor category is assigned the maximum value of 550 for a migration pathway whenever the criteria for an observed release are met for that pathway. If the criteria for an observed release are met, do not evaluate potential to release for that pathway. When the criteria for an observed release are not met, evaluate potential to release for that pathway, with a maximum value of 500. The evaluation of potential to release varies by migration pathway (see sections 3, 4 and 6).

Establish an observed release either by direct observation of the release of a hazardous substance into the media being evaluated (for example, surface water) or by chemical analysis of samples appropriate to the pathway being evaluated (see sections 3, 4, and 6). The minimum standard to establish an observed release by chemical analysis is analytical evidence of a hazardous substance in the media significantly above the background level. Further, some portion of the release must be attributable to the site. Use the criteria in Table 2–3 as the standard for determining analytical significance. (The criteria in Table 2–3 are also used in establishing observed contamination for the soil exposure pathway, see section 5.0.1.) Separate criteria apply to radionuclides (see section 7.1.1).

TABLE 2–3.—OBSERVED RELEASE CRITERIA FOR CHEMICAL ANALYSIS

Sample Measurement < Sample Quantitation Limit[a]
No observed release is established.
Sample Measurement ≥ SAMPLE QUANTITATION LIMIT[a]
An observed release is established as follows: • If the background concentration is not detected (or is less than the detection limit), an observed release is established when the sample measurement equals or exceeds the sample quantitation limit.[a] • If the background concentration equals or exceeds the detection limit, an observed release is established when the sample measurement is 3 times or more above the background concentration.

[a] If the sample quantitation limit (SQL) cannot be established, determined if there is an observed release as follows:

—If the sample analysis was performed under the EPA Contract Laboratory Program, use the EPA contract-required quantitation limit (CRQL) in place of the SQL.

—If the sample analysis is not performed under the EPA Contract Laboratory Program, use the detection limit (DL) in place of the SQL.

2.4 *Waste characteristics.* The waste characteristics factor category includes the following factors: hazardous waste quantity, toxicity, and as appropriate to the pathway or threat being evaluated, mobility, persistence, and/or bioaccumulation (or ecosystem bioaccumulation) potential.

2.4.1 *Selection of substance potentially posing greatest hazard.* For all pathways (and threats), select the hazardous substance potentially posing the greatest hazard for the pathway (or threat) and use that substance in evaluating the waste characteristics category of the pathway (or threat). For the three migration pathways (and threats), base the selection of this hazardous substance on the toxicity factor value for the substance, combined with its mobility, persistence, and/or bioaccumulation (or ecosystem bioaccumulation) potential factor values, as applicable to the migration pathway (or threat). For the soil exposure pathway, base the selection on the toxicity factor alone.

Evaluation of the toxicity factor is specified in section 2.4.1.1. Use and evaluation of the mobility, persistence, and/or bioaccumulation (or ecosystem bioaccumulation) potential factors vary by pathway (or threat) and are specified under the appropriate pathway (or threat) section. Section 2.4.1.2 identifies the specific factors that are combined with toxicity in evaluating each pathway (or threat).

2.4.1.1 *Toxicity factor.* Evaluate toxicity for those hazardous substances at the site that are available to the pathway being scored. For all pathways and threats, except the surface water environmental threat, evaluate human toxicity as specified below. For the surface water environmental threat, evaluate ecosystem toxicity as specified in section 4.1.4.2.1.1.

Establish human toxicity factor values based on quantitative dose-response parameters for the following three types of toxicity:

• Cancer—Use slope factors (also referred to as cancer potency factors) combined with weight-of-evidence ratings for carcinogenicity. If a slope factor is not available for a substance, use its ED_{10} value to estimate a slope factor as follows:

$$\text{Slope factor} = \frac{1}{6\,(ED_{10})}$$

• Noncancer toxicological responses of chronic exposure—use reference dose (RfD) values.

• Noncancer toxicological responses of acute exposure—use acute toxicity parameters, such as the LD_{50}.

Assign human toxicity factor values to a hazardous substance using Table 2–4, as follows:

• If RfD and slope factor values are both available for the hazardous substance, assign the substance a value from Table 2–4 for each. Select the higher of the two values assigned and use it as the overall toxicity factor value for the hazardous substance.

• If either an RfD or slope factor value is available, but not both, assign the hazardous substance an overall toxicity factor value from Table 2–4 based solely on the available value (RfD or slope factor).

• If neither an RfD nor slope factor value is available, assign the hazardous substance an overall toxicity factor value from Table 2–4 based solely on acute toxicity. That is, consider acute toxicity in Table 2–4 only when both RfD and slope factor values are not available.

• If neither an RfD, nor slope factor, nor acute toxicity value is available, assign the hazardous substance an overall toxicity factor value of 0 and use other hazardous substances for which information is available in evaluating the pathway.

TABLE 2–4.—TOXICITY FACTOR EVALUATION

Chronic Toxicity (Human)

Reference dose (RfD) (mg/kg-day)	Assigned value
RfD < 0.0005	10,000
0.0005 ≤ RfD < 0.005	1,000
0.005 ≤ RfD < 0.05	100
0.05 ≤ RfD < 0.5	10
0.5 ≤ RfD	1
RfD not available	0

Carcinogenicity (Human)

Weight-of-evidence[a]/slope factor (mg/kg-day)$^{-1}$			Assigned value
A	B	C	
0.5 ≤ SF[b]	5 ≤ SF	50 ≤ SF	10,000
0.05 ≤ SF < 0.5	0.5 ≤ SF < 5	5 ≤ SF < 50	1,000
SF < 0.05	0.05 ≤ SF < 0.5	0.5 ≤ SF < 5	100
— — —	SF < 0.05	SF < 0.5	10
Slope factor not available.	Slope factor not available.	Slope factor not available.	0

[a] A, B, and C refer to weight-of-evidence categories. Assign substances with a weight-of-evidence category of D (inadequate evidence of carcinogenicity) or E (evidence of lack of carcinogenicity) a value of 0 for carcinogenicity.

[b] SF = Slope factor.

P. 2

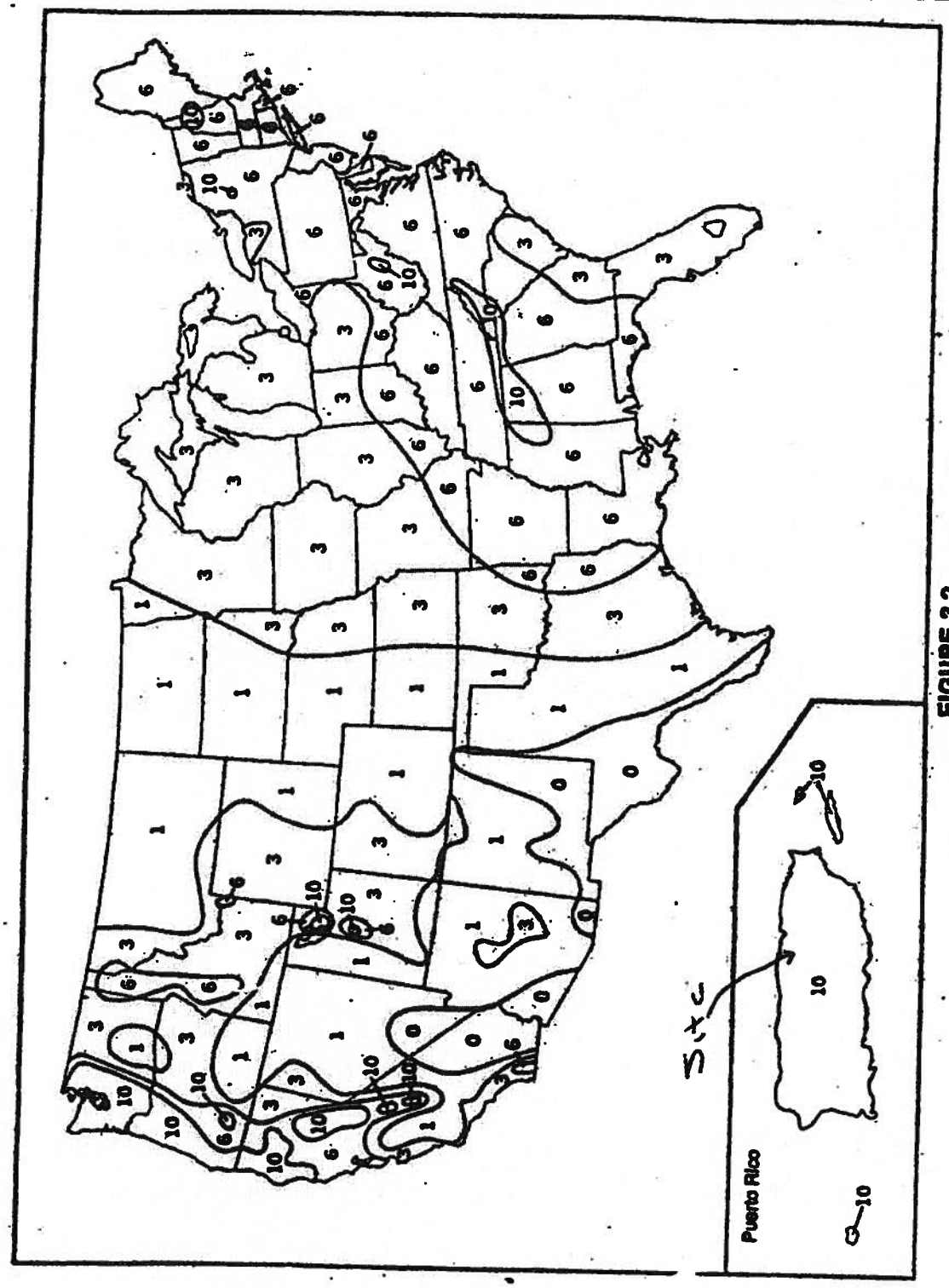

FIGURE 3-2
NET PRECIPITATION FACTOR VALUES

P. 3

–When measured monthly evapotranspiration is not available, calculate monthly potential evapotranspiration (E_i) as follows:

$$E_i = 0.6\, F_i\, (10\, T_i/I)^a$$

where:

E_i=Monthly potential evapotranspiration (inches) for month i.

F_i=Monthly latitude adjusting value for month i.

T_i=Mean monthly temperature (°C) for month i.

$$I = \sum_{i=1}^{12} (T_i/5)^{1.514}$$

$$a = 6.75\times10^{-7} I^3 - 7.71\times10^{-5} I^2 + 1.79\times10^{-2} I + 0.49239$$

Select the latitude adjusting value for each month from Table 3–3. For latitudes lower than 50° North or 20° South, determine the monthly latitude adjusting value by interpolation.

• Calculate monthly net precipitation by subtracting monthly evapotranspiration (or monthly potential evapotranspiration) from monthly precipitation. If evapotranspiration (or potential evapotranspiration) exceeds precipitation for a month, assign that month a net precipitation value of 0.

• Calculate the annual net precipitation by summing the monthly net precipitation values.

• Based on the annual net precipitation, assign a net precipitation factor value from Table 3–4.

Enter the value assigned from Figure 3–2 or from Table 3–4, as appropriate, in Table 3–1.

TABLE 3–3.—MONTHLY LATITUDE ADJUSTING VALUES[a]

Latitude[b] (degrees)	Month											
	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
≥50 N	0.74	0.78	1.02	1.15	1.33	1.38	1.37	1.25	1.06	0.92	0.78	0.70
45 N	0.80	0.81	1.02	1.13	1.28	1.29	1.31	1.21	1.04	0.94	0.79	0.75
40 N	0.84	0.83	1.03	1.11	1.24	1.25	1.27	1.18	1.04	0.96	0.83	0.81
35 N	0.87	0.85	1.03	1.09	1.21	1.21	1.23	1.16	1.03	0.97	0.89	0.85
30 N	0.90	0.87	1.03	1.08	1.18	1.17	1.20	1.14	1.03	0.98	0.89	0.88
20 N	0.95	0.90	1.03	1.05	1.13	1.11	1.14	1.11	1.02	1.00	0.93	0.94
10 N	1.00	0.91	1.03	1.03	1.08	1.06	1.08	1.07	1.02	1.02	0.98	0.99
0	1.04	0.94	1.04	1.01	1.04	1.01	1.04	1.04	1.01	1.04	1.01	1.04
10 S	1.08	0.97	1.05	0.99	1.00	0.96	1.00	1.02	1.00	1.06	1.05	1.09
20 S	1.14	0.99	1.05	0.97	0.96	0.91	0.95	0.99	1.00	1.08	1.09	1.15

[a] Do not round to nearest integer.
[b] For unlisted latitudes lower than 50° North or 20° South, determine the latitude adjusting value by interpolation.

TABLE 3–4.—NET PRECIPITATION FACTOR VALUES

Net precipitation (inches)	Assigned value
0	0
Greater than 0 to 5	1
Greater than 5 to 15	3
Greater than 15 to 30	6
Greater than 30	10

3.1.2.3 *Depth to aquifer.* Evaluate depth to aquifer by determining the depth from the lowest known point of hazardous substances at a site to the top of the aquifer being evaluated, considering all layers in that interval. Measure the depth to an aquifer as the distance from the surface to the top of the aquifer minus the distance from the surface to the lowest known point of hazardous substances eligible to be evaluated for that aquifer. In evaluating depth to aquifer in karst terrain, assign a thickness of 0 feet to a karst aquifer that underlies any portion of the sources at the site. Based on the calculated depth, assign a value from Table 3–5 to the depth to aquifer factor.

Determine the depth to aquifer only at locations within 2 miles of the sources at the site, except: if observed ground water contamination attributable to sources at the site extends more than 2 miles beyond these sources, use any location within the limits of this observed ground water contamination when evaluating the depth to aquifer factor for any aquifer that does not have an observed release. If the necessary geologic information is available at multiple locations, calculate the depth to aquifer at each location. Use the location having the smallest depth to assign the factor value. Enter this value in Table 3–1.

TABLE 3–5.—DEPTH TO AQUIFER FACTOR VALUES

Depth to aquifer[a] (feet)	Assigned value
Less than or equal to 25	5
Greater than 25 to 250	3
Greater than 250	1

[a] Use depth of all layers between the hazardous substances and aquifer. Assign a thickness of 0 feet to any karst aquifer that underlies any portion of the sources at the site.

3.1.2.4 *Travel time.* Evaluate the travel time factor based on the geologic materials in the interval between the lowest known point of hazardous substances at the site and the top of the aquifer being evaluated. Assign a value to the travel time factor as follows:

• If the depth to aquifer (see section 3.1.2.3) is 10 feet or less, assign a value of 35.

• If, for the interval being evaluated, all layers that underlie a portion of the sources at the site are karst, assign a value of 35.

• Otherwise:

–Select the lowest hydraulic conductivity layer(s) from within the above interval. Consider only layers at least 3 feet thick. However, do not consider layers or portions of layers within the first 10 feet of the depth to the aquifer.

–Determine hydraulic conductivities for individual layers from Table 3–6 or from in-situ or laboratory tests. Use representative, measured, hydraulic conductivity values whenever available.

–If more than one layer has the same lowest hydraulic conductivity, include all such layers and sum their thicknesses. Assign a thickness of 0 feet to a karst layer that underlies any portion of the sources at the site.

–Assign a value from Table 3–7 to the travel time factor, based on the thickness and hydraulic conductivity of the lowest hydraulic conductivity layer(s).

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TABLE 3-6.—HYDRAULIC CONDUCTIVITY OF GEOLOGIC MATERIALS

Type of material	Assigned hydraulic conductivity [a] (cm/sec)
Clay; low permeability till (compact unfractured till); shale; unfractured metamorphic and igneous rocks	10^{-6}
Silt; loesses; silty clays; sediments that are predominantly silts; moderately permeable till (fine-grained, unconsolidated till, or compact till with some fractures); low permeability limestones and dolomites (no karst); low permeability sandstone; low permeability fractured igneous and metamorphic rocks	10^{-4}
Sands; sandy silts; sediments that are predominantly sand; highly permeable till (coarse-grained, unconsolidated or compact and highly fractured); peat; moderately permeable limestones and dolomites (no karst); moderately permeable sandstone; moderately permeable fractured igneous and metamorphic rocks	10^{-2}
Gravel; clean sand; highly permeable fractured igneous and metamorphic rocks; permeable basalt; karst limestones and dolomites	10^{-1}

[a] Do not round to nearest integer.

TABLE 3-7.—TRAVEL TIME FACTOR VALUES [a]

Hydraulic conductivity (cm/sec)	Thickness of lowest hydraulic conductivity layer(s) [b] (feet)			
	Greater than 3 to 5	Greater than 5 to 100	Greater than 100 to 500	Greater than 500
Greater than or equal to 10^{-3}	35	35	35	25
Less than 10^{-3} to 10^{-5}	35	25	15	15
Less than 10^{-5} to 10^{-7}	15	15	5	5
Less than 10^{-7}	5	5	1	1

[a] If depth to aquifer is 10 feet or less or if, for the interval being evaluated, all layers that underlie a portion of the sources at the site are karst, assign a value of 35.

[b] Consider only layers at least 3 feet thick. Do not consider layers or portions of layers within the first 10 feet of the depth to the aquifer.

Determine travel time only at locations within 2 miles of the sources at the site, except: If observed ground water contamination attributable to sources at the site extends more than 2 miles beyond these sources, use any location within the limits of this observed ground water contamination when evaluating the travel time factor for any aquifer that does not have an observed release. If the necessary subsurface geologic information is available at multiple locations, evaluate the travel time factor at each location. Use the location having the highest travel time factor value to assign the factor value for the aquifer. Enter this value in Table 3-1.

3.1.2.5 *Calculation of potential to release factor value.* Sum the factor values for net precipitation, depth to aquifer, and travel time, and multiply this sum by the factor value for containment. Assign this product as the potential to release factor value for the aquifer. Enter this value in Table 3-1.

3.1.3 *Calculation of likelihood of release factor category value.* If an observed release is established for an aquifer, assign the observed release factor value of 550 as the likelihood of release factor category value for that aquifer. Otherwise, assign the potential to release factor value for that aquifer as the likelihood of release value. Enter the value assigned in Table 3-1.

3.2 *Waste characteristics.* Evaluate the waste characteristics factor category for an aquifer based on two factors: toxicity/mobility and hazardous waste quantity. Evaluate only those hazardous substances available to migrate from the sources at the site to ground water. Such hazardous substances include:

- Hazardous substances that meet the criteria for an observed release to ground water.
- All hazardous substances associated with a source that has a ground water containment factor value greater than 0 (see sections 2.2.2, 2.2.3, and 3.1.2.1).

3.2.1 *Toxicity/mobility.* For each hazardous substance, assign a toxicity factor value, a mobility factor value, and a combined toxicity/mobility factor value as specified in the following sections. Select the toxicity/mobility factor value for the aquifer being evaluated as specified in section 3.2.1.3.

3.2.1.1 *Toxicity.* Assign a toxicity factor value to each hazardous substance as specified in Section 2.4.1.1.

3.2.1.2 *Mobility.* Assign a mobility factor value to each hazardous substance for the aquifer being evaluated as follows:

- For any hazardous substance that meets the criteria for an observed release by chemical analysis to one or more aquifers underlying the sources at the site, regardless of the aquifer being evaluated, assign a mobility factor value of 1.
- For any hazardous substance that does not meet the criteria for an observed release by chemical analysis to at least one of the aquifers, assign that hazardous substance a mobility factor value from Table 3-8 for the aquifer being evaluated, based on its water solubility and distribution coefficient (K_d).
- If the hazardous substance cannot be assigned a mobility factor value because data on its water solubility or distribution coefficient are not available, use other hazardous substances for which information is available in evaluating the pathway.

TABLE 3-8.—GROUND WATER MOBILITY FACTOR VALUES [a]

Water solubility (mg/l)	Distribution coefficient (K_d) (ml/g)			
	Karst [c]	≤10	>10 to 1,000	>1,000
Present as liquid [b]	1	1	0.01	0.0001
Greater than 100	1	1	0.01	0.0001
Greater than 1 to 100	0.2	0.2	0.002	2×10^{-5}
Greater than 0.01 to 1	0.002	0.002	2×10^{-3}	2×10^{-7}
Less than or equal to 0.01	2×10^{-5}	2×10^{-5}	2×10^{-1}	2×10^{-9}

[a] Do not round to nearest integer.
[b] Use if the hazardous substance is present or deposited as a liquid.
[c] Use if the entire interval from the source to the aquifer being evaluated is karst.

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Drainage area. Determine the drainage area for the sources at the site. Include in this drainage area both the source areas and the area upgradient of the sources, but exclude any portion of this drainage area for which runoff is diverted from entering the sources by storm sewers or run-on control and/or runoff management systems. Assign a drainage area value for the watershed from Table 4-3.

Soil group. Based on the predominant soil group within the drainage area described above, assign a soil group designation for the watershed from Table 4-4 as follows:

- Select the predominant soil group as that type which comprises the largest total area within the applicable drainage area.
- If a predominant soil group cannot be delineated, select that soil group in the drainage area that yields the highest value for the runoff factor.

Calculation of runoff factor value. Assign a combined rainfall/runoff value for the watershed from Table 4-5, based on the 2-year, 24-hour rainfall and the soil group designation. Determine the runoff factor value for the watershed from Table 4-6, based on the rainfall/runoff and drainage area values. Enter the runoff factor value in Table 4-1.

TABLE 4-3.—DRAINAGE AREA VALUES

Drainage area (acres)	Assigned value
Less than 50	1
50 to 250	2
Greater than 250 to 1,000	3
Greater than 1,000	4

TABLE 4-4.—SOIL GROUP DESIGNATIONS

Surface soil description	Soil group designation
Coarse-textured soils with high infiltration rates (for example, sands, loamy sands).	A
Medium-textured soils with moderate infiltration rates (for example, sandy loams, loams).	B
Moderately fine-textured soils with low infiltration rates (for example, silty loams, silts, sandy clay loams).	C
Fine-textured soils with very low infiltration rates (for example, clays, sandy clays, silty clay loams, clay loams, silty clays); or impermeable surfaces (for example, pavement).	D

TABLE 4-5.—RAINFALL/RUNOFF VALUES

2-Year, 24-hour rainfall (inches)	Soil group designation			
	A	B	C	D
Less than 1.0	0	0	2	3
1.0 to less than 1.5	0	1	2	3
1.5 to less than 2.0	0	2	3	4
2.0 to less than 2.5	1	2	3	4
2.5 to less than 3.0	2	3	4	4
3.0 to less than 3.5	2	3	4	5
3.5 or greater	3	4	5	6

TABLE 4-6.—RUNOFF FACTOR VALUES

Drainage area value	Rainfall/runoff value						
	0	1	2	3	4	5	6
1	0	0	0	1	1	1	1
2	0	0	1	1	2	3	4
3	0	0	1	3	7	11	15
4	0	1	2	7	17	25	25

4.1.2.1.2.1.3 *Distance to surface water.* Evaluate the distance to surface water as the shortest distance, along the overland segment, from any source with a surface water containment factor value greater than 0 to either the mean high water level for tidal waters or the mean water level for other surface waters. Based on this distance, assign a value from Table 4-7 to the distance to surface water factor for the watershed. Enter this value in Table 4-1.

4.1.2.1.2.1.4 *Calculation of factor value for potential to release by overland flow.* Sum the factor values for runoff and distance to surface water for the watershed and multiply this sum by the factor value for containment. Assign the resulting product as the factor value for potential to release by overland flow for the watershed. Enter this value in Table 4-1.

4.1.2.1.2.2 *Potential to release by flood.* Evaluate potential to release by flood for each watershed as the product of two factors: containment (flood) and flood frequency. Evaluate potential to release by flood separately for each source that is within the watershed. Furthermore, for each source, evaluate potential to release by flood separately for each category of floodplain in which the source lies. (See section 4.1.2.1.2.2.2 for the applicable floodplain categories.) Calculate the value for the potential to release by flood factor as specified in 4.1.2.1.2.2.3.

4.1.2.1.2.2.1 *Containment (flood).* For each source within the watershed, separately evaluate the containment (flood) factor for each category of floodplain in which the source is partially or wholly located. Assign a containment (flood) factor value from Table 4-8 to each floodplain category applicable to that source. Assign a containment (flood) factor value of 0 to each floodplain category in which the source does not lie.

4.1.2.1.2.2.2 *Flood frequency.* For each source within the watershed, separately evaluate the flood frequency factor for each category of floodplain in which the source is partially or wholly located. Assign a flood frequency factor value from Table 4-9 to each floodplain category in which the source is located.

4.1.2.1.2.2.3 *Calculation of factor value for potential to release by flood.* For each source within the watershed and for each category of floodplain in which the source is partially or wholly located, calculate a separate potential to release by flood factor value. Calculate this value as the product of the containment (flood) value and the flood frequency value applicable to the source for the floodplain category. Select the highest value calculated for those sources that meet the minimum size requirement specified in section 4.1.2.1.2.1.1 and assign it as the value for the potential to release by flood factor for the watershed. However, if, for this watershed, no source at the site meets the minimum size requirement, select the highest value calculated for the sources at the site eligible to be evaluated for this watershed and assign it as the value for this factor.

TABLE 4-7.—DISTANCE TO SURFACE WATER FACTOR VALUES

Distance	Assigned value
Less than 100 feet	25
100 feet to 500 feet	20
Greater than 500 feet to 1,000 feet	16
Greater than 1,000 feet to 2,500 feet	9
Greater than 2,500 feet to 1.5 miles	6
Greater than 1.5 miles to 2 miles	3

TABLE 4-8.—CONTAINMENT (FLOOD) FACTOR VALUES

Containment criteria	Assigned value
Documentation that containment at the source is designed, constructed, operated, and maintained to prevent a washout of hazardous substances by the flood being evaluated.	0
Other	10

TABLE 4-9.—FLOOD FREQUENCY FACTOR VALUES

Floodplain category	Assigned value
Source floods annually	50
Source in 10-year floodplain	50
Source in 100-year floodplain	25
Source in 500-year floodplain	7
None of above	0

Enter this highest potential to release by flood factor value for the watershed in Table 4-1, as well as the values for containment (flood) and flood frequency that yield this highest value.

4.1.2.1.2.3 *Calculation of potential to release factor value.* Sum the factor values assigned to the watershed for potential to release by overland flow and potential to release by flood. Assign this sum as the potential to release factor value for the watershed, subject to a maximum value of 500. Enter this value in Table 4-1.

4.1.2.1.3 *Calculation of drinking water threat-likelihood of release factor category value.* If an observed release is established for the watershed, assign the observed release factor value of 550 as the likelihood of release factor category value for that watershed. Otherwise, assign the potential to release factor value for that watershed as the likelihood of release factor category value for that watershed. Enter the value assigned in Table 4-1.

4.1.2.2 *Drinking water threat-waste characteristics.* Evaluate the waste characteristics factor category for each

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the hazardous substance with the highest toxicity/persistence factor value for the watershed to assign the toxicity/persistence factor value for the drinking water threat for the watershed. Enter this value in Table 4-1.

4.1.2.2.2 *Hazardous waste quantity.* Assign a hazardous waste quantity factor value for the watershed as specified in section 2.4.2. Enter this value in Table 4-1.

4.1.2.2.3 *Calculation of drinking water threat-waste characteristics factor category value.* Multiply the toxicity/persistence and hazardous waste quantity factor values for the watershed, subject to a maximum product of 1×10^8. Based on this product, assign a value from Table 2-7 (section 2.4.3.1) to the drinking water threat-waste characteristics factor category for the watershed. Enter this value in Table 4-1.

TABLE 4-12.—TOXICITY/PERSISTENCE FACTOR VALUES [a]

Persistence factor value	Toxicity factor value					
	10,000	1,000	100	10	1	0
1.0	10,000	1,000	100	10	1	0
0.4	4,000	400	40	4	0.4	0
0.07	700	70	7	0.7	0.07	0
0.0007	7	0.7	0.07	0.007	0.0007	0

[a] Do not round to nearest integer.

4.1.2.3 *Drinking water threat-targets.* Evaluate the targets factor category for each watershed based on three factors: nearest intake, population, and resources.

To evaluate the nearest intake and population factors, determine whether the target surface water intakes are subject to actual or potential contamination as specified in section 4.1.1.2. Use either an observed release based on direct observation at the intake or the exposure concentrations from samples (or comparable samples) taken at or beyond the intake to make this determination (see section 4.1.2.1.1). The exposure concentrations for a sample (that is, surface water, benthic, or sediment sample) consist of the concentrations of those hazardous substances present that are significantly above background levels and attributable at least in part to the site (that is, those hazardous substance concentrations that meet the criteria for an observed release).

When an intake is subject to actual contamination, evaluate it using Level I concentrations or Level II concentrations. If the actual contamination is based on an observed release by direct observation, use Level II concentrations for that intake. However, if the actual contamination is based on an observed release from samples, determine which level applies for the intake by comparing the exposure concentrations from samples (or comparable samples) to health-based benchmarks as specified in sections 2.5.1 and 2.5.2. Use the health-based benchmarks from Table 3-10 (section 3.3.1) in determining the level of contamination from samples. For contaminated sediments with no identified source, evaluate the actual contamination using Level II concentrations (see section 4.1.1.2).

4.1.2.3.1 *Nearest intake.* Evaluate the nearest intake factor based on the drinking water intakes along the overland/flood hazardous substance migration path for the watershed. Include standby intakes in evaluating this factor only if they are used for supply at least once a year.

Assign the nearest intake factor a value as follows and enter the value in Table 4-1:

- If one or more of these drinking water intakes is subject to Level I concentrations as specified in section 4.1.2.3, assign a factor value of 50.
- If not, but if one or more of these drinking water intakes is subject to Level II concentrations, assign a factor value of 45.
- If none of these drinking water intakes is subject to Level I or Level II concentrations, determine the nearest of these drinking water intakes, as measured from the probable point of entry (or from the point where measurement begins for contaminated sediments with no identified source). Assign a dilution weight from Table 4-13 to this intake, based on the type of surface water body in which it is located. Multiply this dilution weight by 20, round the product to the nearest integer, and assign it as the factor value.

Assign the dilution weight from Table 4-13 as follows:

TABLE 4-13.—SURFACE WATER DILUTION WEIGHTS

Type of surface water body [a]		
Descriptor	Flow characteristics	Assigned dilution weight [b]
Minimal stream	Less than 10 cfs [c]	1
Small to moderate stream	10 to 100 cfs	0.1
Moderate to large stream	Greater than 100 to 1,000 cfs	0.01
Large stream to river	Greater than 1,000 to 10,000 cfs	0.001
Large river	Greater than 10,000 to 100,000 cfs	0.0001
Very large river	Greater than 100,000 cfs	0.00001
Coastal tidal waters [d]	Flow not applicable, depth not applicable	0.0001
Shallow ocean zone [e] or Great Lake	Flow not applicable, depth less than 20 feet	0.0001
Moderate depth ocean zone [e] or Great Lake	Flow not applicable, depth 20 to 200 feet	0.00001
Deep ocean zone [e] or Great Lake	Flow not applicable, depth greater than 200 feet	0.000005
3-mile mixing zone in quiet flowing river	10 cfs or greater	0.5

[a] Treat each lake as a separate type of water body and assign a dilution weight as specified in text.
[b] Do not round to nearest integer.
[c] cfs = cubic feet per second.
[d] Embayments, harbors, sounds, estuaries, back bays, lagoons, wetlands, etc., seaward from mouths of rivers and landward from baseline of Territorial Sea.
[e] Seaward from baseline of Territorial Sea. This baseline represents the generalized U.S. coastline. It is parallel to the seaward limit of the Territorial Sea and other maritime limits such as the inner boundary of the Federal fisheries jurisdiction and the limit of States jurisdiction under the Submerged Lands Act, as amended.

- For a river (that is, surface water body types specified in Table 4-13 as minimal stream through very large river), assign a dilution weight based on the average annual flow in the river at the intake. If available, use the average annual discharge as defined in the U.S. Geological Survey Water Resources Data Annual Report. Otherwise, estimate the average annual flow.
- For a lake, assign a dilution weight as follows:
  - For a lake that has surface water flow entering the lake, assign a dilution weight based on the sum of the

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If the site is in more than one watershed:

• Calculate a separate overland/flood migration component score for each watershed using likelihood of release, waste characteristics, and targets applicable to each watershed.

• Select the highest overland/flood migration component score from the watersheds evaluated and assign it as the overland/flood migration component score for the site.

4.1.2 *Drinking water threat.* Evaluate the drinking water threat for each watershed based on three factor categories: likelihood of release, waste characteristics, and targets.

4.1.2.1 *Drinking water threat—likelihood of release.* Evaluate the likelihood of release factor category for each watershed in terms of an observed release factor or a potential to release factor.

4.1.2.1.1 *Observed release.* Establish an observed release to surface water for a watershed by demonstrating that the site has released a hazardous substance to the surface water in the watershed. Base this demonstration on either:

• Direct observation:

–A material that contains one or more hazardous substances has been seen entering surface water through migration or is known to have entered surface water through direct deposition, or

–A source area has been flooded at a time that hazardous substances were present, and one or more hazardous substances were in contact with the flood waters, or

–When evidence supports the inference of a release of a material that contains one or more hazardous substances by the site to surface water, demonstrated adverse effects associated with that release may also be used to establish an observed release.

• Chemical analysis:

–Analysis of surface water, benthic, or sediment samples indicates that the concentration of hazardous substance(s) has increased significantly above the background concentration for the site for that type of sample (see section 2.3).

– –Limit comparisons to similar types of samples and background concentrations—for example, compare surface water samples to surface water background concentrations.

– –For benthic samples, limit comparisons to essentially sessile organisms.

–Some portion of the significant increase must be attributable to the site to establish the observed release, except: when the site itself consists of contaminated sediments with no identified source, no separate attribution is required.

If an observed release can be established for a watershed, assign an observed release factor value of 550 to that watershed, enter this value in Table 4–1, and proceed to section 4.1.2.1.3. If no observed release can be established for the watershed, assign an observed release factor value of 0 to that watershed, enter this value in Table 4–1, and proceed to section 4.1.2.1.2.

4.1.2.1.2 *Potential to release.* Evaluate potential to release only if an observed release cannot be established for the watershed. Evaluate potential to release based on two components: potential to release by overland flow (see section 4.1.2.1.2.1) and potential to release by flood (see section 4.1.2.1.2.2). Sum the values for these two components to obtain the potential to release factor value for the watershed, subject to a maximum value of 500.

4.1.2.1.2.1 *Potential to release by overland flow.* Evaluate potential to release by overland flow for the watershed based on three factors: containment, runoff, and distance to surface water.

Assign potential to release by overland flow a value of 0 for the watershed if:

• No overland segment of the hazardous substance migration path can be defined for the watershed, or

• The overland segment of the hazardous substance migration path for the watershed exceeds 2 miles before surface water is encountered.

If either condition applies, enter a value of 0 in Table 4–1 and proceed to section 4.1.2.1.2.2 to evaluate potential to release by flood. If neither applies, proceed to section 4.1.2.1.2.1.1 to evaluate potential to release by overland flow.

4.1.2.1.2.1.1 *Containment.* Determine the containment factor value for the watershed as follows:

• If one or more sources is located in surface water in the watershed (for example, intact sealed drums in surface water), assign the containment factor a value of 10 for the watershed. Enter this value in Table 4–1.

• If none of the sources is located in surface water in the watershed, assign a containment factor value from Table 4–2 to each source at the site that can potentially release hazardous substances to the hazardous substance migration path for this watershed. Assign the containment factor value for the watershed as follows:

–Select the highest containment factor value assigned to those sources that meet the minimum size requirement described below. Assign this highest value as the containment factor value for the watershed. Enter this value in Table 4–1.

–If, for this watershed, no source at the site meets the minimum size requirement, then select the highest containment factor value assigned to the sources at the site eligible to be evaluated for this watershed and assign it as the containment factor value for the watershed. Enter this value in Table 4–1.

A source meets the minimum size requirement if its source hazardous waste quantity value (see section 2.4.2.1.5) is 0.5 or more. Do not include the minimum size requirement in evaluating any other factor of this surface water migration component, except potential to release by flood as specified in section 4.1.2.1.2.2.3.

4.1.2.1.2.1.2 *Runoff.* Evaluate runoff based on three components: rainfall, drainage area, and soil group.

TABLE 4–2.—CONTAINMENT FACTOR VALUES FOR SURFACE WATER MIGRATION PATHWAY

Source	Assigned value
All Sources (Except Surface Impoundments, Land Treatment, Containers, and Tanks)	
Evidence of hazardous substance migration from source area (i.e., source area includes source and any associated containment structures)	10
No evidence of hazardous substance migration from source area and:	
(a) Neither of the following present: (1) maintained engineered cover, or (2) functioning and maintained run-on control system and runoff management system	10
(b) Any one of the two items in (a) present	9
(c) Any two of the following present: (1) maintained engineered cover, or (2) functioning and maintained run-on control system and runoff management system, or (3) liner with functioning leachate collection and removal system immediately above liner.	7
(d) All items in (c) present	5
(e) All items in (c) present, plus no bulk or non-containerized liquids nor materials containing free liquids deposited in source area	3
No evidence of hazardous substance migration from source area, double liner with functioning leachate collection and removal system above and between liners, and:	
(f) Only one of the following deficiencies present in containment: (1) bulk or noncontainerized liquids or materials containing free liquids deposited in source area, or (2) no or nonfunctioning or nonmaintained run-on control system and runoff management system, or (3) no or nonmaintained engineered cover.	3
(g) None of the deficiencies in (f) present	0
Source area inside or under maintained intact structure that provides protection from precipitation so that neither runoff nor leachate is generated, liquids or materials containing free liquids not deposited in source area, and functioning and maintained run-on control present.	

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4.1.4.2.2 *Hazardous waste quantity.* Assign the same factor value for hazardous waste quantity for the watershed as would be assigned in section 4.1.2.2.2 for the drinking water threat. Enter this value in Table 4-1.

4.1.4.2.3 *Calculation of environmental threat-waste characteristics factor category value.* For the hazardous substance selected for the watershed in section 4.1.4.2.1.4, use its ecosystem toxicity/persistence factor value and ecosystem bioaccumulation potential factor value as follows to assign a value to the waste characteristics factor category. First, multiply the ecosystem toxicity/persistence factor value and the hazardous waste quantity factor value for the watershed, subject to a maximum product of 1×10^8. Then multiply this product by the ecosystem bioaccumulation potential factor value for this hazardous substance, subject to a maximum product of 1×10^{12}. Based on this second product, assign a value from Table 2-7 (section 2.4.3.1) to the environmental threat-waste characteristics factor category for the watershed. Enter this value in Table 4-1.

TABLE 4-22.—ECOLOGICAL-BASED BENCHMARKS FOR HAZARDOUS SUBSTANCES IN SURFACE WATER

• Concentration corresponding to EPA Ambient Water Quality Criteria (AWQC) for protection of aquatic life (fresh water or marine).
• Concentration corresponding to EPA Ambient Aquatic Life Advisory Concentrations (AALAC).
• Select the appropriate AWQC and AALAC as follows:
–Use chronic value, if available; otherwise use acute value.
–If the sensitive environment being evaluated is in fresh water, use fresh water value, except: if no fresh water value is available, use marine value if available.
–If the sensitive environment being evaluated is in salt water, use marine value, except: if no marine value is available, use fresh water value if available.
–If the sensitive environment being evaluated is in both fresh water and salt water, or is in brackish water, use lower of fresh water or marine values.

TABLE 4-23.—SENSITIVE ENVIRONMENTS RATING VALUES

Sensitive environment	Assigned value
Critical habitat [a] for Federal designated endangered or threatened species Marine Sanctuary National Park Designated Federal Wilderness Area Areas identified under Coastal Zone Management Act [b] Sensitive areas identified under National Estuary Program [c] or Near Coastal Waters Program [d] Critical areas identified under the Clean Lakes Program [e] National Monument [f] National Seashore Recreational Area National Lakeshore Recreational Area	100
Habitat known to be used by Federal designated or proposed endangered or threatened species National Preserve National or State Wildlife Refuge Unit of Coastal Barrier Resources System Coastal Barrier (undeveloped) Federal land designated for protection of natural ecosystems Administratively Proposed Federal Wilderness Area Spawning areas critical [g] for the maintenance of fish/shellfish species within river, lake, or coastal tidal waters Migratory pathways and feeding areas critical for maintenance of anadromous fish species within river reaches or areas in lakes or coastal tidal waters in which the fish spend extended periods of time Terrestrial areas utilized for breeding by large or dense aggregations of animals [h] National river reach designated as Recreational	75
Habitat known to be used by State designated endangered or threatened species Habitat known to be used by species under review as to its Federal endangered or threatened status Coastal Barrier (partially developed) Federal designated Scenic or Wild River	50
State land designated for wildlife or game management State designated Scenic or Wild River State designated Natural Areas Particular areas, relatively small in size, important to maintenance of unique biotic communities	25
State designated areas for protection or maintenance of aquatic life [i]	5

[a] Critical habitat as defined in 50 CFR 424.02.
[b] Areas identified in State Coastal Zone Management plans as requiring protection because of ecological value.
[c] National Estuary Program study areas (subareas within estuaries) identified in Comprehensive Conservation and Management Plans as requiring protection because they support critical life stages of key estuarine species (Section 320 of Clean Water Act, as amended).
[d] Near Coastal Waters as defined in Sections 104(b)(3), 304(1), 319, and 320 of Clean Water Act, as amended.
[e] Clean Lakes Program critical areas (subareas within lakes, or in some cases entire small lakes) identified by State Clean Lake Plans as critical habitat (Section 314 of Clean Water Act, as amended).
[f] Use only for air migration pathway.
[g] Limit to areas described as being used for intense or concentrated spawning by a given species.
[h] For the air migration pathway, limit to terrestrial vertebrate species. For the surface water migration pathway, limit to terrestrial vertebrate species with aquatic or semiaquatic foraging habits.
[i] Areas designated under Section 305(a) of Clean Water Act, as amended.

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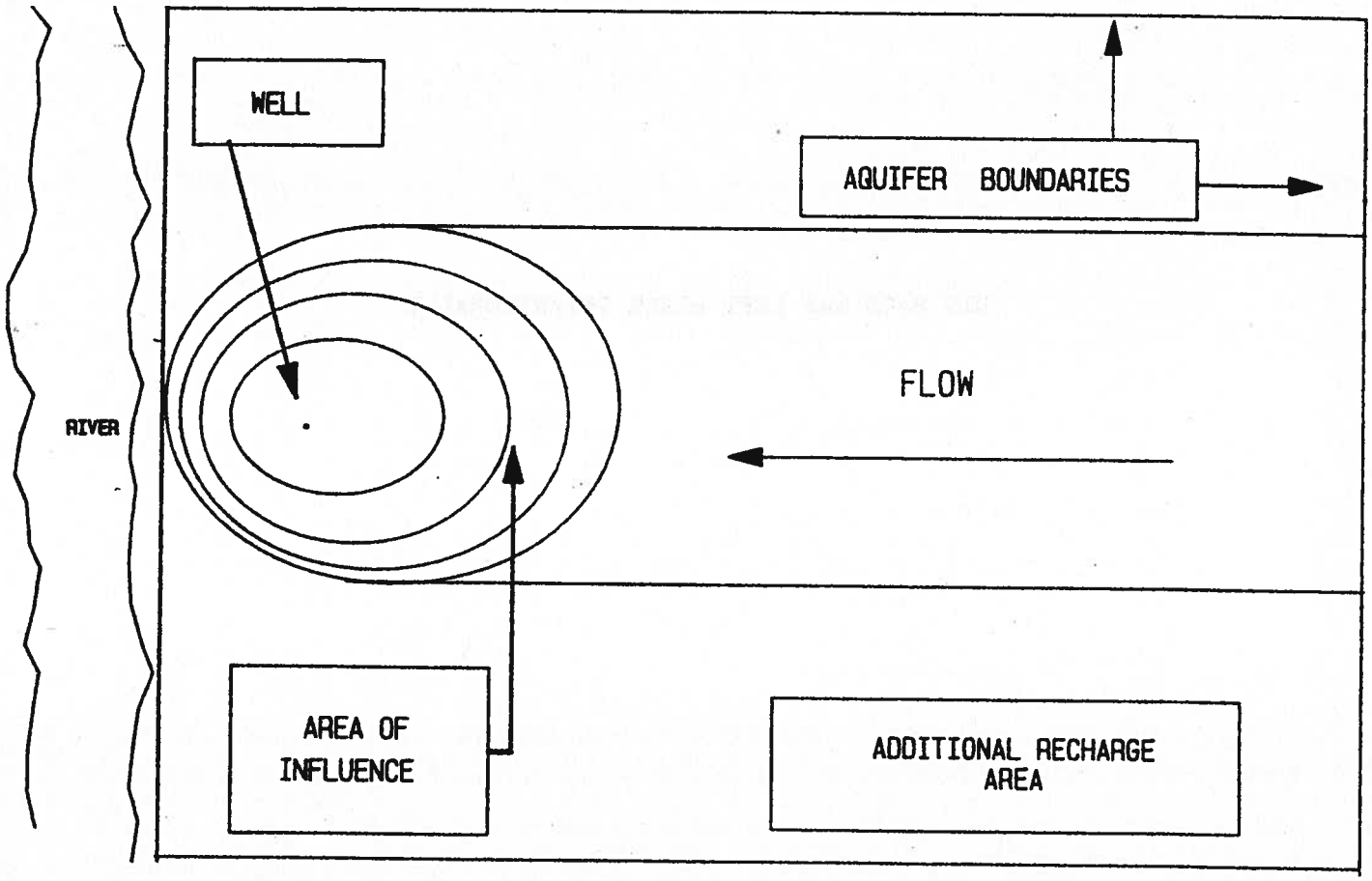

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Chapter 3: Wellhead Protection Area Delineation

EQB, as lead agency is responsible for the development and implementation of the WHP Program, and will develop a method to delineate WHPA's for wells that are used as sources of drinking water. The Groundwater Pollution Control Project, under the Water Quality Area of EQB is currently developing a program for the protection of groundwater in Puerto Rico from contamination of different sources. This program has developed the "Groundwater Quality Management and Protection Strategy for Puerto Rico", with the supervision of EPA, and with the cooperation and assistance of other related state and federal agencies that deal with groundwater in Puerto Rico.

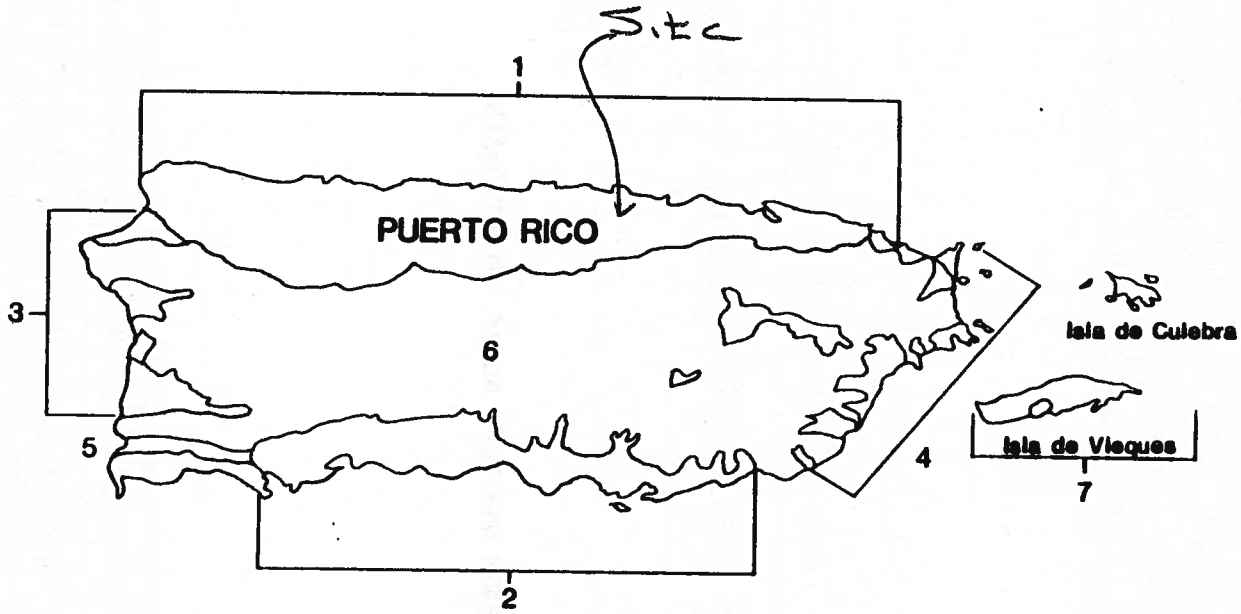
This strategy is aimed at establishing a coordinated effort for the protection of groundwater resources in Puerto Rico. Wellhead protection activities will be included as part of the tasks that EQB is developing in conjunction with this groundwater protection strategy for Puerto Rico. Given the fact that the EQB Groundwater Pollution Control Project has most of the information on wells and well contamination available through efforts initiated with the implementation of the groundwater protection strategy for Puerto Rico, EQB is in the position to initiate the establishment of WHP areas in Puerto Rico.

WHPA's delineation in Puerto Rico will be established by EQB taking into consideration the Island's limited territorial extension. Wells in Puerto Rico have been and are frequently located (1) near or within urban areas, (2) in densely populated

rural communities or (3) near industrial facilities. A general delineation goal consisting of wellfield management areas, including large land portions, may prove to be impractical for Puerto Rico. Many of these urban, rural or industrial zones are already located in well recharge areas. Many contaminant attenuation zones around potable water wells in Puerto Rico may contain portions of residential or industrial zones that constitute potential sources of contamination for groundwater. Most of the largest urban communities and industrial facilities in Puerto Rico are located in coastal areas and alluvial plains, where most of the island's most productive aquifers are encountered. Therefore, the wellhead protection program needs to take into consideration the island's limited land availability and the increasing industrial and urban developments in aquifer-bearing areas in Puerto Rico when delineating the wellhead protection areas throughout the island.

The occurrence and distribution of water resources in Puerto Rico will play an important role in the delineation of wellhead protection areas in Puerto Rico. These delineations need to be developed according (1) to the hydrogeologic characteristics and (2) available information of the island's aquifers. For conveniences of the WHP program, the island's aquifers have been grouped into the following seven (7) ground-water provinces in Puerto Rico shown in Figure 1 and listed in Table 1:

1. North Coast Province
2. South Coast Province
3. West Coast Province
4. East Coast Province



EXPLANATION

1. North Coast Province
2. South Coast Province
3. West Coast Province
4. East Coast Province
5. Lajas Valley
6. Interior Province
7. Vieques, Culebra

Figure 1.--Ground-water provinces in Puerto Rico (Modified from Gomez-Gomez, 1987)

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5. Lajas Valley

6. Interior Province

7. Vieques and Culebra

The first task in the delineation of the wellhead protection areas in Puerto Rico will consist in the identification, location, and plotting of all the potable water wells on the island on topographic maps (scale 1:20,000), according to their geographic coordinates. For this purpose, EQB has been developing a well inventory and data base which also has formed part of the tasks included in the "Groundwater Quality Management and Protection Strategy". The USGS, Caribbean District in San Juan recently created the most complete computerized well inventory in Puerto Rico. EQB will use this inventory known as the Ground Water Site Inventory (GWSI), in conjunction with the Survey's GIS data-management program. Both serve as the basis to preliminarily identify and locate the wells that will be included in the WHPA's delineation process. Additional hydrologic and geographic well data will also be gathered from well records available at DNR, PRASA and EQB. Well data will include pumping rates, well depth, thickness of well screen, geologic information and water levels, if available.

Given the fact that wellhead protection area delineation is an evolutionary process, the delineation of WHPA's in Puerto Rico will be developed in two phases which are described below and summarized in Table 1:

Phase One: In phase one, a fixed radius of 1500 feet will be drawn around all potable water wells that have been plotted on

TABLE 1. Wellhead Protection Area (WHPA) subdivisions in Puerto Rico and corresponding delineation methods.

Groundwater province	Aquifer or area	Type of aquifer	WHPA delineation Phase I	WHPA delineation Phase II	Status of USGS numerical ground water flow model
North Coast...	San Juan	Leaky (alluvium limestone)	Distance (fixed radius 1500 feet)	Time-of-travel (analytical Approach #2)	Near Completion
	Vega Alta	Unconfined (alluvium limestone)	Distance (fixed radius)	Time-of-travel (analytical Approach #2)	Available
	Manatí	Unconfined (alluvium limestone)	Distance (fixed radius)	Time-of-travel (analytical Approach #2)	Available Being Update
	Arecibo	Unconfined (alluvium limestone)	Distance (fixed radius)	Time-of-travel (analytical Approach #2)	In Progress
	Aguadilla	Unconfined (alluvium)	Distance (fixed radius)	Time-of-travel (analytical Approach #2)	In Progress
	Artesian aquifer	Confined	Aquifer boundary (recharge area delineation)	Aquifer boundary (recharge area delineation)	Near Completion
East Coast...	Fajardo	Unconfined (alluvium)	Distance (fixed radius	Time-of-travel (analytical Approach #1)	None
	Naguabo-Humacao	Unconfined (alluvium)	Distance (fixed radius	Time-of-travel (analytical Approach #2)	Available
	Yabucoa	Unconfined (alluvium)	Distance (fixed radius	Time-of-travel (analytical Approach #2)	None
	Maunabo	Unconfined (alluvium)	Distance (fixed radius	Distance (calculated radius Approach #1)	None

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TABLE 1(cont.) Wellhead Protection Area (WHPA) subdivisions in Puerto Rico and corresponding delineation methods.

Groundwater province	Aquifer or area	Type of aquifer	WHPA delineation Phase I	WHPA delineation Phase II	Status of USGS numerical ground water flow model
South Coast...	Patillas to Ponce	Unconfined confined (alluvial fan limestone)	Distance (fixed radius)	Time-of-travel (analytical Approach #2)	Near Completion
	Tallaboa-Guayanilla	Unconfined (alluvium limestone)	Distance (fixed radius)	Distance (calculated radius Approach #1)	None
	Yauco-Guánica	Unconfined (alluvium)	Distance (fixed radius)	Time-of-travel (analytical Approach #2)	Available
Lajas Valley...	Lajas Valley	Unconfined confined (alluvial fan limestone)	Distance (fixed radius)	Time-of-travel (analytical Approach #2)	None
West Coast...	Río Guanajibo valley	Unconfined (alluvium limestone)	Distance (fixed radius)	Time-of-travel (analytical Approach #2)	None
	Río Yaguez valley	Unconfined (alluvium limestone)	Distance (fixed radius)	Distance (calculated radius Approach #1)	None
	Río Grande de Añasco valley	Unconfined (alluvium limestone)	Distance (fixed radius)	Time-of-travel (analytical Approach #2)	None
Vieques and Culebra	Vieques	Unconfined (alluvium)	Distance (fixed radius)	Time-of-travel (analytical Approach #2)	None
	Culebra	Unconfined (alluvium)	Distance (fixed radius)	Time-of-travel (analytical Approach #2)	Available

TABLE 1(cont.) Wellhead Protection Area (WHPA) subdivisions in Puerto Rico and corresponding delineation methods.

Groundwater province	Aquifer or area	Type of aquifer	WHPA delineation Phase I	WHPA delineation Phase II	Status of USGS numerical ground water flow model
Interior...	Caguas-Juncos valley	Unconfined (alluvium)	Distance (fixed radius)	Time-of-travel (analytical Approach #2)	In Progress
	Cayey valley	Unconfined (alluvium)	Distance (fixed radius)	Distance (calculated radius Approach #1)	None
	Bedrock	Unconfined (bedrock)	Distance (fixed radius)	Distance (calculated radius Approach #1)	None

1:20,000 scale maps through the use of the U.S.Geological Survey's GWSI and GIS data management programs. These fixed-radius maps will be provided to EQB by the USGS during Fiscal Year 1991. The fixed-radius criteria will not be used, however, in wells tapping the North Coast artesian limestone aquifer. The aquifer-boundary criteria will be used to delineate WHPA for wells tapping this artesian system. This will consist on delineating the artesian aquifer recharge area based on hydrogeological mapping.

Phase Two: In phase two, wells tapping aquifers located within the ground-water provinces shown in Figure 1 and listed in Table 1 will be analyzed - on a case by case basis - to redefine their wellhead protection areas. As described in Table 1, some protection areas will be delineated using the time-of-travel criteria, others will be delineated with analytical calculations (Figure 2), and finally ground-water flow models could be utilized, if scale permits, in those areas where the USGS already has built these numerical models. Areas in Puerto Rico where ground-water flow models have been constructed are listed in the last column of Table 1.

Prioritization for the delineation of wellhead protection areas in Puerto Rico will probably take into consideration the pumping rates of the island's potable water wells during phase two described above. In phase one, however, the use of the USGS/GWSI-GIS data management banks might preclude the need of establishing

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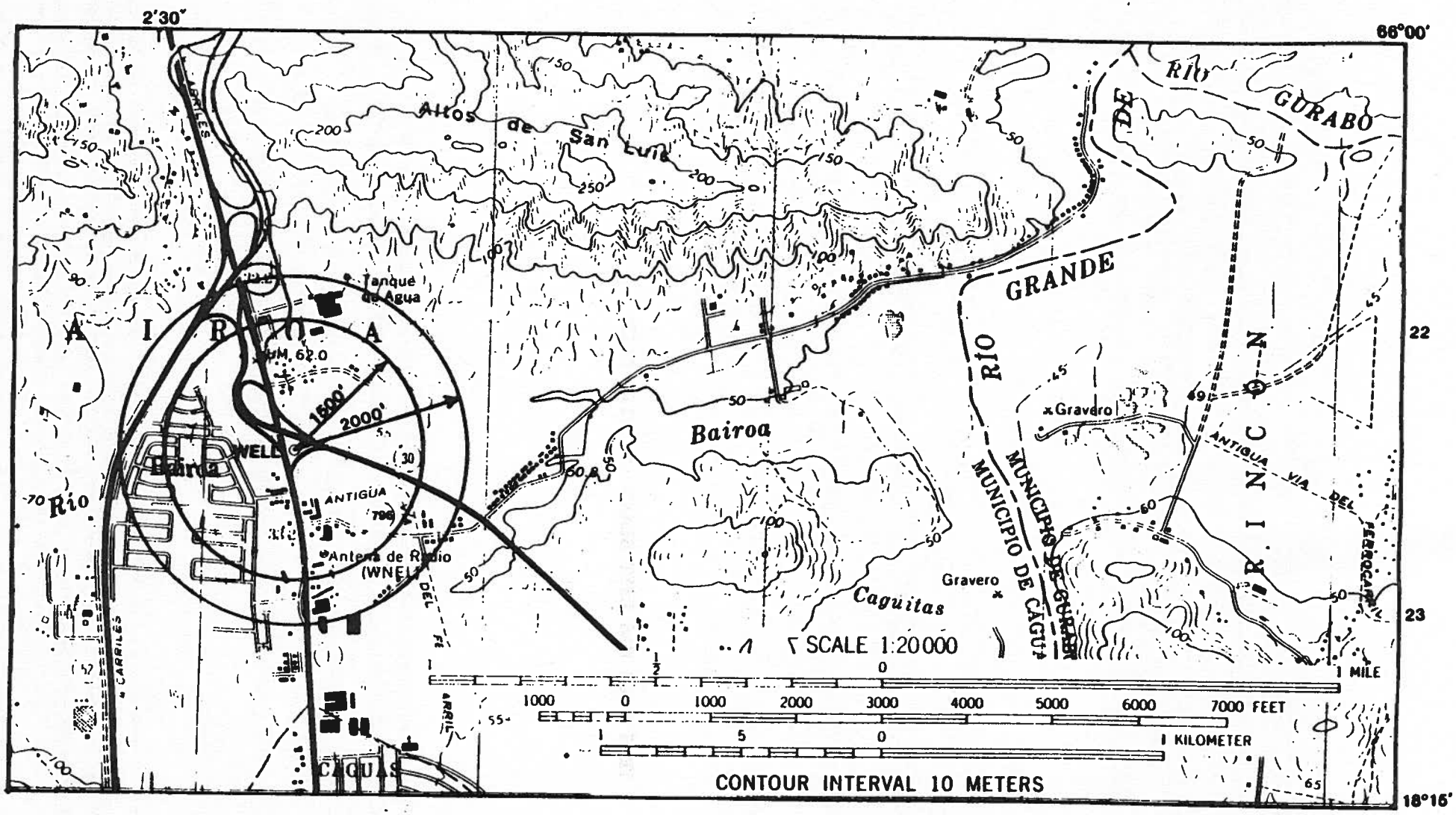

Figure 2. - WHPA delineation near Caguas comparing a fixed radius of 1,500 feet (Phase I); an analytical calculation based on the volumetric flow equation (Phase II, Approach #1) of 1,495 feet (≈1,500 feet); and an analytical calculation based on the Darcian velocity formula (Phase II, Approach #2) of 2,000 feet. Data used for calculations: pumping rate (Q) of 200 gallons per minute; time of travel of 5 years; length of well screen of 100 feet; aquifer porosity of 0.1; hydraulic conductivity of 23 feet per day; and a hydraulic gradient of 0.0048 ft/ft.

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this kind of priority because all wells will be treated equally and because fixed-radius protection areas for all potable wells in Puerto Rico could be drawn quickly with these powerful computer-related tools. During the second phase of the delineation process, wells with greater pumping rates and those that serve greater populations, would probably be delineated first. Wells with pumping rates equal or greater than 1000 gallons per minute (gpm) will be given first priority. Wells with pumping rates between 500 and 1000 gpm will get the second priority, wells pumping at a rate of 100 to 500 gpm will get third priority, and finally those wells with pumping rates of less than 100 gpm will be given last priority. In cases where wells with pumping rates of less than 100 gpm constitute the only source of water for a community, these will get a higher priority. Phase one of the delineation process will begin during the third quarter of FY91 and will continue until all public potable water well protection areas are delineated.

In phase two of the delineation process, two approaches under the analytical method will be used to delineate WHPA's, depending on the data available and the degree of protection delivered by each approach. If a well has enough data available for delineation approaches 1 and 2, the approach that gives greater protection will be used; and if data is available for only one approach, the delineation will be carried out using that approach. Finally, if a well has no data available for either of the approaches, a WHPA will be delineated using the minimum criteria of both delineation approaches, that is a circular area with a radius of 1500 ft around the well. The numerical model method could be

utilized in phase two if scales of the USGS models are appropriate.

During phase two of the delineation process, new wellhead protection areas delineated with the approaches described above, will be plotted on the corresponding 1:20,000 scale maps previously prepared during phase one of the delineation process. A complete set of the 67 topographic quadrangles that comprise the entire surface area of Puerto Rico will be kept in EQB files under the WHP program. EQB will be in constant communication with the USGS, DNR and PRASA, in order to keep track of new wells drilled, wells inactivated, or changes in well capacity in order to modify delineation areas accordingly.

EQB considers that these delineation criteria are not final, and are subject to modifications at any time. During the development and implementation phases of the WHP Program, EQB will continue its evaluation of other methods or criteria for delineation of WHPA's such as delineation methods based on drawdown criteria. If another method or methods for delineation prove to be more suitable for WHPA's delineation, or if more hydrologic data or research becomes available, EQB will reevaluate its delineation criteria. If WHPA's turn out to be too large, too small or improperly defined, new delineations will be carried out for those wells in need of additional or reduced protection.

A. Analytical Delineation Method - Approach #1

To delimit WHPA's around potable water wells, EQB will use the following criteria:

1. Circular areas around each potable water well, where the radius of these areas will be calculated using the volumetric flow equation:

$$r = (Qt/\grave{o}nH)^{1/2}$$

where,

r = WHPA radius, in feet

Q = pumping rate of the well, in ft^3/yr

t = travel time to well (5 years)

H = length of well screen (in feet)

n = aquifer porosity

ò = constant = 3.14

2. If the formula gives a value greater than 1500 ft., the radius (r) will be rounded off to the nearest hundredth. If the radius (r) gives a value less than 1500 ft., a maximum radius of 1500 ft. will be used.

3. If the circular areas of two or more wells overlap, the smallest circular area that includes the total area delimited for each individual well will be outlined.

4. In cases where well data are not available, a minimum radius of 1500 ft will be used.

B. Analytical Delineation Method - Approach # 2

To delimit WHPA's around potable water wells, EQB will also use a criteria based on the time of travel (TOT) of groundwater (considering advection only), using the Darcian velocity formula:

$$v = Ki/n$$

where,

v = Darcian velocity of groundwater flow, in ft/day

K = hydraulic conductivity of the geologic material in ft/d

i = hydraulic gradient

n = porosity

1. K may be known, based on results of aquifer tests, or estimated, depending on the geologic material of the area.
2. Using the formula: distance = velocity x time, the distance traveled in five (5) years will be calculated and delineated around each well. The velocity is assumed to be uniform around each well. A circular area will be delimited around each well, so that a distance equivalent to a time of travel of groundwater of 5 years will be protected. However, areas may not be circular if gradients are not uniform or K is not uniform.
3. If the circular areas of two or more wells overlap, the smallest circular area that includes the total area delimited for each individual well will be outlined.
4. In cases where well data are not available, a minimum radius of 1500 ft. will be used for the WHPA.

http://www.epa.gov/Region2/water/whp.htm
Last updated on Tuesday, October 05, 2010

Region 2 Water

You are here: EPA Home Region 2 Water > Wellhead Protection Program

Wellhead Protection Program

- The Safe Drinking Water Act Amendments of 1986 requested states to establish a Wellhead Protection Program (WHP) for ground water-based public water supplies. (The term "wellhead" is essentially synonymous with either a well or the column or "head" of water within a well.)

- Each state was asked to develop, with public participation, a Wellhead Protection Program Plan that was to be reviewed and approved by EPA. The Plan would describe how the state would accomplish the following three tasks:

  1. Determination of a wellhead protection area based on ground water flow and other hydrogeologic information;

  2. Development of an inventory of potential pollution sources within the wellhead protection area;

  3. Management and control of the potential sources of pollution identified within the wellhead protection area. Anticipated management techniques would range from purely voluntary approaches such as outreach and education to regulatory approaches such as ordinances containing land-use prohibitions.

- Between 1990 and 1991, New York, New Jersey, and Puerto Rico submitted Wellhead Protection Program Plans that were approved by EPA. (The U.S. Virgin Islands has not yet submitted its final plan for approval.)

- Since 1992, the states have been receiving EPA funding to implement the various components of wellhead protection. The states are required to submit to EPA a Biennial Wellhead Protection Report, summarizing their accomplishments.

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for Superfund Organic Methods Data Review

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NOTICE

The policies and procedures set forth here are intended as guidance to the United States Environmental Protection Agency (hereafter referred to as USEPA) and other Governmental employees. They do not constitute rule-making by the USEPA, and may not be relied on to create a substantive or procedural right enforceable by any other person. The Government may take action that is at a variance with the policies and procedures in this manual.

This document can be obtained from the USEPA's Contract Laboratory Program (CLP) Web site at:

http://www.epa.gov/superfund/programs/clp/guidance.htm

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Data Qualifier Definitions

The following definitions provide brief explanations of the national qualifiers assigned to results in the data review process. If the Regions choose to use additional qualifiers, a complete explanation of those qualifiers should accompany the data review.

U	The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the adjusted Contract Required Quantitation Limit (CRQL) for sample and method.
J	The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample (due either to the quality of the data generated because certain quality control criteria were not met, or the concentration of the analyte was below the CRQL).
NJ	The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
UJ	The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
R	The sample results are unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
C	This qualifier applies to pesticide and Aroclor results when the identification has been confirmed by Gas Chromatograph/Mass Spectrometer (GC/MS).
X	This qualifier applies to pesticide and Aroclor results when GC/MS analysis was attempted but was unsuccessful.

FIELD SCREENING DATA SHEET
CAYEY/DORADO/TOA BAJA SITES
CAYEY, DORADO, AND TOA BAJA, PUERTO RICO

Site Name: Laundry Espinosa
Date: 5/17/11
Geoprobe Borehole No.: ~~S02~~ mc S01
Background Concentration: 0.1 ppm
Calibration Time/Method: 0800/ Fresh Air / Iso
Instrument Model No./Serial No.: miniRAE 3000, RFW24711
Name of Operator: Michele Capriglione

Depth Interval (feet)	Screening Interval (feet)	Time of Receipt	Time of Analysis mc	PID Results (Units Above Background)
0-2	1.75-2	1255	1313	Ø
5-7	6.75-7	1300	1315	Ø
10-12	11.75-12	1305	1320	Ø
15-17	16.75-17	1320	1350	Ø
20-22	21.75-22	1325	1353	Ø
25-27	26.75-27			
30-32	31.75-32			
35-37	36.75-37			
40-42	41.75-42			
45-47	46.75-47			
50-52	51.75-52			

Signature M. Capriglione

FIELD SCREENING DATA SHEET
CAYEY/DORADO/TOA BAJA SITES
CAYEY, DORADO, AND TOA BAJA, PUERTO RICO

Site Name: Laundry Espinosa
Date: 5/17/11
Geoprobe Borehole No.: S02
Background Concentration: 0.1 ppm
Calibration Time/Method: 0800 / Fresh Air / Iso
Instrument Model No./Serial No.: MiniRAE 3000; RFW24711
Name of Operator: Michele Capriglione

Depth Interval (feet)	Screening Interval (feet)	Time of Receipt	Time of Analysis	PID Results (Units Above Background)
0-2	1.75-2	1400	1415	0.1 ppm
5-7	6.75-7	1420	1435	0.1 ppm
10-12	11.75-12	1425	1440	0.1 ppm
15-17	16.75-17	1435	1450	Ø
20-22	21.75-22	1442	1457	Ø
25-27	26.75-27	1445	1500	0.1 ppm
30-32	31.75-32			
35-37	36.75-37			
40-42	41.75-42			
45-47	46.75-47			
50-52	51.75-52			

Signature M. Capriglione

FIELD SCREENING DATA SHEET
CAYEY/DORADO/TOA BAJA SITES
CAYEY, DORADO, AND TOA BAJA, PUERTO RICO

Site Name: Laundry Espinosa
Date: 5/17/11
Geoprobe Borehole No.: S03
Background Concentration: 0.1 ppm
Calibration Time/Method: 0800 / Fresh Air / TSO
Instrument Model No./Serial No.: MiniRAE 3000, RFW24711
Name of Operator: Michele Capriglione

Depth Interval (feet)	Screening Interval (feet)	Time of Receipt	Time of Analysis	PID Results (Units Above Background)
0-2	1.75-2	1125	1145	0.1 ppm
5-7	6.75-7	1128	1148	0.1 ppm
10-12	11.75-12	1150	1205	0.1 ppm
15-17	16.75-17	1152	1207	0.1 ppm
20-22	21.75-22	1155	1210	Ø
25-27	26.75-27	1200	1225	0.1 ppm
30-32	31.75-32			
35-37	36.75-37			
40-42	41.75-42			
45-47	46.75-47			
50-52	51.75-52			

Signature M. Capriglione

FIELD SCREENING DATA SHEET
CAYEY/DORADO/TOA BAJA SITES
CAYEY, DORADO, AND TOA BAJA, PUERTO RICO

Site Name: Laundry Espinosa
Date: 5/17/11
Geoprobe Borehole No.: S04
Background Concentration: 0.1 ppm
Calibration Time/Method: 0800 / Fresh Air / ISO
Instrument Model No./Serial No.: MiniRAE 3000; RFW 24711
Name of Operator: Michele Capriglione

Depth Interval (feet)	Screening Interval (feet)	Time of Receipt	Time of Analysis	PID Results (Units Above Background)
0-2	1.75-2	1000	1015	Ø
5-7	6.75-7	1010	1025	0.1 ppm
10-12	~~11.75-12~~ 10.75-11	1015	1030	0.1 ppm
15-17	16.75-17	No recovery		
20-22	21.75-22	1025	1040	0.1 ppm
25-27	26.75-27	1030	1045	0.1 ppm
30-32	31.75-32	1035	1050	0.1 ppm
35-37	36.75-37	1040	1055	0.1 ppm
40-42	41.75-42	1045	1107	Ø ppm
45-47	46.75-47			
50-52	51.75-52			

Signature M. Capriglione

FIELD SCREENING DATA SHEET
CAYEY/DORADO/TOA BAJA SITES
CAYEY, DORADO, AND TOA BAJA, PUERTO RICO

Site Name: Laundry Espinosa
Date: 5/17/11
Geoprobe Borehole No.: S05
Background Concentration: 0.1 ppm
Calibration Time/Method: 0800 / Fresh Air / Iso
Instrument Model No./Serial No.: MiniRAE 3000; RFW24711
Name of Operator: Michele Capriglione

Depth Interval (feet)	Screening Interval (feet)	Time of Receipt	Time of Analysis	PID Results (Units Above Background)
0-2	1.75-2	0815	0830	0.1 ppm
5-7	6.75-7	0830	0845	0.1 ppm
10-12	11.75-12	0835	0850	0.1 ppm
15-17	16.75-17	0845	0900	0.1 ppm
20-22	21.75-22	0850	0905	0.1 ppm
25-27	26.75-27	0855	0910	0.1 ppm
30-32	31.75-32	0900	0915	Ø ppm
35-37	36.75-37	0905	0920	0.1 ppm
40-42	41.75-42	0915	0930	0.1 ppm
45-47	46.75-47	0922	0944	0.1 ppm
50-52	51.75-52			

Signature M. Capriglione

WESTON SOLUTIONS

GEOPROBE Soil Boring Log

Job Name: Laundry Espino SA	Boring No. 1312-S05	Logged By: V. DelloRusso VAL
Job No. 20405.012.013.1312	Page 1 of 3	
Date Drilled: 5/17/11	Boring Method/ Sample Method: Geoprobe / Macrocore 4-ft 5-ft	
Drilling Co: On-Site Environmental	Completion Depth: 50'	
Drill Foreman: Simone Ovada	Location: Dorado, PR	

Depth (Feet)	Recovery (% or Inches)	PID every 6"	Visual Description	Sample No.	Comments
1	3.0	Bkg	0-0.35' Black Asphalt 0.35'-1.1 = med gray M-f gravel w/ sandy silt, non plastic. moist, no odor, or stain, loose.	Sample 1312-S05-0.6-0.9'	Bag Headspace 6.75=2.0 PID=0.1 ppm
2		Bkg	1.1-2.6' Pink ~~to yellow~~ silty c-f sand w/ gravel. med dense, Dry, Poorly sorted, pink limestone rock fragments, siliceous. no odor or stain.		
3		Bkg	2.6-3.0 yellow sandy silt w/ trace gravel. sl plastic, moist, coherent. soft. no odor or stain.		
4					
5	1.75	Bkg	5-6.75' Strong Brown Fat clay w/ some gravel and little sand. Mod-H plast matrix w/ c-f gravel and sand, coherent. Dry-moist, angular siliceous limestone pink rock fragments. soft, no odor or stain. no layering. P. srt.		Bag Headspace 6.75-7.0 PID=0.1 ppm
6					
7					
8					
9					
10	2.0	Bkg	10-12' Strong Brown Fat clay w/ some gravel as above. Limestone rock fragment, fresh, siliceous. Matrix is moist, soft, M-H plasticity.		Bag Headspace PID=0.1 ppm
11		Bkg			
12					
13					
14					
15	2.1		15-16. Pale yellow M-f gravel and c-f sand Dry, P srt, Loose-sl dense. no odor or stain.	Sample 1312-S505A-16.1-16.4'	Bag Headspace PID=0.1 ppm
16			16.0-17.1 Brn-Dk brn, Fat clay, wet, H plast, soft, no odor or stain. massive, no layering.		
17					
18					
19					
20					

GEOPROBE Soil Boring Log

Job Name: Laundry Espinosa	Boring No. 1312-305	Logged By: V. Della Rosso
Job No. 20405.012.013.1312.00	Page 2 of 3	

Date Drilled 5/17/11	Boring Method/ Sample Method: Geoprobe / Macrocore 4-ft 5-ft
Drilling Co. On-Site Env.	Completion Depth 50'
Drill Foreman Simone Ojada	Location Dorado, PR

Depth (Feet)	Recovery (% or inches)	PID every 6"	Visual Description	Sample No.	Comments
20–25	2.5'	Bkg, Bkg, Bkg	20-22.5' reddish brown Fat Clay, no sand or gravel, M plastic, moist-wet, v soft. Massive no layering no odor or stain.		Bkg Headspace; 21.75-22 PID = 0.1 ppm
25–30	5.0	Bkg, Bkg, Bkg, Bkg	25-30' Red Fat Clay, no sand or gravel. M-H plastic, moist, v stiff. no odor or stain. massive, trace pale yellow mottles. no layering.		Bkg Headspace; 26.75-27.0 PID = 0.1 ppm
30–35	5.0'	Bkg, Bkg, Bkg	30-35' Red and brownish yellow streaked Fat Clay, moist, M-H plastic, v stiff. no sand or gravel. No layering, massive. no odor or stain. non dilatant.		Bkg Headspace; 31.75-32.0 PID = 0.0 ppm
35–40	5.0'	Bkg, Bkg	35-40' Red Fat Clay w/ some pale yellow-brown streaks, M-H plasticity, v stiff. no odor or stain non dilatant. moist.		Bkg Headspace; 36.75-37.0 PID = 0.1 ppm

WESTON SOLUTIONS

GEOPROBE Soil Boring Log

Job Name: Laundry Esponoza	Boring No. 1312-505	Logged By: V. Dellorosso UDR
Job No. 20405.012-013.1312.00	Page 3 of 3	

Date Drilled 5/17/11	Boring Method/ Sample Method: Geoprobe / Macrocore 4-ft 5-ft
Drilling Co. On-site Env.	Completion Depth 50'
Drill Foreman Simon Ojada	Location Dorado, PR

Depth (Feet)	Recovery (% or inches)	PID every 6"	Visual Description	Sample No.	Comments
41		Bkg	40-45' Same as last. Red Fat clay w/ yellow streaks, v. stiff.		Bag Headspace
42	5.0	Bkg	H plast, non-dilatent, massive, no layering. No sand or gravel. moist		41.75-42 PID = 0.1 ppm
43		Bkg			
44		Bkg			
45					
46		Bkg	45-50' Red Fat clay w/ trace F sand, moist v. stiff-hard, massive, no layering, non Dilatent.	Sample B12-5505B — 48.0-48.3'	Bag Headspace
47	3.85	Bkg	H plasticity. No odor or stain		46.75-47 PID = 0.1 ppm
48		Bkg			
49					
50			End of Boring		

WESTON SOLUTIONS

GEOPROBE Soil Boring Log

Job Name: Laundry Espinosa	Boring No. 1312-504		Logged By: V. Dello Russo
Job No. 20485.012.013.1312.00	Page 1 of 3		
Date Drilled 5/17/11	Boring Method/ Sample Method	Geoprobe / Macrocore 4-ft 5-ft	
Drilling Co. On Site Env.	Completion Depth 45'		
Drill Foreman Simon Ojada	Location Dorado, PR		

Depth (Feet)	Recovery (% or inches)	PID every 6"	Visual Description	Sample No.	Comments
1	2.2'	Bkg Bkg Bkg	0.-0.3 Black Asphalt 0.3-1.8' Pink to pale yellow brown Sandy silt w/gravel - Fresh angular Limestone (Rag in nature) P SFT Loose to SI Dense. Matrix Cohesive nonplastic. Moist, No odor or stain. 1.8-2.2 Reddish brown Sandy silt w/trace gravel. SI-non plastic, Cohesive, moist, No odor or stain. Soft.	Sample 1312-504 1.7-2.0'	Bag Headspace 1.25'-2.0 PID = 0.0 ppm
5					
6 7 8 9	2.65	Bkg Bkg Bkg	5-7.65' Dk brn Fat clay w/ Trace M sand, H plast, wet, soft, massive, No layering. No odor or stain. Non Dilatent.		Bag Headspace 6.75-7.0 PID = 0.1 ppm
10					
11 12 13 14	1.4	Bkg Bkg	10-10.8 yellow-pink Sandy gravel, loose, c-f sand, f-m gravel, moist-dry, P SFT, No odor or stain. 10.8-11.4 Strong Brown Lean clay w/ Trace gravel and sand, wet, Mod plastic, Non Dilatent, V Soft, No odor or stain.	Sample 1312-SS04A-11.0-11.3	Bag Headspace 10.75-11.0 PID = 0.1 ppm
15					
16 17 18 19 20	0'	NA	No recovery - Barrel jammed		Bag ~~Bag~~ Headspace NA

WESTON SOLUTIONS

GEOPROBE Soil Boring Log

Job Name: Laundry Espinosa	Boring No. 1312-SOH	Logged By: Vidal Russo
Job No. 20405.012.013.1312.00	Page 2 of 3	

Date Drilled: 5/17/11	Boring Method/ Sample Method: Geoprobe / Macrocore 4-ft 5-ft
Drilling Co.: On Site Env.	Completion Depth: 45'
Drill Foreman: Simone Olinda	Location: Dorado, PR

Depth (Feet)	Recovery (% or Inches)	PID every 6"	Visual Description	Sample No.	Comments
20–25	2.25'	Bkg, Bkg, Bkg	20-22.25 Red Fat clay, moist-dry, rare yellow streaks. No sand or gravel. V stiff-Hard, H plasticity, non dilatant. No odor or stain. Massive, no layering.		Bag Headspace 21.75-22 PID=0.1 ppm
25–30	5.0'	Bkg, Bkg, Bkg, Bkg	25'-30' Red Fat clay, H plast, v stiff, massive no layering or streaking. Non dilatant. Moist-dry. No sand or gravel.		Bag Headspace 26.75-27 PID=0.1 ppm
30–35	3.85'	Bkg, Bkg, Bkg	30-33.85' Red Fat clay w/ trace lean clay H plasticity, moist, mod stiff-v stiff/Hard. Massive no visible layering. No odor or stain.		Bag Headspace 36.75-32 PID=0.1 ppm
35–40	5.0'	Bkg, Bkg, Bkg, Bkg	35-40' Red Fat clay, dry-moist, v. stiff/Hard, H plasticity, trace yellow streaks, massive, no odor or stain. Very uniform. No sand or gravel.		Bag Headspace 36.75-37 PID=0.1 ppm

WESTON SOLUTIONS

GEOPROBE Soil Boring Log

Job Name: Laundry Espinosa		Boring No. 1312-S04	Logged By: V. DeMarusso UDR
Job No. 20405-012.013.1312.00		Page 3 of 3	
Date Drilled: 5/17/11	Boring Method/ Sample Method	Geoprobe / Macrocore 4-ft 5-ft	
Drilling Co. On Site Env.	Completion Depth 45'		
Drill Foreman: Simon Ojeda	Location: Dorado, PR		

Depth (Feet)	Recovery (% or Inches)	PID every 6"	Visual Description	Sample No.	Comments
41		Bkg	40-45' Red Fat Clay, H dust, massive, no layering. No mottles. V. stiff, moist. Non dilatent. No odor or stain. Few soft lenses		Bag headspace
42	5.0	Bkg		Sample 1312 SS04B- 44.6-44.9'	41.25-42 PID = 0.1 ppm
43		Bkg			
44	X	~~X~~ Bkg	~~Solid Refusal @ 44' bgs~~		
45			Bottom of Boring @ 45' bgs		

WESTON SOLUTIONS

GEOPROBE Soil Boring Log

Job Name: Laundry Espinosa	Boring No. 1312-503	Logged By: V. Dello Russo UAL
Job No. 20405.012.013.1312.00	Page 1 of 2	
Date Drilled: 5/17/11	Boring Method/ Sample Method: Geoprobe / Macrocore 4-ft 5-ft	
Drilling Co. Onsite Env.	Completion Depth 30'	
Drill Foreman: Simone Ojada	Location: Dorado, PR	

Depth (Feet)	Recovery (% or Inches)	PID every 6"	Visual Description	Sample No.	Comments
0–5	2.65'	Bkg, Bkg, Bkg	0-0.4 Dk yellow-strong Brown Sandy Lean Clay w/gravel. Moist, soft, Limestone Pink Rock fragments. Mod cohesive. Sl plastic. PSAT. No odor or stain. 0.4-2.65' Red Fat Clay. Stiff-V stiff, massive, moist, no mottles or streaks, no sand or gravel. No odor or stain.	Sample 1312-503-0.3-0.6'	Bag Headspace 1.75-2.0 PID = 0.1 ppm
5–10	5.0	Bkg, Bkg, Bkg, Bkg	5-10' Red Fat Clay, Dry-moist, V. stiff-Hard, rare yellow streaks. Massive, no layering. No sand or gravel. H plasticity, non dilatant. No odor or stain.		Bag Headspace ~~11.75-12~~ PID = 0.1 ppm 6.75-7.0
10–15	5.0'	Bkg, Bkg, Bkg, Bkg	10-15' Red Fat Clay, moist, H plasticity, stiff-V stiff, massive, no layering, no dilatant. No sand or gravel. No odor or stain. Very uniform throughout. No mottles or streaks.	Sample 1312-5503A 13.5-13.8'	Bag Headspace 11.75-12 PID = 0.1 ppm
15–20	5.0'	Bkg, Bkg, Bkg, Bkg	15-20' Red Fat Clay w/ yellow streaks H plasticity, nondilatant, stiff-V stiff-Hard, moist-dry, no layering, massive, very uniform. No odor or stain.		Bag Headspace 16.75-17 PID = 0.1 ppm

WESTON SOLUTIONS

GEOPROBE Soil Boring Log

Job Name: Laundry Espinosa		Boring No. 1312-S03	Logged By: V. DelloRusso VDR
Job No. 20405-012-013-1312.00		Page 2 of 2	
Date Drilled 5/17/11	Boring Method/ Sample Method	Geoprobe / Macrocore 4-ft 5-ft	
Drilling Co. OriSite Env.	Completion Depth 35'		
Drill Foreman Simone Ojada	Location Dorado, PR		

Depth (Feet)	Recovery (% or Inches)	PID every 6"	Visual Description	Sample No.	Comments
21		Bkg	20-24.35 Red Fat clay w/ vertical yellow streaks. K plasticity, non dilatant. V. stiff-hard moist-dry. No sand or gravel.		Bag Headspace
22	4.35	Bkg	Massive, no layering. Very uniform. No odor or stain.		21.75-22 PID = 0.1 ppm
23		Bkg			
24		Bkg			
25					
26		Bkg	25-29' Red Clay, Fat Lean in pale yellow/ ~~[illegible]~~ mottled soft - V stiff, Mr K plasticity. Trace F sand. Non-dilatant, massive, no layering visible.		Bag Headspace
27	4.0	Bkg	No odor or stain.		26.75-27 PID = 0.1 ppm
28		Bkg		Sample 1312-SS03B-28.7-29.0	
29		Bkg			
30			No Recovery Core barrel jammed due to dense clay expanding in the barrel.		
31					Bag Headspace
32	0'	NA			PID = NA
33					
34					
35			Bottom of Boring @ 35' bgs		
36					
37					Bag Headspace
38					~~[illegible]~~ PID =
39					
40					

WESTON SOLUTIONS

GEOPROBE Soil Boring Log

Job Name: Laundry Espinosa	Boring No. 1312-~~S01~~ ~~S02~~ S01	Logged By: V. Dellor-SSO
Job No. 20405.812.013.1312.00	Page 1 of 2	
Date Drilled: 5/17/11	Boring Method/ Sample Method: Geoprobe / Macrocore 4-ft 5-ft	
Drilling Co.: On Site Env	Completion Depth: 30'	
Drill Foreman: Simone Ojada	Location: Espinosa/Dorado, PR	

Depth (Feet)	Recovery (% or inches)	PID every 6"	Visual Description	Sample No.	Comments
1		Bkg	0-0.6 Red brn sandy clay w/ gravel. moist, PSRT, SRT, M plast, cohesive, No odor or stain.	Sample 1312-S01-0.6-0.9'	
2	2.1	Bkg	0.6-2.1 Red Fat clay, stiff-v. stiff, H plasticity, massive, No layering, very uniform. No odor or stain. Nondilatant. moist-dry.		Bag Headspace 1.75-2.0 PID = ϕ
3					
4					
5					
6		Bkg	5-10' Red Fat clay, moist, H plasticity, stiff-v. stiff, massive, No layering, No odor or stain. Very uniform. No sand or gravel.		Bag Headspace 6.25-7.0 PID = ϕ
7	5.0'	Bkg			
8		Bkg			
9		Bkg			
10					
11		Bkg	10-15' Red Fat clay w/ thin yellow lamina/mottles. H plasticity, moist, v stiff, massive, No layering, No odor or stain.	Sample 1312-SS01A 11.2-11.5'	Bag Headspace 11.25-12 PID = ϕ
12	5.0	Bkg			
13		Bkg			
14		Bkg			
15					
16		Bkg	15-20 Red Fat clay. H plasticity, v stiff, moist. massive No layering. No mottles. very uniform, No odor or stain.		Bag Headspace 16.75-17.0 PID = ϕ
17	3.7'	Bkg			
18					
19					
20					

WESTON SOLUTIONS

GEOPROBE Soil Boring Log

Job Name: Laundry Espinosa	Boring No. 1312-S01	Logged By: V. DelloRusso	
Job No. 20405-012.013-1312.00	Page 2 of 2		
Date Drilled: 5/17/11	Boring Method/ Sample Method: Geoprobe / Macrocore 4-ft 5-ft		
Drilling Co: Onsite Env.	Completion Depth: 30'		
Drill Foreman: Simone Ojeda	Location: Dorado, PR		

Depth (Feet)	Recovery (% or inches)	PID every 6"	Visual Description	Sample No.	Comments
21		13kg	20-~~24.3 Red Fat Clay~~ 22.4 Red Lean clay w/ Trace sand moist. Mod plastic, V cohesive. Med stiff, massive, no layering. No odor or stain. Grading to;		Bag Headspace 21.75-22 PID=0
22	4.3	Bag		Sample 1312-S501B 23.7-24.0	
23		Bkg	22.4-24.3 Fat Clay, Red, Stiff-V stiff, H plastic, moist, massive, no layering. No odor or stain.		
24					
25			No Recovery, Core Barrel Jammed.		
26					
27	0'	NA			
28					
29					
30			Bottom of Borehole @ 30' Bgs		

GEOPROBE Soil Boring Log

Job Name: Laundry Espinosa		Boring No. 1312-502	Logged By: V. DelloRusso
Job No. 204051.012.013.1312.00		Page 1 of 2	
Date Drilled 5/17/11	Boring Method/ Sample Method	Geoprobe / Macrocore 4-ft 5-ft	
Drilling Co. On Site Env	Completion Depth 30'		
Drill Foreman Simone Ojeda	Location Dorado, PR		

Depth (Feet)	Recovery (% or inches)	PID every 6"	Visual Description	Sample No.	Comments
1		Bkg	0-0.75' Yellow silty c-f sand w/ gravel. Pink fresh Limestone gravel (Aymamón Ls) moist, loose, poorly sorted. No odor or stain	Sample 1312-502- 0.8-1.1' and 506- 0.8-1.1' (Dup)	Bag Headspace 1.25-2 PID = 0.1 ppm
2	3.4	Bkg	0.75-3.4' Red Fat clay, moist-dry, v stiff-hard, massive, H plastic, no sand or gravel. No layering, No odor or stain.		
3		Bkg			
4					
5			5-10' Red Fat Clay, Few yellow streaks (vert) v. stiff-hard, massive, H plasticity, moist-dry. No layering. No odor or stain. No sand or gravel.		Bag Headspace 6.25-7.0 PID = 0.1 ppm
6		Bkg			
7	5.0	Bkg			
8		Bkg			
9		Bkg			
10			10-15' Red Fat Clay w/ Few yellow streaks. H plasticity, moist, v stiff-hard, massive, No layering. No sand or gravel. No odor or stain.	Sample 1312 502A- 13.0-13.3	Bag Headspace PID = 0.1 ppm
11		Bkg			
12	5.0	Bkg			
13		Bkg			
14					
15			15-20' Red Fat Clay, very uniform. H plasticity, moist, v stiff-hard, massive No layering. No sand or gravel. No odor or stain.		Bag Headspace PID = ∅
16		Bkg			
17	5.0	Bkg			
18					
19		Bkg			
20					

WESTON SOLUTIONS

GEOPROBE Soil Boring Log

Job Name: Laundry Espinosa	Boring No. 1312-S02	Logged By: V. DelloRusso VDR
Job No. 20405.012.013.1312.00	Page 2 of 2	

Date Drilled 5/17/11	Boring Method/ Sample Method: Geoprobe / Macrocore 4-ft 5-ft
Drilling Co. OnSite Env.	Completion Depth 30'
Drill Foreman Simona Ojinda	Location Dorado, PR

Depth (Feet)	Recovery (% or Inches)	PID every 6"	Visual Description	Sample No.	Comments
21		Bkg	20-25' Red Fat Clay, Massive, H Plasticity, No laminy, Non Dilatant, No sand or gravel, No Odor or Stain, V. Stiff. Moist.		Bag Headspace PID = Ø
22	5.0	Bkg			
23					
24		Bkg			
25					
26		Bkg	25-30' Red Fat Clay, Dry-moist, V Stiff-Hard, H. Plasticity, No laminy, Massive, Non Dilatant, No Sand or gravel. No Odor or Stain.		Bag Headspace PID = 0.1ppm
27	5.0				
28		Bkg		Sample 1312-S502B-29.0-29.3	
29		Bkg			
30			End of Boring @ 30' bgs		

MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: **EXXSOL D40 FLUID**
Product Description: Dearomatized Hydrocarbons
Product Code:
Intended Use: Solvent

COMPANY IDENTIFICATION

Supplier: **EXXONMOBIL CHEMICAL COMPANY**
P.O. BOX 3272
HOUSTON, TX. 77253-3272 USA

24 Hour Health Emergency	(800) 726-2015
Transportation Emergency Phone	(800) 424-9300 CHEMTREC
Product Technical Information	(281) 870-6000/Health & Medical (281) 870-6884
Supplier General Contact	(281) 870-6000

SECTION 2 COMPOSITION / INFORMATION ON INGREDIENTS

Reportable Hazardous Substance(s) or Complex Substance(s)

Name	CAS#	Concentration*
DISTILLATES (PETROLEUM), HYDROTREATED LIGHT	64742-47-8	100%

* All concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume.

SECTION 3 HAZARDS IDENTIFICATION

This material is considered to be hazardous according to regulatory guidelines (see (M)SDS Section 15).

POTENTIAL PHYSICAL / CHEMICAL EFFECTS

Combustible. Material can release vapors that readily form flammable mixtures. Vapor accumulation could flash and/or explode if ignited. Material can accumulate static charges which may cause an incendiary electrical discharge.

POTENTIAL HEALTH EFFECTS

Repeated exposure may cause skin dryness or cracking. If swallowed, may be aspirated and cause lung damage. May be irritating to the eyes, nose, throat, and lungs.

NFPA Hazard ID:	Health: 1	Flammability: 2	Reactivity: 0
HMIS Hazard ID:	Health: 1	Flammability: 2	Reactivity: 0

NOTE: This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

SECTION 4 FIRST AID MEASURES

INHALATION

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

SKIN CONTACT

Wash contact areas with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse.

EYE CONTACT

Flush thoroughly with water. If irritation occurs, get medical assistance.

INGESTION

Seek immediate medical attention. Do not induce vomiting.

NOTE TO PHYSICIAN

If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately.

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

Appropriate Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

Inappropriate Extinguishing Media: Straight Streams of Water

FIRE FIGHTING

Fire Fighting Instructions: Evacuate area. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Firefighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Unusual Fire Hazards: Combustible. Vapors are flammable and heavier than air. Vapors may travel across the ground and reach remote ignition sources causing a flashback fire danger. Hazardous material. Firefighters should consider protective equipment indicated in Section 8.

Hazardous Combustion Products: Smoke, Fume, Oxides of carbon, Incomplete combustion products

FLAMMABILITY PROPERTIES

Flash Point [Method]: >40C (104F) [ASTM D-56]
Flammable Limits (Approximate volume % in air): LEL: 0.8 UEL: 5.6
Autoignition Temperature: 260°C (500°F)

SECTION 6 ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. U.S. regulations require reporting releases of this material to the environment which exceed the

reportable quantity or oil spills which could reach any waterway including intermittent dry creeks. The National Response Center can be reached at (800)424-8802.

PROTECTIVE MEASURES

Avoid contact with spilled material. Warn or evacuate occupants in surrounding and downwind areas if required due to toxicity or flammability of the material. See Section 5 for fire fighting information. See Section 3 for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for Personal Protective Equipment.

SPILL MANAGEMENT

Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do it without risk. All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Prevent entry into waterways, sewer, basements or confined areas. A vapor suppressing foam may be used to reduce vapors. Use clean non-sparking tools to collect absorbed material. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Large Spills: Water spray may reduce vapor; but may not prevent ignition in closed spaces. Recover by pumping or with suitable absorbent.

Water Spill: Stop leak if you can do it without risk. Eliminate sources of ignition. Warn other shipping. If the Flash Point exceeds the Ambient Temperature by 10 degrees C or more, use containment booms and remove from the surface by skimming or with suitable absorbents when conditions permit. If the Flash Point does not exceed the Ambient Temperature by 10 degrees C or is less than the Ambient Temperature, use booms as a barrier to protect shorelines and allow the material to evaporate. Seek the advice of a specialist before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

ENVIRONMENTAL PRECAUTIONS

Large Spills: Dike far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

SECTION 7 HANDLING AND STORAGE

HANDLING

Avoid contact with skin. Use proper bonding and/or grounding procedures. Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source).

Loading/Unloading Temperature: [Ambient]

Transport Temperature: [Ambient]
Transport Pressure: [Ambient]

Static Accumulator: This material is a static accumulator.

STORAGE

Keep container closed. Handle containers with care. Open slowly in order to control possible pressure release. Store in a cool, well-ventilated area. Storage containers should be grounded and bonded. Drums must be grounded and bonded and equipped with self-closing valves, pressure vacuum bungs and flame arresters.

Storage Temperature: [Ambient]
Storage Pressure: [Ambient]

Suitable Containers/Packing: Railcars; Drums; Barges; Tank Trucks
Suitable Materials and Coatings: Carbon Steel; Stainless Steel; Polyethylene; Polypropylene; Teflon
Unsuitable Materials and Coatings: Natural Rubber; Butyl Rubber; Ethylene-proplyene-diene monomer (EPDM); Polystyrene

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMIT VALUES

Exposure limits/standards (Note: Exposure limits are not additive)

Source	Form	Limit / Standard			Note	Source
DISTILLATES (PETROLEUM), HYDROTREATED LIGHT	Vapor.	RCP - TWA	197 ppm	1200 mg/m3	Total Hydrocarbons	ExxonMobil

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:
Adequate ventilation should be provided so that exposure limits are not exceeded. Use explosion-proof ventilation equipment.

PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:
Half-face filter respirator

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapor warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Work conditions can greatly effect glove durability; inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:
If prolonged or repeated contact is likely, chemical resistant gloves are recommended. If contact with forearms is likely, wear gauntlet style gloves.

Eye Protection: If contact is likely, safety glasses with side shields are recommended.

Skin and Body Protection: Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:
If prolonged or repeated contact is likely, chemical, and oil resistant clothing is recommended.

Specific Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

ENVIRONMENTAL CONTROLS
See Sections 6, 7, 12, 13.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Typical physical and chemical properties are given below. Consult the Supplier in Section 1 for additional data.

GENERAL INFORMATION
Physical State: Liquid
Form: Clear
Color: Colorless
Odor: Mild Petroleum/Solvent
Odor Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION
Relative Density (at 15.6 C): 0.776
Density: 777 kg/m³ (6.48 lbs/gal, 0.78 kg/dm³)
Flash Point [Method]: >40C (104F) [ASTM D-56]
Flammable Limits (Approximate volume % in air): LEL: 0.8 UEL: 5.6
Autoignition Temperature: 260°C (500°F)
Boiling Point / Range: 161C (322F) - 198C (388F)
Vapor Density (Air = 1): 4.9 at 101 kPa
Vapor Pressure: 0.27 kPa (2.03 mm Hg) at 20 C
Evaporation Rate (n-butyl acetate = 1): 0.18
pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): N/D
Solubility in Water: Negligible
Viscosity: 1.09 cSt (1.09 mm2/sec) at 40 C | 1.3 cSt (1.3 mm2/sec) at 25C
Oxidizing Properties: See Sections 3, 15, 16.

OTHER INFORMATION
Freezing Point: <-75°C (-103°F)
Melting Point: N/D
Pour Point: -57°C (-71°F)
Molecular Weight: 143
Hygroscopic: No
Coefficient of Thermal Expansion: 0.00077 V/VDEGC

SECTION 10 STABILITY AND REACTIVITY

STABILITY: Material is stable under normal conditions.

CONDITIONS TO AVOID: Avoid heat, sparks, open flames and other ignition sources.

MATERIALS TO AVOID: Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

ACUTE TOXICITY

Route of Exposure	Conclusion / Remarks
Inhalation	
Toxicity: Data available.	Minimally Toxic. Based on test data for structurally similar materials.
Irritation: Data available.	Negligible hazard at ambient/normal handling temperatures. Based on test data for structurally similar materials.
Ingestion	
Toxicity: LD50 > 15000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Skin	
Toxicity: LD50 > 3160 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Irritation: Data available.	Mildly irritating to skin with prolonged exposure. Based on test data for structurally similar materials.
Eye	
Irritation: Data available.	May cause mild, short-lasting discomfort to eyes. Based on test data for structurally similar materials.

CHRONIC/OTHER EFFECTS

For the product itself:

Vapor/aerosol concentrations above recommended exposure levels are irritating to the eyes and respiratory tract, may cause headaches, dizziness, anesthesia, drowsiness, unconsciousness and other central nervous system effects including death.
Prolonged and/or repeated skin contact with low viscosity materials may defat the skin resulting in possible irritation and dermatitis.
Small amounts of liquid aspirated into the lungs during ingestion or from vomiting may cause chemical pneumonitis or pulmonary edema.

Additional information is available by request.

The following ingredients are cited on the lists below: None.

--REGULATORY LISTS SEARCHED--

1 = NTP CARC	3 = IARC 1	5 = IARC 2B
2 = NTP SUS	4 = IARC 2A	6 = OSHA CARC

SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data available for the material, the components of the material, and similar materials.

ECOTOXICITY

Material -- Not expected to be harmful to aquatic organisms.
Material -- Not expected to demonstrate chronic toxicity to aquatic organisms.

PERSISTENCE AND DEGRADABILITY

Biodegradation:
Material -- Expected to be readily biodegradable.
Hydrolysis:
Material -- Transformation due to hydrolysis not expected to be significant.
Photolysis:
Material -- Transformation due to photolysis not expected to be significant.
Atmospheric Oxidation:
Material -- Expected to degrade rapidly in air

OTHER ECOLOGICAL INFORMATION

VOC (EPA Method 24): 6.476 lbs/gal

SECTION 13 DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

DISPOSAL RECOMMENDATIONS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products.

REGULATORY DISPOSAL INFORMATION

RCRA Information: Disposal of unused product may be subject to RCRA regulations (40 CFR 261). Disposal of the used product may also be regulated due to ignitability, corrosivity, reactivity or toxicity as determined by the Toxicity Characteristic Leaching Procedure (TCLP). Potential RCRA characteristics: IGNITABILITY.

Empty Container Warning PRECAUTIONARY LABEL TEXT: Empty containers may retain residue and can be dangerous. DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH. Do not attempt to refill or clean container since residue is difficult to remove. Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations.

SECTION 14 TRANSPORT INFORMATION

LAND (DOT)

Proper Shipping Name: PETROLEUM DISTILLATES, N.O.S.
Hazard Class & Division: COMBUSTIBLE LIQUID
ID Number: 1268
Packing Group: III
ERG Number: 128
Label(s): NONE
Transport Document Name: PETROLEUM DISTILLATES, N.O.S., COMBUSTIBLE LIQUID, UN1268, PG III

Footnote: The flash point of this material is greater than 100 F. Regulatory classification of this material varies. DOT: Flammable liquid or combustible liquid. OSHA: Combustible liquid. IATA/IMO: Flammable liquid. This material is not regulated under 49 CFR in a container of 119 gallon capacity or less when transported solely by land, as long as the material is not a hazardous waste, a marine pollutant, or specifically listed as a hazardous substance.

LAND (TDG)

Proper Shipping Name: PETROLEUM DISTILLATES, N.O.S.
Hazard Class & Division: 3
UN Number: 1268
Packing Group: III

SEA (IMDG)

Proper Shipping Name: PETROLEUM DISTILLATES, N.O.S.
Hazard Class & Division: 3
EMS Number: F-E, S-E
UN Number: 1268
Packing Group: III
Label(s): 3
Transport Document Name: PETROLEUM DISTILLATES, N.O.S., 3, UN1268, PG III, (40°C c.c.)

AIR (IATA)

Proper Shipping Name: PETROLEUM DISTILLATES, N.O.S.
Hazard Class & Division: 3
UN Number: 1268
Packing Group: III
Label(s): 3
Transport Document Name: PETROLEUM DISTILLATES, N.O.S., 3, UN1268, PG III

SECTION 15 REGULATORY INFORMATION

OSHA HAZARD COMMUNICATION STANDARD: When used for its intended purpose, this material is classified as hazardous in accordance with OSHA 29CFR 1910.1200.

NATIONAL CHEMICAL INVENTORY LISTING: AICS, IECSC, DSL, EINECS, ENCS, KECI, PICCS, TSCA

EPCRA: This material contains no extremely hazardous substances.

SARA (311/312) REPORTABLE HAZARD CATEGORIES: Fire.

SARA (313) TOXIC RELEASE INVENTORY: This material contains no chemicals subject to the supplier notification

requirements of the SARA 313 Toxic Release Program.

The Following Ingredients are Cited on the Lists Below:* None.

--REGULATORY LISTS SEARCHED--

1 = ACGIH ALL	6 = TSCA 5a2	11 = CA P65 REPRO	16 = MN RTK
2 = ACGIH A1	7 = TSCA 5e	12 = CA RTK	17 = NJ RTK
3 = ACGIH A2	8 = TSCA 6	13 = IL RTK	18 = PA RTK
4 = OSHA Z	9 = TSCA 12b	14 = LA RTK	19 = RI RTK
5 = TSCA 4	10 = CA P65 CARC	15 = MI 293	

Code key: CARC=Carcinogen; REPRO=Reproductive

* EPA recently added new chemical substances to its TSCA Section 4 test rules. Please contact the supplier to confirm whether the ingredients in this product currently appear on a TSCA 4 or TSCA 12b list.

SECTION 16 OTHER INFORMATION

N/D = Not determined, N/A = Not applicable

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:
No revision information is available.

PRECAUTIONARY LABEL TEXT:
Contains: DISTILLATES (PETROLEUM), HYDROTREATED LIGHT
CAUTION!
HEALTH HAZARDS
Repeated exposure may cause skin dryness or cracking. If swallowed, may be aspirated and cause lung damage.
PHYSICAL HAZARDS
Combustible. Material can accumulate static charges which may cause an incendiary electrical discharge.

PRECAUTIONS
Avoid contact with skin. Use proper bonding and/or grounding procedures.

FIRST AID
Inhalation: Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

Eye: Flush thoroughly with water. If irritation occurs, get medical assistance.

Oral: Seek immediate medical attention. Do not induce vomiting.

Skin: Wash contact areas with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse.

FIRE FIGHTING MEDIA
Use water fog, foam, dry chemical or carbon dioxide (CO_2) to extinguish flames.

SPILL/LEAK
Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you

can do it without risk. Prevent entry into waterways, sewer, basements or confined areas. A vapor suppressing foam may be used to reduce vapors. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Recover by pumping or with suitable absorbent.

Water Spill: Stop leak if you can do it without risk. Eliminate sources of ignition. Warn other shipping. If the Flash Point exceeds the Ambient Temperature by 10 degrees C or more, use containment booms and remove from the surface by skimming or with suitable absorbents when conditions permit. If the Flash Point does not exceed the Ambient Temperature by 10 degrees C or is less than the Ambient Temperature, use booms as a barrier to protect shorelines and allow the material to evaporate. Seek the advice of a specialist before using dispersants.

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SITE LOGBOOK

Laundry Espinosa

"Rite in the Rain"®
ALL-WEATHER
FIELD
No. 351

DCN: 1312 - 4E - AMKA

"Rite in the Rain"®
ALL-WEATHER WRITING PAPER

Name Weston Solutions, Inc.
Region V START III
Address 205 Campus Dr.
Edison, NJ 08837
Phone 732-417-5800

Project Laundry Espinosa
DCN: 1312-4E-AMKA

Clear Vinyl Protective Slipcovers (Item No. 30) are available for this style of notebook. Helps protect your notebook from wear & tear. Contact your dealer or the J. L. Darling Corporation.

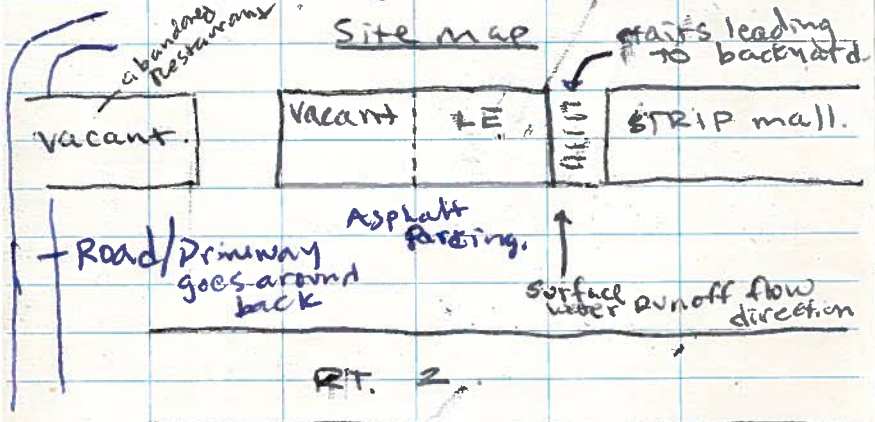
CONTENTS

PAGE	REFERENCE	DATE

Laundry Espinosa 3/21/2011

0820 – Scott Snyder & Anthony Daniels on site Laundry Espinosa. Owner of Laundry Espinosa Refused to offer Contact information of property owner. S.S. gave owner of L.E. Juan Davilas telefone number.

Site map



Good House Keeping/Clean facility. Runoff flows from Street (RT. 2) to the South between Laundry Espinosa and strip mall to the west, via a hole in concrete. Laundry Espinosa 883-2628. Vacant building to the East of LE has sign in window

N

Anthony Daniels 3/21/11

Laundry Espinosa 3/21/11

SE ALQUILA 787-675-4927

owner: Moeses Concepcion 787-533-2628

owner of LE says this number is his contact information but wouldnt provide property owners contact info.

The facility is built on a hillside that slopes to the south behind LE with residential properties directly ajacent downgradient. Traveled down driveway to view South side of property. Private residential property to the south. Drainage trench that runs behind facility to the South. Behind Residential property to the south is a muffler distributor. Front of LE is an Asphalt parking area, in back of facility is vegetated with grass. Two Residences within 200 feet of facility but it is unclear if Residences are on same property as LE. A storage shed is visible

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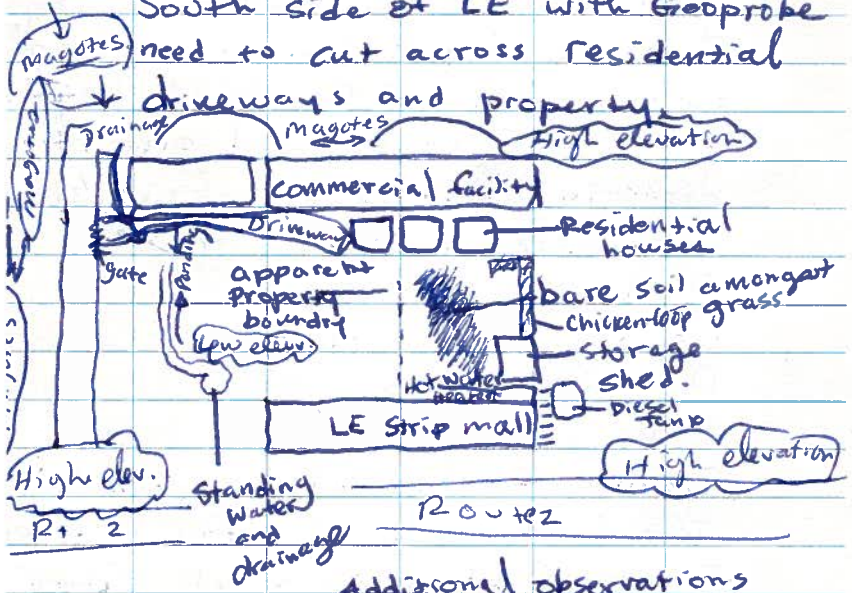
behind facility. Propose boring location next to Storage Shed and another boring location to the East of Storage Shed also in back yard of LE. In order to access South side of LE with Geoprobe need to cut across residential driveways and property.



Additional observations

NO schools or daycares within 200'. No monitoring wells on site. Site is estimated to be ½ acre. Rt. 2 would form a barrier to upgradient runoff, therefore runoff is limited to the site acreage.

[signature] 3/21/11

Laundry Espinosa 3/21/11

Site is located in Stripmall in commercial area, therefore, no Sensitive Environments.

Unanswered Questions from site visit.

- on site waste sources?
- Quantity of Chemicals used on site
- Containment features?
- Evidence of surface soil contamination Stressed vegetation
- drainage pattern/overland path to surface water.
- number of Employees.

-Collected GPS Points in upper Parking lot but because of access issues no GPS points were collected behind facility.

0900 - conclude Recon.

[signature] 3/21/11

LAUNDRY ESPINOSA 5/17/11

0730 WESTON Arrives ON Site.
- Anthony Daniels (AD)
- Michele Capriglione (MC)
- Dan Carlson (DC)
- Vinnie DelloRusso (VD)

On-Site Environmental (OSE)
- Juan Abril (JA)
- Simon Ojeda (SO)
- Gabriel Ojeda (GO)

WEATHER: Sunny, 85°F, Humid.
Health and Safety: Traffic; large concern working in close proximity to Highway RT. 2. Drillers to use Orange Safety Cones and Vests when working Near Road. Biological - Dogs and roosters on Site. Stay away from animals. TCE is contaminant of concern proper PPE, including Nitrile gloves, safety glasses and hard hat when near drilling rig. Ear protection. Stay Hydrated.
Objective - To collect Surface, Subsurface Soil and Ground-

Anthony D 5/17/11

water if encountered. Soil collection using 3 - 5gram Encores for VOC analysis and 1-4oz. Jar for % moisture LAUNDRY ESPINOSA Site (LE) has 5 boring locations including 1 background location proposed for Geoprobing.
Underground utility mark-out conducted on 5/5/11, for all 5 locations.
OSE to set-up at boring location S05 to begin.
0755 - Begin Geoprobe @ S05.
0910 - Geoprobe reached depth of 50' at Location 1312-S05.
NO water encountered in S05 boring hole. Geoprobe completes boring at S05.
LATE ENTRY: 0850: Light rain begins.
0925 - OSE sets up Geoprobe at boring location 1312-S04.
0930 - Begin drilling at 1312-S04.

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0935 - Geoprobe encountered refusal at 10' at 1312-S04. AD instructs OSE to relocate boring S04 2' to the East of origional location and Continue past refusal depth.

0940 - Geoprobe encountered refusal at 9' at 1312-S04 colocated holed. AD instructs OSE to make one more attempt approximately 2' South of Second attempted boring location.

0950 - Third attemp at S04 location successful at pushing beyond refusal encountered at first 2 attempts.

1312-S05 Sample Collection

0930 - Collect SS05B from 48.0'-48.3'.
0935 - Collect SS05A from 16.1' - 16.4'.
0945 - Collect S05 from 0.6 - 0.9'

1025 - Collect 1312-RIN01 from geoprobe cutting shoe.

1035 - Geoprobe encountered Refusal at 44' at boring location 1312-S04.

1045 - Complete 1312-S04.

Anthony Espinosa 5/17/11

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Photo Log

1312-517-01 - Geoprobe drilling at S05, looking East.

1312-517-02 - Preventative maintenance on Geoprobe using ~~NO2~~ Nitrogen (AD)

1312-517-03 - VOC Screening and logging soil on S05, 15'-20' depth.

1312-517-04 - red fatty Clays in Soil boring S05, depth 40'-45'.

1312-517-05 - Geoprobe at boring location 1312-S04. Approximate depth = 5-10', Looking North.

1312-517-06 - collection of Rinsate blank (RIN-01) from Geoprobe cutting shoe.

1312-517-07 - Boring location 1312-S04; 3 attempts. Borehole at top of photo (southern hole) reached Terminal depth of 44'.

1312-517-08 - Deconing coring barrels using pressure washer, looking east.

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1110 - Geoprobe sets up at 1312-SØ3.

1115 - Begin drilling at 1312-SØ3.

[NOTE: Rain continues on and off mixed with sun.]

NOTE - Boring locations SØ5 and SØ4 are located on the North (front) side of LE Building. Geoprobe boring depths were 50' and ~45', respectively, and NO Groundwater was encountered at either location. Boring locations SØ1, SØ2, and SØ3 are located on the South (rear) side of LE Building, which is approximately 20' lower in elevation then the front (North) side of LE Building.

1312-SØ4 Sample Collection

1050 - Collect SSØ4B from 44.6'-44.9'
1100 - Collect SSØ4A from 11.0'-11.3'
1110 - Collect SØ4 from 1.7'-2.0'.

1155 - Boring SØ3 Terminal depth of 35'. 30'-35' core became enlodged in macrocore barrel due

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LAUNDRY ESPINOSA 5/17/11

Photo LOG (cont.)

1312-517-09 - Geoprobe Set-up at location 1312-SØ3. Looking South.

1312-517-10 - Geoprobing at ~~SØ2~~ SØ1 looking North.

1312-517-11 - collecting Headspace reading from SØ2, depth of 11.75'-12'.

1312-517-12 - Geoprobing at SØ2 looking North.

1312-517-13 - Macrocore barrel from 1312-SØ1, 25'-30' depth with acetate sleeve and soil enlodged with cuttingshoe, also tight pack with dense clay.

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Laundry Espinosa 5/17/11

To fatty clays expanding in acetate sleeve. 30' to 35' depth was unrecoverable.

1200 - Complete boring at location 1312-SØ3. OSE Breaks for lunch, WESTON CONTINUES TO LOG SOIL from SØ3 location to collect samples.

1312-SØ3 Sample Collection

1210 - Collect 1312-SSØ3B from 28.7'-29'.
1215 - Collect 1312-SSØ3A from 13.5'-13.8'.
1220 - Collect 1312-SØ3 from Ø.3' to Ø.6'

1245 - Begin Geoprobing at Boring location ~~1312-SØ2~~ AD 1312-SØ1

1310 - Geoprobe pushed to 30' depth However, due to fatty clay, the 25'-30' sleeve could not be extracted from coring barrel. ~~AD decides~~ AD decides to abandon location based on a "refusal" caused by very dense clays. No water encountered.

1315 - OSE sets up Geoprobe at

[signature] 5/17/11

Laundry Espinosa 5/17/11

1312-Ø2 location.

1320 - Begin Geoprobing at location SØ2/SØ6.

SØ6 is surface duplicate sample of SØ2.

1400 - Geoprobe reached 30' with full recovery from 25'-30'. Fatty clays were causing extreme difficulty extracting the soil core from the barrel, Therefor, AD determined that 30' would be the deepest depth for Geoprobing at location SØ2.

1312-SØ1 Sample collection

1340 - Collect SSØ1B from 23.7-24'
1345 - Collect SSØ1A from 11.2'-11.5'
1355 - Collect SØ1 from Ø.6'-Ø.9'.

1405 - Complete Geoprobing at Laundry Espinosa site

[signature] 5/17/11

LAUNDRY ESPINOSA 5/17/..

1312 - SØ2 Sample Collection

1410 - Collect 1312-SØ2 from 0.8-1.1'
1415 - Collect 1312-SØ6 from 0.8-1.1'. 1312-SØ6 is duplicate of 1312-SØ2.
1425 - Collect 1312-SSØ2A from 13.0'-13.3'
1440 - collect 1312-SSØ2B from 29.0'-29.3'

1435 - AD Collects GPS points from all boring locations.

NOTE: A single cooler being packed with Samples, for FedEX Shipment Airbill #: 8736 9394 4450.

1450 - D.C. conducts Sample cooler packing checklist.

Sample cooler being shipped FedEx (Airbill # listed above), to A4 Scientific, INC. 1544 Sawdust rd. Suite 505, THE WOODLANDS, TX.

1500 - WESTON AND OSE off-site Case Complete at LAUNDRY ESPINOSA.

1600 - Relinquish Cooler to FedEX.

END OF DAY — [signature] 5/17/.. —

LATE ENTRY: As WESTON was preparing to leave the site, AD asked the Owner of LE if LE Had any Records (RCRA) of waste disposal. The owner ~~to~~ informed AD that the only Chemicals LE uses are Diesel fuel for the Hot Water tank, and Exsol, a petroleum based laundry detergent. AD asked if He could See the bottle of Exsol. THE Owner told AD that it gets delivered by a truck that offloads via a hose directly into inside holding tank. AD entered facility and verified that there appeared to be no bottles and a tank where Exsol would be off loaded into. LE Owner told AD that the truck delivered Exsol the morning of Sampling and that the Company was J.J. Petroleum. AD asked no

[signature] 5/18/..

Laundry Espinosa 5/18/11

more Questions and left facility. AD to investigate J.J. petroleum and verify their distribution of Exsol, Petroleum-based detergent.

END of LATE ENTRY NOTE

Anthony Dunn 5/18/11

Laundry Espinosa 5/18/11

<u>On Site Drainage Pattern.</u>

overland flow of Surface water On site is from the North to South. Observations indicate surface water to flow from the North side of the site (greater elevation) to the lower elevation South side of the site. Along the South east edge of the site is a low lying area where surface runoff was observed to pool in a vegetated low lying depression. Magotes observed on the East and south of the site Slope toward the site, Because of the elevated topography Surrounding the Site, Surface runoff pools and infiltrates the Surrounding low areas and infiltrates ~~before~~ AD the groundsurface with no overland Segment defined for the surface water path for the watershed. The Site Slopes gently to the South east, and Physical barriers (ie, Rt. 2 on the North, Magotes on

Anthony Dunn 5/18/11

Laundry Espinosa 5/18/11

The east and south, and higher sloping elevation on the west) Prevent Surface runoff from migrating to a Surface water pathway. Pooling and infiltration is most likely for Surface water on site.

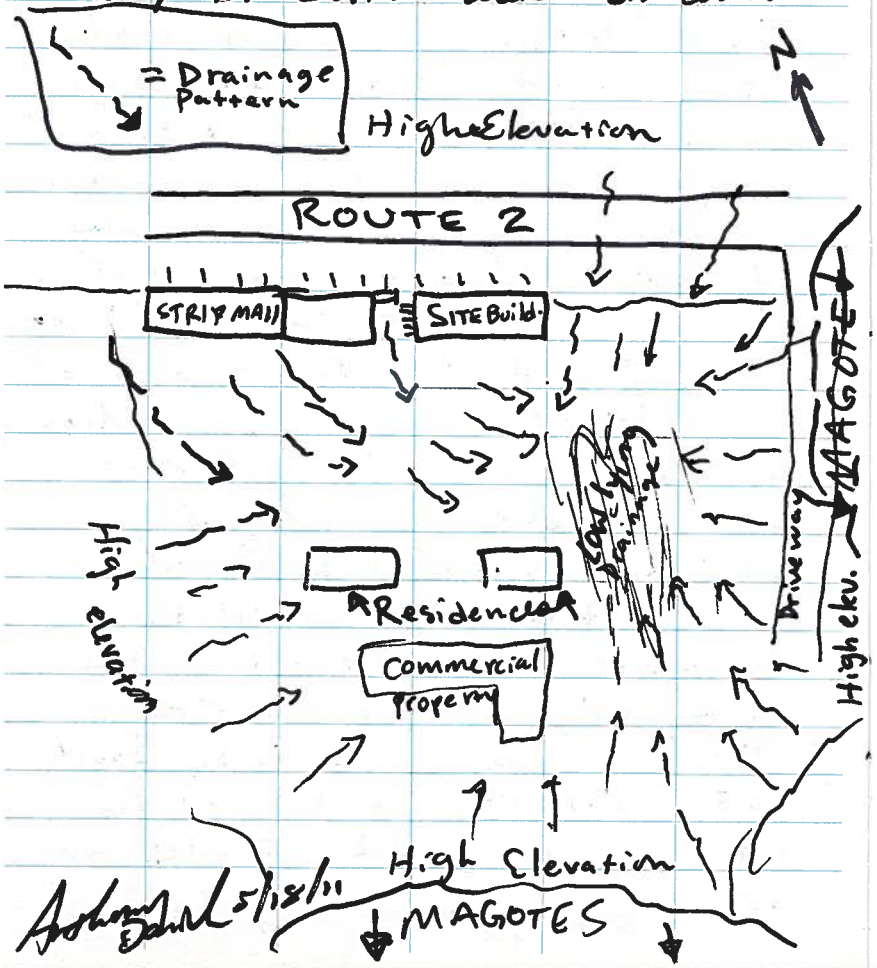

Photo Documentation
Laundry Espinosa
Preliminary Assessment/Site Inspection (PA/SI) Sampling
May 17, 2011

Photo No. 1312-517-01: Geoprobe® drilling at Borehole S05, looking southeast.

Photo No. 1312-517-02: Preventative maintenance on Geoprobe® using compressed nitrogen.

Photo Documentation
Laundry Espinosa
PA/SI Sampling
May 17, 2011

Photo No. 1312-517-03: Volatile Organic Compound (VOC) screening using miniRAE photoionization detector (PID) and soil logging operations from Borehole S05, depth: 15-20 feet.

Photo No. 1312-517-04: Red fatty-clay from Borehole S05, depth: 40-45 feet.

Photo Documentation
Laundry Espinosa
PA/SI Sampling
May 17, 2011

Photo No. 1312-517-05: Geoprobe® at Borehole S04, looking northeast.

Photo No. 1312-517-06: Collection of rinsate blank (1312-RIN01) from Geoprobe® cutting shoe.

Photo Documentation
Laundry Espinosa
PA/SI Sampling
May 17, 2011

Photo No. 1312-517-07: Three attempts at boring location S04. Borehole at top of photo (southern hole) reached a terminal depth of 40 feet.

Photo No. 1312-517-08: Decontaminating coring barrel using pressure washer.

Photo Documentation
Laundry Espinosa
PA/SI Sampling
May 17, 2011

Photo No. 1312-517-09: Geoprobe® at Borehole S03, looking southwest.

Photo No. 1312-517-10: Geoprobe® at Borehole S01, looking north.

Photo Documentation
Laundry Espinosa
PA/SI Sampling
May 17, 2011

Photo No. 1312-517-11: Collecting headspace reading using miniRAE PID from Borehole S01, depth: 11.75-12 feet.

Photo No. 1312-517-12: Geoprobe® at Borehole S02, looking northeast.

Photo Documentation
Laundry Espinosa
PA/SI Sampling
May 17, 2011

Photo No. 1312-517-13: Macrocore barrel from Borehole S01, 25-30 foot depth. Acetate sleeve and soil jammed in barrel and cutting shoe from dense clays.

PROJECT NOTE	**REGION V SUPERFUND TECHNICAL ASSESSMENT AND RESPONSE TEAM III**

To: Laundry Espinosa **Date:** September 6, 2011

TDD No. S-05-0013-1012-023

From: Anthony Daniels

Subject: Sensitive Environments and 4-Mile Population

References

1. Lynes, Jeffrey, WESTON. E-mail correspondence with Anthony Daniels, Subject: Puerto Rico Calculations. August 4, 2011.
2. U.S. Fish and Wildlife Service. Threatened and Endangered Species Sytem (TESS), Species Reports, Environmental Conservation Online System: Species Listed in Puerto Rico based on published historic range and population. Downloaded from http://ecos.fws.gov/tess_public/pub/stateListingIndividual.jsp?state=PR&status=listed on March 7, 2011.
3. WESTON. 4-Mile Radius Map, Laundry Espinosa. April, 2011.

- Reference 1 provides a description of the methodology used to determine the HRS-eligible wetland acreage within 4 miles of the site, the location of threatened and endangered species habitats, and the resident population within 4 miles.
- Reference 2 provides a current list of Federally-listed threatened and endangered species in Puerto Rico.
- Reference 3 provides a 4-Mile Radius Map showing the locations of threatened and endangered species habitats within 4 miles of the site.

- In order to differentiate between Federally-listed and State-listed species, the species habitats shown on the 4-Mile Map were compared to the Federal species list. Those species not on the list are presumed to be State-listed.
- Wetland acreage within 4 miles are shown on Figure 4 of this report (see Reference 3).
- The attached table summarizes all the calculations and target distances.

Signature_____

Anthony Daniels

AREAS FOR HRS ELIGIBLE WETLANDS	**AREA (ACRES)**	**AREA (METERS^2)**	**Threatened and Endangered Species Habitat**	
			Federal	State
total area, ring 4 mile	2260.02	9146022.12	7	14
total area, ring 3 mile	723.28	2927005.70	4	6
total area, ring 2 mile	50.63	204882.56	0	0
total area, ring 1 mile	45.78	185272.71	0	1
total area, ring 0.5 mile	11.70	47342.81	0	0
total area, ring 0.25 mile	1.63	6609.94	0	0
sum	3093.04			
0.25 Mile Pop	225.9			
0.5 Mile Pop	2227.0			
1 Mile Pop	6810.4			
2 Mile Pop	14463.9			
3 Mile Pop	19014.1			
4 Mile Pop	26748.4			

Daniels, Anthony

From: Lynes, Jeffrey
Sent: Thursday, August 04, 2011 11:21 AM
To: Daniels, Anthony
Subject: Puerto Rico Calculations

Follow Up Flag: Follow up
Flag Status: Flagged

4 Mile Wetland Calculations

1. A wetland GIS shapefile is obtained from the U.S Fish & Wildlife Service's National Wetland Inventory.
2. Wetlands are then classified as HRS eligible or not HRS eligible based on the 40CFR 230.3 definition of a wetland.
3. Using the ESRI ArcGIS 10.0 Multiple Ring Buffer tool, ¼, ½. 1, 2, 3, and 4 mile buffers around the site
4. Using the ESRI ArcGIS 10.0 Clip tool HRS eligible wetlands are clipped to each radius ring.
5. Using XTools Pro 7 for ArcGIS desktop areas are calculated for each of the individual wetlands.
6. The total area of each individual HRS wetland within each radius ring is then summed up resulting in the total HRS wetland area between each radius ring.

4 Mile Population

1. Population block groups GIS shapefile and 2000 census info tables is obtained from the US Census Bureau.
2. The block groups GIS shapefile and 2000 census info tables are then joined using ESRI ArcGIS 10.0 join tool.
3. Using the ESRI ArcGIS 10.0 Multiple Ring Buffer tool, ¼, ½. 1, 2, 3, and 4 mile buffers around the site.
4. Using XTools Pro 7 for ArcGIS desktop areas are calculated for each of the individual block groups.
5. Using the ESRI ArcGIS 10.0 Clip block groups with population data are clipped to each radius ring.
6. Since block groups are split by the radius rings, XTools Pro 7 for ArcGIS desktop tool is used to calculate the new areas of each of the block groups.
7. Using the formula (New Area/Original Area)*Population, the approximate amount of people in each block group within each radius ring is calculated.
8. The total population of each individual block group within each radius ring is then summed up resulting in the total population between each radius ring.

15 Mile Frontage

1. A wetland GIS shapefile is obtained from the U.S Fish & Wildlife Service's National Wetland Inventory.
2. Wetlands are then classified as HRS eligible or not HRS eligible based on the 40CFR 230.3 definition of a wetland.
3. Using the ESRI ArcGIS software a 15-mile pathway is made.

4. Edges of HRS wetlands that fall along the 15 mile pathway are traced and assigned a water body for which they fall along.

5. Using XTools Pro 7 for ArcGIS desktop the lengths of the individually traced HRS eligible wetlands are calculated.

6. The total length of each individually traced HRS eligible wetlands is then summed up based on the water body they fall into.

Species

The critical/endangered species habitat information was obtained from the Caribbean Environmental Protection Division of the Environmental Protection Agency in conjunction with the Puerto Rico Department of Natural Resources.

Jeff Lynes
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Phone: (732)417-5883
Fax: (732)417-5801

Species Reports

Environmental Conservation Online System

Species listed in Puerto Rico based on published historic range and population

Notes:

- This report shows the species listed in this state according to the Federal Register listing description.
- This list does not include experimental populations and similarity of appearance listings.
- This list includes species or populations under the sole jurisdiction of the National Marine Fisheries Service.
- Click on the highlighted scientific names below to view a Species Profile for each listing.

Listed species (based on published historic range and population data) -- 77listings

Animals -- 28listings

Status	Species/Listing Name
E	Anole, Culebra Island giant (*Anolis roosevelti*)
E	Blackbird, yellow-shouldered (*Agelaius xanthomus*)
T	Boa, Mona (*Epicrates monensis monensis*)
E	Boa, Puerto Rican (*Epicrates inornatus*)
E	Boa, Virgin Islands tree (*Epicrates monensis granti*)
T	Coqui, golden (*Eleutherodactylus jasperi*)
T	Coral, elkhorn (*Acropora palmata*)
T	Coral, staghorn (*Acropora cervicornis*)
E	Crow, white-necked (*Corvus leucognaphalus*)
E	Gecko, Monito (*Sphaerodactylus micropithecus*)
T	Guajon (*Eleutherodactylus cooki*)
E	Hawk, Puerto Rican broad-winged (*Buteo platypterus brunnescens*)
E	Hawk, Puerto Rican sharp-shinned (*Accipiter striatus venator*)
T	Iguana, Mona ground (*Cyclura cornuta stejnegeri*)
E	Manatee, West Indian (*Trichechus manatus*)
E	Nightjar, Puerto Rican (*Caprimulgus noctitherus*)
E	Parrot, Puerto Rican (*Amazona vittata*)
E	Pigeon, Puerto Rican plain (*Columba inornata wetmorei*)
T	Plover, piping except Great Lakes watershed (*Charadrius melodus*)
T	Sea turtle, green except where endangered (*Chelonia mydas*)
E	Sea turtle, hawksbill (*Eretmochelys imbricata*)

Species listed in Puerto Rico based on published historic range and population

E	Sea turtle, leatherback (***Dermochelys coriacea***)
T	Sea turtle, loggerhead (***Caretta caretta***)
E	Seal, Caribbean monk (***Monachus tropicalis***)
T	Tern, roseate Western Hemisphere except NE U S. (***Sterna dougallii dougallii***)
T	Toad, Puerto Rican crested (***Peltophryne lemur***)
E	Whale, finback (***Balaenoptera physalus***)
E	Whale, sperm (***Physeter catodon (=macrocephalus)***)

Plants -- 49listings

Status	**Species/Listing Name**
E	Bariaco (***Trichilia triacantha***)
E	Boxwood, Vahl's (***Buxus vahlii***)
E	Capa rosa (***Callicarpa ampla***)
T	Chumbo, Higo (***Harrisia portoricensis***)
E	Chupacallos (***Pleodendron macranthum***)
T	Cobana negra (***Stahlia monosperma***)
E	Erubia (***Solanum drymophilum***)
E	Fern, Elfin tree (***Cyathea dryopteroides***)
E	Goetzea, beautiful (***Goetzea elegans***)
E	Higuero de sierra (***Crescentia portoricensis***)
E	Holly, Cook's (***Ilex cookii***)
T	Manaca, palma de (***Calyptronoma rivalis***)
E	***Adiantum vivesii*** (No common name)
E	***Aristida chaseae*** (No common name)
E	***Auerodendron pauciflorum*** (No common name)
E	***Calyptranthes thomasiana*** (No common name)
E	***Catesbaea melanocarpa*** (No common name)
E	***Chamaecrista glandulosa var. mirabilis*** (No common name)
E	***Cordia bellonis*** (No common name)
E	***Cranichis ricartii*** (No common name)
E	***Daphnopsis hellerana*** (No common name)
E	***Elaphoglossum serpens*** (No common name)
E	***Eugenia woodburyana*** (No common name)
T	***Gesneria pauciflora*** (No common name)
E	***Ilex sintenisii*** (No common name)
E	***Lepanthes eltoroensis*** (No common name)
E	***Leptocereus grantianus*** (No common name)
E	***Lyonia truncata var. proctorii*** (No common name)
E	***Mitracarpus maxwelliae*** (No common name)

Species listed in Puerto Rico based on published historic range and population

E	***Mitracarpus polycladus*** (No common name)
E	***Myrcia paganii*** (No common name)
E	***Polystichum calderonense*** (No common name)
T	***Schoepfia arenaria*** (No common name)
E	***Tectaria estremerana*** (No common name)
E	***Ternstroemia subsessilis*** (No common name)
E	***Thelypteris inabonensis*** (No common name)
E	***Thelypteris verecunda*** (No common name)
E	***Thelypteris yaucoensis*** (No common name)
E	***Vernonia proctorii*** (No common name)
E	Palo colorado (***Ternstroemia luquillensis***)
E	Palo de jazmin (***Styrax portoricensis***)
E	Palo de nigua (***Cornutia obovata***)
E	Palo de ramon (***Banara vanderbiltii***)
E	Palo de rosa (***Ottoschulzia rhodoxylon***)
E	Pelos del diablo (***Aristida portoricensis***)
E	Peperomia, Wheeler's (***Peperomia wheeleri***)
E	Prickly-ash, St. Thomas (***Zanthoxylum thomasianum***)
E	Uvillo (***Eugenia haematocarpa***)
E	Walnut (=Nogal), West Indian (***Juglans jamaicensis***)

Last updated: March 7, 2011

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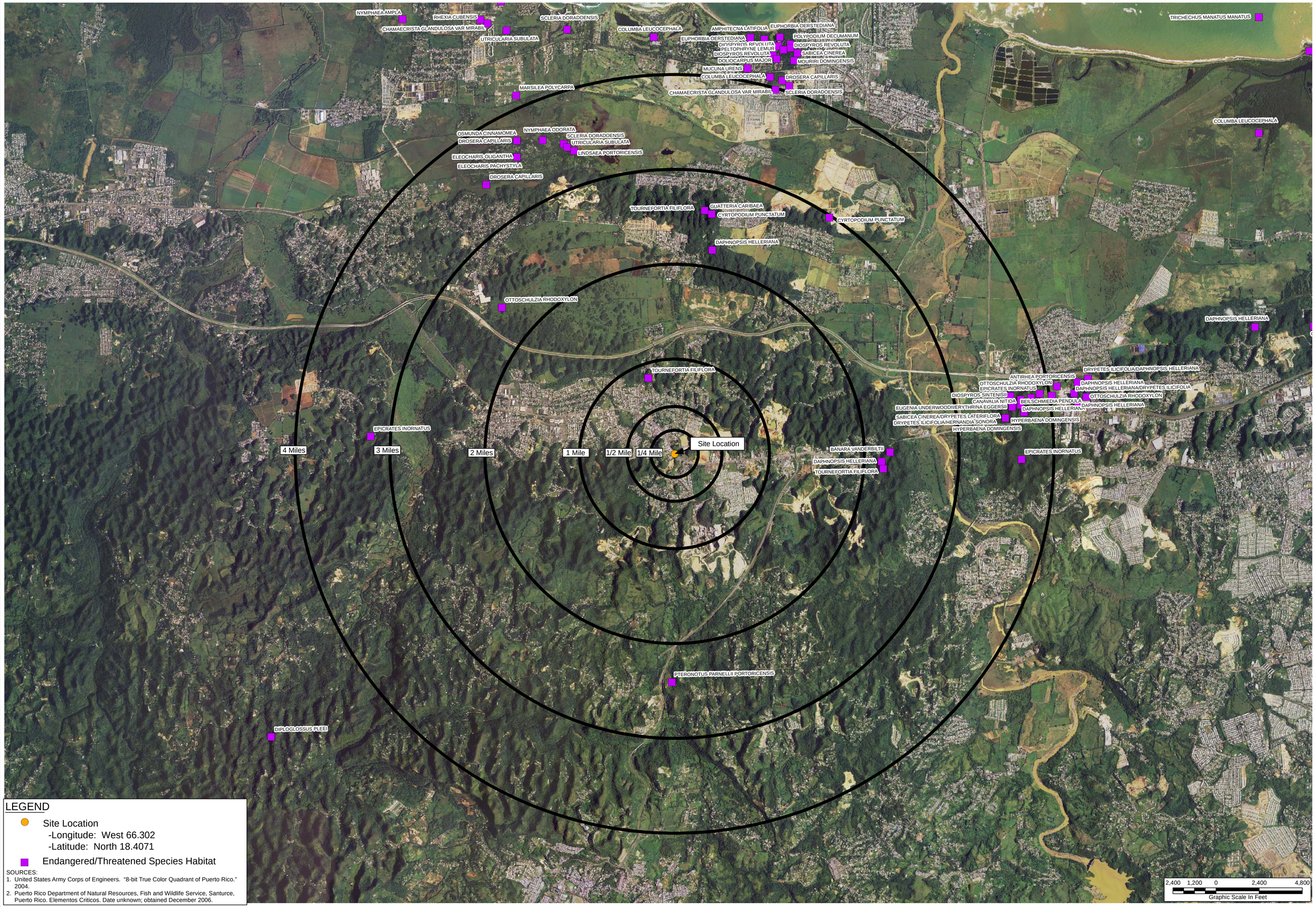

LEGEND

- Site Location
  - -Longitude: West 66.302
  - -Latitude: North 18.4071
- Endangered/Threatened Species Habitat

SOURCES:
1. United States Army Corps of Engineers. "8-bit True Color Quadrant of Puerto Rico." 2004.
2. Puerto Rico Department of Natural Resources, Fish and Wildlife Service, Santurce, Puerto Rico. Elementos Criticos. Date unknown; obtained December 2006.

DRAWING TITLE: 4-Mile Radius Map Laundry Espinosa Dorado, PR

FIGURE: 4 | SCALE: 1" = 2400' | DATE: 07/22/2011

CLIENT NAME: EPA

PROJECT NAME: Laundry Espinosa

PROJECT MANAGER: A. Daniels | CHECKED BY: A. Daniels

CONTRACT No.: EP-S5-06-04

DRAWN/MODIFIED BY: J. Lynes | DATE DRAWN/MODIFIED: 07/22/2011

REPORT DATE: July 2011

DRAWING: 09934_LE_4_Mile_Species.mxd
PATH: p:\GIS\72011_Puerto_Rico_Sites\Dorado\1312_Laundry_Espinosa\GIS\MXD

REVISION No.: 0

WORK ORDER No.: 20405.012.013.1312.00

N W E S

Weston Solutions, Inc.
205 Campus Drive Edison, New Jersey 08837-3939
TEL: (732) 417-5800 Fax: (732) 417-5801
http://www.westonsolutions.com

PROJECT NOTE **REGION V SUPERFUND TECHNICAL ASSESSMENT AND RESPONSE TEAM III**

To: Laundry Espinosa **Date:** September 6, 2011

W.O. No.: 20405.012.013.1312.00

From: Anthony Daniels

Subject: Groundwater Population

References

- EPA. Safe Drinking Water Information System (SDWIS) Search: Maguayo. Downloaded from http://oaspub.epa.gov/enviro/sdw_query_v2.get_list?wsys_name=Maguayo... on April 5, 2011.
- PRASA. Potable Water Quality Report, System: Maguayo, PWSID: 5597. 2009.
- Bermudez, Edgardo, PRASA. E-mail correspondence with Scott Snyder, WESTON, Subject: RE: Maguayo Public Well System. April 18, 2011.
- EPA. SDWIS Search: Dorado Urbano. Downloaded from http://oaspub.epa.gov/enviro/sdw_query_v2.get_list?wsys_name=Dorado+Urbano... on May 24, 2011.
- EPA. SDWIS Search: Vivoni. Downloaded from http://oaspub.epa.gov/enviro/sdw_query_v2.get_list?wsys_name=Vivoni... on August 31, 2011.
- EPA. SDWIS Search: Sabana Hoyos. Downloaded from http://oaspub.epa.gov/enviro/sdw_query_v2.get_list?wsys_name=Sabana... on September 6, 2011.
- PRASA. Potable Water Quality Report, System: Dorado Urbano, PWSID: 5607. 2009.
- Bermudez, Edgardo, PRASA. E-mail correspondence with Scott Snyder, WESTON, Subject: RE: Maguayo Public Well System. April 18, 2011.
- Bermudez, Edgardo, PRASA. E-mail correspondence with Scott Snyder, WESTON, Subject: Re: Santa Rosa Well. April 21, 2011.
- Quinones, Alejandro, PRASA. E-mail correspondence with Scott Snyder, WESTON, Subject: RE: Campanillas and Candelaria Well Systems. May 25, 2011.
- U.S. Census Bureau. San Juan Municipio, Puerto Rico – Fact Sheet – American FactFinder. Downloaded from http://factfinder.census.gov/servlet/ACSSAFFFacts?_event+ChangeGeoContext&geo_id=... on May 25, 2011.

This Project Note presents a population apportionment for public supply wells within 4 miles of the Laundry Espinosa site. Six active public water supply systems are represented by wells within 4 miles, as described below and summarized in the attached table.

Maguayo

Information obtained from PRASA and observations made during the Maguayo Pre-CERCLIS screening activities indicates that the Maguayo wells are periodically taken off-line and then

reactivated. For instance, according to PRASA, in 2009 the Maguayo system was composed of the following sources: Maguayo Wells 2 through 7, and the Super Aqueduct. During pre-CERCLIS screening activities conducted in July 2008, WESTON observed that Maguayo 2 and Maguayo 4 were disconnected from electrical power and the pumps had been removed. Subsequent observations made by WESTON and EPA personnel in 2009 indicate that Maguayo 2 had been reconnected and reactivated, Maguayo 3 was disconnected, and Maguayo 4 remained inactive. Recent information

provided by PRASA in April 2011 indicates that only Maguayo 2, 6, and 7 were active. Since PRASA uses all wells at least periodically, a population is apportioned to each well (Maguayo 2 through 7).

According to information obtained from EPA's Safe Drinking Water Information System (SDWIS), the Maguayo system serves approximately 46,864 people. Total contribution of the Super Aqueduct = 10,692,000 gallons per day (gpd) = 7,425 gallons per minute (gpm).

Maguayo 2 = 300 gpm = 2.5% = **1,172**
Maguayo 4 = 600 gpm = 5.1% = **2,390**
Maguayo 3 = 600 gpm = 5.1% = **2,390**
Maguayo 5 = 900 gpm = 7.7% = **3,609**
Maguayo 6 = 680 gpm = 5.8% = **2,718**
Maguayo 7 = 1,200 gpm = 10.3% = **4,827**
Super Aqueduct = 63.4% = 29,712
Total Wells + Super Aqueduct = 11,705 gpm = 16,855,200 gpd

Dorado Urbano

Information provided by PRASA and observations made by WESTON in 2008 and 2009 indicate that the Santa Rosa well is the only active well in the Dorado Urbano system. According to SDWIS, the Dorado Urbano system serves approximately 36,908 people. The population apportionment based on each input's relative contribution is provided below:

San Antonio 1: Inactive
San Antonio 2: Inactive
San Antonio 3: Inactive
Higuillar: Inactive
Dorado Dairy 1: Inactive
Dorado Dairy 2: Inactive
Nevarez: Slated to be reactivated, but currently inactive.

Total Population = 36,908
Total contribution of the Super Aqueduct = 3,621 gpm = 77.5% = 28,604 people
Pumping Rate of **Santa Rosa** = 1,050 gpm = 22.5 % = **8,304 people**
Total system production = 4,671 gpm

Rio Lajas

The Rio Lajas wells are inactive.

Campanilla and Candelaria Arenas

The Campanilla/Candelaria Arenas System serves the San Juan metropolitan area. The system currently consists of four active standby wells used on a rotating basis to supplement water from the Super Aqueduct and to maintain pressure in the system. The two systems serve separate population centers but are blended together with the Super Aqueduct prior to distribution. The total number of service connections is multiplied by the average household size for San Juan (2.77). Since only one of the four active wells is operating at any given time, only 25 percent of the estimated population will be apportioned for each well.
Total Population = 1,641 households + 2,838 households = 4,479 x 2.77 = 12,407

Campanilla 1 = 600 gpm = 19.3% = 2,395 x 0.25 = **599 people**
Campanilla 3 = Inactive
Campanilla 6 = 500 gpm = 16.1% = 1,998 x 0.25 = **500 people**
Campanilla 7 = 500 gpm = 16.1% = 1,998 x 0.25 = **500 people**
Campanilla 8 = 500 gpm = 16.1% = 1,998 x 0.25 = **500 people**
Candelaria Arenas = Inactive

Super Aqueduct = 1.46 mgd = 1,014 gpm = 32.6%
Total System Production = 3,114 gpm

Vivoni

The Vivoni System is located approximately 3.25 miles south of the site and serves the Dorado County. The Vivoni system serves a population of **1,728 people.**

Sabana Hoyos

The Sabano Hoyos System is located approximately 3.75 miles northwest of the site and serves the Vega Alta County. The system consists of four active wells; Sabana Hoyos 1 through 3, and Monserrate. The total groundwater system serves a population of 9,524 people. Information regarding the percent contribution of each well into the system could not be obtained. Therefore, an apportioned population for each well is determined by the total population served by the system, divided by the number of wells contribution to the system. The apportioned population for each well is **2, 381 people.**

Sabana Hoyos 1= 2,381 people
Sabana Hoyos 2= 2,381 people
Sabana Hoyos 3= 2,381 people
Monsarrate= 2,381 people

gpm = gallons per minute
mgd = million gallons per day

Signature Anthony Daniels

Anthony Daniels

Laundry Espinosa
4-Mile Groundwater Population

Distance Ring	System Name	Total System Production*	Total System Population	Well Name	Source Capacity	Contribution to System (%)	Apportioned Population
0-0.25 mile	-	-	-	None Identified	-	-	-
0.25-0.50 mile	-	-	-	None Identified	-	-	-
0.50-1 mile	-	-	-	None Identified	-	-	-
1-2 miles	Maguayo	11,705 GPM	46,864	Maguayo 2	300 GPM	2.5	1,172
				Maguayo 3	600 GPM	5.1	2,390
				Maguayo 4	600 GPM	5.1	2,390
				Maguayo 5	900 GPM	7.7	3,609
	Vivoni	Unknown	1,728	Vivono	-	-	1,728
							Total for 1-2
							9,561
2-3 miles	Maguayo	11,705 GPM	46,864	Maguayo 6	680 GPM	5.8	2,718
				Maguayo 7	1,200 GPM	10.3	4,827
	Dorado Urbano	4,671 GPM	29,998	Santa Rosa	1,050 GPM	22.5	8,304
							Total for 2 - 3
							15,849
3-4 miles	Sabana Hoyos	-	9,524	Sabana Hoyos 1	-	-	2,381
				Sabana Hoyos 2	-	-	2,381
							Total for 3 - 4
							4,762

GPM = Gallons per minute.

v=10000&pop_serv=100000&pop_serv=100001&sys_status=active&pop_serv=&wsys_id=&fac_state=PR&last_fac_name=&page=1&query_results=&total_rows_found=

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Search Selections:
State selected: **PUERTO RICO**
Water system name beginning with: **Sabana Hoyos**
Population Selected: **Very Small (0-500), Small (501-3,300), Medium (3,301-10,000), Large (10,001-100,000), Very Large (100,000+)**
Water System Status: **active**
Search executed on: **SEP-06-2011**
Results are based on data extracted on : **JUL-19-2011**

List of Water Systems in SDWIS

Information about water systems in PUERTO RICO is maintained by PUERTO RICO DEPARTMENT OF HEALTH.

To obtain additional information about drinking water please call EPA's Safe Drinking Water hotline at 1-800-426-4791.

Community Water Systems: Water Systems that serve the same people year-round (e.g. in homes or businesses).

Water System Name	County(s) Served	Population Served	Primary Water Source Type	System Status	Water System ID
SABANA HOYOS	LOIZA	9524	Groundwater	Active	PR0005587
SABANA HOYOS	ARECIBO	4976	Surface_water	Active	PR0002822
SABANA HOYOS	VEGA ALTA	9524	Groundwater	Active	PR0005587

Non-Transient Non-Community Water Systems: Water Systems that serve the same people, but not year-round (e.g. schools that have their own water system).
No systems were found.

Transient Non-Community Water Systems: Water Systems that do not consistently serve the same people (e.g. rest stops, campgrounds, gas stations).
No systems were found.

Last updated on Tuesday, September 06, 2011

¿POR QUÉ HAY MINERALES O SUSTANCIAS EN EL AGUA?

Las fuentes de abasto de agua superficiales incluyen: ríos, lagos, quebradas y riachuelos. En la clasificación de fuentes subterráneas están los pozos y los manantiales. El agua que llega a estos cuerpos en su trayectoria sobre la superficie de la tierra o en su paso a través del terreno, puede disolver minerales que están naturalmente en el terreno. Además, podría arrastrar sustancias que son el resultado de las diferentes actividades de los seres humanos y los animales.

Es razonable encontrar una cantidad mínima de agentes contaminantes en el agua potable, incluyendo el agua embotellada. Pero la presencia de estos no significa necesariamente que exista o que representan un riesgo a la salud. Es importante orientarse sobre los contaminantes regulados y no regulados en el agua potable y sus efectos potenciales a la salud. Información sobre estos puede ser obtenida en el Programa de Agua Potable del Departamento de Salud llamando al teléfono: (787)-777-0150, o en las oficinas locales de la EPA al teléfono: (787) 977 -5870, o la línea de Agua Potable de la EPA al teléfono (800-426-4791).

¿DE DÓNDE PROVIENEN?

El agua de las fuentes utilizadas en los sistemas públicos, antes de recibir el tratamiento para convertirla en agua potable, podría tener los siguientes contaminantes:

- Microbiológicos - Éstos incluyen virus y bacterias, que pueden originarse de: descargas sanitarias, pozos sépticos, actividades de ganadería y vida silvestre.

- Químicos Inorgánicos - Éstos incluyen sales y metales, que pueden tener origen natural o son el resultado de las escorrentías de lluvia. Además, otros orígenes pueden ser las descargas de agua con desperdicios domésticos o industriales, la producción de gases, aceites o cultivos.

- Plaguicidas y Herbicidas - Éstos contaminantes pueden tener origen de una variedad de fuentes como: la agricultura, escorrentía de lluvia y de usos residenciales.

- Químicos Orgánicos - Éstos incluyen químicos orgánicos sintéticos y volátiles, que son productos intermedios de procesos industriales y de la producción de petróleo. Además, pueden tener su origen en gasolineras, escorrentías de lluvia y pozos sépticos.

- Radiológicos - Éstos pueden estar presentes en el terreno de forma natural.

Para asegurar que el agua que sale de la pluma en tu casa es segura para consumo humano la Agencia Federal de Protección Ambiental (EPA) establece reglamentaciones que limitan la cantidad de ciertos contaminantes en el agua de los sistemas públicos. La reglamentación aplicable a los sistemas de acueductos es la Reglamentación Nacional Primaria de Agua Potable. Esta reglamentación es desarrollada por la Agencia de Protección Ambiental Federal según dispone la Ley de Agua Potable Segura ("Safe Drinking Water Act") y establece los límites máximos permitidos para contaminantes en el agua potable y las técnicas de tratamiento

necesarias. En Puerto Rico, el Departamento de Salud, es la agencia responsable de implantar y hacer cumplir esta reglamentación.

EL ESTADO DE LOS ABASTOS DE AGUA

Otro aspecto importante sobre las fuentes de aguas es mantener la calidad evitando su contaminación y deterioro de su estado natural.

El Departamento de Salud y su Programa de Agua Potable tienen el Programa de Evaluación de Abastos de Agua (Source Water Assesment Program, SWAP por sus siglas en inglés) el cual tiene como objetivo ayudar en la protección de estas fuentes de agua. Se realizaron evaluaciones de las fuentes de abasto y la información obtenida estará disponible al público tan pronto concluya el informe. Esta puede obtenerse en el Departamento de Salud en las oficinas de su Programa de Agua Potable.

CÓMO ASEGURAMOS QUE TU AGUA SEA POTABLE

1. Proceso de Tratamiento

El proceso de tratamiento que ofrece la AAA transforma el agua natural en agua potable, eliminándole las sustancias y microorganismos potencialmente perjudiciales. Los procesos comprenden la coagulación, la floculación/sedimentación, la filtración, la desinfección y su distribución. El proceso de tratamiento toma el agua de ríos y lagos y las somete a procesos físicos y mecánicos. Uno de estos, coagula o atrapa las partículas para removerlas del agua. La floculación es el proceso por el cual los coágulos se unen entre sí para sedimentarse (hundirse) en el tanque donde se recuperará agua limpia. El agua limpia es filtrada y desinfectada con cloro para garantizar su potabilidad y cumplir de ese modo la reglamentación estatal y federal de calidad de agua potable.

2. Programa Intenso de muestras realizadas en nuestros laboratorios

Bacteriología	49,676
Cloro Residual	49,676
Subproductos de desinfección	7,408
Inorgánicos	19,096
Orgánicos	3,359
Desinfectantes	4,209

3. La certificación de nuestros operadores, otra medida para asegurar la calidad del agua potable

La reglamentación requiere, además, tener operadores certificados en los sistemas públicos de agua. En enmiendas recientes a la reglamentación federal, se establecen guías sobre la certificación de operadores. Este requisito es para todos los sistemas de tratamiento de agua.

En la Autoridad de Acueductos y Alcantarillados (AAA), estamos adiestrando a nuestros operadores para que la Junta Examinadora de Operadores de Plantas de Tratamiento de Agua Potable y Aguas Usadas de Puerto Rico los evalúe y los certifique según la reglamentación existente.

Sistema: Sabana Hoyos
PWSID: 5587

Información Sobre Calidad de Agua Potable

Las enmiendas a la Ley de Agua Potable Segura de 1996, requieren que enviemos a nuestros consumidores un breve informe sobre la calidad del agua servida durante el año y las fuentes que usamos para suplirla. Este Informe resume los resultados obtenidos durante el año o el periodo reglamentario más reciente y el cumplimiento con los estándares y niveles establecidos para agua potable por la Agecia Protección Ambiental Federal (EPA, por sus siglas en Inglés) y el Departamento de Salud Estatal.

En cumplimiento con las reglamentaciones estatales y federales, la Autoridad de Acueductos y Alcantarillados analiza mas de 90 posibles contaminantes que pudieran estar en el agua potable. La gran mayoría de estos contaminantes regulados no se encontraron en el agua de su sistema. Las tablas que presentaremos a continuación incluyen los pocos contaminantes que se encontraron en pequeñas cantidades (detectados) en su agua y se identifica si alguno excedió los niveles permitidos. Además encontrará información general sobre el agua, los contaminantes, de donde provienen, y los posibles efectos a la salud cuando se exceden los niveles permitidos.

Para información adicional sobre este Informe de Calidad de Agua Potable, puede comunicarse con los funcionarios de Cumplimiento y Control de Calidad de su Región, de lunes a viernes al (787) 879-7211 efectivo el 1 de julio de 2007.

Información Importante para la Salud

Algunas personas pueden ser más vulnerables que la población general a los contaminantes que pueden estar presentes en el agua potable. Las personas con su sistema inmunológico comprometido tales como: las personas con cáncer que están recibiendo quimioterapia, las que han recibido transplantes de órganos, personas con VIH/SIDA u otras con problemas del sistema inmunológico, algunos ancianos e infantes, pueden estar especialmente en riesgo de alguna infección. La EPA y el Centro para el Control y Prevención de Enfermedades, tienen información disponible para las personas con riesgo a infecciones por Cryptosporidium y otros contaminantes microbiológicos, la cual puede obtener llamando a la EPA al teléfono 1-800-426-4791 o en la dirección de Internet www.epa.gov/safewater.

¿De donde Proviene mi Agua?

El agua potable que usted consume puede provenir de componentes o fuentes de abasto tanto: superficiales (S), como subterráneos (G) o una combinación de ambas. En su caso, el sistema que le suple agua lo compone:

Pozo Monserrate (G), Pozo Sabana Hoyos I (G), Pozo Sabana Hoyos II (G), Sabana Hoyos III (G)

TURBIDEZ

La Turbidez es una medida de la transparencia o contenido de partículas en el agua. Se utiliza como indicador de cuan efectivo es el proceso de filtración en la remoción de posibles agentes contaminates. La monitoreamos como indicador de la calidad del agua tratada. Una alta turbidez puede interferir con la efectividad de la desinfección en el control de microorganismos. Estos organismo pueden provocar síntomas tales como nauseas, cólicos, diarrea y dolores de cabeza.

	Parámetro	Límites EPA NMC	Límites EPA MNMC	Resultados	Fecha	Origen Usual del Contaminante
3	Turbidez (% cummplimiento más bajo, con 0.3 NTU)	0.3 NTU	N/A	N/A	N/A	No Aplica porque su fuente principal es un POZO (Aguas Subterráneas)
6	Turbidez máxima (NTU)	1 NTU	N/A	N/A	N/A	No Aplica porque su fuente principal es un POZO (Aguas Subterráneas)

Efectos Potenciales a la salud (*******)

3	No hay efectos a la salud porque su fuente principal es un POZO (Aguas Subterráneas)
6	No hay efectos a la salud porque su fuente principal es un POZO (Aguas Subterráneas)

BACTERIOLOGÍA

	Parámetro	Límites EPA NMC	Límites EPA MNMC	Resultados	Fecha	Origen Usual del Contaminante
2	Coliformes Fecales	>1	0	1	2006	Desperdicio de animales o descarga sanitaria.
5	Bacterias Coliformes Totales	>1	0	3 *********	Enero	Están presentes en el ambiente.

Efectos Potenciales a la salud (*******)

2	son bacterias cuya presencia indica que el agua puede estar contaminada con escremento animal o de humano. Los microbios en estos desperdicios pueden causar diarrea, calambre, nausea, dolor de cabeza u otros síntomas.
5	son bacterias las cuales están presentes naturalmente en el ambiente y son utilizadas como indicador de otras bacterias que pueden estar presentes también y causar daño potencial.

PLOMO Y COBRE

La frecuencia en que se monitorea el plomo y cobre dependerá de las fuentes de agua cruda y el historial de resultados. Se incluye el periodo de monitoreo más reciente.

	Parámetro	Nivel de Acción	MCLG	# de puntos que exceden nivel de acción	Valor de la Percentila 90	Fecha	Origen Usual del Contaminante
14	Cobre (ppm)	1.3	1.3	0	0.42	2006	Corrosión del sistema de tubería casera; erosión de depósitos naturales; lixiviación de conservantes de la madera.
17	Plomo (ppb)	15	0	0	4.6	2006	Corrosión del sistema de tubería casera; erosión de depósitos naturales.

Efectos Potenciales a la salud (*******)

14	
17	

CONTAMINANTES REGULADOS DETECTADOS

	Contaminantes	NMC - TT MRDL - NA	NMCL	Resultados Valor	Resultados Rango	Fecha	Origen usual del Contaminante
Químicos Inorgánicos							
16	Fluoruro (ppm)	4	4	0.062	0.033-0.062	2005	Erosión de los depósitos naturales; aditivo del agua que previene el deterioro dental; descarga de fábricas de fertilizantes y aluminio.
19	Nitrato [como nitrógeno] (ppm)	10	10	7.15	.26 - 7.15	2006	Escorrentía con fertilizantes; lixiviación de pozos sépticos y alcantarillado; erosión de los depósitos naturales
114	Cloro Residual (ppm)	4	4	1.03	0.03 - 4.5	2006	Es usado en el agua para el control de microbios.
Químicos Orgánicos Volátiles							
72	Tricloroetileno (ppb)	5	0	1.6	1.5-1.7	2006	Descarga de lugares donde se limpian grasas en metales y otras industrias.
Regla Desinfectantes y Subproductos de Desinfección							
73	TTHM's [Trihalometanos Total] (ppb)	80	N/A	17.8	N/A	2006	Residuos o subproductos del proceso de desinfección del agua.
99	Acidos Haloacéticos (ppb)	60	N/A	13	N/A	2006	Residuos o subproductos del proceso de desinfección del agua
110	Carbono Total Orgánico [TOC]	TT	N/A	N/A	N/A	N/A	No aplica porque su fuente principal es un POZO (Aguas Subterráneas)

Detecciones Especiales (Arsénico (ppb) = > 5.0 y <= 10.0 mg/L) - (Nitratos (ppm) = > 5 y < 10 mg/L)

19	El nitrato en el agua potable a niveles sobre 10 ppm, representa un riesgo a la salud para infantes menores de seis (6) meses de edad y pueden causar el síndrome del bebé azul. El nitrato puede aumentar en periodos cortos de tiempo debido a la lluvia o la actividad agrícola. Si usted tiene a su cuidado a un infante debe orientarse con su médico sobre posibles efectos a dicha exposición.

Contaminante Detectados No Regulados

Incluimos información de contaminantes no regulados que fueron monitoreados durante el año. Estos se monitorean para determinar si estan presentes en el agua, recopilar información que ayude a la EPA a decidir si es necesario regularlos o establecer niveles permitido.

	Contaminante	Valor	Rango	Fecha	Origen Usual del Contaminante
96	Sulfato (ppm)	20.7	13.6 - 20.7	2004	La reglamentación requiere muestreo mientras se establece un NMC y MNMC.

Otros Contaminantes Detectados

Contaminante	Promedio	Importancia de los resultados	Origen Usual del Contaminante

Violaciones de Muestreo y Reporte

La Autoridad de Acueductos y Alcantarillados esta obligada a tomar y analizar muestras del agua servida en unos periodos y con un frecuencia establecida en la reglamentación. Las violaciones de muestreo y reporte, no representan incumplimiento con los estándares de calidad de agua y ocurren cuando no se realiza un muestreo requerido, o cuando no se cumple con la fecha para someter un informe. En la siguiente tabla se encuentran las violaciones de muestreo y reporte por contaminante o grupo de contaminantesde este sistema para el 2006.

Contaminante	Periodo de Muestreo	Muestras Requeridas	Muestras Tomadas
Bacteriología	OCTUBRE 2006	10	9
VOC	ENE-MAR 2006	1	0

Términos y Definiciones

Los siguientes términos y definiciones le facilitarán entender la información contenida en este informe sobre la Calidad de Agua de su Sistema.

NMC: Nivel Máximo de Contaminante o nivel más alto permitido en el agua potable. Los NMC son establecidos tan cerca como sea posible del MNMC usando la mejor tecnología disponible.
MNMC: Meta para el Nivel Máximo de Contaminante permitido o el nivel máximo en el agua potable bajo el cual no hay riesgos conocidos o esperados a la salud. Los MNMC permite un margen de seguridad.
N/A: Nivel de Acción - La concentración de un contaminante que provocará que se realicen acciones como establecer tratamiento para prevenir efectos adversos de salud.
TT: Técnica de Tratamiento - Es un proceso requerido para controlar y reducir el nivel de un contaminante en agua potable.
Dispensa y Exención: Autorización otorgada por el Departamento de Salud (DS) o la Agencia Protección Ambiental Federal (EPA, por sus siglas en inglés) bajo ciertas condiciones que permiten no cumplir con un NMC o técnica de tratamiento.
MRDL: Nivel Máximo de un Desinfectante Residual permitido en el agua potable.
MRDLG: Meta del Nivel Máximo de un Desinfectante Residual por debajo del cualno hay riesgos a la salud conocidos o esperados.
Contaminante: sustancia o materia física, química, biológica o radiológica en el agua.
N/A: No Aplica
nd: no detectable, comparado con el límite de detección de la prueba.
ppb: partes por billón o microgramos por litro.
ppm: partes por millón o miligramos por litro.
ppt: partes por trillón o nanogramos por litro.
mrem/año: milirems por año. Medida de exposición a radionucleidos.
pCi/l: picocurios por litro. Medida de radioactividad.
NTU: unidad para medir el material particulado en el agua de turbidez
S/N Sistema Nuevo (se incluye información recolectada)
Max: Máximo **Min:** Mínimo **>:** signo de mayor que

EL AGUA POTABLE Y LAS CUENCAS HIDROGRÁFICAS: RESPONSABILIDAD DE TODOS

1. Las cuencas hidrográficas y las represas son partes integrales de nuestro sistema regional de suministro de agua. ¡Consérvalas!

2. Es más efectivo y económico prevenir la contaminación de los abastos del agua potable que pagar por el tratamiento o limpieza de los mismos.

3. Puedes contribuir a la conservación de los abastos de agua reciclando o desechando correctamente los residuos domésticos peligrosos no deseados.

4. El uso de pesticidas y herbicidas puede afectar la calidad del agua. Cerciórate que uses los productos más amigables para el ambiente y dispón de ellos adecuadamente.

5. No viertas aceite para motores, anticongelantes ni otros materiales tóxicos en los desagües pluviales. El agua que entra en los desagües pluviales llega directamente a nuestros ríos y quebradas. ¡No los contamines!

6. No arrojes diluyentes de pintura, insecticidas, herbicidas ni otros productos químicos nocivos por el fregadero.

MEDIDAS PREVENTIVAS

- Si experimentas interrupciones en el servicio de agua, asegura hervirla por lo menos dos (2) minutos antes de consumirla.
- Si el agua de algún grifo en particular no se ha utilizado durante seis horas o mas, deja correr el agua fría hasta que salga de la tubería tan fría como sea posible.
- Utiliza solamente el agua fría del grifo para beber, cocinar y, especialmente, para preparar la fórmula de bebé.

20 MEDIDAS PARA AHORRAR AGUA Y DINERO

¡Empieza ahora! Sigue estos consejos para reducir el consumo de agua y economiza en tu factura, ponlo en la nevera o en un lugar visible. Haz que la conservación sea parte de tu vida.

- Descongela la comida en la nevera desde la noche anterior en vez de usar la pluma para descongelar. Se desperdicia casi 3 galones de agua por minuto con la pluma totalmente abierta.
- Cuando laves los platos, no dejes el agua correr mientras enjabonas o enjuagas.
- Usa tu lavadora de platos o de ropa sólo con tandas llenas, podrías ahorrar 1,000 galones ó 3.78 m^3 al mes.
- Lava tus frutas y vegetales en un recipiente parcialmente lleno de agua en vez de hacerlo bajo la pluma.
- Verifica las llaves de paso y arréglalas. Es sencillo, barato y puedes ahorrar 140 galones a la semana o cerca de 2 m^3 al mes.
- Bota pañuelos desechables y algodones en el cesto de la basura en vez de

echarlos en el inodoro y estarás ahorrando agua por galones.

- Dúchate en menos de 5 minutos y ahorra hasta 1,000 galones ó 3.78 m^3 al mes. Una ducha abierta durante 10 minutos gasta 26 1/2 galones de agua.
- Echa colorante de comida en el tanque del inodoro. Si se colorea el agua en la taza, tu inodoro tiene un liqueo. Arréglalo y ahorra más de 600 galones ó 2.27 m^3 al mes.
- Si tu inodoro es de antes de 1980, coloca un galón plástico lleno de agua dentro del tanque para controlar la cantidad de agua que se usa en cada descarga. Asegúrate que no interfiera con los mecanismos del tanque.
- Si tu ducha llena un cubo de un galón de agua en menos de 20 segundos, instala un cabezal de ducha de flujo reducido (low flow). Te ahorra hasta 500 galones o casi 2 m^3 a la semana.
- Cierra la pluma al cepillarte los dientes y ahorra 4 galones de agua por minuto. Eso equivale a 200 galones a la semana ó 3 m^3 al mes para una familia de cuatro miembros.
- Si la cierras mientras te afeitas, ahorrarás más de 100 galones a la semana ó 1.5 m^3 al mes.
- Cierra la ducha mientras te enjabonas y te aplicas el champú o acondicionador y ahorra más de 50 galones a la semana o más de 1 m^3 al mes.
- Usa una escoba en vez de la manguera para limpiar la marquesina o la acera y ahorra 80 galones de agua cada vez.
- Pon una capa de viruta orgánica (mulch) alrededor de las plantas para reducir la evaporación y ahorrarás cientos de galones de agua al año.
- Dirige los canales y desagües del techo hacia los arbustos y árboles, o recoge esa agua y úsala para regar tus plantas.
- Minimiza la evaporación del agua regando tus plantas temprano en la mañana, cuando las temperaturas son más bajas y los vientos más livianos.
- No podes la grama demasiado. Una grama más alta protege las raíces y conserva mejor la humedad del terreno.
- Lava tu carro sobre la grama, aprovecha el agua para ambos fines.
- Usa una manguera con pistero y ahorrarás más de 100 galones cada vez. Una manguera abierta desperdicia hasta 10 galones por minuto.

MAGUAYO

pop_serv=&wsys_id=&fac_state=PR&last_fac_name=&page=1&query_results=&total_rows_found=

Envirofacts

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Search Selections:
State selected: PUERTO RICO
Water system name containing: Maguayo
Population Selected: Very Small (0-500), Small (501-3,300), Medium (3,301-10,000), Large (10,001-100,000), Very Large (100,000+)
Water System Status: active
Search executed on: APR-05-2011
Results are based on data extracted on : JAN-14-2011

List of Water Systems in SDWIS

Information about water systems in PUERTO RICO is maintained by PUERTO RICO DEPARTMENT OF HEALTH .

To obtain additional information about drinking water please call EPA's Safe Drinking Water hotline at 1-800-426-4791.

Community Water Systems: Water Systems that serve the same people year-round (e.g. in homes or businesses).

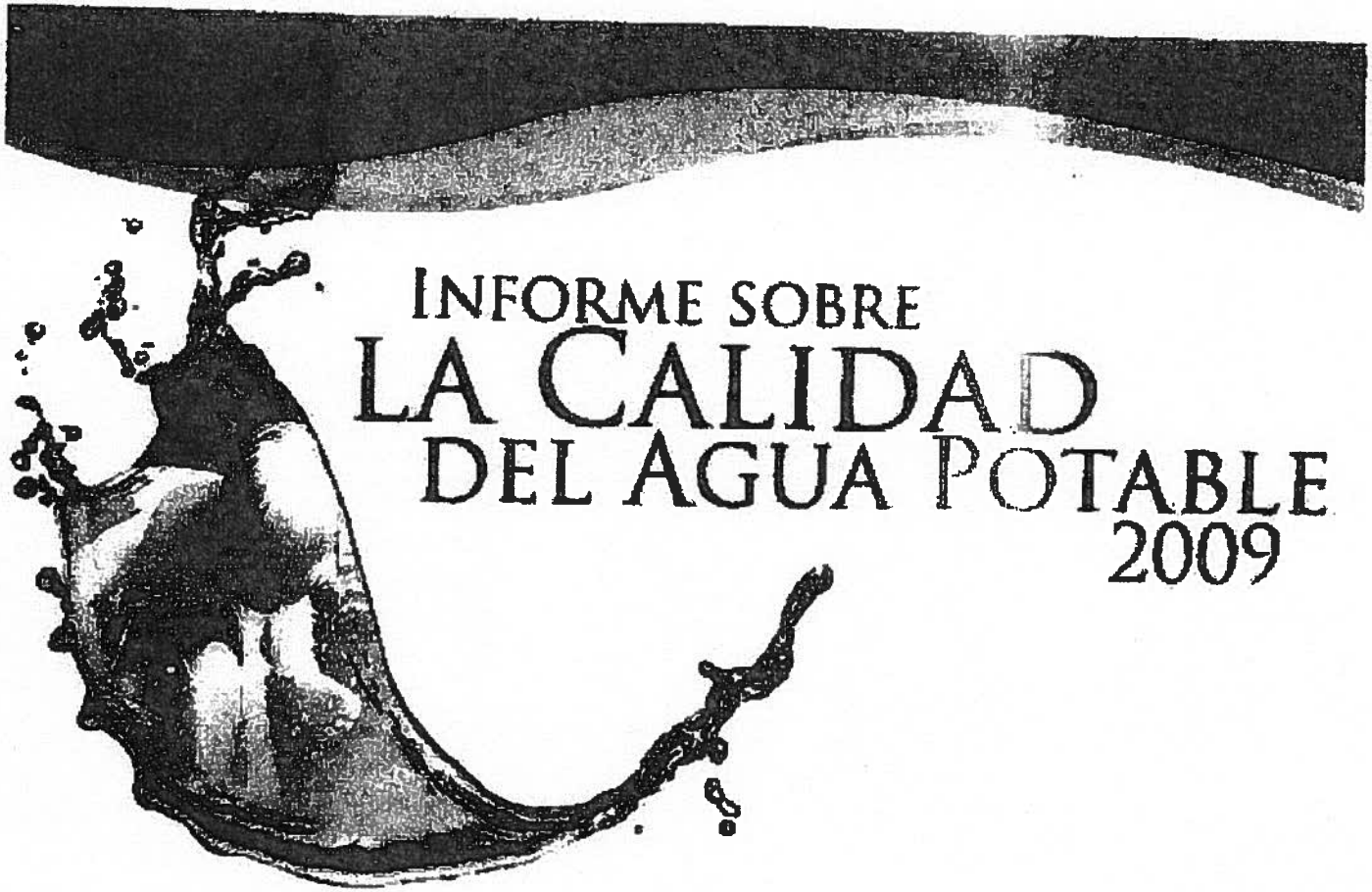
Water System Name	County(s) Served	Population Served	Primary Water Source Type	System Status	Water System ID
MAGUAYO	DORADO	46864	Groundwater	Active	PR0005597

Non-Transient Non-Community Water Systems: Water Systems that serve the same people, but not year-round (e.g. schools that have their own water system).

No systems were found.

Transient Non-Community Water Systems: Water Systems that do not consistently serve the same people (e.g. rest stops, campgrounds, gas stations).
No systems were found.

Last updated on Tuesday, April 05, 2011



INFORME SOBRE LA CALIDAD DEL AGUA POTABLE 2009

INFORMACIÓN SOBRE CALIDAD DE AGUA POTABLE

Las enmiendas a la Ley de Agua Potable Segura de 1986, requieren que enviemos a nuestros consumidores un breve informe sobre la calidad del agua servida durante el año y las fuentes que usamos para suplirla. Este informe resume los resultados obtenidos durante el año o el período reglamentado más reciente y el cumplimiento con los estándares y niveles establecidos para agua potable por la Agencia de Protección Ambiental Federal (EPA, por sus siglas en inglés) y el Departamento de Salud Estatal.

En cumplimiento con las reglamentaciones estatales y federales, la Autoridad de Acueductos y Alcantarillados analiza más de 80 posibles contaminantes que pueden estar en el agua potable. La gran mayoría de estos contaminantes regulados no se encontraron en el agua de su sistema. Las tablas que presentamos a continuación incluyen los pocos contaminantes que se encontraron en pequeñas cantidades (detectados) en su agua y se identifica si alguno excedió los niveles permitidos. Además encontrará información general sobre el agua, los contaminantes, de donde provienen, y los posibles efectos a la salud cuando se exceden los niveles permitidos.

Para información adicional sobre este Informe de Calidad de Agua Potable, puede comunicarse con los funcionarios de Cumplimiento y Control de Calidad de su Región, de lunes a viernes al (787) 878-7211 efectivo al 1 de julio de 2010.

INFORMACIÓN IMPORTANTE PARA LA SALUD

Algunas personas pueden ser más vulnerables que la población general a los contaminantes que pueden estar presentes en el agua potable. Las personas con un sistema inmunológico comprometido tales como: las personas con cáncer que están recibiendo quimioterapia, las que han recibido trasplantes de órganos, personas con VIH/SIDA u otras con problemas del sistema inmunológico, algunos ancianos e infantes, pueden estar especialmente en riesgo de alguna infección. La EPA y el Centro para el Control y Prevención de Enfermedades, tienen información disponible para las personas con riesgo a infecciones por Cryptosporidium y otros contaminantes microbiológicos, la cual puede obtener llamando a la EPA al teléfono 1-800-426-4791, o en la dirección de Internet www.epa.gov/safewater ó www.cdc.gov

¿DE DONDE PROVIENE MI AGUA?

El agua potable que usted consume puede provenir de componentes o fuentes de abasto tanto superficiales (S), como subterráneos (G) o una combinación de ambas. En su caso, el sistema que le suple agua le compete:

Pozo Maguayo 2 (G), Pozo Maguayo III (G), Pozo Maguayo IV (G), Pozo Maguayo V (G), Pozo Maguayo VI (G), Pozo Maguayo VII (G), Tanque Dorado y Suministro (fuente principal de agua: Río Grande de Añasco-S)

TURBIDEZ

La Turbidez es la medida de la transparencia o claridad de partículas en el agua. Se utiliza como indicador de calidad del proceso de filtración en la remoción de partículas suspendidas. La transparencia nos ayuda a determinar la calidad del agua tratada. Una alta turbidez puede interferir con la desinfección de la depuradora en el sistema de distribución. Entre ejemplos de partículas que pueden producir turbidez están: sedimento, coloides, algas y bacterias de colores.

	Parámetro	Límites EPA MRC	Límites EPA MNMC	Resultados	Fecha	Origen Usual del Contaminante
5	Turbidez (% cumplimiento más bajo, con 0.3 NTU)	0.3 NTU	N/A	N/A	N/A	No Aplica - su fuente principal es el POZO (Aguas Subterráneas)
6	Turbidez máxima (NTU)	1 NTU	N/A	N/A	N/A	No Aplica - su fuente principal es el POZO (Aguas Subterráneas)

BACTERIOLOGÍA

	Parámetro	Límites EPA MRC	Límites EPA MNMC	Resultados	Fecha	Origen Usual del Contaminante
1	Bacterias Coliformes Totales	5%	0	4.76%	Diciembre	Están presentes en el ambiente.
2	Coliformes Fecales	>1	0	2 [illegible]	2009	Desperdicio de animales o descarga sanitaria.

Efectos Potenciales a la salud (Opcional)

2 Una bacteria como presencia indica que el agua pudiera estar contaminada con excremento sobre el o deshuesar. Los microbios en estos desperdicios pueden causar diarrea, cólicos, náusea, dolor de cabeza u otros síntomas.

Explicación de Total Violación(es)

3 La violación ocurrió en el EPA. Al obtener resultados positivos para coliformes fecales, en su presencia en el agua potable está asociada con desperdicios de animales o descargas sanitarias y puede indicar problemas con el proceso de purificación del agua o con las tuberías del sistema de distribución. Al ocurrir la violación se evaluó las condiciones de operación de los componentes del sistema. Para determinar y corregir los posibles causas, potencial de verter un aviso al público.

PLOMO Y COBRE

[illegible]

	Parámetro	Nivel de Acción	MNMC	# de muestras que excedieron nivel de acción	Valor de la Percentil 90	Fecha	Origen Usual del Contaminante
14	Cobre (ppm)	1.3	1.3	0	0.264	2009	Corrosión del sistema de tubería interna; erosión de depósitos naturales; lixiviación de conservantes de la madera.
17	Plomo (ppb)	15	0	0	6	2009	Corrosión del sistema de tubería interna; erosión de depósitos naturales.

CONTAMINANTES REGULADOS DETECTADOS

	Contaminantes	MRC - TT MRDL - MA	MRMC	Resultados Valor	Resultados Rango	Fecha	Origen usual del Contaminante
Químicos Inorgánicos							
10	Boro (ppb)	2	2	0.05	ND - 0.05	2009	Descargas de refinerías de metal; arsénico de los depósitos naturales y descargas de [illegible]
15	Cloruro (ppb)	200	200	2	N/A	2009	Descarga de fábricas de metal y acero; descarga de líquidos de [illegible] y plásticos.
19	Fluoruro (ppm)	4	4	0.06	0.04 - 0.06	2009	Erosión de los depósitos naturales; aditivo del agua que promueve el desarrollo dental; descarga de fábricas de fertilizantes y aluminio.
16	Nitrato (como nitrógeno) (ppm)	10	10	5.02	1.34 - 5.02	2009	Escurrimiento con fertilizantes; lixiviado de pozos sépticos y alcantarillado; erosión de los depósitos naturales
114	Cloro Residual (ppm)	4	4	1.42	0.03 - 2.80	2009	Es usado en el agua para el control de microbios.
Químicos Orgánicos Sintéticos, Herbicidas y Pesticidas							
23	Di (2-etil-hexil) ftalato (ppb)	6	0	0.4	ND-0.92	2009	Descarga de fábricas químicas y de goma.
Químicos Orgánicos Volátiles							
34	1,1 - Dicloroetileno (ppb)	7	7	0.4	<0.5-0.7	2009	Descargas de fábricas químicas
42	cis-1,2 -Dicloroeteno (ppb)	70	70	1	<0.5-1.9	2009	Descarga de fábricas químicas
43	Tetracloroeteno (ppb)	5	0	1.9	<0.5-5.8	2009	Efluentes de fábricas y derrames de líquidos de limpieza.
52	Tricloroeteno (ppb)	5	0	0.8	<0.5-1.1	2009	Descarga de líquidos usados de limpieza grasa en metales y otra industria.
Otros - Desinfectantes y Subproductos de Desinfectantes							
73	Trihalo metanos Total (ppb)	80	N/A	58.8	2.3 - 87.8	2009	Resultado o subproductos del proceso de desinfección del agua.
89	Ácidos Haloacéticos (ppb)	60	N/A	37	ND - 75.0	2009	Resultado o subproductos del proceso de desinfección del agua.
119	Carbono Total Orgánico (TOC)	TT	N/A	N/A	N/A	N/A	No aplica - Fuente principal es un PWSD (Aguas Subterráneas)

Otros [illegible]

19	El nivel en el agua potable [illegible] 10 ppm, representa un riesgo [illegible] para bebés menores de seis (6) meses de edad y pueden causar el síndrome del bebé azul. Elevados niveles [illegible] de cáncer entre [illegible] en la boca o la garganta. [illegible]

CONTAMINANTES NO REGULADOS DETECTADOS

[illegible]

	Contaminante	Valor	Rango	Fecha	Origen Usual del Contaminante
88	Sulfato (ppm)	26	19.5 - 26	2009	La reglamentación requiere muestreo rutinario [illegible] un MRC y MRMC.
124	Hierro (ppm)	0.017	ND - 0.017	2009	La reglamentación requiere muestreo rutinario [illegible] un MRC y MRMC.
129	Níquel (ppm)	0.01	ND - 0.01	2009	La reglamentación requiere muestreo rutinario [illegible] un MRC y MRMC.
130	Sodio (ppm)	13	3.75 - 13	2009	La reglamentación requiere muestreo rutinario [illegible] un MRC y MRMC.
150	Cobre (pCi/L)	0	0 - 0	2007	La reglamentación requiere muestreo rutinario [illegible] un MRC y MRMC.
131	Dureza Cálcio (ppm)	265	265 - 265	2007	La reglamentación requiere muestreo rutinario [illegible] un MRC y MRMC.
133	Cloruro (ppm)	43	30 - 43	2007	La reglamentación requiere muestreo rutinario [illegible] un MRC y MRMC.
134	Residual Total 105°C (ppm)	440	410 - 440	2007	La reglamentación requiere muestreo rutinario [illegible] un MRC y MRMC.
136	Residual Filtrable 180°C (ppm)	420	300 - 420	2007	La reglamentación requiere muestreo rutinario [illegible] un MRC y MRMC.
138	Alcalinidad (ppm)	272	256.8 - 272	2007	La reglamentación requiere muestreo rutinario [illegible] un MRC y MRMC.
137	Dureza Total (ppm)	300	284 - 300	2007	La reglamentación requiere muestreo rutinario [illegible] un MRC y MRMC.

[illegible] CONTAMINANTES DETECTADOS

Contaminante	Promedio	Importancia de los resultados	Origen Usual del Contaminante

[illegible] MUESTREO Y REPORTE

[illegible]

Contaminante	Periodo de Muestreo	Muestras Requeridas	Muestras Tomadas
[illegible]	Diciembre 2009	2	0
GLYPHOSATE (547)	ENE-MAR 2009	1	0
VOC	OCT-DIC 2009	3	1
VOC	OCT-DIC 2009	3	1
VOC	OCT-DIC 2009	3	1

Términos y Definiciones

Los siguientes términos y definiciones le facilitarán entender la información contenida en este informe sobre la Calidad de Agua de su Sistema.

NMC: Nivel Máximo de Contaminante o nivel más alto permitido en el agua potable. Los NMC son establecidos tan cerca como sea posible del MNMC usando la mejor tecnología disponible.

MNMC: Meta para el Nivel Máximo de Contaminante permitido o el nivel máximo en el agua potable bajo el cual no hay riesgos conocidos o esperados a la salud. Los MNMC permiten un margen de seguridad.

NA: Nivel de Acción - La concentración de un contaminante que provocará que se realicen acciones como establecer tratamiento para prevenir efectos adversos a la salud.

TT: Técnica de Tratamiento - Es un proceso requerido para controlar y reducir el nivel de un contaminante en agua potable.

Dispensa y Exención: Autorización otorgada por el Departamento de Salud (DS) o la Agencia de Protección Ambiental Federal (EPA, por sus siglas en inglés) bajo ciertas condiciones que permiten no cumplir con un NMC o técnica de tratamiento.

MRDL: Nivel Máximo de un Desinfectante Residual permitido en el agua potable.

MRDLG: Meta del Nivel Máximo de un Desinfectante Residual por debajo del cual no hay riesgos a la salud conocidos o esperados.

Contaminante: sustancia o materia física, química, biológica o radiológica en el agua.

NIA: No Aplica

nd: no detectable, comparado con el límite de detección de la prueba.

ppb: partes por billón o microgramos por litro.

ppm: partes por millón o miligramos por litro.

ppt: partes por trillón o nanogramos por litro.

mrem/año: milirrems por año. Medida de exposición a radionucleidos.

pCi/l: picocuries por litro. Medida de radioactividad.

NTU: unidad para medir el material particulado en el agua de turbidez

S/N: Sistema Nuevo (se incluye información recolectada)

Max: Máximo **Min:** Mínimo **M:** Agua de mayor que

Snyder, Scott

From: Edgardo.BERMUDEZ@acueductospr.com
Sent: Monday, April 18, 2011 9:54 AM
To: Snyder, Scott
Cc: Jose.RIVERA4@acueductospr.com; Zeno.Daniel@epamail.epa.gov
Subject: RE: Maguayo Public Well System

Good Morning Mr Scott

In respose to your e-mail the answers are as follows

- What is the total system production (wells + super aqueduct)?
  The total system production considering al wells active is of 16,855,200 gpd

- What is the contribution of the super aqueduct to the total system production?
  According to the flow meters readings installed at the super acueduct facilities, the contribution is of about 10,692,000 gpd

- What are the pumping rates of Maguayo Wells 2, 3, 5, 6, and 7?
  Maguayo 2 is 300 gpm, Maguayo 3 is 600 gpm, Maguayo 5 is 900 gpm, Maguayo 6 is 680 gpm, Maguayo 7 is 1,200 gpm

- Is water from all the wells and the super aqueduct blended prior to distribution?
  Yes

- Are Maguayo Wells 2, 3, 5, 6, and 7 currently active?
  Currently we only have active Maguayo wells 2, 6 and 7; but we are working to get it all on service very soon. The Maguayo well 4 is also active and it has a pumping rate of 600 gpm.

- Depths or screened interval for each of the wells?
  Maguayo 2 is 150', Maguayo 3 is 100', Maguayo 4 is 100', Maguayo 5 is 100', Maguayo 6 is 80' and Maguayo 7 is 100'.

- Total population served by the Maguayo system?
  I can't precise this number since the Maguayo wells and the super acueduct system are blended prior to distribution. Also is known that there're a lot of illegal connections in the system.

If you have any other question, please don't hesitate to contact me.

Edgardo Bermúdez Valentín
Director Auxiliar Senior
Area Toa Alta
Cel. (787) 406-9547
Ofic.. (787) 870-8222

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"Snyder, Scott" <S.Snyder@WestonSolutions.com>

04/13/2011 01:08 PM

To "Edgardo.BERMUDEZ@acueductospr.com" <Edgardo.BERMUDEZ@acueductospr.com>, "Jose.RIVERA4@acueductospr.com" <Jose.RIVERA4@acueductospr.com>
cc "Zerio.Denise@epamail.epa.gov" <Zerio.Denise@epamail.epa.gov>
Subject RE: Maguayo Public Well System

Viewed by: Edgardo BERMUDEZ VALENTIN/DirArea/NorteAA at 04/18/2011 08:53:50 AM

Good afternoon Gentlemen
I'm writing to follow-up on my request for information regarding the Maguayo public well system. We are currently conducting several environmental investigations in Dorado on behalf of EPA. This information is necessary to complete these investigations.

Please consider responding in the near future

Thank you

scott

From: Edgardo.BERMUDEZ@acueductospr.com [mailto:Edgardo.BERMUDEZ@acueductospr.com]
Sent: Wednesday, April 06, 2011 9:04 AM
To: Jose.RIVERA4@acueductospr.com
Cc: Snyder, Scott
Subject: Re: Maguayo Public Well System

Saludos Rivera

Por favor vamos a reunirnos para trabajar esta contestación

Gracias

Edgardo Bermúdez Valentín
Director Auxiliar Senior
Area Toa Alta
Cel. (787) 406-9647
Ofic.. (787) 870-8222

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****

Miguel MARTINEZ
NEGOCIO/DirArea/Norte/AAA

04/05/2011 08:49 AM

To "Snyder, Scott" <S.Snyder@WestonSolutions.com>, Edgardo BERMUDEZ VALENTIN/DirArea/Norte/AAA@AAA
cc
Subject Re: Maguayo Public Well System Link

Viewed by: Edgardo BERMUDEZ VALENTIN/DirArea/Norte/AAA at 04/05/2011 08:04:14 AM

Saludos:

The person is Eng. Edgardo Bermudez.

"Snyder, Scott" <S.Snyder@WestonSolutions.com>

04/05/2011 02:13 PM

To "miguel.martinez@acueductospr.com" <miguel.martinez@acueductospr.com>
cc
Subject Maguayo Public Well System

Viewed by: Edgardo BERMUDEZ VALENTIN/DirArea/Norte/AAA at 04/05/2011 09:04:14 AM

Good afternoon Miguel
I'm conducting a groundwater study for EPA Region 2 Dorado. I'm trying to obtain information regarding the Maguayo System. Listed below is the information I need. If you're unfamiliar with the Maguayo system can you refer me to someone who is?

- What is the total system production (wells + super aqueduct)?
- What is the contribution of the super aqueduct to the total system production?
- What are the pumping rates of Maguayo Wells 2, 3, 5, 6, and 7?
- Is water from all the wells and the super aqueduct blended prior to distribution?
- Are Maguayo Wells 2, 3, 5, 6, and 7 currently active?
- Depths or screened interval for each of the wells?

- Total population served by the Maguayo system?

Thank you

Scott T. Snyder, CHMM
Principal Project Scientist
Weston Solutions, Inc.
205 Campus Drive, Edison, NJ 08837
Phone: (732) 417-5812
Fax: (732) 417-5801

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DORADO URBANO

pop_serv=100001&sys_status=active&pop_serv=&wsys_id=&fac_state=PR&last_fac_name=&page=1&query_results=&total_rows_four

EPA

Envirofacts

Search

SDWIS

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- SDWIS Search User Guide
- Contact Us
- Office of Ground Water and Drinking Water

Search Selections:
State selected: PUERTO RICO
Water system name beginning with: Dorado Urbano
Population Selected: Very Small (0-500), Small (501-3,300), Medium (3,301-10,000), Large (10,001-100,000), Very Large (100,000+)
Water System Status: active
Search executed on: MAY-24-2011
Results are based on data extracted on : APR-14-2011

List of Water Systems in SDWIS

Information about water systems in PUERTO RICO is maintained by PUERTO RICO DEPARTMENT OF HEALTH .

To obtain additional information about drinking water please call EPA's Safe Drinking Water hotline at 1-800-426-4791.

Community Water Systems: Water Systems that serve the same people year-round (e.g. in homes or businesses).

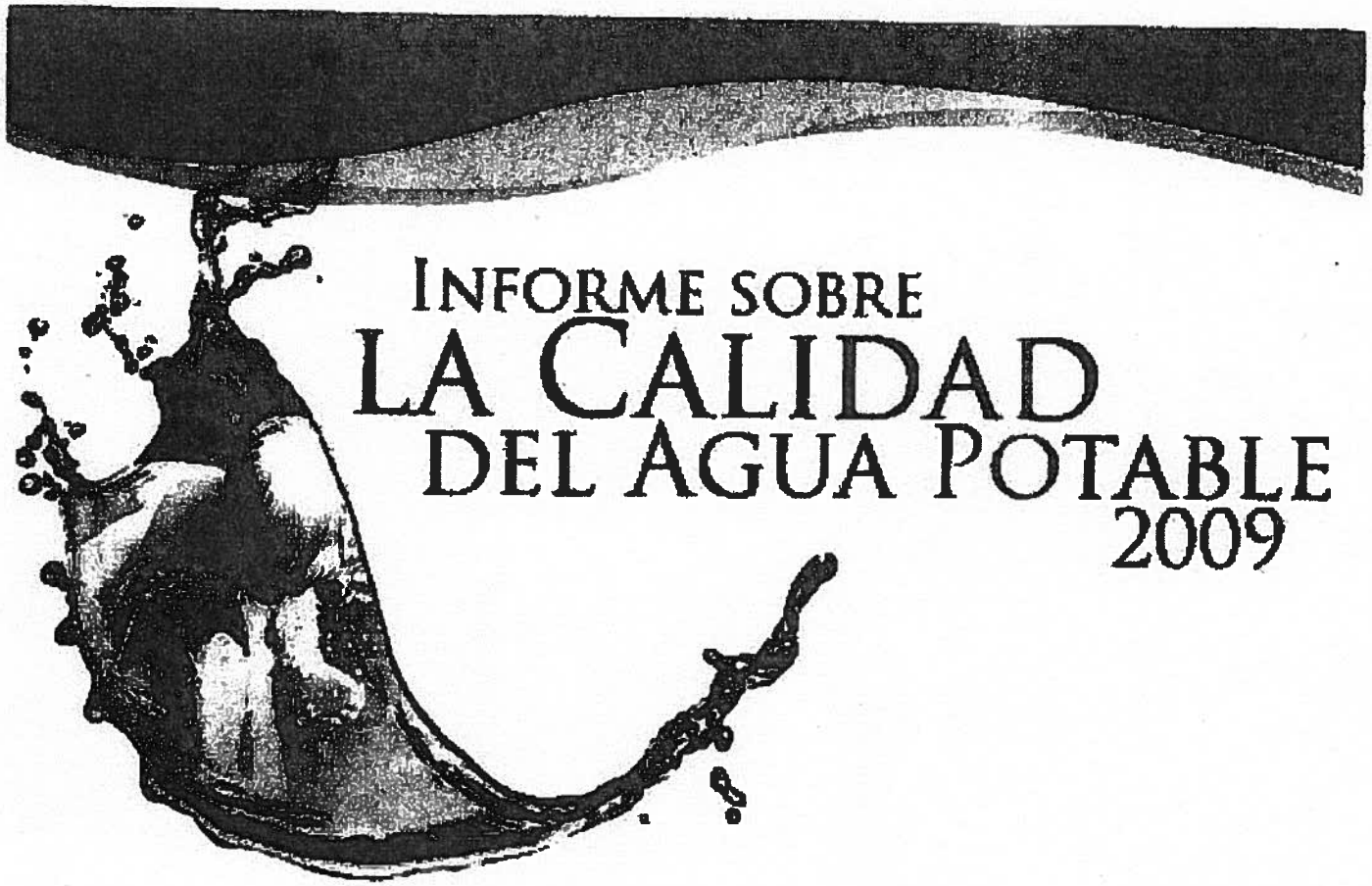
Water System Name	County(s) Served	Population Served	Primary Water Source Type	System Status	Water System ID
DORADO URBANO	DORADO	38908	Groundwater	Active	PR0005607

Non-Transient Non-Community Water Systems: Water Systems that serve the same people, but not year-round (e.g. schools that

have their own water system).
No systems were found.

Transient Non-Community Water Systems: Water Systems that do not consistently serve the same people (e.g. rest stops, campgrounds, gas stations).
No systems were found.

Last updated on Tuesday, May 24, 2011



INFORME SOBRE LA CALIDAD DEL AGUA POTABLE 2009

INFORMACIÓN SOBRE CALIDAD DE AGUA POTABLE

Las enmiendas a la Ley de Agua Potable Segura de 1996, requieren que enviemos a nuestros consumidores un informe sobre la calidad del agua servida durante el año y las fuentes que usamos para suplirla. Este informe refleja los resultados obtenidos durante el año o el período reglamentario más reciente y el cumplimiento con los estándares y niveles establecidos para agua potable por la Agencia de Protección Ambiental Federal (EPA, por sus siglas en inglés) y el Departamento de Salud Estatal.

En cumplimiento con las reglamentaciones estatales y federales, la Autoridad de Acueductos y Alcantarillados analiza más de 80 posibles contaminantes que pueden estar en el agua potable. La gran mayoría de estos contaminantes regulados no se encontraron en el agua de su sistema. Las tablas que presentaremos a continuación incluyen los pocos contaminantes que se encontraron en pequeñas cantidades (detectados) en su agua y se identifica si alguno excedió los niveles permitidos. Además encontrará información general sobre el agua, los contaminantes, de donde provienen, y los posibles efectos a la salud cuando no exceden los niveles permitidos.

Para información adicional sobre este Informe de Calidad de Agua Potable, puede comunicarse con los Funcionarios de Cumplimiento y Control de Calidad de su Región, de lunes a viernes al (787) 878-7211 efectivo el 1 de julio de 2010.

INFORMACIÓN IMPORTANTE PARA LA SALUD

Algunas personas pueden ser más vulnerables que la población general a los contaminantes que pueden estar presentes en el agua potable. Las personas con un sistema inmunológico comprometido tales como: las personas con cáncer que están recibiendo quimioterapia, las que han recibido transplantes de órganos, personas con VIH/SIDA u otro con problemas del sistema inmunológico, algunos ancianos e infantes, pueden estar especialmente en riesgo de adquirir infección. La EPA y el Centro para el Control y Prevención de Enfermedades, tienen información disponible para las personas con riesgo de infecciones por Cryptosporidium y otros contaminantes microbiológicos, la cual puede obtener llamando a la EPA al teléfono 1-800-426-4791, ó en la dirección de Internet www.epa.gov/safewater ó www.cdc.gov

¿DE DONDE PROVIENE MI AGUA?

El agua potable que usted consume puede provenir de componentes o fuentes de abasto tanto: superficiales (S), como subterráneos (G) o una combinación de ambas. En su caso, el sistema que le surte agua lo compone:

Pozo San Antonio I (G), Pozo San Antonio II (G), Pozo San Antonio III (G), Pozo Dorado Dairy 1(G), Pozo Dorado Dairy 2 (G), Pozo Navilinc (G) y Pozo Santa Rosa (G)

TURBIDEZ

La Turbidez es una medida de la claridad o transparencia del agua. Se utiliza como indicador de cómo funciona el proceso de filtración, para establecer de posibles [illegible] contaminantes. La turbidez [illegible] de la calidad del agua [illegible]. Otra vez también [illegible] el mantenimiento de la [illegible] de la [illegible] control de microorganismos. Algo preocupante también es [illegible] como hongos, virus, bacterias y otros organismos.

	Parámetro	Límites EPA MRC	Límites EPA MRMC	Resultados	Fecha	Origen Usual del Contaminante
2	Turbidez (% cumplimiento más bajo, con 0.3 NTU)	0.3 NTU	N/A	N/A	N/A	No Aplica - Su fuente principal es un POZO (Aguas Subterráneas)
3	Turbidez máxima (NTU)	1 NTU	N/A	N/A	N/A	No Aplica - Su fuente principal es un POZO (Aguas Subterráneas)

BACTERIOLOGÍA

	Parámetro	Límites EPA MRC	Límites EPA MRMC	Resultados	Fecha	Origen Usual del Contaminante
2	Coliformes Fecales	>1	0	0	2008	Desperdicio de animales y fertilizante animal.
1	Bacterias Coliformes Totales	>1	0	0	2008	Están presentes en el ambiente.

PLOMO Y COBRE

[illegible]

	Parámetro	Nivel de Acción	MRMC	# de puntos que excedieron nivel de acción	Valor de la Percentilla 90	Fecha	Origen Usual del Contaminante
14	Cobre (ppm)	1.3	1.3	0	0.5	2008	Corrosión de sistemas de tubería caseros; erosión de depósitos naturales; lixiviación de conservantes de la madera.
17	Plomo (ppb)	15	0	0	5.4	2008	Corrosión del sistema de tubería casera; erosión de depósitos naturales.

Sistema: DORADO URBANO
PWSID: 8607

CONTAMINANTES REGULADOS DETECTADOS

	Contaminantes	NMC - TT MRDL - NA	MNMC	Resultados Valor	Resultados Rango	Fecha	Origen usual del Contaminante
Químicos Inorgánicos							
10	Nitrato (como nitrógeno) (ppm)	10	10	2.73	2.1 - 2.73	2009	Escurrimiento con fertilizantes, lavatorio de pozos sépticos y alcantarillado, erosión de los depósitos naturales
116	Cloro Residual (ppm)	4	4	1.84	0.04 - 2.70	2009	Es usado en el agua para el control de microbios.
Químicos Orgánicos Sintéticos, Herbicidas y Fungicidas							
28	2,4-D (ppb)	70	70	0.043	ND-1.3	2009	Aguas contaminadas por la aplicación de herbicidas para cultivos.
Químicos Orgánicos Volátiles							
72	Tricloroetileno (ppb)	5	0	0.7	N/A	2009	Descarga de lugares donde se limpian grasas en metales y otros industrias.
Sub-Desinfectantes y Subproductos de Desinfección							
73	TTHM's (Trihalometanos Total) (ppb)	80	N/A	44.6	50.7 - 58.1	2009	Residuos o subproductos del proceso de desinfección del agua.
93	Acidos Haloacéticos (ppb)	60	N/A	48.2	27 - 50.5	2009	Residuos o subproductos del proceso de desinfección del agua.
110	Carbono Total Orgánico (TOC)	TT	N/A	N/A	N/A	N/A	No aplica - Fuente principal es un POZO (Aguas Subterráneas)

CONTAMINANTES NO REGULADOS DETECTADOS

[illegible]

	Contaminante	Valor	Rango	Fecha	Origen Usual del Contaminante
150	Sodio (ppm)	0.0149	0.0149 - 0.0149	2009	La reglamentación requiere muestreo mientras se establece un NMC y MNMC.
150	Color (pCi/L)	0	N/A	2007	La reglamentación requiere muestreo mientras se establece un NMC y MNMC.
151	Dureza Calcio (ppm)	236	N/A	2007	La reglamentación requiere muestreo mientras se establece un NMC y MNMC.
153	Cloruro (ppm)	92	N/A	2007	La reglamentación requiere muestreo mientras se establece un NMC y MNMC.
154	Residual Total 103°C (ppm)	360	N/A	2007	La reglamentación requiere muestreo mientras se establece un NMC y MNMC.
155	Residual Filtrable 180°C (ppm)	340	N/A	2007	La reglamentación requiere muestreo mientras se establece un NMC y MNMC.
156	Alcalinidad (ppm)	280.3	N/A	2007	La reglamentación requiere muestreo mientras se establece un NMC y MNMC.
157	Dulces Total (ppm)	250	N/A	2007	La reglamentación requiere muestreo mientras se establece un NMC y MNMC.

OTROS CONTAMINANTES DETECTADOS

Contaminante	Promedio	Importancia de los resultados	Origen Usual del Contaminante

VIOLACIONES DE MUESTREO Y REPORTE

[illegible]

Contaminante	Periodo de Muestreo	Muestras Requeridas	Muestras Tomadas
ACIDOS HALOACETICOS	OCT-DIC 2009	4	0
PLAGICIDAS, HERBICIDAS, SOC Y PCB'S	OCT-DIC 2009	1	0
THM	OCT-DIC 2009	4	0
VOC	OCT-DIC 2009	5	1

Términos y Definiciones

Los siguientes términos y definiciones le facilitarán entender la información contenida en este informe sobre la Calidad de Agua de su Sistema.

NMC: Nivel Máximo de Contaminante o nivel más alto permitido en el agua potable. Los NMC son establecidos tan cerca como sea posible del MNMC usando la mejor tecnología disponible.
MNMC: Meta para el Nivel Máximo de Contaminante permitido o el nivel máximo en el agua potable bajo el cual no hay riesgos conocidos o esperados a la salud. Los MNMC permiten un margen de seguridad.
NA: Nivel de Acción - La concentración de un contaminante que provocará que se realicen acciones como establecer tratamiento para prevenir efectos adversos a la salud.
TT: Técnica de Tratamiento - Es un proceso requerido para controlar y reducir el nivel de un contaminante en agua potable.
Dispensa y Exención: Autorización otorgada por el Departamento de Salud (DS) o la Agencia de Protección Ambiental Federal (EPA, por sus siglas en inglés) bajo ciertas condiciones que permiten no cumplir con un NMC o técnica de tratamiento.
MRDL: Nivel Máximo de un Desinfectante Residual permitido en el agua potable.
MRDLS: Meta del Nivel Máximo de un Desinfectante Residual por debajo del cual no hay riesgos a la salud conocidos o esperados.
Contaminante: sustancia o materia física, química, biológica o radiológica en el agua.
N/A: No Aplica
nd: no detectable, comparado con el límite de detección de la prueba.
ppb: partes por billón o microgramos por litro
ppm: partes por millón o miligramos por litro.
ppm: partes por billón o nanogramos por litro.
mrem/año: milirems por año. Medida de exposición a radionucleidos.
pCi/l: picocuritos por litro. Medida de radioactividad.
NTU: unidad para medir el material particulado en el agua de turbidez.
S/N: Sistema Nuevo (se incluye información recolectada)
Max: Máximo **Min:** Mínimo **>=** signo de mayor que

Snyder, Scott

From:	Edgardo.BERMUDEZ@acueductospr.com
Sent:	Monday, April 18, 2011 11:34 AM
To:	Snyder, Scott
Cc:	Javier.RIVERA@acueductospr.com
Subject:	RE: Maguayo Public Well System

Mr. Scott:

Among the wells you mention for the Dorado Urbano system, the only one active at this moment is the Santa Rosa. The Santa Rosa Well and the super aqueduct are blended together in the Dorado Urbano system. According to the Costumer Service Area they both combined serves a total of 9,118 housing units. On the other hand, the Neveras well (also part of the Dorado Urbano system) is under rehabilitation works and near to start its operation. At this moment we are conducting the final test and inspections prior to start with the well operation.

The Rio Lajas 1,4 and 5 are not active.

The Campanillas and Candelaria Arenas systems serves the Metro Area. For assistance concerning to these systems please contact Mr. Javier Rivera Williams. Mr. Rivera Williams email is as follows: javier.rivera@acueductospr.com

Edgardo Bermúdez Valentín
Director Auxiliar Senior
Area Toa Alta
Cel. (787) 406-9547
Ofic.. (787) 870-8222

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"Snyder, Scott" <S.Snyder@WestonSolutions.com>

04/18/2011 10:27 AM

To "Edgardo.BERMUDEZ@acueductospr.com" <Edgardo.BERMUDEZ@acueductospr.com>

cc:

Subject RE: Maguayo Public Well System

Viewed by: Edgardo BERMUDEZ VALENTIN/DirArea/Noda/AAA at 04/18/2011 11:33:43 AM

Sr. Bermudez Valentin
Thank you!

1

Snyder, Scott

From: Edgardo.BERMUDEZ@acueductospr.com
Sent: Thursday, April 21, 2011 12:15 PM
To: Snyder, Scott
Subject: Re: Santa Rosa Well

Mr. Snyder

The Santa Rosa Well has a production capacity of 1,050 gpm. The super aqueduct contributes with 3,621 gpm.

Edgardo Bermúdez Valentín
Director Auxiliar Senior
Area Toa Alta
Cel. (787) 408-9547
Ofic.. (787) 870-8222

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"Snyder, Scott" <S.Snyder@Weston-Solutions.com>

04/19/2011 08:14 AM

To "Edgardo.BERMUDEZ@acueductospr.com" <Edgardo.BERMUDEZ@acueductospr.com>
cc
Subject Santa Rosa Well

Viewed by: Edgardo BERMUDEZ VALENTIN/Ex/AreaNorte/AAA at 04/21/2011 12:15:17 PM

Mr. Bermudez
Can you provide me with a breakdown of how much water is pumped from Santa Rosa and what the contribution of the Super Aqueduct is to that system?

Scott T. Snyder, CHMM
Principal Project Scientist
Weston Solutions, Inc.
205 Campus Drive, Edison, NJ 08837
Phone: (732) 417-5812
Fax: (732) 417-5801

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CAMPANILLA/CANDELARIA ARENAS

RE: Campanillas and Candelaria Well Systems

Alejandro.QUINONES@acueductospr.com [Alejandro.QUINONES@acueductospr.com]

Sent: Wednesday, May 25, 2011 1:45 PM

To: Snyder, Scott

Cc: Alvaro.SAYAN@acueductospr.com

Good afternoon:

I am sending the answers clarifying your doubts

1- Are the Campanilla and Candelaria Arenas separate systems or are they blended together? You seem to indicate that they are one system (6 wells); however, you listed two separate populations (service connections) suggesting that they are separate systems.

Answer:

Are two separate sectors but the service is a combination of super aqueduct and wells as was described. We can say blended together

2- The pumping rates for the wells are given in gallons per day (GPD). This seems to be very low. Are the pumping rates actually in gallons per minute

Answer:

Excuse me, was a error. The unit should be GPM

3- What I meant by screened intervals is not the length of operation per day, but rather at when depths is the water withdrawn from the aquifer

Answer:

a) Campanilla 1- 600GPM
b) Campanilla 3- 700GPM
c) Campanilla 6- 500GPM
d) Campanilla 7- 500GPM
e) Campanilla 8- 500GPM
f) Candelaria Arenas -200GPM

"Snyder, Scott" [illegible]

05/25/2011 08:55 AM

To "Alejandro.QUINONES@acueductospr.com" [illegible]

cc

Subject RE: Campanilla and Candelaria Well Systems

Moved by: Alejandro.QUINONES@QUINONES/OpRoles/WaterAAA at 05/25/2011 01:45:07 PM

Good morning Mr. Quinones

Could you please clarify a few of the statistics you listed below:

1. Are the Campanilla and Candelaria Arenas separate systems or are they blended together? You seem to indicate that they are one system (6 wells); however, you listed two separate populations (service connections) suggesting that they are separate systems.
2. The pumping rates for the wells are given in gallons per day (GPD). This seems to be very low. Are the pumping rates actually in gallons per minute (GPM)?
3. What I meant by screened intervals is not the length of operation per day, but rather at what depths is the water withdrawn from the aquifer

Thank you again for you help.

scott

From: Alejandro.QUINONES@acueductospr.com [mailto:Alejandro.QUINONES@acueductospr.com]
Sent: Monday, May 23, 2011 3:25 PM
To: Snyder, Scott
Cc: Alvaro.SAYAN@acueductospr.com; Alberto.IRIZARRY@acueductospr.com; Juan.MAYSONET@acueductospr.com
Subject: Campanilla and Candelaria Well Systems
Importance: High

Good Morning Mr. Snyder:

We are sending the answers at the questions that you asked by Campanilla and Candelaria Arenas Well Systems. These are:

1- What are the pumping rates for each of the well in the system?

This system consists of 8 wells. The wells are: Campanilla 1, 3, 6, 7, 8 and Candelaria Arenas. Of these, Campanilla 3 and Candelaria Arenas are out of operation, but Campanilla 1,6,7 and 8 are stand by. Actually the stanby wells are alternated to maintain the pressure in the system, starting one for a week and so. The capacities of the wells are:

a) Campanilla 1- 600GPD
b) Campanilla 3- 700GPD
c) Campanilla 6- 500GPD
d) Campanilla 7- 500GPD
e) Campanilla 8- 500GPD
f) Candelaria Arenas -200GPD

2- What is the contribution of the super aqueduct to each system?

The super aqueduct water arrive at two 10MG tanks. Near of this tanks there is a pump station known as Pepsi. This station has 5 pumps. Each pump has

a capacity of 2,200GPM. Usually only one is in operation and pulls through 36"Ø pipe. This pipe has different ramifications. One of this is the 16"Ø that carries water to Campanilla and Candelaria Arenas Systems. This 16"Ø pipe does not has a meter. We can estimate the contribution in base of clients or house numbers. Of this form the contribution is aprox. 1.48MGD

3- What are the depths or screened intervals for each of the wells?

The screened intervals are 24hr/day/week when the wells are in operation.

4- What is the total population served or number of service connection for each system?

The total number of service connection for Candelaria system are 1,641 and for Campanilla system are 2,838

We hope this information clarifies your doubts. If you need more information please write to alejandro.quinones@aqueductos.com

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U.S. Census Bureau
American FactFinder

FACT SHEET

San Juan Municipio, Puerto Rico

2005-2009 American Community Survey 5-Year Estimates - what's this?
Data Profile Highlights:

Note: The following links are to data from the American Community Survey and the Population Estimates Program.

NOTE: Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, it is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities and towns and estimates of housing units for states and counties.

Social Characteristics - show more >>	Estimate	Percent	U.S.	Margin of Error	
Average household size	2.77	(X)	2.60	+/-0.02	map
Average family size	3.48	(X)	3.19	+/-0.04	
Population 25 years and over	287,744			*****	
High school graduate or higher	(X)	73.1	84.6%	(X)	map
Bachelor's degree or higher	(X)	31.1	27.5%	(X)	map
Civilian veterans (civilian population 18 years and over)	15,114	4.6	10.1%	+/-823	map
With a Disability	(X)	(X)	(X)	(X)	
Foreign born	49,850	11.7	12.4%	+/-2,108	map
Male, Now married, except separated (population 15 years and over)	59,192	37.4	52.3%	+/-1,136	
Female, Now married, except separated (population 15 years and over)	57,138	30.0	48.4%	+/-1,288	
Speak a language other than English at home (population 5 years and over)	377,851	94.4	19.6%	+/-1,336	map
Household population	412,989			+/-1,477	
Group quarters population	(X)	(X)	(X)	(X)	

Economic Characteristics - show more >>	Estimate	Percent	U.S.	Margin of Error	
In labor force (population 16 years and over)	183,503	53.9	65.0%	+/-1,823	map
Mean travel time to work in minutes (workers 16 years and over)	25.8	(X)	25.2	+/-0.4	map
Median household income (in 2009 inflation-adjusted dollars)	23,749	(X)	51,425	+/-561	map
Median family income (in 2009 inflation-adjusted dollars)	28,279	(X)	62,363	+/-784	map
Per capita income (in 2009 inflation-adjusted dollars)	15,597	(X)	27,041	+/-330	
Families below poverty level	(X)	34.3	9.9%	+/-0.8	
Individuals below poverty level	(X)	37.8	13.8%	+/-0.6	map

Housing Characteristics - show more >>	Estimate	Percent	U.S.	Margin of Error	
Total housing units	176,282			+/-694	
Occupied housing units	148,302	83.7	88.2%	+/-1,119	
Owner-occupied housing units	85,417	57.2	66.9%	+/-1,066	
Renter-occupied housing units	63,885	42.8	33.1%	+/-1,105	
Vacant housing units	28,980	16.3	11.8%	+/-1,034	
Owner-occupied homes	85,417			+/-1,066	map
Median value (dollars)	161,800	(X)	185,400	+/-1,813	map
Median of selected monthly owner costs					
With a mortgage (dollars)	1,063	(X)	1,496	+/-18	map
Not mortgaged (dollars)	188	(X)	419	+/-4	

ACS Demographic Estimates - show more >>	Estimate	Percent	U.S.	Margin of Error	
Total population	424,662			*****	
Male	196,798	46.1	49.3%	*****	
Female	228,864	53.9	50.7%	*****	
Median age (years)	37.7	(X)	36.8	+/-0.1	map
Under 5 years	24,515	5.8	6.9%	*****	
18 years and over	329,007	77.5	76.4%	*****	
65 years and over	68,230	16.1	12.8%	*****	
One race	402,946	94.9	97.8%	+/-1,705	
White	286,864	67.6	74.5%	+/-3,285	map
Black or African American	69,923	16.5	12.4%	+/-2,805	map
American Indian and Alaska Native	1,727	0.4	0.8%	+/-360	map
Asian	4,284	1.0	4.4%	+/-847	map
Native Hawaiian and Other Pacific Islander	14	0.0	0.1%	+/-24	map
Some other race	40,133	9.5	5.6%	+/-2,229	map
Two or more races	21,707	5.1	2.2%	+/-1,705	map
Hispanic or Latino (of any race)	416,969	98.2	15.1%	+/-774	

Source: U.S. Census Bureau, 2005-2009 American Community Survey

Explanation of Symbols:
'****' - The median falls in the lowest interval or upper interval of an open-ended distribution. A statistical test is not appropriate.
'*****' - The estimate is controlled. A statistical test for sampling variability is not appropriate.
'N' - Data for this geographic area cannot be displayed because the number of sample cases is too small.
'(X)' - The value is not applicable or not available.

The letters PDF or symbol indicate a document is in the Portable Document Format (PDF). To view the file you will need the Adobe® Acrobat® Reader, which is available for free from the Adobe web site.

VIVONI

v=[illegible]pop_serv=10000&pop_serv=100000&pop_serv=100001&sys_status=active&pop_serv=&wsys_id=&fac_state=PR&last_fac_name=&page=1&query_results=&total_rows_found=

Envirofacts

Search

SDWIS

Search Results

Return

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- Model
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- Contact Us
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Report an Error

Search Selections:
State selected: PUERTO RICO
Water system name containing: Vivoni
Population Selected: Very Small (0-500), Small (501-3,300), Medium (3,301-10,000), Large (10,001-100,000), Very Large (100,000+)
Water System Status: active
Search executed on: AUG-31-2011
Results are based on data extracted on : JUL-19-2011

List of Water Systems in SDWIS

Information about water systems in PUERTO RICO is maintained by PUERTO RICO DEPARTMENT OF HEALTH .

To obtain additional information about drinking water please call EPA's Safe Drinking Water hotline at 1-800-426-4791.

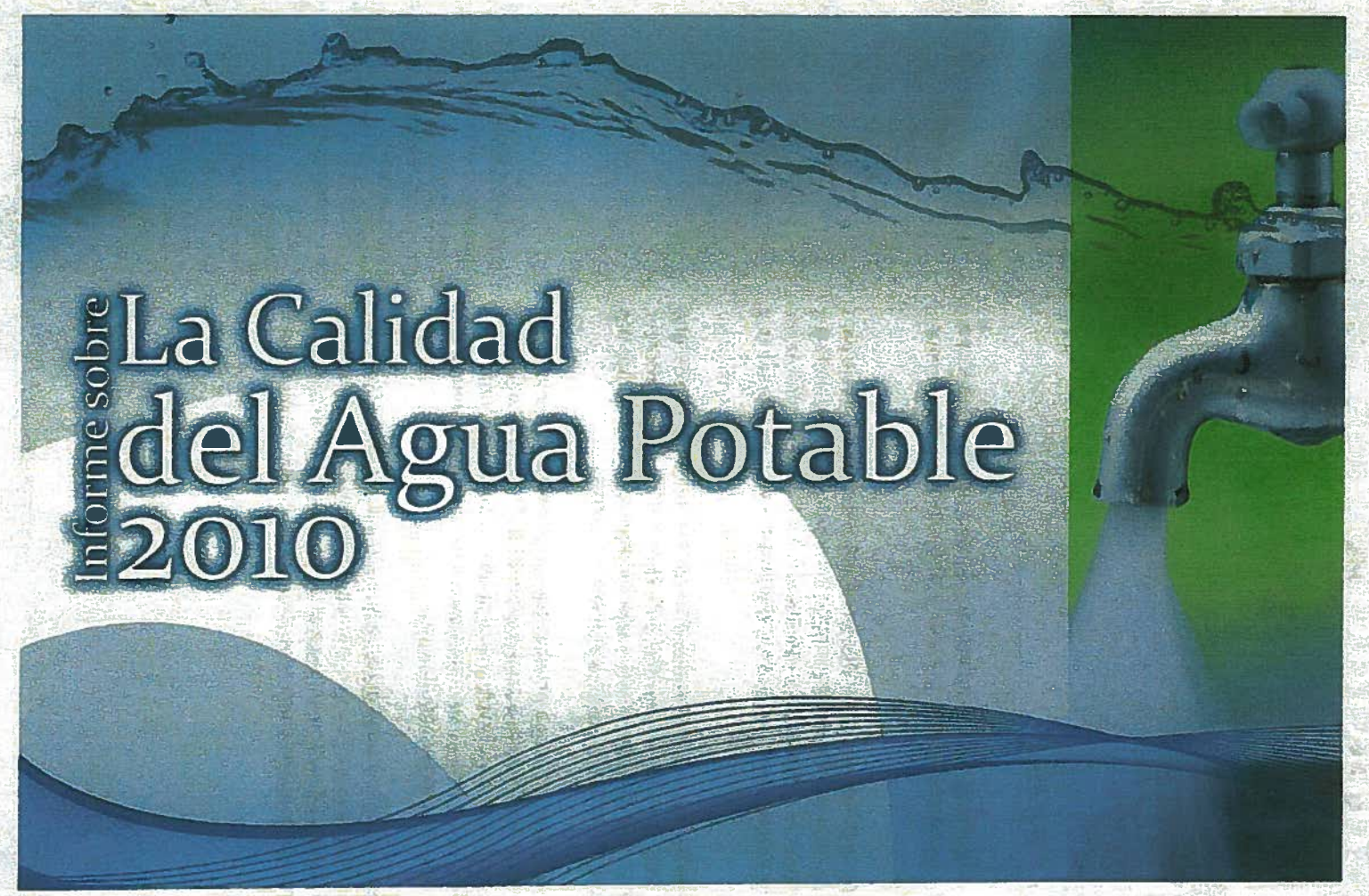
Community Water Systems: Water Systems that serve the same people year-round (e.g. in homes or businesses).

Water System Name	County(s) Served	Population Served	Primary Water Source Type	System Status	Water System ID
VIVONI	DORADO	1728	Groundwater	Active	PR0005617

Non-Transient Non-Community Water Systems: Water Systems that serve the same people, but not year-round (e.g. schools that have their own water system).
No systems were found.

Transient Non-Community Water Systems: Water Systems that do not consistently serve the same people (e.g. rest stops, campgrounds, gas stations).
No systems were found.

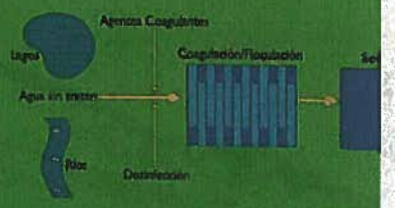
Last updated on Wednesday, August 31, 2011


Informe sobre
La Calidad
del Agua Potable
2010

¿Cómo interpreto mi Informe de Calidad del Agua?

En este informe te ofrecemos información general sobre los sistemas de agua potable además del agua que recibes en tu hogar en específico. En las tablas identificamos los cuerpos de agua que usamos y las plantas donde tratamos la que llega a tu casa. Indicamos las sustancias que analizamos, cuáles encontramos, los resultados obtenidos y los niveles establecidos por las agencias reguladoras. Además, te informamos el posible origen de esas sustancias y los efectos a la salud que pudieran ocurrir cuando se exceden los niveles permitidos. Es importante que conozcas que cuando se excede algún nivel, no significa que tu salud se va a afectar inmediatamente. Cuando ocurre alguna excedencia, de inmediato el sistema comienza a hacer notificaciones públicas por radio o prensa, se toman acciones correctivas y se realizan análisis adicionales hasta certificar que el agua sea segura para tu consumo.

Nuestro proceso de filtración de agua



El proceso de filtración que ofrece la AAA transforr sustancias y microorganismos potencialmente perjudic

Los procesos comprenden la coagulación, la floculac distribución.

El proceso de filtración toma el agua de ríos y lagos y la someto las partículas para removerlas del agua. La floculación es el proc (hundirse) en el tanque donde se recuperará agua limpia. Ésta e y cumplir de ese modo la reglamentación estatal y federal de c

Reglamentación de Agua Potable

Para asegurar que el agua que sale de la pluma en tu casa es segura para consumo humano, la Agencia Federal de Protección Ambiental (EPA) establece reglamentaciones que limitan la cantidad de ciertos contaminantes en los sistemas públicos. La reglamentación aplicable a los sistemas de acueductos es la Reglamentación Nacional Primaria de Agua Potable. Esta reglamentación es desarrollada por la EPA, según dispone la Ley de Agua Potable Segura ("Safe Drinking Water Act") y establece los límites máximos permitidos para cada sustancia en el agua potable y las técnicas de tratamiento necesarias para eliminarlos. En Puerto Rico, el Departamento de Salud, es la agencia responsable de implantar y hacer cumplir esta reglamentación.

¿Por qué hay minerales o sustancias en el agua?

Las fuentes de abasto superficiales incluyen: ríos, lagos, quebradas y riachuelos. En la clasificación de fuentes subterráneas están los pozos y los manantiales. El agua que llega a estos cuerpos de agua y en su trayectoria sobre la superficie de la tierra o en su paso a través del terreno, puede disolver minerales que están naturalmente en el terreno. Además, podría arrastrar sustancias que son el resultado de las diferentes actividades de los seres humanos y los animales.

Es razonable encontrar una cantidad mínima de agentes contaminantes en el agua potable, incluyendo la embotellada. Pero la presencia de estos no significa necesariamente que exista o que representan un riesgo a la salud. Es importante orientarse sobre los contaminantes regulados y no regulados en el agua potable y sus efectos potenciales a la salud. Información sobre estos puede ser obtenida en el Programa de Agua Potable del Departamento de Salud llamando al teléfono: (787)-777-0150, o en las oficinas locales de la EPA al teléfono: (787) 977 -5870, o la línea de Agua Potable de la EPA al teléfono (800) 426-4791.

El estado de los abastos de agua

Un aspecto importante sobre las fuentes de agua es mantener su calidad, evitando su contaminación y el deterioro de su estado natural.

El Departamento de Salud y su Programa de Agua Potable tienen a su cargo el Programa de Protección de Abasto de Agua (Source Water Protection Program, SWAP por sus siglas en inglés) el cual tiene como objetivo ayudar en la protección de estas fuentes de agua. Bajo el programa se realizaron evaluaciones de las fuentes de abasto y la información obtenida está disponible al público en el Departamento de Salud, en las oficinas de su Programa de Agua Potable o en su página de Internet www.salud.gov.pr.

INFORMACIÓN SOBRE CALIDAD DE AGUA POTABLE

Las enmiendas a la Ley de Agua Potable Segura de 1996, requieren que enviemos a nuestros consumidores un breve informe sobre la calidad del agua servida durante el año y las fuentes que usamos para supirla. Este informe resume los resultados obtenidos durante el año o el periodo reglamentario más reciente y el cumplimiento con los estándares y niveles establecidos para agua potable por la Agencia de Protección Ambiental Federal (EPA, por sus siglas en inglés) y el Departamento de Salud Estatal.

En cumplimiento con las reglamentaciones estatales y federales, la Autoridad de Acueductos y Alcantarillados analiza más de 90 posibles contaminantes que pudieran estar en el agua potable. La gran mayoría de estos contaminantes regulados no se encontraron en el agua de su sistema. Las tablas que presentaremos a continuación incluyen los pocos contaminantes que se encontraron en pequeñas cantidades (detectados) en su agua y se identifica si alguno excedió los niveles permitidos. Además encontrará información general sobre el agua, los contaminantes, de donde provienen, y los posibles efectos a la salud cuando se exceden los niveles permitidos.

Para información adicional sobre este informe de Calidad de Agua Potable, puede comunicarse con los funcionarios de Cumplimiento y Control de Calidad de su Región, de lunes a viernes al (787) 879-7211 efectivo el 1 de julio de 2011.

INFORMACIÓN IMPORTANTE PARA LA SALUD

Algunas personas pueden ser más vulnerables que la población general a los contaminantes que pueden estar presentes en el agua potable. Las personas con su sistema inmunológico comprometido tales como: las personas con cáncer que están recibiendo quimioterapia, las que han recibido transplantes de órganos, personas con VIH/SIDA u otras con problemas del sistema inmunológico, algunos ancianos e infantes, pueden estar especialmente en riesgo de alguna infección. La EPA y el Centro para el Control y Prevencción de Enfermedades, tienen información disponible para las personas con riesgo a infecciones por Cryptosporidium y otros contaminantes microbiológicos, la cual puede obtener llamando a la EPA al teléfono 1 - 800 - 426 - 4791, ó en la dirección de internet www.epa.gov/safewater ó www.cdc.gov

¿DE DONDE PROVIENE MI AGUA?

El agua potable que usted consume puede provenir de componentes o fuentes de abasto tanto: superficiales (S), como subterráneos (G) o una combinación de ambas. En su caso, el sistema que le suple agua lo compone:

Pozo Vivoni (G)

TURBIDEZ

La Turbidez es una medida de la transparencia o contenido de partículas en el agua. Se utiliza como indicador de cuan efectivo es el proceso de filtración en la remoción de posibles agentes contaminates. La monitoreamos como indicador de la calidad del agua tratada. Una alta turbidez puede interferir con la efectividad de la desinfección en el control de microorganismos. Estos organismos pueden provocar síntomas tales como nauseas, cólicos, diarrea y dolores de cabeza.

	Parámetro	Límites EPA NMC	Límites EPA MNMC	Resultados	Fecha	Origen Usual del Contaminante
3	Turbidez (% cumplimiento más bajo)	0.3 NTU	N/A	N/A	N/A	No Aplica - Su fuente principal es un POZO (Aguas Subterráneas)
6	Turbidez máxima (NTU)	1 NTU	N/A	N/A	N/A	No Aplica - Su fuente principal es un POZO (Aguas Subterráneas)

BACTERIOLOGÍA

	Parámetro	Límites EPA NMC	Límites EPA MNMC	Resultados	Fecha	Origen Usual del Contaminante
2	Coliformes Fecales	>1	0	1	2010	Desperdicio de animales o descarga sanitaria.
5	Bacterias Coliformes Totales	>1	0	1	Jul, Oct	Están presentes en el ambiente.

PLOMO Y COBRE

La frecuencia en que se monitorea el plomo y cobre dependerá de las fuentes de agua cruda y el historial de resultados. Se incluye el periodo de monitoreo más reciente.

	Parámetro	Nivel de Acción	MNMC	# de puntos que exceden nivel de acción	Valor de la Percentila 90	Fecha	Origen Usual del Contaminante
14	Cobre (ppm)	1.3	1.3	1	0.729	2010	Corrosión del sistema de tubería casera; erosión de depósitos naturales; lixiviación de conservantes de la madera.
17	Plomo (ppb)	15	0	9	40.2 *********	2010	Corrosión del sistema de tubería casera; erosión de depósitos naturales.

Efectos Potenciales a la salud (*******)

17 Infantes y niños que toman dicha agua puede experimentar y mostrar retardo en su desarrollo físico o mental. Pueden mostrar pequeñas deficiencias en habilidades de aprendizaje y atención. Los adultos, por muchos años pueden desarrollar problemas del riñón o presión sanguínea alta.

Explicacion de la(s) Violacion(es)

17 La violación ocurrió en el muestreo realizado en el sistema Vivoni. El plomo puede llegar al agua potable por la corrosión de las tuberías, soldaduras y accesorios de tuberías dentro y fuera de la casa. Al momento de violacion, se muestrearon otros parametros para identificar las causas y controlar la corrosividad. Ademas se avalua el sistema para determinar tratamiento adicional que puede aplicarse para controlar la corrosión d las tuberías.

Términos y Definiciones

Los siguientes términos y definiciones le facilitarán entender la información contenida en este informe sobre la Calidad de Agua de su Sistema.

NMC: Nivel Máximo de Contaminante o nivel más alto permitido en el agua potable. Los NMC son establecidos tan cerca como sea posible del MNMC usando la mejor tecnología disponible.
MNMC: Meta para el Nivel Máximo de Contaminante permitido o el nivel máximo en el agua potable bajo el cual no hay riesgos conocidos o esperados a la salud. Los MNMC permiten un margen de seguridad.
NA: Nivel de Acción - La concentración de un contaminante que provocará que se realicen acciones como establecer tratamiento para prevenir efectos adversos a la salud.
TT: Técnica de Tratamiento - Es un proceso requerido para controlar y reducir el nivel de un contaminante en agua potable.
Dispensa y Exención: Autorización otorgada por el Departamento de Salud (DS) o la Agencia de Protección Ambiental Federal (EPA, por sus siglas en inglés) bajo ciertas condiciones que permiten no cumplir con un NMC o técnica de tratamiento.
MRDL: Nivel Máximo de un Desinfectante Residual permitido en el agua potable.
MRDLG: Meta del Nivel Máximo de un Desinfectante Residual por debajo del cual no hay riesgos a la salud conocidos o esperados.
Contaminante: sustancia o materia física, química, biológica o radiológica en el agua.
N/A: No Aplica
nd: no detectable, comparado con el límite de detección de la prueba.
ppb: partes por billón o microgramos por litro.
ppm: partes por millón o miligramos por litro.
ppt: partes por trillón o nanogramos por litro.
mrem/año: milirems por año. Medida de exposición a radionucleidos.
pCi/l: picocurios por litro. Medida de radioactividad.
NTU: unidad para medir el material particulado en el agua de turbidez
S/N: Sistema Nuevo (se incluye información recolectada)
Max: Máximo **Min:** Mínimo **>:** signo de mayor que

Sabana Hoyos

v=50&pop_serv=10000&pop_serv=100000&pop_serv=100001&sys_status=active&pop_serv=&wsys_id=&fac_state=PR&last_fac_name=&page=1&query_results=&total_rows_found=

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Search Selections:
State selected: **PUERTO RICO**
Water system name beginning with: **Sabana Hoyos**
Population Selected: **Very Small (0-500), Small (501-3,300), Medium (3,301-10,000), Large (10,001-100,000), Very Large (100,000+)**
Water System Status: **active**
Search executed on: **SEP-06-2011**
Results are based on data extracted on : **JUL-19-2011**

List of Water Systems in SDWIS

Information about water systems in PUERTO RICO is maintained by PUERTO RICO DEPARTMENT OF HEALTH .

To obtain additional information about drinking water please call EPA's Safe Drinking Water hotline at 1-800-426-4791.

Community Water Systems: Water Systems that serve the same people year-round (e.g. in homes or businesses).

Water System Name	County(s) Served	Population Served	Primary Water Source Type	System Status	Water System ID
SABANA HOYOS	LOIZA	9524	Groundwater	Active	PR0005587
SABANA HOYOS	ARECIBO	4976	Surface_water	Active	PR0002822
SABANA HOYOS	VEGA ALTA	9524	Groundwater	Active	PR0005587

Non-Transient Non-Community Water Systems: Water Systems that serve the same people, but not year-round (e.g. schools that have their own water system).
No systems were found.

Transient Non-Community Water Systems: Water Systems that do not consistently serve the same people (e.g. rest stops, campgrounds, gas stations).
No systems were found.

Last updated on Tuesday, September 06, 2011

¿POR QUÉ HAY MINERALES O SUSTANCIAS EN EL AGUA?

Las fuentes de abasto de agua superficiales incluyen: ríos, lagos, quebradas y riachuelos. En la clasificación de fuentes subterráneas están los pozos y los manantiales. El agua que llega a estos cuerpos en su trayectoria sobre la superficie de la tierra o en su paso a través del terreno, puede disolver minerales que están naturalmente en el terreno. Además, podría arrastrar sustancias que son el resultado de las diferentes actividades de los seres humanos y los animales.

Es razonable encontrar una cantidad mínima de agentes contaminantes en el agua potable, incluyendo el agua embotellada. Pero la presencia de estos no significa necesariamente que exista o que representan un riesgo a la salud. Es importante orientarse sobre los contaminantes regulados y no regulados en el agua potable y sus efectos potenciales a la salud. Información sobre estos puede ser obtenida en el Programa de Agua Potable del Departamento de Salud llamando al teléfono: (787)-777-0150, o en las oficinas locales de la EPA al teléfono: (787) 977 -5870, o la línea de Agua Potable de la EPA al teléfono (800-426-4791).

¿DE DÓNDE PROVIENEN?

El agua de las fuentes utilizadas en los sistemas públicos, antes de recibir el tratamiento para convertirla en agua potable, podría tener los siguientes contaminantes:

- Microbiológicos - Éstos incluyen virus y bacterias, que pueden originarse de: descargas sanitarias, pozos sépticos, actividades de ganadería y vida silvestre.

- Químicos Inorgánicos - Éstos incluyen sales y metales, que pueden tener origen natural o son el resultado de las escorrentías de lluvia. Además, otros orígenes pueden ser las descargas de agua con desperdicios domésticos o industriales, la producción de gases, aceites o cultivos.

- Plaguicidas y Herbicidas - Éstos contaminantes pueden tener origen de una variedad de fuentes como: la agricultura, escorrentía de lluvia y de usos residenciales.

- Químicos Orgánicos - Éstos incluyen químicos orgánicos sintéticos y volátiles, que son productos intermedios de procesos industriales y de la producción de petróleo. Además, pueden tener su origen en gasolineras, escorrentías de lluvia y pozos sépticos.

- Radiológicos - Éstos pueden estar presentes en el terreno de forma natural.

Para asegurar que el agua que sale de la pluma en tu casa es segura para consumo humano la Agencia Federal de Protección Ambiental (EPA) establece reglamentaciones que limitan la cantidad de ciertos contaminantes en el agua de los sistemas públicos. La reglamentación aplicable a los sistemas de acueductos es la Reglamentación Nacional Primaria de Agua Potable. Esta reglamentación es desarrollada por la Agencia de Protección Ambiental Federal según dispone la Ley de Agua Potable Segura ("Safe Drinking Water Act") y establece los límites máximos permitidos para contaminantes en el agua potable y las técnicas de tratamiento

necesarias. En Puerto Rico, el Departamento de Salud, es la agencia responsable de implantar y hacer cumplir esta reglamentación.

EL ESTADO DE LOS ABASTOS DE AGUA

Otro aspecto importante sobre las fuentes de aguas es mantener la calidad evitando su contaminación y deterioro de su estado natural.

El Departamento de Salud y su Programa de Agua Potable tienen el Programa de Evaluación de Abastos de Agua (Source Water Assesment Program, SWAP por sus siglas en inglés) el cual tiene como objetivo ayudar en la protección de estas fuentes de agua. Se realizaron evaluaciones de las fuentes de abasto y la información obtenida estará disponible al público tan pronto concluya el informe. Esta puede obtenerse en el Departamento de Salud en las oficinas de su Programa de Agua Potable.

CÓMO ASEGURAMOS QUE TU AGUA SEA POTABLE

1. Proceso de Tratamiento

El proceso de tratamiento que ofrece la AAA transforma el agua natural en agua potable, eliminándole las sustancias y microorganismos potencialmente perjudiciales. Los procesos comprenden la coagulación, la floculación/sedimentación, la filtración, la desinfección y su distribución. El proceso de tratamiento toma el agua de ríos y lagos y las somete a procesos físicos y mecánicos. Uno de estos, coagula o atrapa las partículas para removerlas del agua. La floculación es el proceso por el cual los coágulos se unen entre sí para sedimentarse (hundirse) en el tanque donde se recuperará agua limpia. El agua limpia es filtrada y desinfectada con cloro para garantizar su potabilidad y cumplir de ese modo la reglamentación estatal y federal de calidad de agua potable.

2. Programa intenso de muestras realizadas en nuestros laboratorios

Bacteriología	49,676
Cloro Residual	49,676
Subproductos de desinfección	7,408
Inorgánicos	19,096
Orgánicos	3,359
Desinfectantes	4,209

3. La certificación de nuestros operadores, otra medida para asegurar la calidad del agua potable

La reglamentación requiere, además, tener operadores certificados en los sistemas públicos de agua. En enmiendas recientes a la reglamentación federal, se establecen guías sobre la certificación de operadores. Este requisito es para todos los sistemas de tratamiento de agua.

En la Autoridad de Acueductos y Alcantarillados (AAA), estamos adiestrando a nuestros operadores para que la Junta Examinadora de Operadores de Plantas de Tratamiento de Agua Potable y Aguas Usadas de Puerto Rico los evalúe y los certifique según la reglamentación existente.

Sistema: Sabana Hoyos
PWSID: 5587

Información Sobre Calidad de Agua Potable

Las enmiendas a la Ley de Agua Potable Segura de 1996, requieren que enviemos a nuestros consumidores un breve informe sobre la calidad del agua servida durante el año y las fuentes que usamos para suplirla. Este informe resume los resultados obtenidos durante el año o el periodo reglamentario más reciente y el cumplimiento con los estándares y niveles establecidos para agua potable por la Agecia Protección Ambiental Federal (EPA, por sus siglas en Inglés) y el Departamento de Salud Estatal.

En cumplimiento con las reglamentaciones estatales y federales, la Autoridad de Acueductos y Alcantarillados analiza mas de 90 posibles contaminantes que pudieran estar en el agua potable. La gran mayoría de estos contaminantes regulados no se encontraron en el agua de su sistema. Las tablas que presentaremos a continuación incluyen los pocos contaminantes que se encontraron en pequeñas cantidades (detectados) en su agua y se identifica si alguno excedió los niveles permitidos. Además encontrará información general sobre el agua, los contaminantes, de donde provienen, y los posibles efectos a la salud cuando se exceden los niveles permitidos.

Para información adicional sobre este Informe de Calidad de Agua Potable, puede comunicarse con los funcionarios de Cumplimiento y Control de Calidad de su Región, de lunes a viernes al (787) 879-7211 efectivo el 1 de julio de 2007.

Información Importante para la Salud

Algunas personas pueden ser más vulnerables que la población general a los contaminantes que pueden estar presentes en el agua potable. Las personas con su sistema inmunológico comprometido tales como: las personas con cáncer que están recibiendo quimioterapia, las que han recibido transplantes de órganos, personas con VIH/SIDA u otras con problemas del sistema inmunológico, algunos ancianos e infantes, pueden estar especialmente en riesgo de alguna infección. La EPA y el Centro para el Control y Prevencción de Enfermedades, tienen información disponible para las personas con riesgo a infecciones por Cryptosporidium y otros contaminantes microbiológicos, la cual puede obtener llamando a la EPA al teléfono 1-800-426-4791 o en la dirección de Internet www.epa.gov/safewater.

¿De donde Proviene mi Agua?

El agua potable que usted consume puede provenir de componentes o fuentes de abasto tanto: superficiales (S), como subterráneos (G) o una combinación de ambas. En su caso, el sistema que le suple agua lo compone:

Pozo Monserrate (G), Pozo Sabana Hoyos I (G), Pozo Sabana Hoyos II (G), Sabana Hoyos III (G)

TURBIDEZ

La Turbidez es una medida de la transparencia o contenido de partículas en el agua. Se utiliza como indicador de cuan efectivo es el proceso de filtración en la remoción de posibles agentes contaminates. La monitoreamos como indicador de la calidad del agua tratada. Una alta turbidez puede interferir con la efectividad de la desinfección en el control de microorganismos. Estos organismo pueden provocar síntomas tales como nauseas, cólicos, diarrea y dolores de cabeza.

	Parámetro	Límites EPA NMC	Límites EPA MNMC	Resultados	Fecha	Origen Usual del Contaminante
3	Turbidez (% cummplimiento más bajo, con 0.3 NTU)	0.3 NTU	N/A	N/A	N/A	No Aplica porque su fuente principal es un POZO (Aguas Subterráneas)
6	Turbidez máxima (NTU)	1 NTU	N/A	N/A	N/A	No Aplica porque su fuente principal es un POZO (Aguas Subterráneas)

Efectos Potenciales a la salud (*******)

3	No hay efectos a la salud porque su fuente principal es un POZO (Aguas Subterráneas)
6	No hay efectos a la salud porque su fuente principal es un POZO (Aguas Subterráneas)

BACTERIOLOGÍA

	Parámetro	Límites EPA NMC	Límites EPA MNMC	Resultados	Fecha	Origen Usual del Contaminante
2	Coliformes Fecales	>1	0	1	2006	Desperdicio de animales o descarga sanitaria.
5	Bacterias Coliformes Totales	>1	0	3 *********	Enero	Están presentes en el ambiente.

Efectos Potenciales a la salud (*******)

2	son bacterias cuya presencia indica que el agua puede estar contaminada con escremento animal o de humano. Los microbios en estos desperdicios pueden causar diarrea, calambre, nausea, dolor de cabeza u otros síntomas.
5	son bacterias las cuales están presentes naturalmente en el ambiente y son utilizadas como indicador de otras bacterias que pueden estar presentes también y causar daño potencial.

PLOMO Y COBRE

La frecuencia en que se monitorea el plomo y cobre dependerá de las fuentes de agua cruda y el historial de resultados. Se incluye el periodo de monitoreo más reciente.

	Parámetro	Nivel de Acción	MCLG	# de puntos que exceden nivel de acción	Valor de la Percentila 90	Fecha	Origen Usual del Contaminante
14	Cobre (ppm)	1.3	1.3	0	0.42	2006	Corrosión del sistema de tubería casera; erosión de depósitos naturales; lixiviación de conservantes de la madera.
17	Plomo (ppb)	15	0	0	4.6	2006	Corrosión del sistema de tubería casera; erosión de depósitos naturales.

Efectos Potenciales a la salud (*******)

14	
17	

Sistema: Sabana Hoyos
PWSID: 5587

CONTAMINANTES REGULADOS DETECTADOS

	Contaminantes	NMC - TT MRDL - NA	NMCL	Resultados Valor	Resultados Rango	Fecha	Origen usual del Contaminante
Químicos Inorgánicos							
16	Fluoruro (ppm)	4	4	0.062	0.033-0.062	2005	Erosión de los depósitos naturales; aditivo del agua que previene el deterioro dental; descarga de fábricas de fertilizantes y aluminio.
19	Nitrato [como nitrógeno] (ppm)	10	10	7.15	.26 - 7.15	2006	Escorrentía con fertilizantes; lixiviación de pozos sépticos y alcantarillado; erosión de los depósitos naturales
114	Cloro Residual (ppm)	4	4	1.03	0.03 - 4.5	2006	Es usado en el agua para el control de microbios.
Químicos Orgánicos Volátiles							
72	Tricloroetileno (ppb)	5	0	1.6	1.5-1.7	2006	Descarga de lugares donde se limpian grasas en metales y otras industrias.
Regla Desinfectantes y Subproductos de Desinfección							
73	TTHM's [Trihalometanos Total] (ppb)	80	N/A	17.8	N/A	2006	Residuos o subproductos del proceso de desinfección del agua.
99	Acidos Haloacéticos (ppb)	60	N/A	13	N/A	2006	Residuos o subproductos del proceso de desinfección del agua
110	Carbono Total Orgánico [TOC]	TT	N/A	N/A	N/A	N/A	No aplica porque su fuente principal es un POZO (Aguas Subterráneas)

Detecciones Especiales

(Arsénico (ppb) = > 5.0 y <= 10.0 mg/L) - (Nitratos (ppm) = > 5 y < 10 mg/L)

19	El nitrato en el agua potable a niveles sobre 10 ppm, representa un riesgo a la salud para infantes menores de seis (6) meses de edad y pueden causar el síndrome del bebé azul. El nitrato puede aumentar en periodos cortos de tiempo debido a la lluvia o la actividad agrícola. Si usted tiene a su cuidado a un infante debe orientarse con su médico sobre posibles efectos a dicha exposición.

Contaminante Detectados No Regulados

Incluímos información de contaminantes no regulados que fueron monitoreados durante el año. Estos se monitorean para determinar si estan presentes en el agua, recopilar información que ayude a la EPA a decidir si es necesario regularlos o establecer niveles permitido.

	Contaminante	Valor	Rango	Fecha	Origen Usual del Contaminante
96	Sulfato (ppm)	20.7	13.6 - 20.7	2004	La reglamentación requiere muestreo mientras se establece un NMC y MNMC.

Otros Contaminantes Detectados

Contaminante	Promedio	Importancia de los resultados	Origen Usual del Contaminante

Violaciones de Muestreo y Reporte

La Autoridad de Acueductos y Alcantarillados esta obligada a tomar y analizar muestras del agua servida en unos periodos y con un frecuencia establecida en la reglamentación. Las violaciones de muestreo y reporte, no representan incumplimiento con los estándares de calidad de agua y ocurren cuando no se realiza un muestreo requerido, o cuando no se cumple con la fecha para someter un informe. En la siguiente tabla se encuentran las violaciones de muestreo y reporte por contaminante o grupo de contaminantesde este sistema para el 2006.

Contaminante	Periodo de Muestreo	Muestras Requeridas	Muestras Tomadas
Bacteriología	OCTUBRE 2006	10	9
VOC	ENE-MAR 2006	1	0

Términos y Definiciones

Los siguientes términos y definiciones le facilitarán entender la información contenida en este informe sobre la Calidad de Agua de su Sistema.

NMC: Nivel Máximo de Contaminante o nivel más alto permitido en el agua potable. Los NMC son establecidos tan cerca como sea posible del MNMC usando la mejor tecnologia disponible.
MNMC: Meta para el Nivel Máximo de Contaminante permitido o el nivel máximo en el agua potable bajo el cual no hay riesgos conocidos o esperados a la salud. Los MNMC permite un margen de seguridad.
N/A: Nivel de Acción - La concentración de un contaminante que provocará que se realicen acciones como establecer tratamiento para prevenir efectos adversos de salud.
TT: Técnica de Tratamiento - Es un proceso requerido para controlar y reducir el nivel de un contaminante en agua potable.
Dispensa y Exención: Autorización otorgada por el Departamento de Salud (DS) o la Agencia Protección Ambiental Federal (EPA, por sus siglas en inglés) bajo ciertas condiciones que permiten no cumplir con un NMC o técnica de tratamiento.
MRDL: Nivel Máximo de un Desinfectante Residual permitido en el agua potable.
MRDLG: Meta del Nivel Máximo de un Desinfectante Residual por debajo del cualno hay riesgos a la salud conocidos o esperados.
Contaminante: sustancia o materia física, química, biológica o radiológica en el agua.
N/A: No Aplica
nd: no detectable, comparado con el límite de detección de la prueba.
ppb: partes por billón o microgramos por litro.
ppm: partes por millón o miligramos por litro.
ppt: partes por trillón o nanogramos por litro.
mrem/año: milirems por año. Medida de exposición a radionucleidos.
pCi/l: picocurios por litro. Medida de radioactividad.
NTU: unidad para medir el material particulado en el agua de turbidez
S/N Sistema Nuevo (se incluye información recolectada)
Max: Máximo **Min:** Mínimo **>:** signo de mayor que

EL AGUA POTABLE Y LAS CUENCAS HIDROGRÁFICAS: RESPONSABILIDAD DE TODOS

1. Las cuencas hidrográficas y las represas son partes integrales de nuestro sistema regional de suministro de agua. ¡Consérvalas!

2. Es más efectivo y económico prevenir la contaminación de los abastos del agua potable que pagar por el tratamiento o limpieza de los mismos.

3. Puedes contribuir a la conservación de los abastos de agua reciclando o desechando correctamente los residuos domésticos peligrosos no deseados.

4. El uso de pesticidas y herbicidas puede afectar la calidad del agua. Cerciórate que uses los productos más amigables para el ambiente y dispón de ellos adecuadamente.

5. No viertas aceite para motores, anticongelantes ni otros materiales tóxicos en los desagües pluviales. El agua que entra en los desagües pluviales llega directamente a nuestros ríos y quebradas. ¡No los contamines!

6. No arrojes diluyentes de pintura, insecticidas, herbicidas ni otros productos químicos nocivos por el fregadero.

MEDIDAS PREVENTIVAS

- Si experimentas interrupciones en el servicio de agua, asegura hervirla por lo menos dos (2) minutos antes de consumirla.
- Si el agua de algún grifo en particular no se ha utilizado durante seis horas o mas, deja correr el agua fría hasta que salga de la tubería tan fría como sea posible.
- Utiliza solamente el agua fría del grifo para beber, cocinar y, especialmente, para preparar la fórmula de bebé.

20 MEDIDAS PARA AHORRAR AGUA Y DINERO

¡Empieza ahora! Sigue estos consejos para reducir el consumo de agua y economiza en tu factura, ponlo en la nevera o en un lugar visible. Haz que la conservación sea parte de tu vida.

- Descongela la comida en la nevera desde la noche anterior en vez de usar la pluma para descongelar. Se desperdicia casi 3 galones de agua por minuto con la pluma totalmente abierta.
- Cuando laves los platos, no dejes el agua correr mientras enjabonas o enjuagas.
- Usa tu lavadora de platos o de ropa sólo con tandas llenas, podrías ahorrar 1,000 galones ó 3.78 m^3 al mes.
- Lava tus frutas y vegetales en un recipiente parcialmente lleno de agua en vez de hacerlo bajo la pluma.
- Verifica las llaves de paso y arréglalas. Es sencillo, barato y puedes ahorrar 140 galones a la semana o cerca de 2 m^3 al mes.
- Bota pañuelos desechables y algodones en el cesto de la basura en vez de

echarlos en el inodoro y estarás ahorrando agua por galones.

- Dúchate en menos de 5 minutos y ahorra hasta 1,000 galones ó 3.78 m^3 al mes. Una ducha abierta durante 10 minutos gasta 26 1/2 galones de agua.
- Echa colorante de comida en el tanque del inodoro. Si se colorea el agua en la taza, tu inodoro tiene un liqueo. Arréglalo y ahorra más de 600 galones ó 2.27 m^3 al mes.
- Si tu inodoro es de antes de 1980, coloca un galón plástico lleno de agua dentro del tanque para controlar la cantidad de agua que se usa en cada descarga. Asegúrate que no interfiera con los mecanismos del tanque.
- Si tu ducha llena un cubo de un galón de agua en menos de 20 segundos, instala un cabezal de ducha de flujo reducido (low flow). Te ahorra hasta 500 galones o casi 2 m^3 a la semana.
- Cierra la pluma al cepillarte los dientes y ahorra 4 galones de agua por minuto. Eso equivale a 200 galones a la semana ó 3 m^3 al mes para una familia de cuatro miembros.
- Si la cierras mientras te afeitas, ahorrarás más de 100 galones a la semana ó 1.5 m^3 al mes.
- Cierra la ducha mientras te enjabonas y te aplicas el champú o acondicionador y ahorra más de 50 galones a la semana o más de 1 m^3 al mes.
- Usa una escoba en vez de la manguera para limpiar la marquesina o la acera y ahorra 80 galones de agua cada vez.
- Pon una capa de viruta orgánica (mulch) alrededor de las plantas para reducir la evaporación y ahorrarás cientos de galones de agua al año.
- Dirige los canales y desagües del techo hacia los arbustos y árboles, o recoge esa agua y úsala para regar tus plantas.
- Minimiza la evaporación del agua regando tus plantas temprano en la mañana, cuando las temperaturas son más bajas y los vientos más livianos.
- No podes la grama demasiado. Una grama más alta protege las raíces y conserva mejor la humedad del terreno.
- Lava tu carro sobre la grama, aprovecha el agua para ambos fines.
- Usa una manguera con pistero y ahorrarás más de 100 galones cada vez. Una manguera abierta desperdicia hasta 10 galones por minuto.

Product Safety Summary

ExxonMobil Chemical

EXXSOL ™ D40 FLUID

This Product Safety Summary document is a high-level summary intended to provide the general public with an overview of product safety information on this chemical substance. It is not intended to provide emergency response, medical or treatment information, or to provide a discussion of all safety and health information. This document is not intended to replace the Material Safety Data Sheet. Warnings and handling precautions provided below are not intended to replace or supersede manufacturers' instructions and warning for their consumer products which may contain this chemical substance.

1. Chemical Identity

Exxsol™ D40 Fluid is produced from petroleum-based raw materials which are treated with hydrogen in the presence of a catalyst to produce a low odor, low aromatic hydrocarbon solvent. The major components include normal paraffins, isoparaffins, and cycloparaffins.

CAS No.: 64742-47-8 **Chemical Name:** Distillates (petroleum), hydrotreated light (US product)

CAS No.: 64742-48-9 **Chemical Name:** Naphtha (petroleum), hydrotreated heavy (EU and AP product)

2. Product Uses

Exxsol D40 Fluid is a solvent used in industrial and professional applications such as manufacturing process solvent, metal working, and coatings. It may be repackaged and sold directly to the public for general consumer uses, for example to clean paint brushes. This product may be an ingredient in consumer and commercial applications which may include:

- Metal working solvents
- Architectural, construction and traffic marking coatings

3. Physical / Chemical Properties

Exxsol D40 Fluid is a flammable material and should be handled only with adequate ventilation and in areas without any ignition source present (e.g. no open flames, static electricity sources, or unprotected light switches).

The flash point for this product is approximately 104°F / 40°C.

4. Health Information

Exxsol D40 Fluid is generally recognized to have low acute and chronic toxicity. Vapor or aerosol concentrations above the exposure limit of 197 parts per million (ppm) in the air can cause eye and lung irritation and may cause headaches, dizziness or drowsiness. Prolonged or repeated skin contact in an occupational setting may result in irritation and in these situations, the use of chemical resistant gloves is recommended. This product is not regarded as a mutagen or carcinogen, and there is low concern for reproductive, developmental, or nervous system toxic effects.

5. Additional Hazard Information

If accidentally swallowed, small amounts of liquid may be aspirated into the lungs during ingestion or from vomiting which may cause severe lung inflammation and lung edema (an accumulation of fluid in the lungs). This is a medical emergency which must be immediately and properly treated. Do not induce vomiting.

6. Food Contact Regulated Uses

Appropriate manufacturing and distribution practices are employed to ensure the quality of Exxsol D40 Fluid offered for use in indirect food contact applications.

7. Environmental Information

Exxsol D40 Fluid biodegrades at a rapid rate and will not persist in the environment. It is not expected to cause short-term toxicity to fish or other aquatic organisms. Because of its low solubility in water and volatility (tendency to move from water to air) chronic aquatic toxicity is not expected. Exxsol D40 Fluid is a volatile organic compound (VOC) and is rapidly degraded in air. Considerable measures are taken to prevent its release to the atmosphere and minimize any exposure to the environment from manufacturing and use activities.

8. Exposure Potential

- **Workplace exposure** – This refers to potential exposure in a manufacturing facility or through evaporation in various industrial applications. Generally, exposure of personnel in manufacturing facilities is relatively low because the process, storage and handling operations are enclosed. The ExxonMobil recommended occupational exposure limit (OEL) is 197 ppm per 8-hour work day.
- **Consumer use of products containing Exxsol D40 Fluid** – If exposure should occur, it is likely to be infrequent and of short duration depending on the products used and the conditions under which they are used. Exposure could occur through the use of commercial metal working solvents or coatings formulations, paint diluents, and cleaning fluids that contain this product. The best way to prevent exposure to vapors is to work in well-ventilated areas, wear chemical resistant gloves, and follow good personal hygiene practices.
- **Environmental releases** – As a chemical manufacturer, we are committed to operating in an environmentally responsible manner everywhere we do business. Our efforts are guided by in-depth scientific understanding of the environmental impact of our operations, as well as by the social and economic needs of the communities in which we operate. Industrial spills or releases are rare; however a spill may pose a significant flammability issue. Our operational improvement targets and plans are based on driving incidents with real environmental impact to zero and delivering superior environmental performance.

9. Manufacture of Product

- **Capacity** – Publicly available sources report total global production capacity for this type of solvent product exceeded 1 billion pounds in 2005 (450 kT).
- **Process** – Exxsol D40 Fluid is produced from petroleum-based raw materials which are treated with hydrogen in the presence of a catalyst to produce a low odor solvent.

10. Risk Management

- **Workplace Risk Management** – When using this product, make sure that there is adequate ventilation. Always use chemical resistant gloves to protect your hands and skin and always wear eye protection such as chemical goggles. Do not eat, drink, or smoke where chemicals are handled, processed, or stored. Wash hands and skin following contact. If this product gets into your eyes, rinse eyes thoroughly for at least 15 minutes with tap water and seek medical attention. Please refer to the Safety Data Sheet.
- **Consumer Risk Management** - This chemical may be repackaged and sold directly to the public for general consumer uses. If exposure should occur, it is expected to be infrequent and of short duration. Always follow manufacturers' instructions, warnings and handling precautions when using their products.The best way to prevent exposure to vapors is to work in well-ventilated areas.

11. Federal/Science Agency Resources

(For CAS No. searches, enter 64742-47-8 or 64742-48-9)

Organization for Economic Cooperation and Development (OECD) - ChemPortal web-based search tool

- http://webnet3.oecd.org/echemportal/

European Chemical Substances Information System (ESIS)

- http://ecb.jrc.it/esis/

12. Regulatory Information

Regulations may exist that govern the manufacture, sale, transportation, use and/or disposal of this chemical and may vary by city, state, country or geographic region. Additional helpful information may be found by consulting the relevant ExxonMobil Safety Data Sheet at:

- http://www.msds.exxonmobil.com/psims/psims.aspx?brand=xomcc

13. Conclusion Statements

- Exxsol D40 Fluid is a widely used industrial solvent, and may be an ingredient in consumer products.
- Exxsol D40 Fluid is low in toxicity; however it may cause lung damage if swallowed.
- Exxsol D40 Fluid does not cause adverse health or environmental effects at levels typically found in the workplace or environment.
- Exxsol D40 Fluid is combustible; use only with good ventilation; avoid all ignition sources.

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PRE-CERCLIS SCREENING/NEW SITE ASSIGNMENT FORM

EPA ID NUMBER: None

SITE NAME: Laundry Espinosa

PREVIOUS NAMES (AKAs): None

SITE LOCATION:

Street address: Route 2, Km 27.4
City: Bo. Espinosa, Dorado
State: Puerto Rico
Zip code: 00646
County: Not Applicable

BLOCK: N/A
LOT: N/A

LATITUDE (decimal degrees): +18.407145219
LONGITUDE (decimal degrees): -66.30196708

a. Accuracy meters: 1.02
b. Collection method: Global Positioning System
c. Reference datum: WGS84
d. Reference point: Driveway entrance (customer parking)
e. Source map scale: None
f. Point/line/area: Point
g. Collection date: 8/27/2009

(See attachment 1 for available values)

AVAILABLE SITE TYPE MAIN CATEGORIES: Other
AVAILABLE SITE TYPE MAIN SUBCATERGORIES: Retail/commercial (dry cleaning service)
(See attachment 2 for available values)

COMPLETE THE FOLLOWING CHECKLIST.

	YES	NO
1. Does the site already appear in CERCLIS?		X
2. Is the release from products that are part of the structure of, and result in exposure within, residential buildings or businesses or community structures?		X
3. Does the site consist of a release of a naturally occurring substance in its unaltered form, or altered solely through naturally occurring processes or phenomena, from a location where it is naturally found?		X
4. Is the release into a public or private drinking water supply due to deterioration of the water supply system through ordinary use?		X
5. Is some other program actively involved with the site (i.e., another Federal, State or Tribal program)?		X
6. Are the hazardous substances potentially released at the site regulated under a statutory exclusion (i.e., petroleum, natural gas, natural gas liquids, synthetic gas usable for fuel, normal application of fertilizer, release located in a workplace, naturally occurring, or regulated by the NRC, UMTRCA or OSHA?	X	

7. Are the hazardous substances potentially released at the site excluded by policy considerations (e.g., deferral to RCRA Corrective Action)?		X
8. Is there sufficient documentation that clearly demonstrates that there is no potential for a release that could cause adverse environmental or human health impacts (e.g., comprehensive remedial investigation equivalent data showing no release above ARARs, completed removal action, previous HRS score determined, ASTM Phase I, II, etc. completed, EPA approved risk assessment completed)?		X

EXPLAIN ALL YES ANSWERS:

A 500-gallon diesel tank is present on site. Petroleum products, including diesel, fall under CERCLA's petroleum exclusion provisions.

SITE DETERMINATION:

_X_ **FURTHER ASSESSMENT IS RECOMMENDED. ENTER SITE INTO CERCLIS.**

____ **THE SITE IS NOT RECOMMENDED FOR PLACEMENT INTO CERCLIS.**

DISCUSS DECISION AND RATIONALE:

Pre-CERCLIS screening activities at this facility are being conducted under EPA's Maguayo Site Discovery. A review of Puerto Rico Aqueduct and Sewer Authority (PRASA) quarterly public well system organic analytical data for January 2002 through September 2006 indicates tetrachloroethylene (PCE) and trichloroethylene (TCE) contamination of the public wells within the Maguayo system. Concentrations of these contaminants exceeded the Hazard Ranking System (HRS) Level I benchmarks throughout this time period and exceeded the Maximum Contaminant Level (MCL) for TCE on two occasions. Analytical results of aqueous samples collected by WESTON in July 2008 confirmed the presence of PCE and TCE at concentrations above their respective HRS Level I benchmarks.

On August 27, 2009, WESTON personnel observed the Laundry Espinosa dry cleaning facility. Laundry Espinosa is a dry cleaner that has been operating at the current location for 30 years. Observations made during the facility inspection indicated that the site is currently clean and well-maintained. No wastes are stored outside and no signs of spills or discharges were noted. The facility currently uses Exol™, an ethanol-based cleaning solution.

Based on possible historical use of PCE as a cleaning solvent (as is common in the dry cleaning industry) and the length of time that dry cleaning has been conducted at the site (i.e., 30 years), Laundry Espinosa is recommended for further assessment under CERCLA.

Checklist preparer: Scott Snyder
Print name/signature

9/23/09
Date

Title: Principal Project Scientist, Weston Solutions, Inc.
Date: 9/23/09
Address: 205 Campus Drive, Edison, NJ 08837
Phone Number: (732) 417-5812
E-mail address: s.snyder@westonsolutions.com

Regional EPA Reviewer: _____
Print name/signature

_____
Date

ATTACHMENT 1

REQUIRED INFORMATION FOR SITE COORDINATES

Please provide Latitude and Longitude in decimal degrees.

a. Accuracy meters: Describe the accuracy value as a range (+/-) of the latitude and longitude in meters: **1.02**

b. Collection method: Describe the method used to determine the site coordinates.

- ☐ Address matching
  - ☐ Block Face
  - ☐ Digitized
  - ☐ House Number
  - ☐ Nearest Intersection
  - ☐ Primary Name
  - ☐ Street Centerline
  - ☐ Other (specify) _____
- ☐ Interpolation
  - ☐ Map
  - ☐ Digital map source (TIGER)
  - ☐ Photo
  - ☐ Satellite
  - ☐ MSS
  - ☐ SPOT
  - ☐ TM
  - ☐ Other (specify) _____
- ☒ Global Positioning System
  - ☐ Carrier phase kinematic relative positioning technique
  - ☐ Carrier phase static relative positioning technique
  - ☐ Code measurements (pseudo range) differential (DGPS)
  - ☐ Code measurements (pseudo range) precise positioning service
  - ☐ Code measurements (pseudo range) standard positioning service SA off
  - ☐ Code measurements (pseudo range) standard positioning service SA on
  - ☒ GPS unspecified
- ☐ Public land Survey
  - ☐ Footing
  - ☐ Quarter section
  - ☐ Eighth section
  - ☐ Sixteenth section
  - ☐ Section
- ☐ Census
  - ☐ Block - 1990 - centroid
  - ☐ Block/group - 1990 - centroid
  - ☐ Block tract - 1990 - centroid
  - ☐ Other (specify) _____

- ☐ Loran C
  - ☐ Classical Surveying Techniques
  - ☐ Zip Code Centroid
  - ☐ Zip+2 Centroid
  - ☐ Zip+4 Centroid
  - ☐ Unknown
  - ☐ Other (specify) _____

c. Reference Datum: Please describe the reference datum of the latitude and longitude

- ☐ NAD27
- ☐ NAD83
- ☒ WGS84
- ☐ Other (specify) _____
- ☐ Unknown

d. Reference Point: Describe the category of feature referenced by the site coordinates

- ☐ Administrative building
- ☐ Air monitoring station
- ☐ Air release
  - ☐ Stack
  - ☐ Vent
- ☐ Atmosphere emissions treatment unit
- ☐ Boundary point
- ☐ Center of facility/centroid
- ☐ Facility/station building entrance
- ☐ Intake point
- ☐ Lagoon or settling pond
- ☐ Liquid waste treatment unit
- ☐ Loading area centroid
- ☐ Loading facility
- ☐ Monitoring point
- ☐ Northeast corner of land parcel
- ☐ Northwest corner of land parcel
- ☐ Plant Entrance
  - ☐ Freight
  - ☐ General
  - ☐ Personnel
- ☐ Process Unit
- ☐ Process Unit area centroid
- ☐ Southeast corner of land parcel
- ☐ Southwest corner of land parcel
- ☐ Solid waste treatment/disposal unit
- ☐ Solid waste storage area
- ☐ Water monitoring station
- ☐ Water release pipe
- ☐ Well

- ☐ Well protection area
- ☐ Within limits of groundwater plume
- ☒ Other (specify) Driveway entrance (customer parking)
- ☐ Unknown

e. Source Map Scale: Describe the scale of the source used to determine the site coordinates

- ☐ 1:10,000
- ☐ 1:12,000
- ☐ 1:15,840
- ☐ 1:20,000
- ☐ 1:24,000
- ☐ 1:25,000
- ☐ 1:50,000
- ☐ 1:62,500
- ☐ 1:63,360
- ☐ 1:100,000
- ☐ 1:125,000
- ☐ 1:250,000
- ☐ 1:500,000
- ☒ None
- ☐ Other (specify) _____
- ☐ Unknown

f. Point/line/area: Describe the area defined by the coordinates

- ☐ Area
- ☐ Line
- ☒ Point
- ☐ Region
- ☐ Route
- ☐ Unknown

g. Collection Date: Please provide the date the site coordinates were obtained: **8/27/2009**

ATTACHMENT 2

SITE TYPE MAIN CATEGORIES AND SUB CATEGORIES

Manufacturing/processing/maintenance
Chemicals and allied products
Radioactive products
Primary metals/mineral processing
Oil and gas refining
Metal fabrication/finishing/coating and allied industries
Lumber and wood products/pulp and paper
Lumber and wood products/wood preserving/treatment
Plastics and rubber products
Electronic/electrical equipment
Coal gasification
Ordnance production
Coke production
Trucks/ships/trains/aircraft and related components
Tanneries
Fabrics/textiles
Other (please specify)

Recycling
Batteries/scrap metals/secondary smelting/precious metal recovery
Waste/used oil
Automobiles/tires
Drums/tanks
Chemicals/chemical waste (e.g., solvent recovery)
Other (please specify)

Waste Management
Municipal solid waste landfill
Industrial waste landfill
Co-disposal landfill (municipal and industrial)
Industrial waste facility (non-generator)
Radioactive waste treatment, storage, disposal (non-generator)
Mine tailings disposal
Illegal disposal/open dump
Other (please specify)

Mining
Coal
Oil and gas
Metals
Non-Metal minerals
Other (please specify)

Other
Treatment works/septic tanks/other sewage treatment
Transportation (e.g., railroad yards, airport, barge docking site)
Product storage/distribution
Groundwater plume site with no identifiable source
Contaminated sediment site with no identifiable source
Retail/commercial (e.g., dry cleaners)
Agricultural (e.g., grain elevators)
Spill or other one time event
Military
Research, development, and testing facility
Dust control
Other (please specify)

Weston Solutions, Inc.
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www.westonsolutions.com

The Trusted Integrator for Sustainable Solutions

June 1, 2011

Mr. Juan Davila, Work Assignment Manager
U.S. Environmental Protection Agency
290 Broadway - 18th Floor
New York, NY 10007-1866

Document Control No.: 1312-2A-AMZG

Subject: **Sampling Trip Report**
20405.012.013.1312.00, Laundry Espinosa
Contract No.: EP-S5-06-04, TDD No.: S05-0013-1012-023

Dear Mr. Davila:

Weston Solutions, Inc. (WESTON®) is pleased to submit the Sampling Trip Report for soil samples collected during the Laundry Espinosa Preliminary Assessment/Site Inspection (PA/SI) sampling event. WESTON personnel collected soil samples from the site under Case No. 41323 on May 17, 2011. If you have any questions, please contact me at (732) 417-5823.

Very truly yours,

WESTON SOLUTIONS, INC.

Anthony Daniels
Associate Project Scientist

enclosure

cc: C. Romano, EPA (w/o enclosure)
W.S. Butterfield, WESTON (w/o enclosure)
J. Feranda, EPA (w/o enclosure)
A. Michael, EPA
Site file

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SAMPLING TRIP REPORT

SITE NAME: Laundry Espinosa
DCN: 1312-2A-AMZG
W.O.: 20405.012.013.1312.00
Case No.: 41323

EPA I.D. NO.: PRN000206358

SAMPLING DATES: May 17, 2011

1. Site Location: Refer to Figure 1

2. Soil Sample Locations: Refer to Figure 2

3. Sample Descriptions: Refer to Table 1

4. Laboratories Receiving Samples:

Analysis	Name and Address of Laboratory
Target Compound List (TCL) Volatile Organic Compounds (VOCs)	A4 Scientific, Inc. – A4 1544 Sawdust Road Suite 505 The Woodlands, TX 77380

5. Sample Dispatch Data:

- Sixteen soil samples and one aqueous sample for TCL VOCs (low-medium concentration) analysis were shipped to A4-Scientific on 05/17/11 at 1600 hours via Federal Express Airbill No. 8736 9394 4450.

6. On-Site Personnel:

Name	Company	Duties on Site
Anthony Daniels	WESTON	Project Manager, Global Positioning System (GPS) Data Collection

On-Site Personnel (continued):

Vincent DelloRusso	WESTON	Site Geologist, Driller Oversight, Sampler
Michele Capriglione	WESTON	Field Screening, Sampler, Health and Safety Officer
Dan Carlson	WESTON	Sample Management Officer
Simone Ojada	On-Site Environmental	Geoprobe™ Operator/Crew Chief
Gabriel Ojada	On-Site Environmental	Assistant Geoprobe™ Operator
Juan Carlos Abril	On-Site Environmental	Decon, Support Staff
Luis Lugo	On-Site Environmental	Decon, Support Staff

7. Additional Comments:

On May 17, 2011, WESTON personnel collected surface soil and subsurface soil samples from the Laundry Espinosa site. Six surface soil samples (including one environmental duplicate sample), and ten subsurface soil samples were collected from five boreholes advanced throughout the site using Geoprobe™ direct-push technology. Groundwater was not encountered at any of the five borehole locations; therefore, proposed groundwater samples were not collected.

Soil samples were collected using En Core™ dedicated sampling devices. The depths of the soil samples submitted for laboratory analysis were chosen based on the results of field screening analysis using a photoionization detector (PID). If no PID readings above background were noted, soil sample depths were chosen based on visual observation or from arbitrary depths (e.g., surface, borehole mid-point, and borehole bottom, or above refusal, or groundwater). Soil cores were kept on ice pending PID field screening results.

One rinsate blank was collected to demonstrate adequate decontamination of non-dedicated sampling equipment.

WESTON logged all Geoprobe™ borehole locations electronically using GPS equipment and performed post-processing differential correction of the GPS data in accordance with the EPA Region 2 GPS Standard Operating Procedures. The processed GPS data for the soil samples have been transferred to the Sample Location Map (Figure 2) using Geographic Information Systems (GIS).

All samples were collected as part of the Laundry Espinosa PA/SI work assignment. All samples collected by WESTON were designated to be analyzed for TCL VOCs through the EPA Contract Laboratory Program. The Organic Traffic Reports and Airbills are presented in Attachment 1.

8. Report Prepared by: _____ Date: 6/1/11
Anthony Daniels

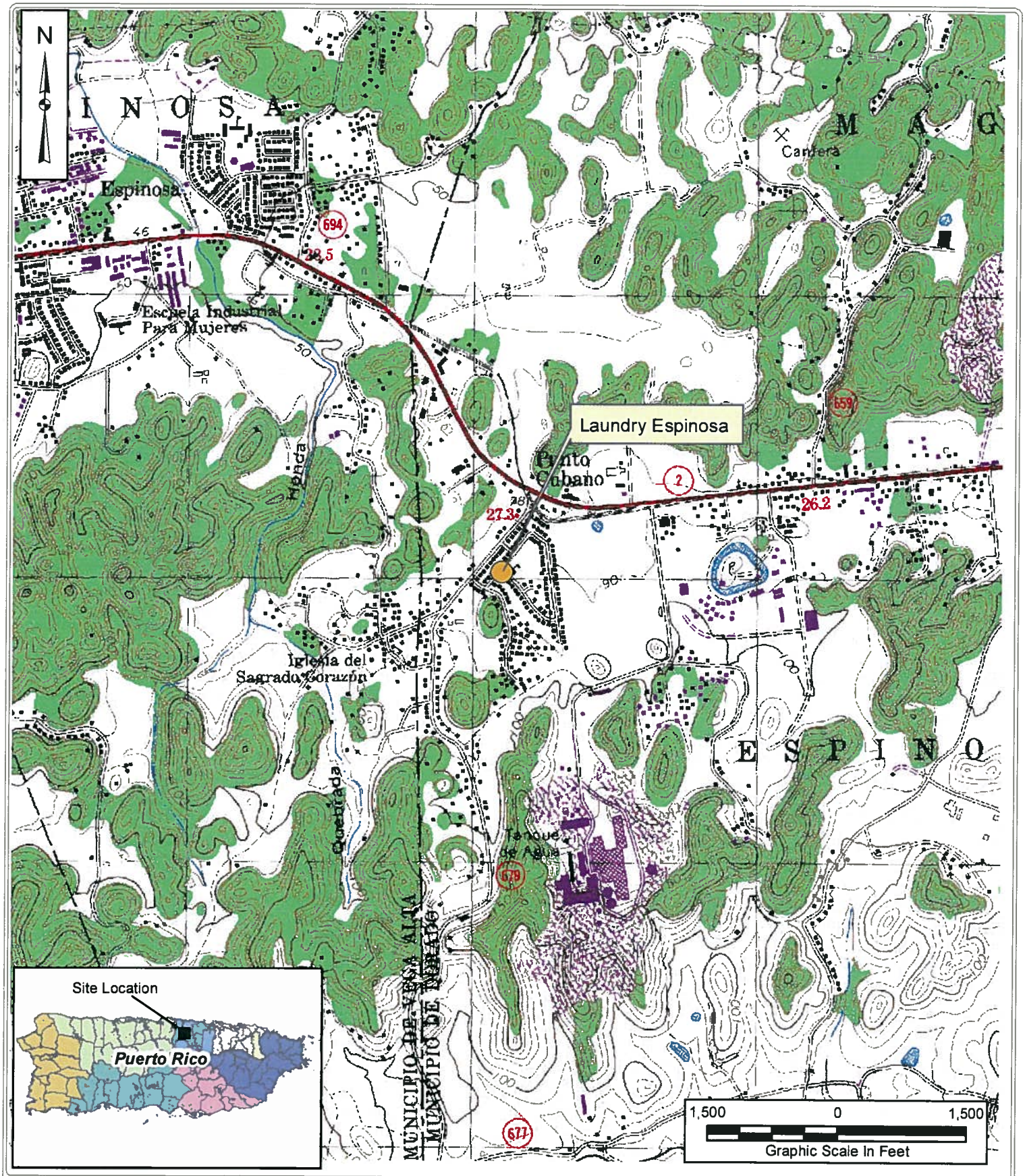
9. Report Approved by: _____ Date: 6/1/11
W. Scott Butterfield, CHMM

Table 1
Sample Descriptions
Laundry Espinosa
Dorado, Puerto Rico

SAMPLE NUMBER	ORGANIC CLP NO.	DATE	TIME	COMMENTS
1312-S01	B98H4	5/17/2011	1355	Surface soil sample from Geoprobe™ Borehole 1, depth: 0.6 to 0.9 feet.
1312-SS01A	B98H5	5/17/2011	1345	Subsurface soil sample from Geoprobe™ Borehole 1, depth: 11.2 to 11.5 feet.
1312-SS01B	B98H6	5/17/2011	1340	Subsurface soil sample from Geoprobe™ Borehole 1, depth: 23.7 to 24.0 feet.
1312-S02	B98H7	5/17/2011	1410	Surface soil sample from Geoprobe™ Borehole 2, depth: 0.8 to 1.1 feet.
1312-S06	B98J9	5/17/2011	1415	Duplicate of 1312-S02.
1312-SS02A	B98H8	5/17/2011	1425	Subsurface soil sample from Geoprobe™ Borehole 2, depth: 13.0 to 13.3 feet.
1312-SS02B	B98H9	5/17/2011	1440	Subsurface soil sample from Geoprobe™ Borehole 2, depth: 29.0 to 29.3 feet.
1312-S03	B98J0	5/17/2011	1220	Surface soil sample from Geoprobe™ Borehole 3, depth: 0.3 to 0.6 feet.
1312-SS03A	B98J1	5/17/2011	1215	Subsurface soil sample from Geoprobe™ Borehole 3, depth: 13.5 to 13.8 feet.
1312-SS03B	B98J2	5/17/2011	1210	Subsurface soil sample from Geoprobe™ Borehole 3, depth: 28.7 to 29.0 feet.
1312-S04	B98J3	5/17/2011	1110	Surface soil sample from Geoprobe™ Borehole 4, depth: 1.7 to 2.0 feet.
1312-SS04A	B98J7	5/17/2011	1100	Subsurface soil sample from Geoprobe™ Borehole 4, depth: 11.0 to 11.3 feet.
1312-SS04B	B98J5	5/17/2011	1050	Subsurface soil sample from Geoprobe™ Borehole 4, depth: 44.6 to 44.9 feet.
1312-S05	B98J6	5/17/2011	0945	Surface soil sample from Geoprobe™ Borehole 5, depth: 0.6 to 0.9 feet.
1312-SS05A	B98J4	5/17/2011	0935	Subsurface soil sample from Geoprobe™ Borehole 5, depth: 16.1 to 16.4 feet.
1312-SS05B	B98J8	5/17/2011	0930	Subsurface soil sample from Geoprobe™ Borehole 5, depth: 48.0 to 48.3 feet.
1312-RIN01	B98K6	5/17/2011	1025	Rinsate blank (Geoprobe™ cutting shoe).

FIGURE 1

SITE LOCATION MAP



LEGEND:

Approximate Site Location

SOURCE:
7.5 Minute Series Topographic Quadrangle: Vega Alta, PR.

PROJECT:
Laundry Espinosa

CLIENT NAME:
EPA

TITLE:

Site Location Map
Laundry Espinosa
Dorado, PR

Page 7 of 16

WESTON

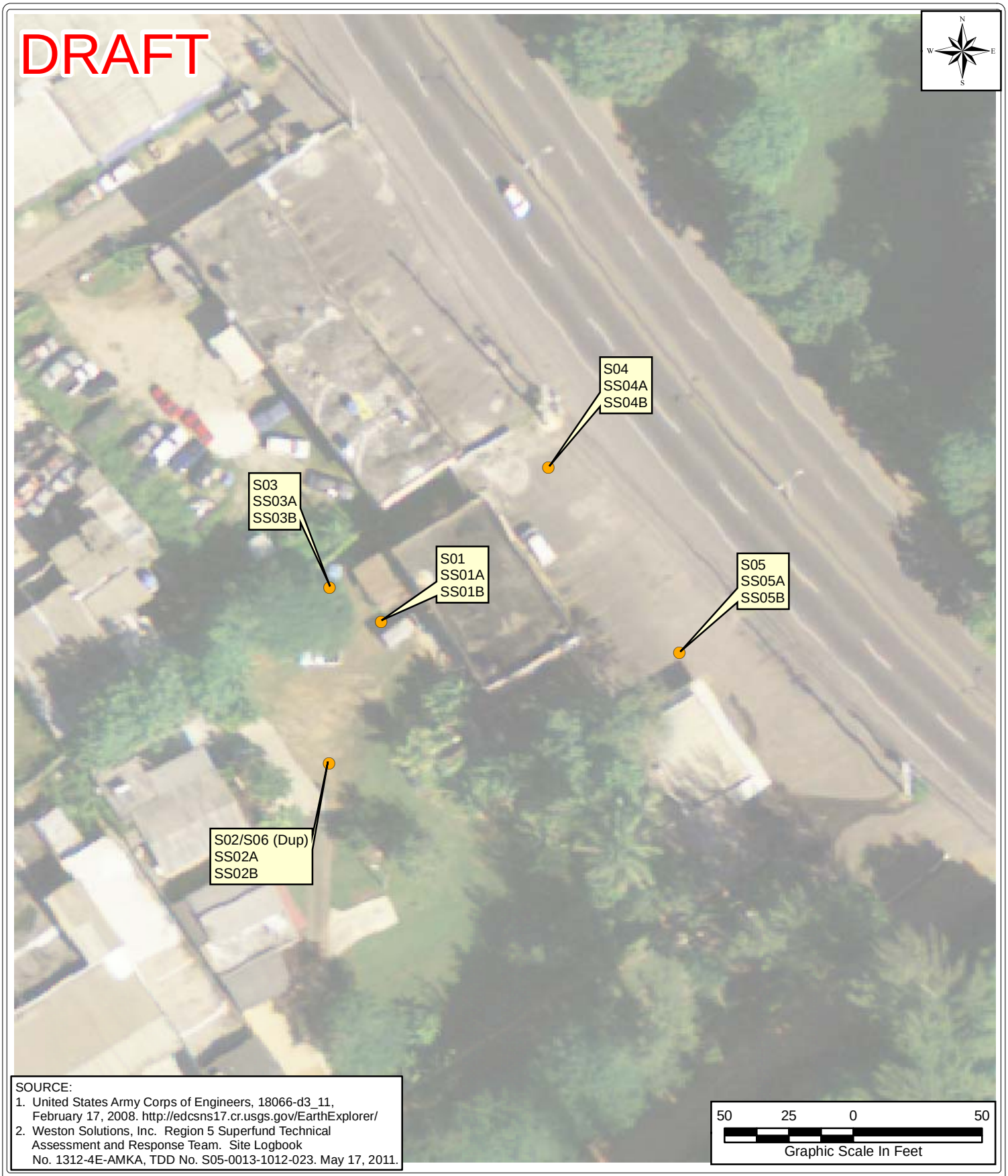
DATE:
April 2011

FIGURE #:
1

P:\SAT2\2010_Puerto_Rico_Sites\Laundry Espinosa\MXD\08822_LE_Site_Loc.mxd

FIGURE 2

SAMPLE LOCATION MAP



SOURCE:
1. United States Army Corps of Engineers, 18066-d3_11, February 17, 2008. http://edcsns17.cr.usgs.gov/EarthExplorer/
2. Weston Solutions, Inc. Region 5 Superfund Technical Assessment and Response Team. Site Logbook No. 1312-4E-AMKA, TDD No. S05-0013-1012-023. May 17, 2011.

LEGEND:
Geoprobe Sample Location

LEGEND:
All Sample numbers preceeded by "1312-"

PROJECT:
Edwards Dry Cleaners Toa Baja

TITLE:
Sample Location Map
Laundry Espinosa
Dorado, PR

CLIENT NAME: EPA

WESTON SOLUTIONS

DATE: 6/1/2011

FIGURE #: 2

P:\SAT2\2011_Puerto_Rico_Sites\Dorado\1312_Laundry_Espinosa\GIS\MXD\09612_LE_Sample_Loc.mxd

ATTACHMENT 1

TRAFFIC REPORT/CHAIN OF CUSTODY RECORD AND AIRBILL

USEPA CLP Organics COC (REGION COPY)

DateShipped: 5/17/2011
CarrierName: FedEx
AirbillNo: 873693944450

CHAIN OF CUSTODY RECORD

Laundry Espinosa/NJ
Case #: 41323
Cooler #: 1

No: 2-051711-104118-0001

Lab: A4 Scientific
Lab Contact: Laxmi Teerupalli
Lab Phone: 281-292-5277

Organic Sample #	Matrix/Sampler	Coll. Method	Analysis/Turnaround	Tag/Preservative/Bottles DC	Station Location	Collected	Inorganic Sample #	Sample Type
B98H4	Soil/ Dan Carlson	Grab	VOA	1000 (3)	1312-S01	05/17/2011 13:55		Field Sample
B98H5	Soil/ Dan Carlson	Grab	VOA	1004 (3)	1312-SS01A	05/17/2011 13:45		Field Sample
B98H6	Soil/ Dan Carlson	Grab	VOA	1005 (3)	1312-SS01B	05/17/2011 13:40		Field Sample
B98H7	Soil/ Dan Carlson	Grab	VOA	1006 (3)	1312-S02	05/17/2011 14:10		Field Sample
B98H8	Soil/ Dan Carlson	Grab	VOA	1007 (3)	1312-SS02A	05/17/2011 14:25		Field Sample
B98H9	Soil/ Dan Carlson	Grab	VOA	1008 (3)	1312-SS02B	05/17/2011 14:40		Field Sample
B98J0	Soil/ Dan Carlson	Grab	VOA	1009 (3)	1312-S03	05/17/2011 12:20		Field Sample
B98J1	Soil/ Dan Carlson	Grab	VOA	1010 (3)	1312-SS03A	05/17/2011 12:15		Field Sample
B98J2	Soil/ Dan Carlson	Grab	VOA	1011 (3)	1312-SS03B	05/17/2011 12:10		Field Sample
B98J3	Soil/ Dan Carlson	Grab	VOA	1012 (3)	1312-S04	05/17/2011 11:10		Field Sample
B98J4	Soil/ Dan Carlson	Grab	VOA	1016 (3)	1312-SS05A	05/17/2011 09:35		Field Sample

Special Instructions:

Shipment for Case Complete? Y
Samples Transferred From Chain of Custody #

Analysis Key: VOA=CLP TCL Volatiles

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time
—	[signature]	5/17/11	FedEx	5/17/11	1600						

USEPA CLP Organics COC (REGION COPY)

DateShipped: 5/17/2011
CarrierName: FedEx
AirbillNo: 873693944450

CHAIN OF CUSTODY RECORD

Laundry Espinosa/NJ
Case #: 41323
Cooler #: 1

No: 2-051711-104118-0001

Lab: A4 Scientific
Lab Contact: Laxmi Teerupalli
Lab Phone: 281-292-5277

Organic Sample #	Matrix/Sampler	Coll. Method	Analysis/Turnaround	Tag/Preservative/Bottles DC	Station Location	Collected	Inorganic Sample #	Sample Type
B98J5	Soil/ Dan Carlson	Grab	VOA	1014 (3)	1312-SS04B	05/17/2011 10:50		Field Sample
B98J6	Soil/ Dan Carlson	Grab	VOA	1015 (3)	1312-S05	05/17/2011 09:45		Field Sample
B98J7	Soil/ Dan Carlson	Grab	VOA	1013 (3)	1312-SS04A	05/17/2011 11:00		Field Sample
B98J8	Soil/ Dan Carlson	Grab	VOA	1017 (3)	1312-SS05B	05/17/2011 09:30		Field Sample
B98J9	Soil/ Dan Carlson	Grab	VOA	1018 (3)	1312-S06	05/17/2011 14:15		Field Duplicate
B98K6	Blank/ Dan Carlson	Grab	VOA	1002 (HCl) (3)	1312-RIN01	05/17/2011 10:25		Lab QC

Special Instructions:

Shipment for Case Complete? Y
Samples Transferred From Chain of Custody #

Analysis Key: VOA=CLP TCL Volatiles

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time
—	[signature]	5/17/11	FedEx	5/17/11	1600						

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Date 05/17/11 Sender's FedEx Account Number SENDER'S FEDEX ACCOUNT NUMBER ONLY

Sender's Name Dan Carlson Phone 973-271-7633

Company Weston Solutions, Inc.

Address Courtyard Marriot

Address 7012 Boca de Cangrejos Ave

City Carolina State/Province PR

Country USA/PR ZIP/Postal Code 00979

2 To

Recipient's Name Laxmi Teerupalli Phone 281-292-5277

Company A4 Scientific, Inc.

Address 1544 Sawdust Road Dept./Floor

Address Suite 505

City The Woodlands State/Province TX

Country USA ZIP/Postal Code 77380

Recipient's Tax ID Number for Customs Purposes
e.g., GST/RFC/VAT/IN/EIN/ABN, or as locally required.

3 Shipment Information ☐ For EU Only: Tick here if goods are not in free circulation and provide C.I.

Total Packages (Shipper's Load and Count/SLAC) 1 Total Weight 40 ☒ lbs ☐ kg DIM / / ☐ in. ☐ cm

Commodity Description	Harmonized Code	Country of Manufacture	Value for Customs
Environmental Samples		USA	500-

Has EEI been filed in AES? (For U.S. Export Only: Check One)
☐ No EEI required, value $2,500 or less per Sch. B Number, no license required (NLR), not subject to ITAR.
☐ No EEI required, enter exemption number:
☐ Yes – Enter AES proof of filing citation:
If other than NLR, enter License Exception:

Total Declared Value for Carriage

Total Value for Customs (Specify Currency) 500- USD

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☒ Other Cooler ☐ FedEx 10kg Box* ☐ FedEx 25kg Box*

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☐ HOLD at FedEx Location ☐ SATURDAY Delivery (Available to select locations for FedEx Intl. Priority only.)

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Credit Card No.

Credit Card Exp. Date

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FedEx Acct. No. 108 067 691

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20405.016.013.0312.00

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USEPA CLP Organics COC (REGION COPY)

DateShipped: 5/17/2011
CarrierName: FedEx
AirbillNo: 873693944450

CHAIN OF CUSTODY RECORD

Laundry Espinosa/NJ
Case #: 41323
Cooler #: 1

No: 2-051711-104118-0001

Lab: A4 Scientific
Lab Contact: Laxmi Teerupalli
Lab Phone: 281-292-5277

Organic Sample #	Matrix/Sampler	Coll. Method	Analysis/Turnaround	Tag/Preservative/Bottles DC	Station Location	Collected	Inorganic Sample #	Sample Type
B98H4	Soil/ Dan Carlson	Grab	VOA	1000 (3)	1312-S01	05/17/2011 13:55		Field Sample
B98H5	Soil/ Dan Carlson	Grab	VOA	1004 (3)	1312-SS01A	05/17/2011 13:45		Field Sample
B98H6	Soil/ Dan Carlson	Grab	VOA	1005 (3)	1312-SS01B	05/17/2011 13:40		Field Sample
B98H7	Soil/ Dan Carlson	Grab	VOA	1006 (3)	1312-S02	05/17/2011 14:10		Field Sample
B98H8	Soil/ Dan Carlson	Grab	VOA	1007 (3)	1312-SS02A	05/17/2011 14:25		Field Sample
B98H9	Soil/ Dan Carlson	Grab	VOA	1008 (3)	1312-SS02B	05/17/2011 14:40		Field Sample
B98J0	Soil/ Dan Carlson	Grab	VOA	1009 (3)	1312-S03	05/17/2011 12:20		Field Sample
B98J1	Soil/ Dan Carlson	Grab	VOA	1010 (3)	1312-SS03A	05/17/2011 12:15		Field Sample
B98J2	Soil/ Dan Carlson	Grab	VOA	1011 (3)	1312-SS03B	05/17/2011 12:10		Field Sample
B98J3	Soil/ Dan Carlson	Grab	VOA	1012 (3)	1312-S04	05/17/2011 11:10		Field Sample
B98J4	Soil/ Dan Carlson	Grab	VOA	1016 (3)	1312-SS05A	05/17/2011 09:35		Field Sample

Special Instructions:

Shipment for Case Complete? Y

Samples Transferred From Chain of Custody #

Analysis Key: VOA=CLP TCL Volatiles

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time
—	[signature]	5/17/11	FedEx	5/17/11	1600						

USEPA CLP Organics COC (REGION COPY)

DateShipped: 5/17/2011
CarrierName: FedEx
AirbillNo: 873693944450

CHAIN OF CUSTODY RECORD

Laundry Espinosa/NJ
Case #: 41323
Cooler #: 1

No: 2-051711-104118-0001

Lab: A4 Scientific
Lab Contact: Laxmi Teerupalli
Lab Phone: 281-292-5277

Organic Sample #	Matrix/Sampler	Coll. Method	Analysis/Turnaround	Tag/Preservative/Bottles DC	Station Location	Collected	Inorganic Sample #	Sample Type
B98J5	Soil/ Dan Carlson	Grab	VOA	1014 (3)	1312-SS04B	05/17/2011 10:50		Field Sample
B98J6	Soil/ Dan Carlson	Grab	VOA	1015 (3)	1312-S05	05/17/2011 09:45		Field Sample
B98J7	Soil/ Dan Carlson	Grab	VOA	1013 (3)	1312-SS04A	05/17/2011 11:00		Field Sample
B98J8	Soil/ Dan Carlson	Grab	VOA	1017 (3)	1312-SS05B	05/17/2011 09:30		Field Sample
B98J9	Soil/ Dan Carlson	Grab	VOA	1018 (3)	1312-S06	05/17/2011 14:15		Field Duplicate
B98K6	Blank/ Dan Carlson	Grab	VOA	1002 (HCl) (3)	1312-RIN01	05/17/2011 10:25		Lab QC

Special Instructions:

Shipment for Case Complete? Y

Samples Transferred From Chain of Custody #

Analysis Key: VOA=CLP TCL Volatiles

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time
—	[signature]	5/17/11	FedEx	5/17/11	1600						

FedEx Express

International Air Waybill

For FedEx services worldwide.

Sender's Copy

1 From *Please print and press hard.*

Date 05/17/11 Sender's FedEx Account Number SENDER'S FEDEX ACCOUNT NUMBER ONLY

Sender's Name Dan Carlson Phone 973-271-7633

Company Weston Solutions, Inc.

Address Courtyard Marriot

Address 7012 Boca de Cangrejos Ave

City Carolina State/Province PR

Country USA/PR ZIP/Postal Code 00979

2 To

Recipient's Name Laxmi Teerupalli Phone 281-292-5277

Company A4 Scientific, Inc.

Address 1544 Sawdust Road Dept./Floor

Address Suite 505

City The Woodlands State/Province TX

Country USA ZIP/Postal Code 77380

Recipient's Tax ID Number for Customs Purposes
e.g., GST/RFC/VAT/IN/EIN/ABN, or as locally required.

3 Shipment Information ☐ For EU Only. Tick here if goods are not in free circulation and provide C.I.

Total Packages (Shipper's Load and Count/SLAC) 1 Total Weight 40 ☒ lbs. ☐ kg DIM L / W / H ☐ in. ☐ cm

Commodity Description	Harmonized Code	Country of Manufacture	Value for Customs
Environmental Samples		USA	500-

Has EEI been filed in AES? or U.S. Export Only: Check One

☒ No EEI required, value $2,500 or less per Sch. B Number, no license required (NLR), not subject to ITAR.

☐ No EEI required, enter exemption number:

☐ Yes – Enter AES proof of filing citation:

If other than NLR, enter License Exception:

Total Declared Value for Carriage

Total Value for Customs (Specify Currency) 500- USD

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FedEx Acct. No. 108 067 691

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Credit Card Exp. Date

Bill duties and taxes to: ALL shipments may be subject to Customs charges, which FedEx does not estimate prior to clearance.

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☐ Sender Acct. No. in Section I will be billed. ☐ Recipient ☒ Third Party

FedEx Acct. No. 108 067 691

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9 Required Signature

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Daniels, Anthony

From: Gilliland, Gerald
Sent: Monday, July 18, 2011 11:31 AM
To: Daniels, Anthony
Subject: FW: Attached are the regionally assessed data for the Laundry Espinosa site under the CLP Case # 41323, SDG # B98H4 and B98K6
Attachments: 5431.41323.EPW10018.B98H4.SampleSummary.pdf; 5432.41323.EPW10018.B98K6.SampleSummary.pdf; 123022.Y41323.EPW10018.B98H4.edm.xls; 123024.Y41323.EPW10018.B98K6.edm.xls; Case#41323_B98H4_B98K6_SOMVOA_2011.DA.doc

---

From: Sergio Lopez [mailto:Lopez.Sergio@epamail.epa.gov]
Sent: Wednesday, July 13, 2011 9:44 AM
To: Carlson, Daniel; Capriglione, Michele L.; Gilliland, Gerald
Subject: Fw: Attached are the regionally assessed data for the Laundry Espinosa site under the CLP Case # 41323, SDG # B98H4 and B98K6

Sergio López-Luna, P.E.
Environmental Engineer
USEPA, Region 2
DESA/HSWB/HWSS
732-321-6778
Fax 732-321-6622
---- Forwarded by Sergio Lopez/R2/USEPA/US on 07/13/2011 09:42 AM ----

From: Sergio Lopez/R2/USEPA/US
To: Juan Davila/R2/USEPA/US@EPA
Cc: Russell Arnone/R2/USEPA/US@EPA, Muhammad Sheikh/R2/USEPA/US@EPA, Jennifer Feranda/R2/USEPA/US@EPA, Adly Michael/R2/USEPA/US@EPA, Region2_EQUISedd@epa.gov, Patricia Sheridan/R2/USEPA/US@EPA, Phil Cocuzza/R2/USEPA/US@EPA, Agustin Aoanan/R2/USEPA/US@EPA
Date: 07/08/2011 02:35 PM
Subject: Attached are the regionally assessed data for the Laundry Espinosa site under the CLP Case # 41323, SDG # B98H4 and B98K6

Attached are the regionally assessed data for the Laundry Espinosa site under the CLP Case # 41323, SDG # B98H4 & B98K6 in Excel format from EDM, a PDF of Form 1 results from EDM, and the associated data assessment(s). EDM has been updated. The RPM will forward the data as necessary.

Please contact Russ Arnone 732-321-6791 if you have any questions or require information.

Sergio López-Luna, P.E.
Environmental Engineer
USEPA, Region 2
DESA/HSWB/HWSS
732-321-6778
Fax 732-321-6622

ATTACHMENT 1
SOM01.2/Low/Med
SOP NO. HW-33/VOA, Rev.1

Functional Guidelines for Evaluating Organic Analysis

CASE No.: 41323
LABORATORY: A4
SAMPLER: W-SAT

SDG No.: B98H4 & B98K6
SITE: LAUNDRY ESPINOSA
ANALYSIS: VOA

DATA ASSESSMENT

The current SOP HW-33/VOA (Revision 1) August 2007, USEPA Region II Data Validation SOP for Statement of Work SOM01.2 for evaluating organic data has been applied.

Data has been reviewed according to TDF specifications, the National Functional Guidelines Report # 3 and CCS Semi-Automated Screening Results Report.

Tentatively Identified Compounds (TICS) for VOA fraction are not validated. They are validated only at the specific request of the data user.

All data are valid and acceptable except those analytes rejected "R"(unusable). Due to the detection of QC problems, some analytes may have the "J" (estimated), "N"(presumptive evidence for the presence of the material), "U" (non-detect) or "JN" (presumptive evidence for the presence of the material at an estimated value) flag. All action is detailed on the attached sheets.

The "R" flag means that the associated value is unusable. In other words, significant data bias is evident and the reported analyte concentration is unreliable.

Reviewer's Signature: Shobitha Capil Date: JULY / 08 /2011

Peer Reviewer's Signature: _____ Date: ____ / ____ /2011

Verified By: _____ Date: ____ / ____ /2011

ATTACHMENT 1
SOM01.2/Low/Med
SOP NO. HW-33/VOA, Rev.1

SDG# B98H4

1. HOLDING TIME:

The amount of an analyte in a sample can change with time due to chemical instability, degradation, volatilization, etc. If the specified holding time is exceeded, the data may not be valid. Those analytes detected in the samples whose holding time has been exceeded will be qualified as estimated, "J". The non-detects (sample quantitation limits) will be flagged as estimated, "J", or unusable, "R", if the holding times are grossly exceeded.

The following action was taken in the samples and analytes shown due to excessive holding time.

No problems found for this qualification.

2. DMC's

All samples are spiked with surrogate compounds (DMC's) prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. If the measured surrogate concentrations were outside contract specifications, qualifications were applied to the samples and analytes as shown below.

No problems found for this qualification.

3. MATRIX SPIKE/SPIKE DUPLICATE, MS/MSD:

The MS/MSD data are generated to determine the long-term precision and accuracy of the analytical method in various matrices. The MS/MSD may be used in conjunction with other QC criteria for additional qualification of data.

Not applicable.

4. BLANK CONTAMINATION:

Quality assurance (QA) blanks, i.e., method, trip, field, or rinse blanks are prepared to identify any contamination, which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Trip blanks measure cross-contamination of samples during shipment. Field and rinse blanks measure cross-contamination of samples during field operations. If the concentration of the analyte is less than 1 times the blank contaminant level (2 times for common contaminants), the analytes are qualified as non-detects, "U".

The following analytes in the sample shown were qualified with "U" for these reasons:

A) Method blank contamination:

The following volatile samples have common contaminant analyte concentrations reported less than 2x the CRQL. The associated method blank has common contaminant analyte concentration less than 2x the concentration criteria. Detected compounds are qualified U. Non detected compounds are not qualified. Sample concentrations have been reported at the CRQL.

- **Methylene chloride** B98H4, B98H5, B98H6, B98H7, B98J1, B98J4, B98J5, B98J8

B) Field/ Equipment or rinse blank contamination:

The following volatile samples have common contaminant analyte concentrations reported less than 2x the CRQL. The associated Field blank has common contaminant analyte concentration less than 2x the concentration criteria. Detected compounds are qualified U. Nondetected compounds are not qualified. Sample concentrations have been reported at the CRQL.

- **Methylene chloride** B98J0, B98J2, B98J3, B98J6

C) Trip blank contamination for VOA aqueous samples:
Not applicable.

D) Storage Blank associated with VOA samples only:
No problems found for this qualification.

E) Tics "R" rejected:
Tentatively Identified Compounds (TICS) for VOA fraction are not validated. They are validated at the specific request of the data user.

5. MASS SPECTROMETER TUNING:

Tuning and performance criteria are established to ensure adequate mass resolution, proper identification of compounds and to some degree, sufficient instrument sensitivity. These criteria are not sample specific. Instrument performance is determined using standard materials. Therefore, these criteria should be met in all circumstances. The tuning standard for volatile organics is (BFB) Bromofluorobenzene.

If the mass calibration is in error, all associated data will be classified as unusable "R".

No problems found for this qualification.

6. CALIBRATION:

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of giving acceptable performance at the beginning of an experimental sequence. The continuing calibration checks document that the instrument is giving satisfactory daily performance.

A) Response Factor GC/MS:

The response factor measures the instrument's response to specific chemical compounds. The response factor for the Target Compound List (TCL) must be ≥ 0.05, and ≥ 0.01 for the twenty-two analytes with poor response in both the initial and continuing calibrations. A value < 0.05, or < 0.01 for the poor performers indicates a serious detection and quantitation problem (poor sensitivity). Analytes detected in the sample will be qualified as estimated, "J". All non-detects for that compound will be rejected "R".

B) Percent Relative Standard Deviation (%RSD) and Percent Difference (%D):

Percent RSD is calculated from the initial calibration and is used to indicate the stability of the specific compound response factor over increasing concentration. Percent D compares the response factor of the continuing calibration check to the mean response factor (RRF) from the initial calibration. Percent D is a measure of the instrument's daily performance. Percent RSD must be < 20%, < 40% for the poor performers, and < 50% for 1,4-Dioxane. %D must be < 25%, < 40% for the poor performers, and < 50% for 1,4-Dioxane. A value outside of these limits indicates potential detection and quantitation errors. For these reasons, all positive results are flagged as estimated, "J" and non-detects are flagged "UJ". If %RSD and %D grossly exceed QC criteria (> 90%), non-detects data may be qualified "R".

The following analytes in the sample shown were qualified for %RSD and %D:

VC6-The following volatile samples are associated with an initial calibration percent relative standard deviation (%RSD) outside criteria. Detected compounds are qualified J. Non detected compounds are not qualified.

-B98H4, B98H5, B98H6, B98H7, B98H8, B98H9, B98J0, B98J1, B98J2, B98J3, B98J4, B98J5, B98J6, B98J7, B98J8, B98J9, VBLK69, VBLK70, VBLK71, VBLK79, VHBLK22N

1,2,4-Trichlorobenzene VSTD2.568

1,2,3-Trichlorobenzene VSTD2.568, VSTD2.579

7. INTERNAL STANDARDS PERFORMANCE GC/MS:

Internal standards (IS) performance criteria ensure that the GC/MS sensitivity and response are stable during every experimental run. The internal standard area count must not vary by more than a factor of 2 (-50% to +200%) from the associated continuing calibration standard. The retention time of the internal standard must not vary more than 30 seconds from the associated continuing calibration standard. If the area count is outside the (-50% to +200%) range of the associated standard, all of the positive results for compounds quantitated using that IS are qualified as estimated, "J", and all non-detects as "UJ", or "R" if there is a severe loss of sensitivity.

If an internal standard retention time varies by more than 30 seconds, the reviewer will use professional judgment to determine either partial or total rejection of the data for that sample fraction.

No problems found for this qualification.

8. COMPOUND IDENTIFICATION:

A) Volatile Fraction:

TCL compounds are identified on the GC/MS by using the analyte's relative retention time (RRT) and by comparison to the ion spectra obtained from known standards. For the results to be a positive hit, the sample peak must be within 0.06 RRT units of the standard compound and have ion spectra which has a ratio of the primary and secondary m/e intensities within 20% of that in the standard compound. For the tentatively identified compounds (TIC) the ion spectra must match accurately. In

the cases where there is not an adequate ion spectrum match, the laboratory may have provided false positive identifications.

No problems found for this qualification as per NFG/CCS report.

9. CONTRACT PROBLEMS NON-COMPLIANCE:

Initial calibration:

Initial calibration percent relative standard deviation (%RSD) is outside criteria for the following analytes:

1,2,4-Trichlorobenzene, 1,2,3-Trichlorobenzene

10. FIELD DOCUMENTATION:

11. OTHER PROBLEMS:

12. This package contains re-extracted, re-analyzed or diluted runs. Upon reviewing the QA results, the following Form 1(s) are identified NOT to be used.

None.

ATTACHMENT 1
SOM01.2/Low/Med
SOP NO. HW-33/VOA, Rev.1

SDG# B98K6

1. HOLDING TIME:

The amount of an analyte in a sample can change with time due to chemical instability, degradation, volatilization, etc. If the specified holding time is exceeded, the data may not be valid. Those analytes detected in the samples whose holding time has been exceeded will be qualified as estimated, "J". The non-detects (sample quantitation limits) will be flagged as estimated, "J", or unusable, "R", if the holding times are grossly exceeded.

The following action was taken in the samples and analytes shown due to excessive holding time.

No problems found for this qualification.

2. DMC's

All samples are spiked with surrogate compounds (DMC's) prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. If the measured surrogate concentrations were outside contract specifications, qualifications were applied to the samples and analytes as shown below.

No problems found for this qualification.

3. MATRIX SPIKE/SPIKE DUPLICATE, MS/MSD:

The MS/MSD data are generated to determine the long-term precision and accuracy of the analytical method in various matrices. The MS/MSD may be used in conjunction with other QC criteria for additional qualification of data.

Not applicable.

4. BLANK CONTAMINATION:

Quality assurance (QA) blanks, i.e., method, trip, field, or rinse blanks are prepared to identify any contamination, which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Trip blanks measure cross-contamination of samples during shipment. Field and rinse blanks measure cross-contamination of samples during field operations. If the concentration of the analyte is less than 1 times the blank contaminant level (2 times for common contaminants), the analytes are qualified as non-detects, "U".

The following analytes in the sample shown were qualified with "U" for these reasons:

A) Method blank contamination:
No problems found for this qualification.

B) Field/ Equipment or rinse blank contamination:
Not applicable. Sample is a Field Blank.

C) Trip blank contamination for VOA aqueous samples:
Not applicable.

D) Storage Blank associated with VOA samples only:
No problems found for this qualification.

E) Tics "R" rejected:
Tentatively Identified Compounds (TICS) for VOA fraction are not validated. They are validated at the specific request of the data user.

5. MASS SPECTROMETER TUNING:

Tuning and performance criteria are established to ensure adequate mass resolution, proper identification of compounds and to some degree, sufficient instrument sensitivity. These criteria are not sample specific. Instrument performance is determined using standard materials. Therefore, these criteria should be met in all circumstances. The tuning standard for volatile organics is (BFB) Bromofluorobenzene.

If the mass calibration is in error, all associated data will be classified as unusable "R".

No problems found for this qualification.

6. CALIBRATION:

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of giving acceptable performance at the beginning of an experimental sequence. The continuing calibration checks document that the instrument is giving satisfactory daily performance.

A) Response Factor GC/MS:

The response factor measures the instrument's response to specific chemical compounds. The response factor for the Target Compound List (TCL) must be ≥ 0.05, and ≥ 0.01 for the twenty-two analytes with poor response in both the initial and continuing calibrations. A value < 0.05, or < 0.01 for the poor performers indicates a serious detection and quantitation problem (poor sensitivity). Analytes detected in the sample will be qualified as estimated, "J". All non-detects for that compound will be rejected "R".

No problems found for this qualification.

B) Percent Relative Standard Deviation (%RSD) and Percent Difference (%D):

Percent RSD is calculated from the initial calibration and is used to indicate the stability of the specific compound response factor over increasing concentration. Percent D compares the response factor of the continuing calibration check to the mean response factor (RRF) from the initial calibration. Percent D is a measure of the instrument's daily performance. Percent RSD must be < 20%, < 40% for the poor performers, and < 50% for 1,4-Dioxane. %D must be < 25%, < 40% for the poor performers, and < 50% for 1,4-Dioxane. A value outside of these limits indicates potential detection and quantitation errors. For these reasons, all positive results are flagged as estimated, "J" and non-detects are flagged "UJ". If %RSD and %D grossly exceed QC criteria (> 90%), non-detects data may be qualified "R".

The following analytes in the sample shown were qualified for %RSD and %D:

No problems found for this qualification.

7. INTERNAL STANDARDS PERFORMANCE GC/MS:

Internal standards (IS) performance criteria ensure that the GC/MS sensitivity and response are stable during every experimental run. The internal standard area count must not vary by more than a factor of 2 (-50% to +200%) from the associated continuing calibration standard. The retention time of the internal standard must not vary more than 30 seconds from the associated continuing calibration standard. If the area count is outside the (-50% to +200%) range of the associated standard, all of the positive results for compounds quantitated using that IS are qualified as estimated, "J", and all non-detects as "UJ", or "R" if there is a severe loss of sensitivity.

If an internal standard retention time varies by more than 30 seconds, the reviewer will use professional judgment to determine either partial or total rejection of the data for that sample fraction.

No problems found for this qualification.

8. COMPOUND IDENTIFICATION:

A) Volatile Fraction:

TCL compounds are identified on the GC/MS by using the analyte's relative retention time (RRT) and by comparison to the ion spectra obtained from known standards. For the results to be a positive hit, the sample peak must be within 0.06 RRT units of the standard compound and have ion spectra which has a ratio of the primary and secondary m/e intensities within 20% of that in the standard compound. For the tentatively identified compounds (TIC) the ion spectra must match accurately. In the cases where there is not an adequate ion spectrum match, the laboratory may have provided false positive identifications.

No problems found for this qualification.

9. CONTRACT PROBLEMS NON-COMPLIANCE:

10. FIELD DOCUMENTATION:

11. OTHER PROBLEMS:

12. This package contains re-extracted, re-analyzed or diluted runs. Upon reviewing the QA results, the following Form 1(s) are identified NOT to be used.

None.

Sample Summary Report

Case No:	41323	Contract:	EPW10018	SDG No:	B98K6	Lab Code:	A4
Sample Number:	B98K6	Method:	VOA_Low_Med	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	1312-RIN01	pH:	2.0	Sample Date:	05172011	Sample Time:	10:25:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Dichlorodifluoro methane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Chloromethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Vinyl chloride	5.0	ug/L	1.0	U	U	Yes	S3VEM
Bromomethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Chloroethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Trichlorofluorom ethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,1-Dichloroethene	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Acetone	10	ug/L	1.0	U	U	Yes	S3VEM
Carbon Disulfide	5.0	ug/L	1.0	U	U	Yes	S3VEM
Methyl acetate	5.0	ug/L	1.0	U	U	Yes	S3VEM
Methylene chloride	3.1	ug/L	1.0	JB	J	Yes	S3VEM
trans-1,2-Dichloroethene	5.0	ug/L	1.0	U	U	Yes	S3VEM
Methyl tert-butyl ether	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,1-Dichloroethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
cis-1,2-Dichloroethene	5.0	ug/L	1.0	U	U	Yes	S3VEM
2-Butanone	10	ug/L	1.0	U	U	Yes	S3VEM
Bromochloromet hane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Chloroform	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,1,1-Trichloroethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Cyclohexane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Carbon tetrachloride	5.0	ug/L	1.0	U	U	Yes	S3VEM
Benzene	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,2-Dichloroethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,4-Dioxane	100	ug/L	1.0	U	U	Yes	S3VEM
Trichloroethene	5.0	ug/L	1.0	U	U	Yes	S3VEM

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Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Methylcyclohexane	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,2-Dichloropropane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Bromodichloromethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
cis-1,3-Dichloropropene	5.0	ug/L	1.0	U	U	Yes	S3VEM
4-Methyl-2-pentanone	10	ug/L	1.0	U	U	Yes	S3VEM
Toluene	5.0	ug/L	1.0	U	U	Yes	S3VEM
trans-1,3-Dichloropropene	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,1,2-Trichloroethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Tetrachloroethene	5.0	ug/L	1.0	U	U	Yes	S3VEM
2-Hexanone	10	ug/L	1.0	U	U	Yes	S3VEM
Dibromochloromethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,2-Dibromoethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Chlorobenzene	5.0	ug/L	1.0	U	U	Yes	S3VEM
Ethylbenzene	5.0	ug/L	1.0	U	U	Yes	S3VEM
o-Xylene	5.0	ug/L	1.0	U	U	Yes	S3VEM
m,p-Xylene	5.0	ug/L	1.0	U	U	Yes	S3VEM
Styrene	5.0	ug/L	1.0	U	U	Yes	S3VEM
Bromoform	5.0	ug/L	1.0	U	U	Yes	S3VEM
Isopropylbenzene	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,1,2,2-Tetrachloroethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,3-Dichlorobenzene	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,4-Dichlorobenzene	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,2-Dichlorobenzene	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,2-Dibromo-3-chloropropane	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,2,4-Trichlorobenzene	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,2,3-Trichlorobenzene	5.0	ug/L	1.0	U	U	Yes	S3VEM

Case No: 41323	Contract: EPW10018	SDG No: B98K6	Lab Code: A4
Sample Number: VBLK62	Method: VOA_Low_Med	Matrix: Water	MA Number: DEFAULT
Sample Location:	pH:	Sample Date:	Sample Time:
% Moisture : 0		% Solids :	

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Dichlorodifluoro methane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Chloromethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Vinyl chloride	5.0	ug/L	1.0	U	U	Yes	S3VEM
Bromomethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Chloroethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Trichlorofluorom ethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,1-Dichloroethene	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Acetone	3.5	ug/L	1.0	J	J	Yes	S3VEM
Carbon Disulfide	5.0	ug/L	1.0	U	U	Yes	S3VEM
Methyl acetate	5.0	ug/L	1.0	U	U	Yes	S3VEM
Methylene chloride	2.5	ug/L	1.0	J	J	Yes	S3VEM
trans-1,2-Dichloroethene	5.0	ug/L	1.0	U	U	Yes	S3VEM
Methyl tert-butyl ether	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,1-Dichloroethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
cis-1,2-Dichloroethene	5.0	ug/L	1.0	U	U	Yes	S3VEM
2-Butanone	10	ug/L	1.0	U	U	Yes	S3VEM
Bromochloromet hane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Chloroform	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,1,1-Trichloroethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Cyclohexane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Carbon tetrachloride	5.0	ug/L	1.0	U	U	Yes	S3VEM
Benzene	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,2-Dichloroethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,4-Dioxane	100	ug/L	1.0	U	U	Yes	S3VEM
Trichloroethene	5.0	ug/L	1.0	U	U	Yes	S3VEM
Methylcyclohexa ne	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,2-Dichloropropane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Bromodichlorom	5.0	ug/L	1.0	U	U	Yes	S3VEM

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Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
ethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
cis-1,3-Dichloropropene	5.0	ug/L	1.0	U	U	Yes	S3VEM
4-Methyl-2-pentanone	10	ug/L	1.0	U	U	Yes	S3VEM
Toluene	5.0	ug/L	1.0	U	U	Yes	S3VEM
trans-1,3-Dichloropropene	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,1,2-Trichloroethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Tetrachloroethene	5.0	ug/L	1.0	U	U	Yes	S3VEM
2-Hexanone	10	ug/L	1.0	U	U	Yes	S3VEM
Dibromochloromethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,2-Dibromoethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Chlorobenzene	5.0	ug/L	1.0	U	U	Yes	S3VEM
Ethylbenzene	5.0	ug/L	1.0	U	U	Yes	S3VEM
o-Xylene	5.0	ug/L	1.0	U	U	Yes	S3VEM
m,p-Xylene	5.0	ug/L	1.0	U	U	Yes	S3VEM
Styrene	5.0	ug/L	1.0	U	U	Yes	S3VEM
Bromoform	5.0	ug/L	1.0	U	U	Yes	S3VEM
Isopropylbenzene	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,1,2,2-Tetrachloroethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,3-Dichlorobenzene	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,4-Dichlorobenzene	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,2-Dichlorobenzene	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,2-Dibromo-3-chloropropane	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,2,4-Trichlorobenzene	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,2,3-Trichlorobenzene	5.0	ug/L	1.0	U	U	Yes	S3VEM

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Case No: 41323	Contract: EPW10018	SDG No: B98K6	Lab Code: A4
Sample Number: VBLK77	Method: VOA_Low_Med	Matrix: Water	MA Number: DEFAULT
Sample Location:	pH:	Sample Date:	Sample Time:
% Moisture : 0		% Solids :	

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Dichlorodifluoro methane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Chloromethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Vinyl chloride	5.0	ug/L	1.0	U	U	Yes	S3VEM
Bromomethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Chloroethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Trichlorofluorom ethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,1-Dichloroethene	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Acetone	10	ug/L	1.0	U	U	Yes	S3VEM
Carbon Disulfide	5.0	ug/L	1.0	U	U	Yes	S3VEM
Methyl acetate	5.0	ug/L	1.0	U	U	Yes	S3VEM
Methylene chloride	5.0	ug/L	1.0	U	U	Yes	S3VEM
trans-1,2-Dichloroethene	5.0	ug/L	1.0	U	U	Yes	S3VEM
Methyl tert-butyl ether	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,1-Dichloroethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
cis-1,2-Dichloroethene	5.0	ug/L	1.0	U	U	Yes	S3VEM
2-Butanone	10	ug/L	1.0	U	U	Yes	S3VEM
Bromochloromet hane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Chloroform	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,1,1-Trichloroethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Cyclohexane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Carbon tetrachloride	5.0	ug/L	1.0	U	U	Yes	S3VEM
Benzene	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,2-Dichloroethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,4-Dioxane	100	ug/L	1.0	U	U	Yes	S3VEM
Trichloroethene	5.0	ug/L	1.0	U	U	Yes	S3VEM
Methylcyclohexa ne	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,2-Dichloropropane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Bromodichlorom	5.0	ug/L	1.0	U	U	Yes	S3VEM

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Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
ethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
cis-1,3-Dichloropropene	5.0	ug/L	1.0	U	U	Yes	S3VEM
4-Methyl-2-pentanone	10	ug/L	1.0	U	U	Yes	S3VEM
Toluene	5.0	ug/L	1.0	U	U	Yes	S3VEM
trans-1,3-Dichloropropene	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,1,2-Trichloroethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Tetrachloroethene	5.0	ug/L	1.0	U	U	Yes	S3VEM
2-Hexanone	10	ug/L	1.0	U	U	Yes	S3VEM
Dibromochloromethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,2-Dibromoethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Chlorobenzene	5.0	ug/L	1.0	U	U	Yes	S3VEM
Ethylbenzene	5.0	ug/L	1.0	U	U	Yes	S3VEM
o-Xylene	5.0	ug/L	1.0	U	U	Yes	S3VEM
m,p-Xylene	5.0	ug/L	1.0	U	U	Yes	S3VEM
Styrene	5.0	ug/L	1.0	U	U	Yes	S3VEM
Bromoform	5.0	ug/L	1.0	U	U	Yes	S3VEM
Isopropylbenzene	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,1,2,2-Tetrachloroethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,3-Dichlorobenzene	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,4-Dichlorobenzene	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,2-Dichlorobenzene	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,2-Dibromo-3-chloropropane	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,2,4-Trichlorobenzene	1.5	ug/L	1.0	J	J	Yes	S3VEM
1,2,3-Trichlorobenzene	2.9	ug/L	1.0	J	J	Yes	S3VEM

Case No: 41323	Contract: EPW10018	SDG No: B98K6	Lab Code: A4
Sample Number: VHBLK22P	Method: VOA_Low_Med	Matrix: Water	MA Number: DEFAULT
Sample Location:	pH: 7.0	Sample Date: 05182011	Sample Time: 00:00:00
% Moisture :		% Solids :	

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Dichlorodifluoro methane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Chloromethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Vinyl chloride	5.0	ug/L	1.0	U	U	Yes	S3VEM
Bromomethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Chloroethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Trichlorofluorom ethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,1-Dichloroethene	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Acetone	10	ug/L	1.0	U	U	Yes	S3VEM
Carbon Disulfide	5.0	ug/L	1.0	U	U	Yes	S3VEM
Methyl acetate	5.0	ug/L	1.0	U	U	Yes	S3VEM
Methylene chloride	5.0	ug/L	1.0	U	U	Yes	S3VEM
trans-1,2-Dichloroethene	5.0	ug/L	1.0	U	U	Yes	S3VEM
Methyl tert-butyl ether	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,1-Dichloroethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
cis-1,2-Dichloroethene	5.0	ug/L	1.0	U	U	Yes	S3VEM
2-Butanone	10	ug/L	1.0	U	U	Yes	S3VEM
Bromochloromet hane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Chloroform	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,1,1-Trichloroethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Cyclohexane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Carbon tetrachloride	5.0	ug/L	1.0	U	U	Yes	S3VEM
Benzene	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,2-Dichloroethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,4-Dioxane	100	ug/L	1.0	U	U	Yes	S3VEM
Trichloroethene	5.0	ug/L	1.0	U	U	Yes	S3VEM
Methylcyclohexa ne	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,2-Dichloropropane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Bromodichlorom	5.0	ug/L	1.0	U	U	Yes	S3VEM

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Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
ethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
cis-1,3-Dichloropropene	5.0	ug/L	1.0	U	U	Yes	S3VEM
4-Methyl-2-pentanone	10	ug/L	1.0	U	U	Yes	S3VEM
Toluene	5.0	ug/L	1.0	U	U	Yes	S3VEM
trans-1,3-Dichloropropene	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,1,2-Trichloroethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Tetrachloroethene	5.0	ug/L	1.0	U	U	Yes	S3VEM
2-Hexanone	10	ug/L	1.0	U	U	Yes	S3VEM
Dibromochloromethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,2-Dibromoethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
Chlorobenzene	5.0	ug/L	1.0	U	U	Yes	S3VEM
Ethylbenzene	5.0	ug/L	1.0	U	U	Yes	S3VEM
o-Xylene	5.0	ug/L	1.0	U	U	Yes	S3VEM
m,p-Xylene	5.0	ug/L	1.0	U	U	Yes	S3VEM
Styrene	5.0	ug/L	1.0	U	U	Yes	S3VEM
Bromoform	5.0	ug/L	1.0	U	U	Yes	S3VEM
Isopropylbenzene	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,1,2,2-Tetrachloroethane	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,3-Dichlorobenzene	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,4-Dichlorobenzene	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,2-Dichlorobenzene	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,2-Dibromo-3-chloropropane	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,2,4-Trichlorobenzene	5.0	ug/L	1.0	U	U	Yes	S3VEM
1,2,3-Trichlorobenzene	5.0	ug/L	1.0	U	U	Yes	S3VEM

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Sample Summary Report

Case No:	41323	Contract:	EPW10018	SDG No:	B98H4	Lab Code:	A4
Sample Number:	B98H4	Method:	VOA_Low_Med	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	1312-S01	pH:		Sample Date:	05172011	Sample Time:	13:55:00
% Moisture :	24.32			% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Dichlorodifluoro methane	9.1	ug/kg	1.0	U	U	Yes	S3VEM
Chloromethane	9.1	ug/kg	1.0	U	U	Yes	S3VEM
Vinyl chloride	9.1	ug/kg	1.0	U	U	Yes	S3VEM
Bromomethane	9.1	ug/kg	1.0	U	U	Yes	S3VEM
Chloroethane	9.1	ug/kg	1.0	U	U	Yes	S3VEM
Trichlorofluorom ethane	9.1	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethene	9.1	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	9.1	ug/kg	1.0	U	U	Yes	S3VEM
Acetone	18	ug/kg	1.0	U	U	Yes	S3VEM
Carbon Disulfide	9.1	ug/kg	1.0	U	U	Yes	S3VEM
Methyl acetate	9.1	ug/kg	1.0	U	U	Yes	S3VEM
Methylene chloride	9.1	ug/kg	1.0	JB	U	Yes	S3VEM
trans-1,2-Dichloroethene	9.1	ug/kg	1.0	U	U	Yes	S3VEM
Methyl tert-butyl ether	9.1	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethane	9.1	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,2-Dichloroethene	9.1	ug/kg	1.0	U	U	Yes	S3VEM
2-Butanone	18	ug/kg	1.0	U	U	Yes	S3VEM
Bromochloromet hane	9.1	ug/kg	1.0	U	U	Yes	S3VEM
Chloroform	9.1	ug/kg	1.0	U	U	Yes	S3VEM
1,1,1-Trichloroethane	9.1	ug/kg	1.0	U	U	Yes	S3VEM
Cyclohexane	9.1	ug/kg	1.0	U	U	Yes	S3VEM
Carbon tetrachloride	9.1	ug/kg	1.0	U	U	Yes	S3VEM
Benzene	9.1	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloroethane	9.1	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dioxane	180	ug/kg	1.0	U	U	Yes	S3VEM
Trichloroethene	9.1	ug/kg	1.0	U	U	Yes	S3VEM

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Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Methylcyclohexane	9.1	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloropropane	9.1	ug/kg	1.0	U	U	Yes	S3VEM
Bromodichloromethane	9.1	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,3-Dichloropropene	9.1	ug/kg	1.0	U	U	Yes	S3VEM
4-Methyl-2-pentanone	18	ug/kg	1.0	U	U	Yes	S3VEM
Toluene	9.1	ug/kg	1.0	U	U	Yes	S3VEM
trans-1,3-Dichloropropene	9.1	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloroethane	9.1	ug/kg	1.0	U	U	Yes	S3VEM
Tetrachloroethene	9.1	ug/kg	1.0	U	U	Yes	S3VEM
2-Hexanone	18	ug/kg	1.0	U	U	Yes	S3VEM
Dibromochloromethane	9.1	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromoethane	9.1	ug/kg	1.0	U	U	Yes	S3VEM
Chlorobenzene	9.1	ug/kg	1.0	U	U	Yes	S3VEM
Ethylbenzene	9.1	ug/kg	1.0	U	U	Yes	S3VEM
o-Xylene	9.1	ug/kg	1.0	U	U	Yes	S3VEM
m,p-Xylene	9.1	ug/kg	1.0	U	U	Yes	S3VEM
Styrene	9.1	ug/kg	1.0	U	U	Yes	S3VEM
Bromoform	9.1	ug/kg	1.0	U	U	Yes	S3VEM
Isopropylbenzene	9.1	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2,2-Tetrachloroethane	9.1	ug/kg	1.0	U	U	Yes	S3VEM
1,3-Dichlorobenzene	9.1	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dichlorobenzene	9.1	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichlorobenzene	9.1	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromo-3-chloropropane	9.1	ug/kg	1.0	U	U	Yes	S3VEM
1,2,4-Trichlorobenzene	9.1	ug/kg	1.0	U	U	Yes	S3VEM
1,2,3-Trichlorobenzene	9.1	ug/kg	1.0	U	U	Yes	S3VEM

Case No: 41323	Contract: EPW10018	SDG No: B98H4	Lab Code: A4
Sample Number: B98H5	Method: VOA_Low_Med	Matrix: Soil	MA Number: DEFAULT
Sample Location: 1312-SS01A	pH:	Sample Date: 05172011	Sample Time: 13:45:00
% Moisture : 23.93		% Solids :	

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Dichlorodifluoro methane	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Chloromethane	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Vinyl chloride	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Bromomethane	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Chloroethane	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Trichlorofluorom ethane	7.1	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethene	7.1	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Acetone	14	ug/kg	1.0	U	U	Yes	S3VEM
Carbon Disulfide	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Methyl acetate	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Methylene chloride	7.1	ug/kg	1.0	JB	U	Yes	S3VEM
trans-1,2-Dichloroethene	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Methyl tert-butyl ether	7.1	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethane	7.1	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,2-Dichloroethene	7.1	ug/kg	1.0	U	U	Yes	S3VEM
2-Butanone	14	ug/kg	1.0	U	U	Yes	S3VEM
Bromochloromet hane	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Chloroform	3.5	ug/kg	1.0	J	J	Yes	S3VEM
1,1,1-Trichloroethane	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Cyclohexane	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Carbon tetrachloride	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Benzene	7.1	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloroethane	7.1	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dioxane	140	ug/kg	1.0	U	U	Yes	S3VEM
Trichloroethene	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Methylcyclohexa ne	7.1	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloropropane	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Bromodichlorom	7.1	ug/kg	1.0	U	U	Yes	S3VEM

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Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
ethane	7.1	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,3-Dichloropropene	7.1	ug/kg	1.0	U	U	Yes	S3VEM
4-Methyl-2-pentanone	14	ug/kg	1.0	U	U	Yes	S3VEM
Toluene	7.1	ug/kg	1.0	U	U	Yes	S3VEM
trans-1,3-Dichloropropene	7.1	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloroethane	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Tetrachloroethene	7.1	ug/kg	1.0	U	U	Yes	S3VEM
2-Hexanone	14	ug/kg	1.0	U	U	Yes	S3VEM
Dibromochloromethane	7.1	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromoethane	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Chlorobenzene	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Ethylbenzene	7.1	ug/kg	1.0	U	U	Yes	S3VEM
o-Xylene	7.1	ug/kg	1.0	U	U	Yes	S3VEM
m,p-Xylene	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Styrene	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Bromoform	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Isopropylbenzene	7.1	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2,2-Tetrachloroethane	7.1	ug/kg	1.0	U	U	Yes	S3VEM
1,3-Dichlorobenzene	7.1	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dichlorobenzene	7.1	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichlorobenzene	7.1	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromo-3-chloropropane	7.1	ug/kg	1.0	U	U	Yes	S3VEM
1,2,4-Trichlorobenzene	7.1	ug/kg	1.0	U	U	Yes	S3VEM
1,2,3-Trichlorobenzene	7.1	ug/kg	1.0	U	U	Yes	S3VEM

Case No: 41323	Contract: EPW10018	SDG No: B98H4	Lab Code: A4
Sample Number: B98H6	Method: VOA_Low_Med	Matrix: Soil	MA Number: DEFAULT
Sample Location: 1312-SS01B	pH:	Sample Date: 05172011	Sample Time: 13:40:00
% Moisture : 23.58		% Solids :	

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Dichlorodifluoro methane	6.6	ug/kg	1.0	U	U	Yes	S3VEM
Chloromethane	6.6	ug/kg	1.0	U	U	Yes	S3VEM
Vinyl chloride	6.6	ug/kg	1.0	U	U	Yes	S3VEM
Bromomethane	6.6	ug/kg	1.0	U	U	Yes	S3VEM
Chloroethane	6.6	ug/kg	1.0	U	U	Yes	S3VEM
Trichlorofluorom ethane	6.6	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethene	6.6	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	6.6	ug/kg	1.0	U	U	Yes	S3VEM
Acetone	13	ug/kg	1.0	U	U	Yes	S3VEM
Carbon Disulfide	6.6	ug/kg	1.0	U	U	Yes	S3VEM
Methyl acetate	6.6	ug/kg	1.0	U	U	Yes	S3VEM
Methylene chloride	6.6	ug/kg	1.0	JB	U	Yes	S3VEM
trans-1,2-Dichloroethene	6.6	ug/kg	1.0	U	U	Yes	S3VEM
Methyl tert-butyl ether	6.6	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethane	6.6	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,2-Dichloroethene	6.6	ug/kg	1.0	U	U	Yes	S3VEM
2-Butanone	13	ug/kg	1.0	U	U	Yes	S3VEM
Bromochloromet hane	6.6	ug/kg	1.0	U	U	Yes	S3VEM
Chloroform	4.7	ug/kg	1.0	J	J	Yes	S3VEM
1,1,1-Trichloroethane	6.6	ug/kg	1.0	U	U	Yes	S3VEM
Cyclohexane	6.6	ug/kg	1.0	U	U	Yes	S3VEM
Carbon tetrachloride	6.6	ug/kg	1.0	U	U	Yes	S3VEM
Benzene	6.6	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloroethane	6.6	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dioxane	130	ug/kg	1.0	U	U	Yes	S3VEM
Trichloroethene	6.6	ug/kg	1.0	U	U	Yes	S3VEM
Methylcyclohexa ne	6.6	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloropropane	6.6	ug/kg	1.0	U	U	Yes	S3VEM
Bromodichlorom	6.6	ug/kg	1.0	U	U	Yes	S3VEM

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Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
ethane	6.6	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,3-Dichloropropene	6.6	ug/kg	1.0	U	U	Yes	S3VEM
4-Methyl-2-pentanone	13	ug/kg	1.0	U	U	Yes	S3VEM
Toluene	6.6	ug/kg	1.0	U	U	Yes	S3VEM
trans-1,3-Dichloropropene	6.6	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloroethane	6.6	ug/kg	1.0	U	U	Yes	S3VEM
Tetrachloroethene	6.6	ug/kg	1.0	U	U	Yes	S3VEM
2-Hexanone	13	ug/kg	1.0	U	U	Yes	S3VEM
Dibromochloromethane	6.6	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromoethane	6.6	ug/kg	1.0	U	U	Yes	S3VEM
Chlorobenzene	6.6	ug/kg	1.0	U	U	Yes	S3VEM
Ethylbenzene	6.6	ug/kg	1.0	U	U	Yes	S3VEM
o-Xylene	6.6	ug/kg	1.0	U	U	Yes	S3VEM
m,p-Xylene	6.6	ug/kg	1.0	U	U	Yes	S3VEM
Styrene	6.6	ug/kg	1.0	U	U	Yes	S3VEM
Bromoform	6.6	ug/kg	1.0	U	U	Yes	S3VEM
Isopropylbenzene	6.6	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2,2-Tetrachloroethane	6.6	ug/kg	1.0	U	U	Yes	S3VEM
1,3-Dichlorobenzene	6.6	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dichlorobenzene	6.6	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichlorobenzene	6.6	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromo-3-chloropropane	6.6	ug/kg	1.0	U	U	Yes	S3VEM
1,2,4-Trichlorobenzene	6.6	ug/kg	1.0	U	U	Yes	S3VEM
1,2,3-Trichlorobenzene	6.6	ug/kg	1.0	U	U	Yes	S3VEM

Case No: 41323	Contract: EPW10018	SDG No: B98H4	Lab Code: A4
Sample Number: B98H7	Method: VOA_Low_Med	Matrix: Soil	MA Number: DEFAULT
Sample Location: 1312-S02	pH:	Sample Date: 05172011	Sample Time: 14:10:00
% Moisture : 22.76		% Solids :	

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Dichlorodifluoro methane	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Chloromethane	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Vinyl chloride	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Bromomethane	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Chloroethane	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Trichlorofluorom ethane	7.5	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethene	7.5	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Acetone	15	ug/kg	1.0	U	U	Yes	S3VEM
Carbon Disulfide	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Methyl acetate	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Methylene chloride	7.5	ug/kg	1.0	B	U	Yes	S3VEM
trans-1,2-Dichloroethene	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Methyl tert-butyl ether	7.5	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethane	7.5	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,2-Dichloroethene	7.5	ug/kg	1.0	U	U	Yes	S3VEM
2-Butanone	15	ug/kg	1.0	U	U	Yes	S3VEM
Bromochloromet hane	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Chloroform	7.5	ug/kg	1.0	U	U	Yes	S3VEM
1,1,1-Trichloroethane	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Cyclohexane	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Carbon tetrachloride	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Benzene	7.5	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloroethane	7.5	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dioxane	150	ug/kg	1.0	U	U	Yes	S3VEM
Trichloroethene	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Methylcyclohexa ne	7.5	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloropropane	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Bromodichlorom	7.5	ug/kg	1.0	U	U	Yes	S3VEM

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Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
ethane	7.5	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,3-Dichloropropene	7.5	ug/kg	1.0	U	U	Yes	S3VEM
4-Methyl-2-pentanone	15	ug/kg	1.0	U	U	Yes	S3VEM
Toluene	7.5	ug/kg	1.0	U	U	Yes	S3VEM
trans-1,3-Dichloropropene	7.5	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloroethane	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Tetrachloroethene	7.5	ug/kg	1.0	U	U	Yes	S3VEM
2-Hexanone	15	ug/kg	1.0	U	U	Yes	S3VEM
Dibromochloromethane	7.5	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromoethane	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Chlorobenzene	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Ethylbenzene	7.5	ug/kg	1.0	U	U	Yes	S3VEM
o-Xylene	7.5	ug/kg	1.0	U	U	Yes	S3VEM
m,p-Xylene	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Styrene	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Bromoform	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Isopropylbenzene	7.5	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2,2-Tetrachloroethane	7.5	ug/kg	1.0	U	U	Yes	S3VEM
1,3-Dichlorobenzene	7.5	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dichlorobenzene	7.5	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichlorobenzene	7.5	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromo-3-chloropropane	7.5	ug/kg	1.0	U	U	Yes	S3VEM
1,2,4-Trichlorobenzene	7.5	ug/kg	1.0	U	U	Yes	S3VEM
1,2,3-Trichlorobenzene	7.5	ug/kg	1.0	U	U	Yes	S3VEM

Case No: 41323	Contract: EPW10018	SDG No: B98H4	Lab Code: A4
Sample Number: B98H8	Method: VOA_Low_Med	Matrix: Soil	MA Number: DEFAULT
Sample Location: 1312-SS02A	pH:	Sample Date: 05172011	Sample Time: 14:25:00
% Moisture : 24.36		% Solids :	

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Dichlorodifluoro methane	9.4	ug/kg	1.0	U	U	Yes	S3VEM
Chloromethane	9.4	ug/kg	1.0	U	U	Yes	S3VEM
Vinyl chloride	9.4	ug/kg	1.0	U	U	Yes	S3VEM
Bromomethane	9.4	ug/kg	1.0	U	U	Yes	S3VEM
Chloroethane	9.4	ug/kg	1.0	U	U	Yes	S3VEM
Trichlorofluorom ethane	9.4	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethene	9.4	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	9.4	ug/kg	1.0	U	U	Yes	S3VEM
Acetone	19	ug/kg	1.0	U	U	Yes	S3VEM
Carbon Disulfide	9.4	ug/kg	1.0	U	U	Yes	S3VEM
Methyl acetate	9.4	ug/kg	1.0	U	U	Yes	S3VEM
Methylene chloride	9.4	ug/kg	1.0	U	U	Yes	S3VEM
trans-1,2-Dichloroethene	9.4	ug/kg	1.0	U	U	Yes	S3VEM
Methyl tert-butyl ether	9.4	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethane	9.4	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,2-Dichloroethene	9.4	ug/kg	1.0	U	U	Yes	S3VEM
2-Butanone	19	ug/kg	1.0	U	U	Yes	S3VEM
Bromochloromet hane	9.4	ug/kg	1.0	U	U	Yes	S3VEM
Chloroform	9.4	ug/kg	1.0	U	U	Yes	S3VEM
1,1,1-Trichloroethane	9.4	ug/kg	1.0	U	U	Yes	S3VEM
Cyclohexane	9.4	ug/kg	1.0	U	U	Yes	S3VEM
Carbon tetrachloride	9.4	ug/kg	1.0	U	U	Yes	S3VEM
Benzene	9.4	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloroethane	9.4	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dioxane	190	ug/kg	1.0	U	U	Yes	S3VEM
Trichloroethene	9.4	ug/kg	1.0	U	U	Yes	S3VEM
Methylcyclohexa ne	9.4	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloropropane	9.4	ug/kg	1.0	U	U	Yes	S3VEM
Bromodichlorom	9.4	ug/kg	1.0	U	U	Yes	S3VEM

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Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
ethane	9.4	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,3-Dichloropropene	9.4	ug/kg	1.0	U	U	Yes	S3VEM
4-Methyl-2-pentanone	19	ug/kg	1.0	U	U	Yes	S3VEM
Toluene	9.4	ug/kg	1.0	U	U	Yes	S3VEM
trans-1,3-Dichloropropene	9.4	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloroethane	9.4	ug/kg	1.0	U	U	Yes	S3VEM
Tetrachloroethene	9.4	ug/kg	1.0	U	U	Yes	S3VEM
2-Hexanone	19	ug/kg	1.0	U	U	Yes	S3VEM
Dibromochloromethane	9.4	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromoethane	9.4	ug/kg	1.0	U	U	Yes	S3VEM
Chlorobenzene	9.4	ug/kg	1.0	U	U	Yes	S3VEM
Ethylbenzene	9.4	ug/kg	1.0	U	U	Yes	S3VEM
o-Xylene	9.4	ug/kg	1.0	U	U	Yes	S3VEM
m,p-Xylene	9.4	ug/kg	1.0	U	U	Yes	S3VEM
Styrene	9.4	ug/kg	1.0	U	U	Yes	S3VEM
Bromoform	9.4	ug/kg	1.0	U	U	Yes	S3VEM
Isopropylbenzene	9.4	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2,2-Tetrachloroethane	9.4	ug/kg	1.0	U	U	Yes	S3VEM
1,3-Dichlorobenzene	9.4	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dichlorobenzene	9.4	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichlorobenzene	9.4	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromo-3-chloropropane	9.4	ug/kg	1.0	U	U	Yes	S3VEM
1,2,4-Trichlorobenzene	9.4	ug/kg	1.0	U	U	Yes	S3VEM
1,2,3-Trichlorobenzene	9.4	ug/kg	1.0	U	U	Yes	S3VEM

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Case No: 41323	Contract: EPW10018	SDG No: B98H4	Lab Code: A4
Sample Number: B98H9	Method: VOA_Low_Med	Matrix: Soil	MA Number: DEFAULT
Sample Location: 1312-SS02B	pH:	Sample Date: 05172011	Sample Time: 14:40:00
% Moisture : 23.01		% Solids :	

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Dichlorodifluoro methane	8.1	ug/kg	1.0	U	U	Yes	S3VEM
Chloromethane	8.1	ug/kg	1.0	U	U	Yes	S3VEM
Vinyl chloride	8.1	ug/kg	1.0	U	U	Yes	S3VEM
Bromomethane	8.1	ug/kg	1.0	U	U	Yes	S3VEM
Chloroethane	8.1	ug/kg	1.0	U	U	Yes	S3VEM
Trichlorofluorom ethane	8.1	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethene	8.1	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	8.1	ug/kg	1.0	U	U	Yes	S3VEM
Acetone	16	ug/kg	1.0	U	U	Yes	S3VEM
Carbon Disulfide	8.1	ug/kg	1.0	U	U	Yes	S3VEM
Methyl acetate	8.1	ug/kg	1.0	U	U	Yes	S3VEM
Methylene chloride	8.1	ug/kg	1.0	U	U	Yes	S3VEM
trans-1,2-Dichloroethene	8.1	ug/kg	1.0	U	U	Yes	S3VEM
Methyl tert-butyl ether	8.1	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethane	8.1	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,2-Dichloroethene	8.1	ug/kg	1.0	U	U	Yes	S3VEM
2-Butanone	16	ug/kg	1.0	U	U	Yes	S3VEM
Bromochloromet hane	8.1	ug/kg	1.0	U	U	Yes	S3VEM
Chloroform	8.1	ug/kg	1.0	U	U	Yes	S3VEM
1,1,1-Trichloroethane	8.1	ug/kg	1.0	U	U	Yes	S3VEM
Cyclohexane	8.1	ug/kg	1.0	U	U	Yes	S3VEM
Carbon tetrachloride	8.1	ug/kg	1.0	U	U	Yes	S3VEM
Benzene	8.1	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloroethane	8.1	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dioxane	160	ug/kg	1.0	U	U	Yes	S3VEM
Trichloroethene	8.1	ug/kg	1.0	U	U	Yes	S3VEM
Methylcyclohexa ne	8.1	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloropropane	8.1	ug/kg	1.0	U	U	Yes	S3VEM
Bromodichlorom	8.1	ug/kg	1.0	U	U	Yes	S3VEM

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Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
ethane	8.1	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,3-Dichloropropene	8.1	ug/kg	1.0	U	U	Yes	S3VEM
4-Methyl-2-pentanone	16	ug/kg	1.0	U	U	Yes	S3VEM
Toluene	8.1	ug/kg	1.0	U	U	Yes	S3VEM
trans-1,3-Dichloropropene	8.1	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloroethane	8.1	ug/kg	1.0	U	U	Yes	S3VEM
Tetrachloroethene	8.1	ug/kg	1.0	U	U	Yes	S3VEM
2-Hexanone	16	ug/kg	1.0	U	U	Yes	S3VEM
Dibromochloromethane	8.1	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromoethane	8.1	ug/kg	1.0	U	U	Yes	S3VEM
Chlorobenzene	8.1	ug/kg	1.0	U	U	Yes	S3VEM
Ethylbenzene	8.1	ug/kg	1.0	U	U	Yes	S3VEM
o-Xylene	8.1	ug/kg	1.0	U	U	Yes	S3VEM
m,p-Xylene	8.1	ug/kg	1.0	U	U	Yes	S3VEM
Styrene	8.1	ug/kg	1.0	U	U	Yes	S3VEM
Bromoform	8.1	ug/kg	1.0	U	U	Yes	S3VEM
Isopropylbenzene	8.1	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2,2-Tetrachloroethane	8.1	ug/kg	1.0	U	U	Yes	S3VEM
1,3-Dichlorobenzene	8.1	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dichlorobenzene	8.1	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichlorobenzene	8.1	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromo-3-chloropropane	8.1	ug/kg	1.0	U	U	Yes	S3VEM
1,2,4-Trichlorobenzene	8.1	ug/kg	1.0	U	U	Yes	S3VEM
1,2,3-Trichlorobenzene	8.1	ug/kg	1.0	U	U	Yes	S3VEM

Case No: 41323	Contract: EPW10018	SDG No: B98H4	Lab Code: A4
Sample Number: B98J0	Method: VOA_Low_Med	Matrix: Soil	MA Number: DEFAULT
Sample Location: 1312-S03	pH:	Sample Date: 05172011	Sample Time: 12:20:00
% Moisture : 23.32		% Solids :	

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Dichlorodifluoro methane	7.7	ug/kg	1.0	U	U	Yes	S3VEM
Chloromethane	7.7	ug/kg	1.0	U	U	Yes	S3VEM
Vinyl chloride	7.7	ug/kg	1.0	U	U	Yes	S3VEM
Bromomethane	7.7	ug/kg	1.0	U	U	Yes	S3VEM
Chloroethane	7.7	ug/kg	1.0	U	U	Yes	S3VEM
Trichlorofluorom ethane	7.7	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethene	7.7	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	7.7	ug/kg	1.0	U	U	Yes	S3VEM
Acetone	15	ug/kg	1.0	U	U	Yes	S3VEM
Carbon Disulfide	7.7	ug/kg	1.0	U	U	Yes	S3VEM
Methyl acetate	7.7	ug/kg	1.0	U	U	Yes	S3VEM
Methylene chloride	7.7	ug/kg	1.0	J	U	Yes	S3VEM
trans-1,2-Dichloroethene	7.7	ug/kg	1.0	U	U	Yes	S3VEM
Methyl tert-butyl ether	7.7	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethane	7.7	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,2-Dichloroethene	7.7	ug/kg	1.0	U	U	Yes	S3VEM
2-Butanone	15	ug/kg	1.0	U	U	Yes	S3VEM
Bromochloromet hane	7.7	ug/kg	1.0	U	U	Yes	S3VEM
Chloroform	7.7	ug/kg	1.0	U	U	Yes	S3VEM
1,1,1-Trichloroethane	7.7	ug/kg	1.0	U	U	Yes	S3VEM
Cyclohexane	7.7	ug/kg	1.0	U	U	Yes	S3VEM
Carbon tetrachloride	7.7	ug/kg	1.0	U	U	Yes	S3VEM
Benzene	7.7	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloroethane	7.7	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dioxane	150	ug/kg	1.0	U	U	Yes	S3VEM
Trichloroethene	7.7	ug/kg	1.0	U	U	Yes	S3VEM
Methylcyclohexa ne	7.7	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloropropane	7.7	ug/kg	1.0	U	U	Yes	S3VEM
Bromodichlorom	7.7	ug/kg	1.0	U	U	Yes	S3VEM

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Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
ethane	7.7	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,3-Dichloropropene	7.7	ug/kg	1.0	U	U	Yes	S3VEM
4-Methyl-2-pentanone	15	ug/kg	1.0	U	U	Yes	S3VEM
Toluene	7.7	ug/kg	1.0	U	U	Yes	S3VEM
trans-1,3-Dichloropropene	7.7	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloroethane	7.7	ug/kg	1.0	U	U	Yes	S3VEM
Tetrachloroethene	7.7	ug/kg	1.0	U	U	Yes	S3VEM
2-Hexanone	15	ug/kg	1.0	U	U	Yes	S3VEM
Dibromochloromethane	7.7	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromoethane	7.7	ug/kg	1.0	U	U	Yes	S3VEM
Chlorobenzene	7.7	ug/kg	1.0	U	U	Yes	S3VEM
Ethylbenzene	7.7	ug/kg	1.0	U	U	Yes	S3VEM
o-Xylene	7.7	ug/kg	1.0	U	U	Yes	S3VEM
m,p-Xylene	7.7	ug/kg	1.0	U	U	Yes	S3VEM
Styrene	7.7	ug/kg	1.0	U	U	Yes	S3VEM
Bromoform	7.7	ug/kg	1.0	U	U	Yes	S3VEM
Isopropylbenzene	7.7	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2,2-Tetrachloroethane	7.7	ug/kg	1.0	U	U	Yes	S3VEM
1,3-Dichlorobenzene	7.7	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dichlorobenzene	7.7	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichlorobenzene	7.7	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromo-3-chloropropane	7.7	ug/kg	1.0	U	U	Yes	S3VEM
1,2,4-Trichlorobenzene	7.7	ug/kg	1.0	U	U	Yes	S3VEM
1,2,3-Trichlorobenzene	7.7	ug/kg	1.0	U	U	Yes	S3VEM

Case No: 41323	Contract: EPW10018	SDG No: B98H4	Lab Code: A4
Sample Number: B98J1	Method: VOA_Low_Med	Matrix: Soil	MA Number: DEFAULT
Sample Location: 1312-SS03A	pH:	Sample Date: 05172011	Sample Time: 12:15:00
% Moisture : 21.86		% Solids :	

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Dichlorodifluoro methane	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Chloromethane	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Vinyl chloride	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Bromomethane	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Chloroethane	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Trichlorofluorom ethane	6.3	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethene	6.3	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Acetone	13	ug/kg	1.0	U	U	Yes	S3VEM
Carbon Disulfide	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Methyl acetate	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Methylene chloride	6.3	ug/kg	1.0	JB	U	Yes	S3VEM
trans-1,2-Dichloroethene	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Methyl tert-butyl ether	6.3	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethane	6.3	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,2-Dichloroethene	6.3	ug/kg	1.0	U	U	Yes	S3VEM
2-Butanone	13	ug/kg	1.0	U	U	Yes	S3VEM
Bromochloromet hane	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Chloroform	6.3	ug/kg	1.0	U	U	Yes	S3VEM
1,1,1-Trichloroethane	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Cyclohexane	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Carbon tetrachloride	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Benzene	6.3	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloroethane	6.3	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dioxane	130	ug/kg	1.0	U	U	Yes	S3VEM
Trichloroethene	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Methylcyclohexa ne	6.3	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloropropane	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Bromodichlorom	6.3	ug/kg	1.0	U	U	Yes	S3VEM

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Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
ethane	6.3	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,3-Dichloropropene	6.3	ug/kg	1.0	U	U	Yes	S3VEM
4-Methyl-2-pentanone	13	ug/kg	1.0	U	U	Yes	S3VEM
Toluene	6.3	ug/kg	1.0	U	U	Yes	S3VEM
trans-1,3-Dichloropropene	6.3	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloroethane	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Tetrachloroethene	6.3	ug/kg	1.0	U	U	Yes	S3VEM
2-Hexanone	13	ug/kg	1.0	U	U	Yes	S3VEM
Dibromochloromethane	6.3	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromoethane	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Chlorobenzene	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Ethylbenzene	6.3	ug/kg	1.0	U	U	Yes	S3VEM
o-Xylene	6.3	ug/kg	1.0	U	U	Yes	S3VEM
m,p-Xylene	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Styrene	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Bromoform	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Isopropylbenzene	6.3	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2,2-Tetrachloroethane	6.3	ug/kg	1.0	U	U	Yes	S3VEM
1,3-Dichlorobenzene	6.3	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dichlorobenzene	6.3	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichlorobenzene	6.3	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromo-3-chloropropane	6.3	ug/kg	1.0	U	U	Yes	S3VEM
1,2,4-Trichlorobenzene	6.3	ug/kg	1.0	U	U	Yes	S3VEM
1,2,3-Trichlorobenzene	6.3	ug/kg	1.0	U	U	Yes	S3VEM

Case No: 41323	Contract: EPW10018	SDG No: B98H4	Lab Code: A4
Sample Number: B98J2	Method: VOA_Low_Med	Matrix: Soil	MA Number: DEFAULT
Sample Location: 1312-SS03B	pH:	Sample Date: 05172011	Sample Time: 12:10:00
% Moisture : 20.84		% Solids :	

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Dichlorodifluoro methane	11	ug/kg	1.0	U	U	Yes	S3VEM
Chloromethane	11	ug/kg	1.0	U	U	Yes	S3VEM
Vinyl chloride	11	ug/kg	1.0	U	U	Yes	S3VEM
Bromomethane	11	ug/kg	1.0	U	U	Yes	S3VEM
Chloroethane	11	ug/kg	1.0	U	U	Yes	S3VEM
Trichlorofluorom ethane	11	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethene	11	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	11	ug/kg	1.0	U	U	Yes	S3VEM
Acetone	21	ug/kg	1.0	U	U	Yes	S3VEM
Carbon Disulfide	11	ug/kg	1.0	U	U	Yes	S3VEM
Methyl acetate	11	ug/kg	1.0	U	U	Yes	S3VEM
Methylene chloride	11	ug/kg	1.0	J	U	Yes	S3VEM
trans-1,2-Dichloroethene	11	ug/kg	1.0	U	U	Yes	S3VEM
Methyl tert-butyl ether	11	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethane	11	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,2-Dichloroethene	11	ug/kg	1.0	U	U	Yes	S3VEM
2-Butanone	21	ug/kg	1.0	U	U	Yes	S3VEM
Bromochloromet hane	11	ug/kg	1.0	U	U	Yes	S3VEM
Chloroform	11	ug/kg	1.0	U	U	Yes	S3VEM
1,1,1-Trichloroethane	11	ug/kg	1.0	U	U	Yes	S3VEM
Cyclohexane	11	ug/kg	1.0	U	U	Yes	S3VEM
Carbon tetrachloride	11	ug/kg	1.0	U	U	Yes	S3VEM
Benzene	11	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloroethane	11	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dioxane	210	ug/kg	1.0	U	U	Yes	S3VEM
Trichloroethene	11	ug/kg	1.0	U	U	Yes	S3VEM
Methylcyclohexa ne	11	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloropropane	11	ug/kg	1.0	U	U	Yes	S3VEM
Bromodichlorom	11	ug/kg	1.0	U	U	Yes	S3VEM

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Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
ethane	11	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,3-Dichloropropene	11	ug/kg	1.0	U	U	Yes	S3VEM
4-Methyl-2-pentanone	21	ug/kg	1.0	U	U	Yes	S3VEM
Toluene	11	ug/kg	1.0	U	U	Yes	S3VEM
trans-1,3-Dichloropropene	11	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloroethane	11	ug/kg	1.0	U	U	Yes	S3VEM
Tetrachloroethene	11	ug/kg	1.0	U	U	Yes	S3VEM
2-Hexanone	21	ug/kg	1.0	U	U	Yes	S3VEM
Dibromochloromethane	11	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromoethane	11	ug/kg	1.0	U	U	Yes	S3VEM
Chlorobenzene	11	ug/kg	1.0	U	U	Yes	S3VEM
Ethylbenzene	11	ug/kg	1.0	U	U	Yes	S3VEM
o-Xylene	11	ug/kg	1.0	U	U	Yes	S3VEM
m,p-Xylene	11	ug/kg	1.0	U	U	Yes	S3VEM
Styrene	11	ug/kg	1.0	U	U	Yes	S3VEM
Bromoform	11	ug/kg	1.0	U	U	Yes	S3VEM
Isopropylbenzene	11	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2,2-Tetrachloroethane	11	ug/kg	1.0	U	U	Yes	S3VEM
1,3-Dichlorobenzene	11	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dichlorobenzene	11	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichlorobenzene	11	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromo-3-chloropropane	11	ug/kg	1.0	U	U	Yes	S3VEM
1,2,4-Trichlorobenzene	11	ug/kg	1.0	U	U	Yes	S3VEM
1,2,3-Trichlorobenzene	11	ug/kg	1.0	U	U	Yes	S3VEM

Case No: 41323	Contract: EPW10018	SDG No: B98H4	Lab Code: A4
Sample Number: B98J3	Method: VOA_Low_Med	Matrix: Soil	MA Number: DEFAULT
Sample Location: 1312-S04	pH:	Sample Date: 05172011	Sample Time: 11:10:00
% Moisture : 15.84		% Solids :	

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Dichlorodifluoro methane	6.5	ug/kg	1.0	U	U	Yes	S3VEM
Chloromethane	6.5	ug/kg	1.0	U	U	Yes	S3VEM
Vinyl chloride	6.5	ug/kg	1.0	U	U	Yes	S3VEM
Bromomethane	6.5	ug/kg	1.0	U	U	Yes	S3VEM
Chloroethane	6.5	ug/kg	1.0	U	U	Yes	S3VEM
Trichlorofluorom ethane	6.5	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethene	6.5	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	6.5	ug/kg	1.0	U	U	Yes	S3VEM
Acetone	13	ug/kg	1.0	U	U	Yes	S3VEM
Carbon Disulfide	6.5	ug/kg	1.0	U	U	Yes	S3VEM
Methyl acetate	6.5	ug/kg	1.0	U	U	Yes	S3VEM
Methylene chloride	6.5	ug/kg	1.0	J	U	Yes	S3VEM
trans-1,2-Dichloroethene	6.5	ug/kg	1.0	U	U	Yes	S3VEM
Methyl tert-butyl ether	6.5	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethane	6.5	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,2-Dichloroethene	6.5	ug/kg	1.0	U	U	Yes	S3VEM
2-Butanone	13	ug/kg	1.0	U	U	Yes	S3VEM
Bromochloromet hane	6.5	ug/kg	1.0	U	U	Yes	S3VEM
Chloroform	6.5	ug/kg	1.0	U	U	Yes	S3VEM
1,1,1-Trichloroethane	6.5	ug/kg	1.0	U	U	Yes	S3VEM
Cyclohexane	6.5	ug/kg	1.0	U	U	Yes	S3VEM
Carbon tetrachloride	6.5	ug/kg	1.0	U	U	Yes	S3VEM
Benzene	6.5	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloroethane	6.5	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dioxane	130	ug/kg	1.0	U	U	Yes	S3VEM
Trichloroethene	6.5	ug/kg	1.0	U	U	Yes	S3VEM
Methylcyclohexa ne	6.5	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloropropane	6.5	ug/kg	1.0	U	U	Yes	S3VEM
Bromodichlorom	6.5	ug/kg	1.0	U	U	Yes	S3VEM

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Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
ethane	6.5	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,3-Dichloropropene	6.5	ug/kg	1.0	U	U	Yes	S3VEM
4-Methyl-2-pentanone	13	ug/kg	1.0	U	U	Yes	S3VEM
Toluene	6.5	ug/kg	1.0	U	U	Yes	S3VEM
trans-1,3-Dichloropropene	6.5	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloroethane	6.5	ug/kg	1.0	U	U	Yes	S3VEM
Tetrachloroethene	6.5	ug/kg	1.0	U	U	Yes	S3VEM
2-Hexanone	13	ug/kg	1.0	U	U	Yes	S3VEM
Dibromochloromethane	6.5	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromoethane	6.5	ug/kg	1.0	U	U	Yes	S3VEM
Chlorobenzene	6.5	ug/kg	1.0	U	U	Yes	S3VEM
Ethylbenzene	6.5	ug/kg	1.0	U	U	Yes	S3VEM
o-Xylene	6.5	ug/kg	1.0	U	U	Yes	S3VEM
m,p-Xylene	6.5	ug/kg	1.0	U	U	Yes	S3VEM
Styrene	6.5	ug/kg	1.0	U	U	Yes	S3VEM
Bromoform	6.5	ug/kg	1.0	U	U	Yes	S3VEM
Isopropylbenzene	6.5	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2,2-Tetrachloroethane	6.5	ug/kg	1.0	U	U	Yes	S3VEM
1,3-Dichlorobenzene	6.5	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dichlorobenzene	6.5	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichlorobenzene	6.5	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromo-3-chloropropane	6.5	ug/kg	1.0	U	U	Yes	S3VEM
1,2,4-Trichlorobenzene	6.5	ug/kg	1.0	U	U	Yes	S3VEM
1,2,3-Trichlorobenzene	6.5	ug/kg	1.0	U	U	Yes	S3VEM

Case No: 41323	Contract: EPW10018	SDG No: B98H4	Lab Code: A4
Sample Number: B98J4	Method: VOA_Low_Med	Matrix: Soil	MA Number: DEFAULT
Sample Location: 1312-SS05A	pH:	Sample Date: 05172011	Sample Time: 09:35:00
% Moisture : 31.97		% Solids :	

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Dichlorodifluoro methane	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Chloromethane	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Vinyl chloride	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Bromomethane	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Chloroethane	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Trichlorofluorom ethane	7.1	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethene	7.1	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Acetone	14	ug/kg	1.0	U	U	Yes	S3VEM
Carbon Disulfide	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Methyl acetate	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Methylene chloride	7.1	ug/kg	1.0	JB	U	Yes	S3VEM
trans-1,2-Dichloroethene	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Methyl tert-butyl ether	7.1	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethane	7.1	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,2-Dichloroethene	7.1	ug/kg	1.0	U	U	Yes	S3VEM
2-Butanone	14	ug/kg	1.0	U	U	Yes	S3VEM
Bromochloromet hane	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Chloroform	15	ug/kg	1.0			Yes	S3VEM
1,1,1-Trichloroethane	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Cyclohexane	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Carbon tetrachloride	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Benzene	7.1	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloroethane	7.1	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dioxane	140	ug/kg	1.0	U	U	Yes	S3VEM
Trichloroethene	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Methylcyclohexa ne	7.1	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloropropane	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Bromodichlorom	7.1	ug/kg	1.0	U	U	Yes	S3VEM

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Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
ethane	7.1	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,3-Dichloropropene	7.1	ug/kg	1.0	U	U	Yes	S3VEM
4-Methyl-2-pentanone	14	ug/kg	1.0	U	U	Yes	S3VEM
Toluene	7.1	ug/kg	1.0	U	U	Yes	S3VEM
trans-1,3-Dichloropropene	7.1	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloroethane	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Tetrachloroethene	7.1	ug/kg	1.0	U	U	Yes	S3VEM
2-Hexanone	14	ug/kg	1.0	U	U	Yes	S3VEM
Dibromochloromethane	7.1	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromoethane	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Chlorobenzene	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Ethylbenzene	7.1	ug/kg	1.0	U	U	Yes	S3VEM
o-Xylene	7.1	ug/kg	1.0	U	U	Yes	S3VEM
m,p-Xylene	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Styrene	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Bromoform	7.1	ug/kg	1.0	U	U	Yes	S3VEM
Isopropylbenzene	7.1	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2,2-Tetrachloroethane	7.1	ug/kg	1.0	U	U	Yes	S3VEM
1,3-Dichlorobenzene	7.1	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dichlorobenzene	7.1	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichlorobenzene	7.1	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromo-3-chloropropane	7.1	ug/kg	1.0	U	U	Yes	S3VEM
1,2,4-Trichlorobenzene	7.1	ug/kg	1.0	U	U	Yes	S3VEM
1,2,3-Trichlorobenzene	7.1	ug/kg	1.0	U	U	Yes	S3VEM

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Case No: 41323	Contract: EPW10018	SDG No: B98H4	Lab Code: A4
Sample Number: B98J5	Method: VOA_Low_Med	Matrix: Soil	MA Number: DEFAULT
Sample Location: 1312-SS04B	pH:	Sample Date: 05172011	Sample Time: 10:50:00
% Moisture : 22.90		% Solids :	

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Dichlorodifluoro methane	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Chloromethane	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Vinyl chloride	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Bromomethane	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Chloroethane	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Trichlorofluorom ethane	6.3	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethene	6.3	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Acetone	13	ug/kg	1.0	U	U	Yes	S3VEM
Carbon Disulfide	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Methyl acetate	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Methylene chloride	6.3	ug/kg	1.0	JB	U	Yes	S3VEM
trans-1,2-Dichloroethene	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Methyl tert-butyl ether	6.3	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethane	6.3	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,2-Dichloroethene	6.3	ug/kg	1.0	U	U	Yes	S3VEM
2-Butanone	13	ug/kg	1.0	U	U	Yes	S3VEM
Bromochloromet hane	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Chloroform	5.3	ug/kg	1.0	J	J	Yes	S3VEM
1,1,1-Trichloroethane	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Cyclohexane	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Carbon tetrachloride	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Benzene	6.3	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloroethane	6.3	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dioxane	130	ug/kg	1.0	U	U	Yes	S3VEM
Trichloroethene	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Methylcyclohexa ne	6.3	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloropropane	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Bromodichlorom	6.3	ug/kg	1.0	U	U	Yes	S3VEM

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Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
ethane	6.3	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,3-Dichloropropene	6.3	ug/kg	1.0	U	U	Yes	S3VEM
4-Methyl-2-pentanone	13	ug/kg	1.0	U	U	Yes	S3VEM
Toluene	6.3	ug/kg	1.0	U	U	Yes	S3VEM
trans-1,3-Dichloropropene	6.3	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloroethane	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Tetrachloroethene	6.3	ug/kg	1.0	U	U	Yes	S3VEM
2-Hexanone	13	ug/kg	1.0	U	U	Yes	S3VEM
Dibromochloromethane	6.3	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromoethane	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Chlorobenzene	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Ethylbenzene	6.3	ug/kg	1.0	U	U	Yes	S3VEM
o-Xylene	6.3	ug/kg	1.0	U	U	Yes	S3VEM
m,p-Xylene	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Styrene	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Bromoform	6.3	ug/kg	1.0	U	U	Yes	S3VEM
Isopropylbenzene	6.3	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2,2-Tetrachloroethane	6.3	ug/kg	1.0	U	U	Yes	S3VEM
1,3-Dichlorobenzene	6.3	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dichlorobenzene	6.3	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichlorobenzene	6.3	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromo-3-chloropropane	6.3	ug/kg	1.0	U	U	Yes	S3VEM
1,2,4-Trichlorobenzene	6.3	ug/kg	1.0	U	U	Yes	S3VEM
1,2,3-Trichlorobenzene	6.3	ug/kg	1.0	U	U	Yes	S3VEM

Case No: 41323	Contract: EPW10018	SDG No: B98H4	Lab Code: A4
Sample Number: B98J6	Method: VOA_Low_Med	Matrix: Soil	MA Number: DEFAULT
Sample Location: 1312-S05	pH:	Sample Date: 05172011	Sample Time: 09:45:00
% Moisture : 10.03		% Solids :	

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Dichlorodifluoro methane	5.7	ug/kg	1.0	U	U	Yes	S3VEM
Chloromethane	5.7	ug/kg	1.0	U	U	Yes	S3VEM
Vinyl chloride	5.7	ug/kg	1.0	U	U	Yes	S3VEM
Bromomethane	5.7	ug/kg	1.0	U	U	Yes	S3VEM
Chloroethane	5.7	ug/kg	1.0	U	U	Yes	S3VEM
Trichlorofluorom ethane	5.7	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethene	5.7	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	5.7	ug/kg	1.0	U	U	Yes	S3VEM
Acetone	11	ug/kg	1.0	U	U	Yes	S3VEM
Carbon Disulfide	5.7	ug/kg	1.0	U	U	Yes	S3VEM
Methyl acetate	5.7	ug/kg	1.0	U	U	Yes	S3VEM
Methylene chloride	5.7	ug/kg	1.0	J	U	Yes	S3VEM
trans-1,2-Dichloroethene	5.7	ug/kg	1.0	U	U	Yes	S3VEM
Methyl tert-butyl ether	5.7	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethane	5.7	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,2-Dichloroethene	5.7	ug/kg	1.0	U	U	Yes	S3VEM
2-Butanone	11	ug/kg	1.0	U	U	Yes	S3VEM
Bromochloromet hane	5.7	ug/kg	1.0	U	U	Yes	S3VEM
Chloroform	5.7	ug/kg	1.0	U	U	Yes	S3VEM
1,1,1-Trichloroethane	5.7	ug/kg	1.0	U	U	Yes	S3VEM
Cyclohexane	5.7	ug/kg	1.0	U	U	Yes	S3VEM
Carbon tetrachloride	5.7	ug/kg	1.0	U	U	Yes	S3VEM
Benzene	5.7	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloroethane	5.7	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dioxane	110	ug/kg	1.0	U	U	Yes	S3VEM
Trichloroethene	5.7	ug/kg	1.0	U	U	Yes	S3VEM
Methylcyclohexa ne	5.7	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloropropane	5.7	ug/kg	1.0	U	U	Yes	S3VEM
Bromodichlorom	5.7	ug/kg	1.0	U	U	Yes	S3VEM

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Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
ethane	5.7	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,3-Dichloropropene	5.7	ug/kg	1.0	U	U	Yes	S3VEM
4-Methyl-2-pentanone	11	ug/kg	1.0	U	U	Yes	S3VEM
Toluene	5.7	ug/kg	1.0	U	U	Yes	S3VEM
trans-1,3-Dichloropropene	5.7	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloroethane	5.7	ug/kg	1.0	U	U	Yes	S3VEM
Tetrachloroethene	5.7	ug/kg	1.0	U	U	Yes	S3VEM
2-Hexanone	11	ug/kg	1.0	U	U	Yes	S3VEM
Dibromochloromethane	5.7	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromoethane	5.7	ug/kg	1.0	U	U	Yes	S3VEM
Chlorobenzene	5.7	ug/kg	1.0	U	U	Yes	S3VEM
Ethylbenzene	5.7	ug/kg	1.0	U	U	Yes	S3VEM
o-Xylene	5.7	ug/kg	1.0	U	U	Yes	S3VEM
m,p-Xylene	5.7	ug/kg	1.0	U	U	Yes	S3VEM
Styrene	5.7	ug/kg	1.0	U	U	Yes	S3VEM
Bromoform	5.7	ug/kg	1.0	U	U	Yes	S3VEM
Isopropylbenzene	5.7	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2,2-Tetrachloroethane	5.7	ug/kg	1.0	U	U	Yes	S3VEM
1,3-Dichlorobenzene	5.7	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dichlorobenzene	5.7	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichlorobenzene	5.7	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromo-3-chloropropane	5.7	ug/kg	1.0	U	U	Yes	S3VEM
1,2,4-Trichlorobenzene	5.7	ug/kg	1.0	U	U	Yes	S3VEM
1,2,3-Trichlorobenzene	5.7	ug/kg	1.0	U	U	Yes	S3VEM

Case No: 41323	Contract: EPW10018	SDG No: B98H4	Lab Code: A4
Sample Number: B98J7	Method: VOA_Low_Med	Matrix: Soil	MA Number: DEFAULT
Sample Location: 1312-SS04A	pH:	Sample Date: 05172011	Sample Time: 11:00:00
% Moisture : 30.98		% Solids :	

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Dichlorodifluoro methane	7.8	ug/kg	1.0	U	U	Yes	S3VEM
Chloromethane	7.8	ug/kg	1.0	U	U	Yes	S3VEM
Vinyl chloride	7.8	ug/kg	1.0	U	U	Yes	S3VEM
Bromomethane	7.8	ug/kg	1.0	U	U	Yes	S3VEM
Chloroethane	7.8	ug/kg	1.0	U	U	Yes	S3VEM
Trichlorofluorom ethane	7.8	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethene	7.8	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	7.8	ug/kg	1.0	U	U	Yes	S3VEM
Acetone	16	ug/kg	1.0	U	U	Yes	S3VEM
Carbon Disulfide	7.8	ug/kg	1.0	U	U	Yes	S3VEM
Methyl acetate	7.8	ug/kg	1.0	U	U	Yes	S3VEM
Methylene chloride	7.8	ug/kg	1.0	U	U	Yes	S3VEM
trans-1,2-Dichloroethene	7.8	ug/kg	1.0	U	U	Yes	S3VEM
Methyl tert-butyl ether	7.8	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethane	7.8	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,2-Dichloroethene	7.8	ug/kg	1.0	U	U	Yes	S3VEM
2-Butanone	16	ug/kg	1.0	U	U	Yes	S3VEM
Bromochloromet hane	7.8	ug/kg	1.0	U	U	Yes	S3VEM
Chloroform	5.1	ug/kg	1.0	J	J	Yes	S3VEM
1,1,1-Trichloroethane	7.8	ug/kg	1.0	U	U	Yes	S3VEM
Cyclohexane	7.8	ug/kg	1.0	U	U	Yes	S3VEM
Carbon tetrachloride	7.8	ug/kg	1.0	U	U	Yes	S3VEM
Benzene	7.8	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloroethane	7.8	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dioxane	160	ug/kg	1.0	U	U	Yes	S3VEM
Trichloroethene	7.8	ug/kg	1.0	U	U	Yes	S3VEM
Methylcyclohexa ne	7.8	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloropropane	7.8	ug/kg	1.0	U	U	Yes	S3VEM
Bromodichlorom	7.8	ug/kg	1.0	U	U	Yes	S3VEM

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Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
ethane	7.8	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,3-Dichloropropene	7.8	ug/kg	1.0	U	U	Yes	S3VEM
4-Methyl-2-pentanone	16	ug/kg	1.0	U	U	Yes	S3VEM
Toluene	7.8	ug/kg	1.0	U	U	Yes	S3VEM
trans-1,3-Dichloropropene	7.8	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloroethane	7.8	ug/kg	1.0	U	U	Yes	S3VEM
Tetrachloroethene	7.8	ug/kg	1.0	U	U	Yes	S3VEM
2-Hexanone	16	ug/kg	1.0	U	U	Yes	S3VEM
Dibromochloromethane	7.8	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromoethane	7.8	ug/kg	1.0	U	U	Yes	S3VEM
Chlorobenzene	7.8	ug/kg	1.0	U	U	Yes	S3VEM
Ethylbenzene	7.8	ug/kg	1.0	U	U	Yes	S3VEM
o-Xylene	7.8	ug/kg	1.0	U	U	Yes	S3VEM
m,p-Xylene	7.8	ug/kg	1.0	U	U	Yes	S3VEM
Styrene	7.8	ug/kg	1.0	U	U	Yes	S3VEM
Bromoform	7.8	ug/kg	1.0	U	U	Yes	S3VEM
Isopropylbenzene	7.8	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2,2-Tetrachloroethane	7.8	ug/kg	1.0	U	U	Yes	S3VEM
1,3-Dichlorobenzene	7.8	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dichlorobenzene	7.8	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichlorobenzene	7.8	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromo-3-chloropropane	7.8	ug/kg	1.0	U	U	Yes	S3VEM
1,2,4-Trichlorobenzene	7.8	ug/kg	1.0	U	U	Yes	S3VEM
1,2,3-Trichlorobenzene	7.8	ug/kg	1.0	U	U	Yes	S3VEM

Case No: 41323	Contract: EPW10018	SDG No: B98H4	Lab Code: A4
Sample Number: B98J8	Method: VOA_Low_Med	Matrix: Soil	MA Number: DEFAULT
Sample Location: 1312-SS05B	pH:	Sample Date: 05172011	Sample Time: 09:30:00
% Moisture : 21.89		% Solids :	

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Dichlorodifluoro methane	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Chloromethane	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Vinyl chloride	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Bromomethane	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Chloroethane	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Trichlorofluorom ethane	7.5	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethene	7.5	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Acetone	15	ug/kg	1.0	U	U	Yes	S3VEM
Carbon Disulfide	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Methyl acetate	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Methylene chloride	7.5	ug/kg	1.0	JB	U	Yes	S3VEM
trans-1,2-Dichloroethene	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Methyl tert-butyl ether	7.5	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethane	7.5	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,2-Dichloroethene	7.5	ug/kg	1.0	U	U	Yes	S3VEM
2-Butanone	15	ug/kg	1.0	U	U	Yes	S3VEM
Bromochloromet hane	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Chloroform	6.2	ug/kg	1.0	J	J	Yes	S3VEM
1,1,1-Trichloroethane	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Cyclohexane	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Carbon tetrachloride	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Benzene	7.5	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloroethane	7.5	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dioxane	150	ug/kg	1.0	U	U	Yes	S3VEM
Trichloroethene	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Methylcyclohexa ne	7.5	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloropropane	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Bromodichlorom	7.5	ug/kg	1.0	U	U	Yes	S3VEM

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Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
ethane	7.5	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,3-Dichloropropene	7.5	ug/kg	1.0	U	U	Yes	S3VEM
4-Methyl-2-pentanone	15	ug/kg	1.0	U	U	Yes	S3VEM
Toluene	7.5	ug/kg	1.0	U	U	Yes	S3VEM
trans-1,3-Dichloropropene	7.5	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloroethane	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Tetrachloroethene	7.5	ug/kg	1.0	U	U	Yes	S3VEM
2-Hexanone	15	ug/kg	1.0	U	U	Yes	S3VEM
Dibromochloromethane	7.5	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromoethane	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Chlorobenzene	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Ethylbenzene	7.5	ug/kg	1.0	U	U	Yes	S3VEM
o-Xylene	7.5	ug/kg	1.0	U	U	Yes	S3VEM
m,p-Xylene	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Styrene	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Bromoform	7.5	ug/kg	1.0	U	U	Yes	S3VEM
Isopropylbenzene	7.5	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2,2-Tetrachloroethane	7.5	ug/kg	1.0	U	U	Yes	S3VEM
1,3-Dichlorobenzene	7.5	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dichlorobenzene	7.5	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichlorobenzene	7.5	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromo-3-chloropropane	7.5	ug/kg	1.0	U	U	Yes	S3VEM
1,2,4-Trichlorobenzene	7.5	ug/kg	1.0	U	U	Yes	S3VEM
1,2,3-Trichlorobenzene	7.5	ug/kg	1.0	U	U	Yes	S3VEM

Case No: 41323	Contract: EPW10018	SDG No: B98H4	Lab Code: A4
Sample Number: B98J9	Method: VOA_Low_Med	Matrix: Soil	MA Number: DEFAULT
Sample Location: 1312-S06	pH:	Sample Date: 05172011	Sample Time: 14:15:00
% Moisture : 22.95		% Solids :	

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Dichlorodifluoro methane	8.7	ug/kg	1.0	U	U	Yes	S3VEM
Chloromethane	8.7	ug/kg	1.0	U	U	Yes	S3VEM
Vinyl chloride	8.7	ug/kg	1.0	U	U	Yes	S3VEM
Bromomethane	8.7	ug/kg	1.0	U	U	Yes	S3VEM
Chloroethane	8.7	ug/kg	1.0	U	U	Yes	S3VEM
Trichlorofluorom ethane	8.7	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethene	8.7	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	8.7	ug/kg	1.0	U	U	Yes	S3VEM
Acetone	17	ug/kg	1.0	U	U	Yes	S3VEM
Carbon Disulfide	8.7	ug/kg	1.0	U	U	Yes	S3VEM
Methyl acetate	8.7	ug/kg	1.0	U	U	Yes	S3VEM
Methylene chloride	8.7	ug/kg	1.0	U	U	Yes	S3VEM
trans-1,2-Dichloroethene	8.7	ug/kg	1.0	U	U	Yes	S3VEM
Methyl tert-butyl ether	8.7	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethane	8.7	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,2-Dichloroethene	8.7	ug/kg	1.0	U	U	Yes	S3VEM
2-Butanone	17	ug/kg	1.0	U	U	Yes	S3VEM
Bromochloromet hane	8.7	ug/kg	1.0	U	U	Yes	S3VEM
Chloroform	8.7	ug/kg	1.0	U	U	Yes	S3VEM
1,1,1-Trichloroethane	8.7	ug/kg	1.0	U	U	Yes	S3VEM
Cyclohexane	8.7	ug/kg	1.0	U	U	Yes	S3VEM
Carbon tetrachloride	8.7	ug/kg	1.0	U	U	Yes	S3VEM
Benzene	8.7	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloroethane	8.7	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dioxane	170	ug/kg	1.0	U	U	Yes	S3VEM
Trichloroethene	8.7	ug/kg	1.0	U	U	Yes	S3VEM
Methylcyclohexa ne	8.7	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloropropane	8.7	ug/kg	1.0	U	U	Yes	S3VEM
Bromodichlorom	8.7	ug/kg	1.0	U	U	Yes	S3VEM

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Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
ethane	8.7	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,3-Dichloropropene	8.7	ug/kg	1.0	U	U	Yes	S3VEM
4-Methyl-2-pentanone	17	ug/kg	1.0	U	U	Yes	S3VEM
Toluene	8.7	ug/kg	1.0	U	U	Yes	S3VEM
trans-1,3-Dichloropropene	8.7	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloroethane	8.7	ug/kg	1.0	U	U	Yes	S3VEM
Tetrachloroethene	8.7	ug/kg	1.0	U	U	Yes	S3VEM
2-Hexanone	17	ug/kg	1.0	U	U	Yes	S3VEM
Dibromochloromethane	8.7	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromoethane	8.7	ug/kg	1.0	U	U	Yes	S3VEM
Chlorobenzene	8.7	ug/kg	1.0	U	U	Yes	S3VEM
Ethylbenzene	8.7	ug/kg	1.0	U	U	Yes	S3VEM
o-Xylene	8.7	ug/kg	1.0	U	U	Yes	S3VEM
m,p-Xylene	8.7	ug/kg	1.0	U	U	Yes	S3VEM
Styrene	8.7	ug/kg	1.0	U	U	Yes	S3VEM
Bromoform	8.7	ug/kg	1.0	U	U	Yes	S3VEM
Isopropylbenzene	8.7	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2,2-Tetrachloroethane	8.7	ug/kg	1.0	U	U	Yes	S3VEM
1,3-Dichlorobenzene	8.7	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dichlorobenzene	8.7	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichlorobenzene	8.7	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromo-3-chloropropane	8.7	ug/kg	1.0	U	U	Yes	S3VEM
1,2,4-Trichlorobenzene	8.7	ug/kg	1.0	U	U	Yes	S3VEM
1,2,3-Trichlorobenzene	8.7	ug/kg	1.0	U	U	Yes	S3VEM

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Case No: 41323	Contract: EPW10018	SDG No: B98H4	Lab Code: A4
Sample Number: VBLK69	Method: VOA_Low_Med	Matrix: Soil	MA Number: DEFAULT
Sample Location:	pH:	Sample Date:	Sample Time:
% Moisture : 0		% Solids :	

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Dichlorodifluoro methane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Chloromethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Vinyl chloride	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Bromomethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Chloroethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Trichlorofluorom ethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Acetone	10	ug/kg	1.0	U	U	Yes	S3VEM
Carbon Disulfide	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Methyl acetate	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Methylene chloride	2.2	ug/kg	1.0	J	J	Yes	S3VEM
trans-1,2-Dichloroethene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Methyl tert-butyl ether	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,2-Dichloroethene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
2-Butanone	10	ug/kg	1.0	U	U	Yes	S3VEM
Bromochloromet hane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Chloroform	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,1,1-Trichloroethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Cyclohexane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Carbon tetrachloride	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Benzene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloroethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dioxane	100	ug/kg	1.0	U	U	Yes	S3VEM
Trichloroethene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Methylcyclohexa ne	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloropropane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Bromodichlorom	5.0	ug/kg	1.0	U	U	Yes	S3VEM

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Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
ethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,3-Dichloropropene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
4-Methyl-2-pentanone	10	ug/kg	1.0	U	U	Yes	S3VEM
Toluene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
trans-1,3-Dichloropropene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloroethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Tetrachloroethene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
2-Hexanone	10	ug/kg	1.0	U	U	Yes	S3VEM
Dibromochloromethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromoethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Chlorobenzene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Ethylbenzene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
o-Xylene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
m,p-Xylene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Styrene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Bromoform	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Isopropylbenzene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2,2-Tetrachloroethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,3-Dichlorobenzene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dichlorobenzene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichlorobenzene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromo-3-chloropropane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,2,4-Trichlorobenzene	2.5	ug/kg	1.0	J	J	Yes	S3VEM
1,2,3-Trichlorobenzene	4.0	ug/kg	1.0	J	J	Yes	S3VEM

Case No: 41323	Contract: EPW10018	SDG No: B98H4	Lab Code: A4
Sample Number: VBLK70	Method: VOA_Low_Med	Matrix: Soil	MA Number: DEFAULT
Sample Location:	pH:	Sample Date:	Sample Time:
% Moisture : 0		% Solids :	

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Dichlorodifluoro methane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Chloromethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Vinyl chloride	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Bromomethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Chloroethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Trichlorofluorom ethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Acetone	10	ug/kg	1.0	U	U	Yes	S3VEM
Carbon Disulfide	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Methyl acetate	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Methylene chloride	4.4	ug/kg	1.0	J	J	Yes	S3VEM
trans-1,2-Dichloroethene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Methyl tert-butyl ether	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,2-Dichloroethene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
2-Butanone	10	ug/kg	1.0	U	U	Yes	S3VEM
Bromochloromet hane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Chloroform	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,1,1-Trichloroethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Cyclohexane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Carbon tetrachloride	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Benzene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloroethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dioxane	100	ug/kg	1.0	U	U	Yes	S3VEM
Trichloroethene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Methylcyclohexa ne	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloropropane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Bromodichlorom	5.0	ug/kg	1.0	U	U	Yes	S3VEM

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Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
ethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,3-Dichloropropene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
4-Methyl-2-pentanone	10	ug/kg	1.0	U	U	Yes	S3VEM
Toluene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
trans-1,3-Dichloropropene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloroethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Tetrachloroethene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
2-Hexanone	10	ug/kg	1.0	U	U	Yes	S3VEM
Dibromochloromethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromoethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Chlorobenzene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Ethylbenzene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
o-Xylene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
m,p-Xylene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Styrene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Bromoform	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Isopropylbenzene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2,2-Tetrachloroethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,3-Dichlorobenzene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dichlorobenzene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichlorobenzene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromo-3-chloropropane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,2,4-Trichlorobenzene	2.4	ug/kg	1.0	J	J	Yes	S3VEM
1,2,3-Trichlorobenzene	3.9	ug/kg	1.0	J	J	Yes	S3VEM
Cyclotetrasiloxane, octamet...			1.0	JN		Yes	S3VEM

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Case No: 41323	Contract: EPW10018	SDG No: B98H4	Lab Code: A4
Sample Number: VBLK71	Method: VOA_Low_Med	Matrix: Soil	MA Number: DEFAULT
Sample Location:	pH:	Sample Date:	Sample Time:
% Moisture : 0		% Solids :	

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Dichlorodifluoro methane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Chloromethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Vinyl chloride	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Bromomethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Chloroethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Trichlorofluorom ethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Acetone	10	ug/kg	1.0	U	U	Yes	S3VEM
Carbon Disulfide	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Methyl acetate	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Methylene chloride	5.0	ug/kg	1.0	U	U	Yes	S3VEM
trans-1,2-Dichloroethene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Methyl tert-butyl ether	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,2-Dichloroethene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
2-Butanone	10	ug/kg	1.0	U	U	Yes	S3VEM
Bromochloromet hane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Chloroform	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,1,1-Trichloroethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Cyclohexane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Carbon tetrachloride	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Benzene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloroethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dioxane	100	ug/kg	1.0	U	U	Yes	S3VEM
Trichloroethene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Methylcyclohexa ne	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloropropane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Bromodichlorom	5.0	ug/kg	1.0	U	U	Yes	S3VEM

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Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
ethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,3-Dichloropropene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
4-Methyl-2-pentanone	10	ug/kg	1.0	U	U	Yes	S3VEM
Toluene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
trans-1,3-Dichloropropene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloroethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Tetrachloroethene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
2-Hexanone	10	ug/kg	1.0	U	U	Yes	S3VEM
Dibromochloromethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromoethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Chlorobenzene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Ethylbenzene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
o-Xylene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
m,p-Xylene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Styrene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Bromoform	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Isopropylbenzene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2,2-Tetrachloroethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,3-Dichlorobenzene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dichlorobenzene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichlorobenzene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromo-3-chloropropane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,2,4-Trichlorobenzene	2.2	ug/kg	1.0	J	J	Yes	S3VEM
1,2,3-Trichlorobenzene	3.9	ug/kg	1.0	J	J	Yes	S3VEM

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Case No: 41323	Contract: EPW10018	SDG No: B98H4	Lab Code: A4
Sample Number: VBLK79	Method: VOA_Low_Med	Matrix: Soil	MA Number: DEFAULT
Sample Location:	pH:	Sample Date:	Sample Time:
% Moisture : 0		% Solids :	

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Dichlorodifluoro methane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Chloromethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Vinyl chloride	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Bromomethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Chloroethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Trichlorofluorom ethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Acetone	10	ug/kg	1.0	U	U	Yes	S3VEM
Carbon Disulfide	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Methyl acetate	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Methylene chloride	5.0	ug/kg	1.0	U	U	Yes	S3VEM
trans-1,2-Dichloroethene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Methyl tert-butyl ether	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,2-Dichloroethene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
2-Butanone	10	ug/kg	1.0	U	U	Yes	S3VEM
Bromochloromet hane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Chloroform	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,1,1-Trichloroethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Cyclohexane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Carbon tetrachloride	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Benzene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloroethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dioxane	100	ug/kg	1.0	U	U	Yes	S3VEM
Trichloroethene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Methylcyclohexa ne	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloropropane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Bromodichlorom	5.0	ug/kg	1.0	U	U	Yes	S3VEM

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Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
ethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,3-Dichloropropene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
4-Methyl-2-pentanone	10	ug/kg	1.0	U	U	Yes	S3VEM
Toluene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
trans-1,3-Dichloropropene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloroethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Tetrachloroethene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
2-Hexanone	10	ug/kg	1.0	U	U	Yes	S3VEM
Dibromochloromethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromoethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Chlorobenzene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Ethylbenzene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
o-Xylene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
m,p-Xylene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Styrene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Bromoform	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Isopropylbenzene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2,2-Tetrachloroethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,3-Dichlorobenzene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dichlorobenzene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichlorobenzene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromo-3-chloropropane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,2,4-Trichlorobenzene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,2,3-Trichlorobenzene	5.0	ug/kg	1.0	U	U	Yes	S3VEM

Case No: 41323	Contract: EPW10018	SDG No: B98H4	Lab Code: A4
Sample Number: VHBLK22N	Method: VOA_Low_Med	Matrix: Soil	MA Number: DEFAULT
Sample Location:	pH:	Sample Date: 05182011	Sample Time: 00:00:00
% Moisture : 0		% Solids :	

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Dichlorodifluoro methane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Chloromethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Vinyl chloride	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Bromomethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Chloroethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Trichlorofluorom ethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Acetone	10	ug/kg	1.0	U	U	Yes	S3VEM
Carbon Disulfide	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Methyl acetate	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Methylene chloride	5.0	ug/kg	1.0	U	U	Yes	S3VEM
trans-1,2-Dichloroethene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Methyl tert-butyl ether	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,1-Dichloroethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,2-Dichloroethene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
2-Butanone	10	ug/kg	1.0	U	U	Yes	S3VEM
Bromochloromet hane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Chloroform	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,1,1-Trichloroethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Cyclohexane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Carbon tetrachloride	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Benzene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloroethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dioxane	100	ug/kg	1.0	U	U	Yes	S3VEM
Trichloroethene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Methylcyclohexa ne	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichloropropane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Bromodichlorom	5.0	ug/kg	1.0	U	U	Yes	S3VEM

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Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
ethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
cis-1,3-Dichloropropene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
4-Methyl-2-pentanone	10	ug/kg	1.0	U	U	Yes	S3VEM
Toluene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
trans-1,3-Dichloropropene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2-Trichloroethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Tetrachloroethene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
2-Hexanone	10	ug/kg	1.0	U	U	Yes	S3VEM
Dibromochloromethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromoethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Chlorobenzene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Ethylbenzene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
o-Xylene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
m,p-Xylene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Styrene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Bromoform	5.0	ug/kg	1.0	U	U	Yes	S3VEM
Isopropylbenzene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,1,2,2-Tetrachloroethane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,3-Dichlorobenzene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,4-Dichlorobenzene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dichlorobenzene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,2-Dibromo-3-chloropropane	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,2,4-Trichlorobenzene	5.0	ug/kg	1.0	U	U	Yes	S3VEM
1,2,3-Trichlorobenzene	5.0	ug/kg	1.0	U	U	Yes	S3VEM

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http://www.epa.gov/enviro/html/codes/pr.html
Last updated on Friday, April 10, 2009

Envirofacts Multisystem

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County FIPS Code Listing for the State of PUERTO RICO

State FIPS Code

State Abbreviation	FIPS Code	State Name
PR	72	PUERTO RICO

County FIPS Codes

County Name	FIPS Code
ADJUNTAS	001
AGUADA	003
AGUADILLA	005
AGUAS BUENAS	007
AIBONITO	009
ANASCO	011
ARECIBO	013
ARROYO	015
BARCELONETA	017
BARRANQUITAS	019
BAYAMON	021
CABO ROJO	023
CAGUAS	025
CAMUY	027
CANOVANAS	029
CAROLINA	031
CATANO	033
CAYEY	035
CEIBA	037
CIALES	039
CIDRA	041
COAMO	043
COMERIO	045
COROZAL	047
CULEBRA	049
DORADO	051
FAJARDO	053
FLORIDA	054
GUANICA	055
GUAYAMA	057

GUAYANILLA	059
GUAYNABO	061
GURABO	063
HATILLO	065
HORMIGUEROS	067
HUMACAO	069
ISABELA	071
JAYUYA	073
JUANA DIAZ	075
JUNCOS	077
LAJAS	079
LARES	081
LAS MARIAS	083
LAS PIEDRAS	085
LOIZA	087
LUQUILLO	089
MANATI	091
MARICAO	093
MAUNABO	095
MAYAGUEZ	097
MOCA	099
MOROVIS	101
NAGUABO	103
NARANJITO	105
OROCOVIS	107
PATILLAS	109
PENUELAS	111
PONCE	113
QUEBRADILLAS	115
RINCON	117
RIO GRANDE	119
SABANA GRANDE	121
SALINAS	123
SAN GERMAN	125
SAN JUAN	127
SAN LORENZO	129
SAN SEBASTIAN	131
SANTA ISABEL	133
TOA ALTA	135
TOA BAJA	137
TRUJILLO ALTO	139
UTUADO	141
VEGA ALTA	143
VEGA BAJA	145
VIEQUES	147
VILLALBA	149
YABUCOA	151

YAUCO	153

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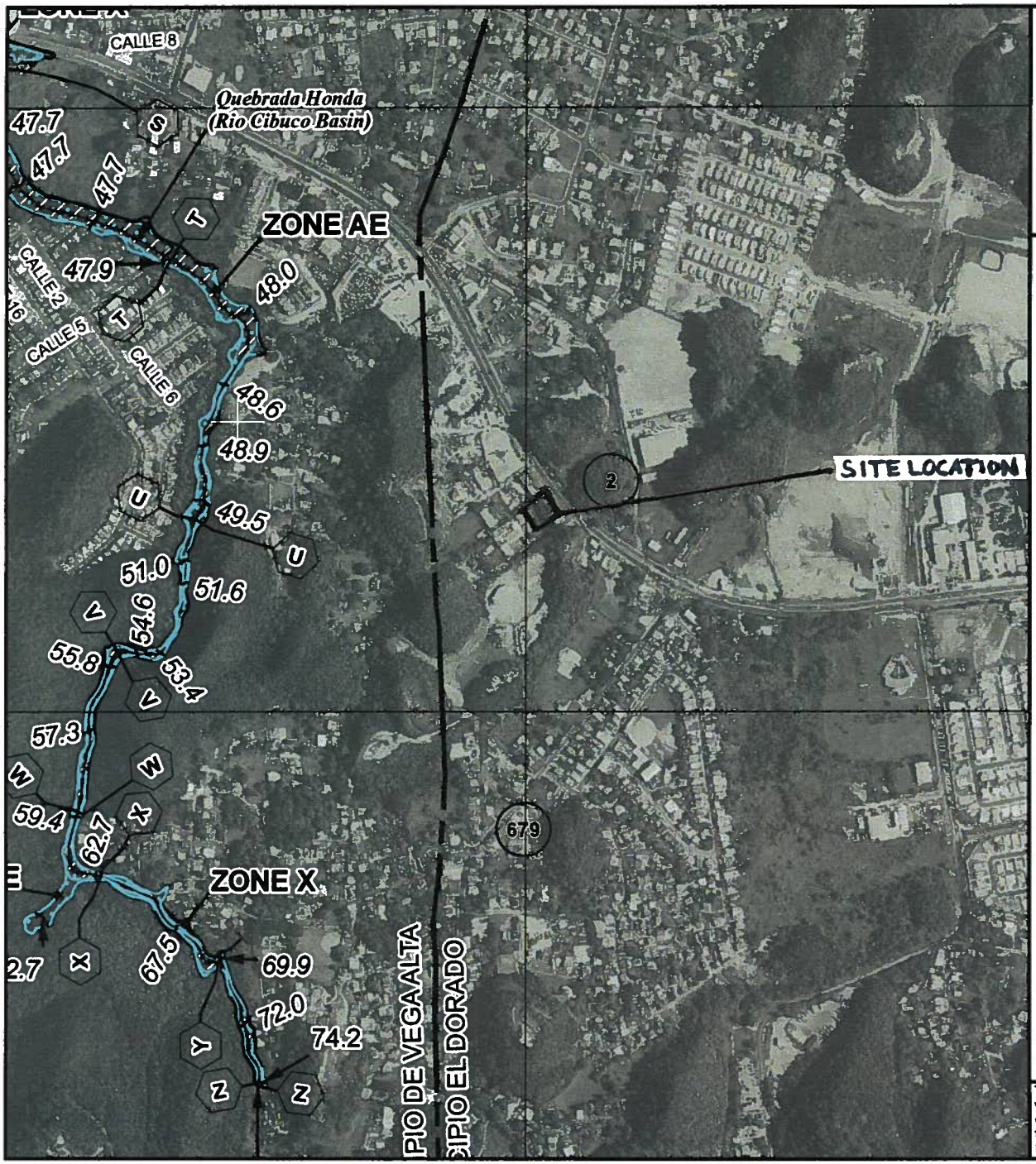

For community map revision history prior to Commonwealth of Puerto Rico and Municipalities mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE
1:10,000

0.5 0.25 0 0.5 Kilometers

500 250 0 500 1,000 1,500 2,000 2,500 3,000 3,500 Feet

0.25 0.125 0 0.25 Miles

NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0320J

FIRM

FLOOD INSURANCE RATE MAP

COMMONWEALTH OF
PUERTO RICO
AND MUNICIPALITIES

PANEL 320 OF 2160

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS

COMMUNITY	NUMBER	PANEL	SUFFIX
PUERTO RICO	720000	0320	J

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
72000C0320J

MAP REVISED
NOVEMBER 18, 2009

Federal Emergency Management Agency

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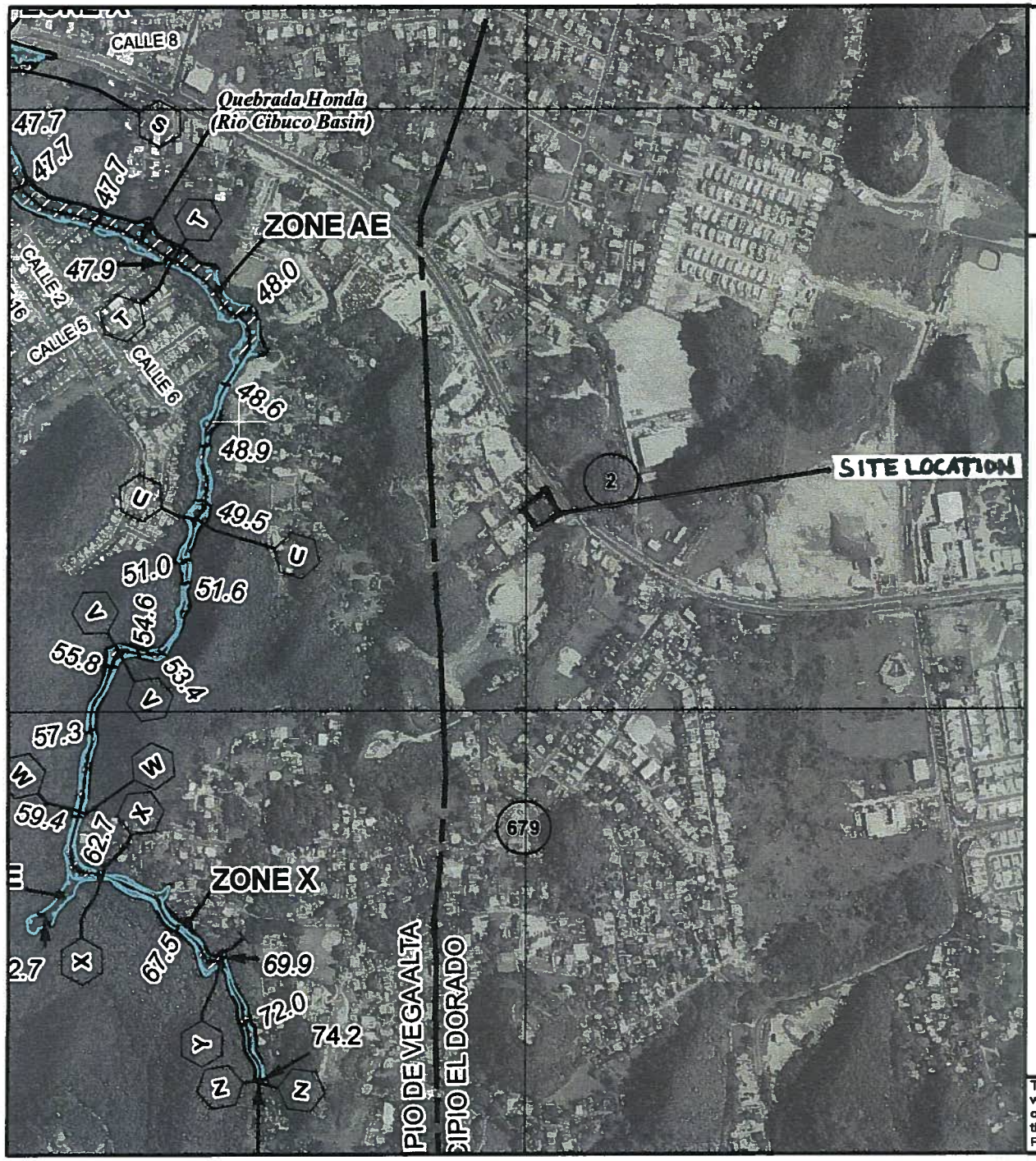

MAP SCALE
1:10,000

0 25 0

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 0.3 to 0.9 meter (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 0.3 to 0.9 meter (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 0.3 meter or with drainage areas less than 2.6 square kilometers; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	1% annual chance floodplain boundary
	0.2% annual chance floodplain boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513	Base Flood Elevation line and value; elevation in meters*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in meters*

* Referenced to the Mean Sea Level

A — A	Cross section line
B - - - - B	Transect line
87°07'45", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
4976000 N	1000-meter Universal Transverse Mercator grid values, zone NAD 1983 UTM Zone 19N
600000 FT	5000-foot grid ticks: Puerto Rico Virgin Islands State Plane coordinate system (FIPSZONE 5200), Lambert Conformal Conic projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
● M1.5	River Mile

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Definitions of FEMA Flood Zone Designations

Flood zones are geographic areas that the FEMA has defined according to varying levels of flood risk. These zones are depicted on a community's Flood Insurance Rate Map (FIRM) or Flood Hazard Boundary Map. Each zone reflects the severity or type of flooding in the area.

Moderate to Low Risk Areas

In communities that participate in the NFIP, flood insurance is available to all property owners and renters in these zones:

ZONE	DESCRIPTION
B and X (shaded)	Area of moderate flood hazard, usually the area between the limits of the 100-year and 500-year floods. B Zones are also used to designate base floodplains of lesser hazards, such as areas protected by levees from 100-year flood, or shallow flooding areas with average depths of less than one foot or drainage areas less than 1 square mile.
C and X (unshaded)	Area of minimal flood hazard, usually depicted on FIRMs as above the 500-year flood level. Zone C may have ponding and local drainage problems that don't warrant a detailed study or designation as base floodplain. Zone X is the area determined to be outside the 500-year flood and protected by levee from 100-year flood.

High Risk Areas

In communities that participate in the NFIP, mandatory flood insurance purchase requirements apply to all of these zones:

ZONE	DESCRIPTION
A	Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. Because detailed analyses are not performed for such areas; no depths or base flood elevations are shown within these zones.
AE	The base floodplain where base flood elevations are provided. AE Zones are now used on new format FIRMs instead of A1-A30 Zones.
A1-30	These are known as numbered A Zones (e.g., A7 or A14). This is the base floodplain where the FIRM shows a BFE (old format).
AH	Areas with a 1% annual chance of shallow flooding, usually in the form of a pond, with an average depth ranging from 1 to 3 feet. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.
AO	River or stream flood hazard areas, and areas with a 1% or greater chance of shallow flooding each year, usually in the form of sheet flow, with an average depth ranging from 1 to 3 feet. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Average flood depths derived from detailed analyses are shown within these zones.
AR	Areas with a temporarily increased flood risk due to the building or restoration of a flood control system (such as a levee or a dam). Mandatory flood insurance purchase requirements will apply, but rates will not exceed the rates for unnumbered A zones if the structure is built or restored in compliance with Zone AR floodplain management regulations.
A99	Areas with a 1% annual chance of flooding that will be protected by a Federal flood control system where construction has reached specified legal requirements. No depths or base flood elevations are shown within these zones.

High Risk - Coastal Areas

In communities that participate in the NFIP, mandatory flood insurance purchase requirements apply to all of these zones:

ZONE	DESCRIPTION
V	Coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. These areas have a 26% chance of flooding over the life of a 30-year mortgage. No base flood elevations are shown within these zones.
VE, V1 - 30	Coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.

Undetermined Risk Areas

ZONE	DESCRIPTION
D	Areas with possible but undetermined flood hazards. No flood hazard analysis has been conducted. Flood insurance rates are commensurate with the uncertainty of the flood risk.

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U.S. DEPARTMENT OF COMMERCE

WEATHER BUREAU

TECHNICAL PAPER 53

Two- to Ten-Day Rainfall for Return Periods of 2 to 100 Years in Puerto Rico and Virgin Islands

p. 1

U.S. DEPARTMENT OF COMMERCE
JOHN T. CONNOR, *Secretary*
WEATHER BUREAU
ROBERT M. WHITE, *Chief*

TECHNICAL PAPER NO. 53

Two- to Ten-Day Rainfall for Return Periods of 2 to 100 Years in Puerto Rico and Virgin Islands

Prepared by
JOHN F. MILLER
Special Studies Branch, Office of Hydrology
U.S. Weather Bureau
for
Engineering Division, Soil Conservation Service
U.S. Department of Agriculture

WASHINGTON, D.C.
1965

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5. ISOPLUVIAL MAPS

Relation between 2-year 24- and 240-hour amounts. It was necessary to develop a relationship for estimating 10-day values for points in regions for which data were either unavailable or inadequate. Since a generalized chart of 2-year 24-hour rainfall was already available, the values for this duration were selected to develop such a relation. Observations from 66 stations (sec. 2) provided the basic data. Comparison of the meteorological situations resulting in heavy rains and examination of the rainfall-frequency characteristics of Puerto Rican and Virgin Island stations indicated some regional differences.

Puerto Rico and the Virgin Islands are located on the northern edge of the Carribbean Sea in the path of the northeasterly trades. The primary orographic feature of Puerto Rico is a range of mountains oriented east-west. In the Virgin Islands generalized elevation contours show a primarily east-west ridge orientation. The stations on the northern slopes of these ridges are favorably exposed for almost daily showers which are orographically augmented. These stations, therefore, indicated a higher 10- to 1-day ratio than those on the leeward or southern slopes. The stations were separated into windward and leeward groups and separate curves were drawn (fig. 4).

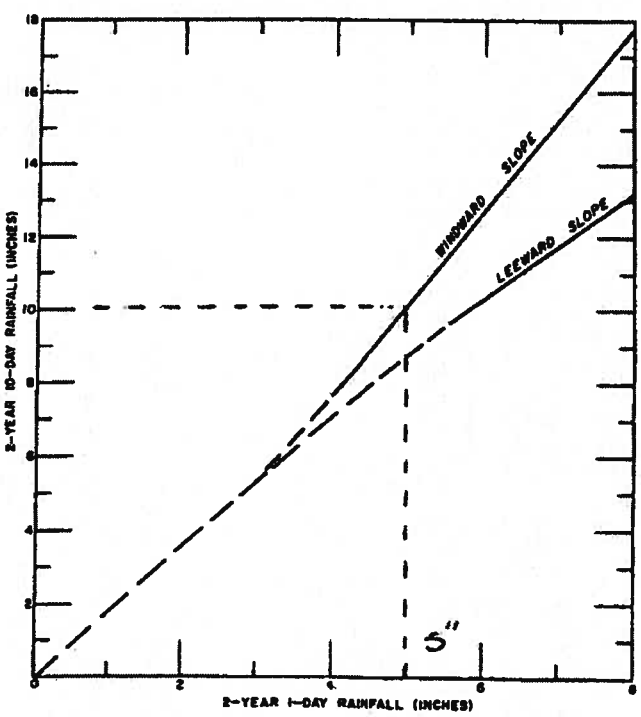

FIGURE 4.—Relation for estimating 2-year 10-day rainfall.

In the development of the relationship of figure 4 all 24-hour data were adjusted to the corresponding 1440-minute amounts. The 10-day values were adjusted to the corresponding 240-hour amounts. The correlation coefficient between the computed and estimated amounts was 0.85, with a standard error of estimate of 0.8 in. The mean of the computed values was 9.3 in. The scatter of estimated vs. computed values is shown in figure 5.

Smoothing of isopluvial maps. The analysis of maps involves the question of how much to smooth the data. An understanding of the degree of smoothing in the analysis is necessary to the most effective use of the maps. The problem of drawing isopluvial lines through a field of data is analogous to drawing a regression line on a scatter diagram. Just as an irregular regression line can be drawn to every point on a scatter diagram, the isolines may be drawn to fit every point. Such a complicated pattern of many small highs and lows would be unrealistic in most cases. There is a degree of inconsistency between smoothness and closeness of fit. Analysis must strive for a balance between the two, sacrificing some closeness of fit for smoothness and vice versa. The maps of this report were drawn so that the standard error of estimate was commensurate with the sampling and other errors in the data and methods used.

2-year 10-day maps (figs. 29 and 53). The relationship (fig. 4) described in the preceding paragraphs, and the 2-year 24-hour maps of [1] were used to estimate the 2-year 10-day values for a grid of 560 points, about 490 points on Puerto Rico and 70 points on St. Croix (fig. 6). Also plotted on the map were the data for the 66 stations (fig. 1) for which 10-day data had been tabulated. On these and similar maps all precipitation data have been adjusted by the factors of table 2 to n-hour amounts, i.e., the 2-day map presents 48-hour amounts, the 4-day presents 96-hour amounts, etc.

Ratio of 100-year to 2-year values. A map of Puerto Rico (fig. 7) was prepared showing the 100-year to 2-year ratio for 10-day amounts. This map was based on data for 52 stations (sec. 2). The ratios indicated a smooth geographical pat-

764-258 O—65——2

p.3

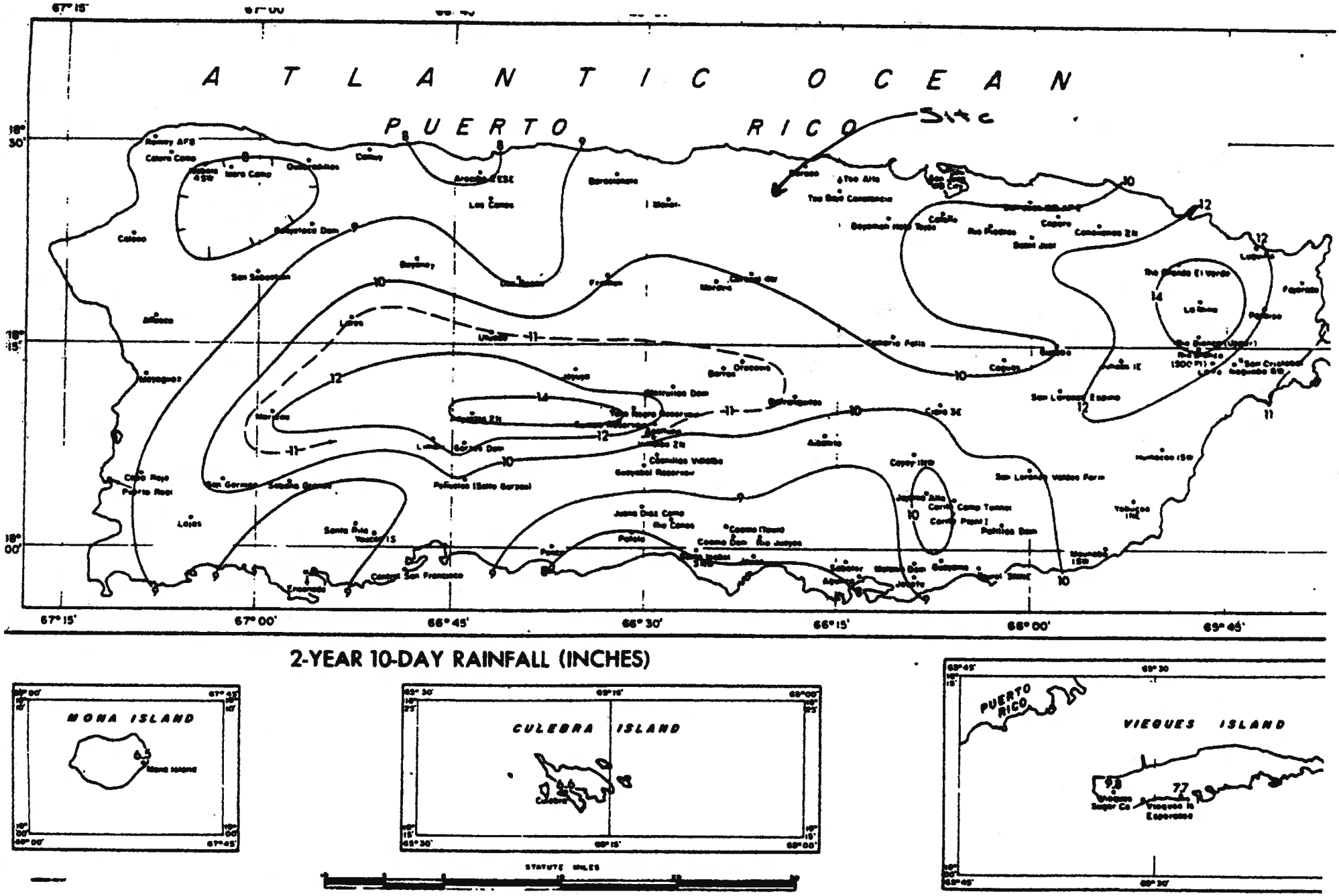

FIGURE 29.—2-year 10-day rainfall (in.) for Puerto Rico.