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November 26, 1997

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VIA FACSIMILE -

Mr. Michael T. Donnellan
Environmental Enforcement Section
Environment and Natural Resources Division
United States Department of Justice
P.O. Box 7611
Washington, D.C. 20044-7611

Re: City of Albuquerque v. Sparton Technology, Inc.
No. CV-97-0206 (D.N.M.)

Dear Michael:

Enclosed is a proposed conceptual design for an infiltration gallery to be located in the arroyo. This design presents an approach for dealing with recovered groundwater if we are able to reach an agreement on the other outstanding issues, yet to be resolved in our settlement discussions.

I look forward to receiving any comments that plaintiffs may have on this proposal in advance of our meeting on December 5.

Yours very truly,

James B. Harris

JBH:elt

cc: Ana Marie Ortiz, Esq.
Gary O'Dea, Esq.
Charles De Saillen, Esq.
Patrick Trujillo, Esq.

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CONCEPTUAL DESIGN
INFILTRATION GALLERY FOR
SPARTON - COORS ROAD CONTAINMENT WELL FLOW

An infiltration gallery is proposed to recharge, into the vadose zone, an assumed 200 gpm of treated groundwater derived from a containment well located at the leading edge of a chlorinated solvent plume associated with the Coors Road Plant.

INFILTRATION GALLERY SIZE

The infiltration gallery was sized based on the experience at the Van Waters and Rogers (VWR) remediation site located in Albuquerque's South Valley. The VWR system is believed to be sized as follows:

Size = 12' x 225' = 0.062 Ac
Capacity = 120 gpm

The system for Sparton was sized by adjusting the VWR system for the ratios of vertical hydraulic conductivity and capacity for the two sites as follows:

$$0.062 \text{ Ac} \times \frac{2472 \text{ ft/yr} \times 200 \text{ gpm}}{814 \text{ ft/yr} \times 120 \text{ gpm}} = 0.31 \text{ Ac.}$$

INFILTRATION GALLERY LIFE

It is assumed that the life of the infiltration gallery, is limited by clogging of the infiltration interface, and clogging rate is proportional to infiltration volume per unit area. It is also assumed that the water will be pretreated with "Aqua-Mag" as is the case at the VWR site. The predicted lifespan for the Sparton Coors Road infiltration gallery is calculated as follows:

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VWR Wetted Area (120 gpm)
= 12' x 225' + 6(2)(12+225) sides + ends
= 5544 ft²

VWR Wetted Area (200 gpm)
$= 5544 \times \frac{120}{200}$
= 9240 ft²

Sparton Wetted Area (200 gpm)
= 0.3 x 43,560 + 6(4)[√ 0.3(43,560)]
= 15,811 ft² assumed to be square

$$\text{Life Sparton Site} = \frac{\text{Area Sparton (200 gpm)}}{\text{Area VWR (200 gpm)}} \times \text{Life VWR Site}$$

$$= \frac{15{,}811}{9{,}240} \times 2.5 \text{ yr.} = 4.2 \text{ yr.}$$

Use 4.0 yr.

SCOUR CALCULATIONS

The objective of the scour analysis is to estimate the total long term degradation plus local scour depth such that the infiltration gallery can be placed deep enough to prevent the gallery from being destroyed during its useful life which is assumed to be 4 years. Two primary references were used in determining a reasonable depth to bury the proposed infiltration gallery to be built in the Calabacillas Arroyo bottom. The two cited references are as follows:

Mussetter Engineering, Inc. December 1996. Draft Report Calabacillas Arroyo Prudent Line Study and Related Work. Prepared for AMAFCA.

Mussetter, K. A., Lagasse, P. F., Harvey, M. D. November 1994. sediment and Erosion Design Guide. Prepared for AMAFCA.

FIGURE 1 shows the Calabacillas Arroyo and the reaches used by Mussetter, December 1996. That report provides design flows, hydraulic variables and maximum

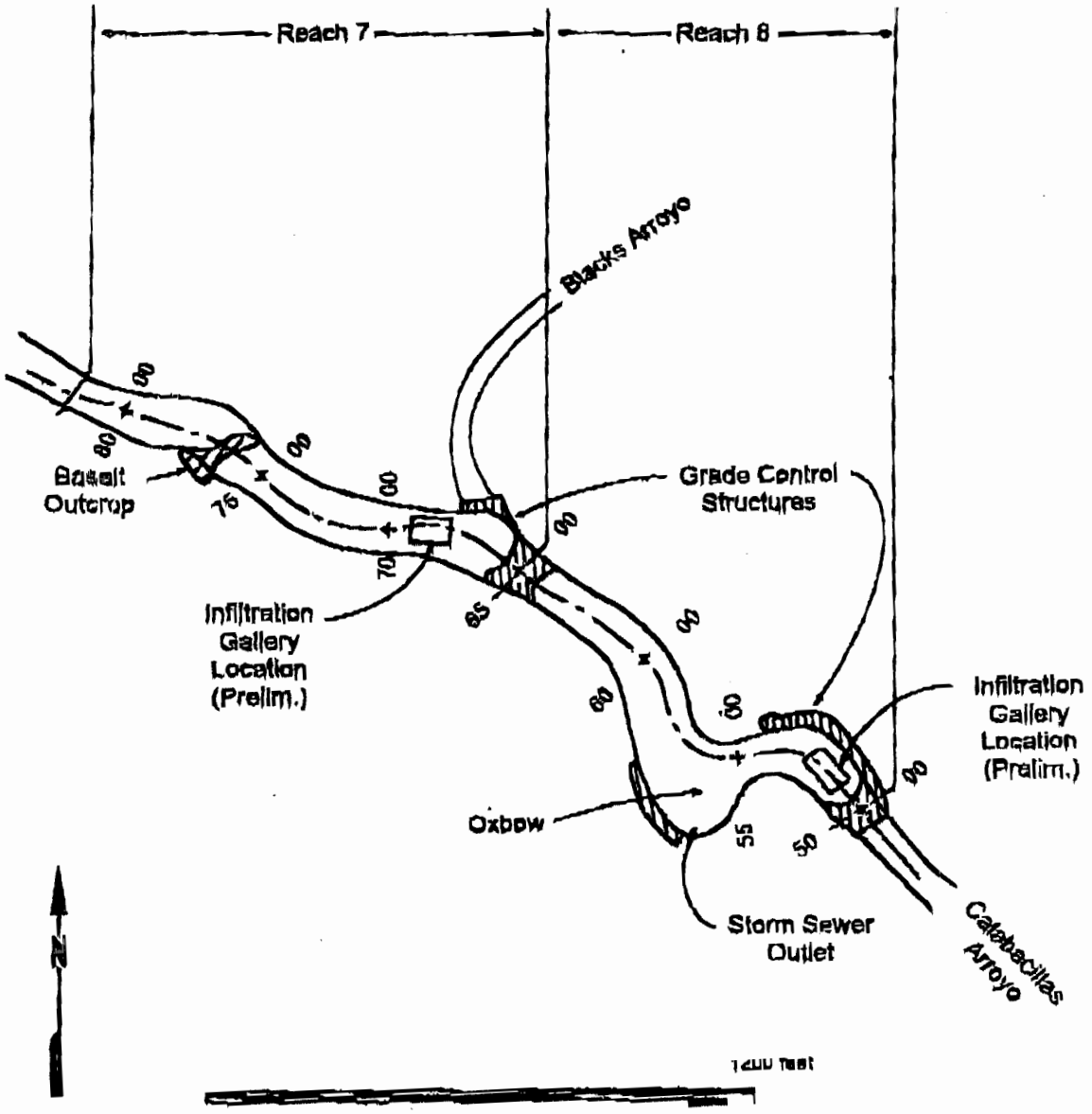

FIGURE 1

PRELIMINARY INFILTRATION GALLERY LOCATIONS

long term degradation values for each reach of the arroyo reaches. The maximum degradation was assumed to occur at the upstream end of each reach. The scour at a particular station was assumed to vary linearly with distance.

Equation 3.90 from Mussetter et al, November 1994, allows calculation of local scour as follows:

$$\frac{y_s}{y_1} = \underbrace{(0.73 \cos\theta)}_{\text{Flood Wall Scour}} + \underbrace{(0.14\,\pi\,Fr^2)\cos\theta}_{\text{Antidune Scour}} + \underbrace{4\,Fr^{0.32}\sin\theta}_{\text{Impingement Scour}}$$

TABLE 1 shows scour calculations for Station 52+00 (see FIGURE 1), and TABLE 2 shows scour calculations for Station 68+00.

The calculations indicate that 7.0 feet of cover will protect the infiltration gallery from the expected scour (FIGURE 2). It is recommended that each time the gallery is rebuilt it be constructed to a total depth of 13.0 feet below the arroyo bottom that exists at the time of reconstruction. This will result in the gallery being constructed at lower and lower elevations as time passes if the arroyo bed is continuing to degrade.

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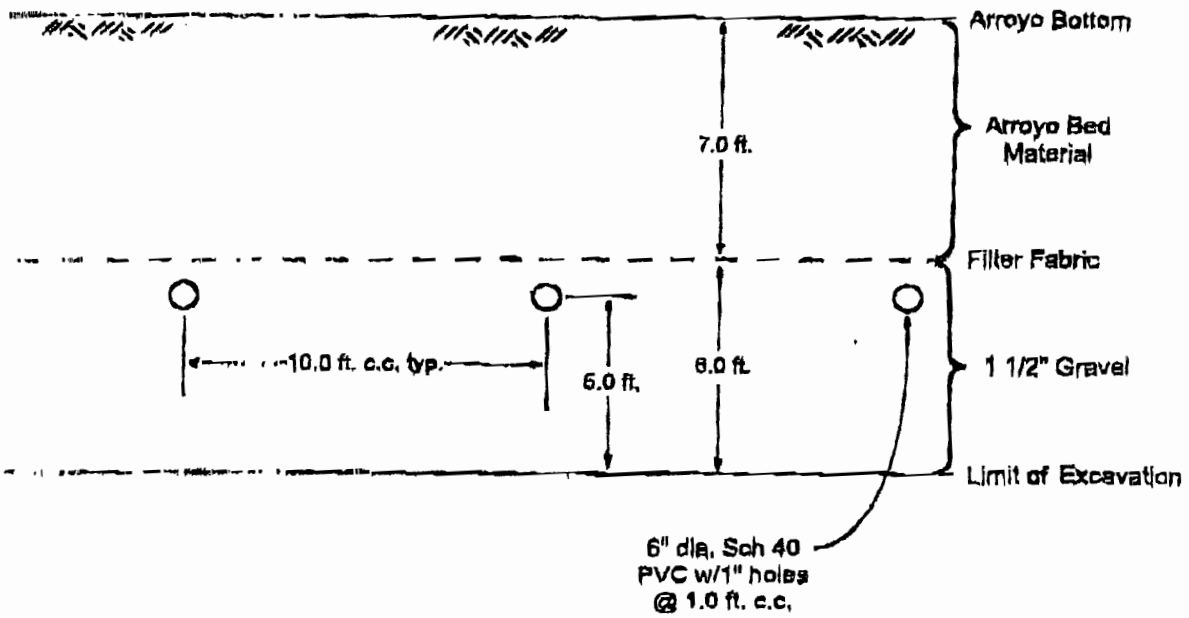

FIGURE 2

TYPICAL CROSS SECTION

TABLE 1

SCOUR CALCULATIONS INFILTRATION GALLERY AT Sta. 52+00 (Oxbow, Reach 8, θ = 0°

Design Storm	10-yr.	100-yr.
Peak Flow (Existing conditions) (CFS)	4,540	11,550
Velocity (V) (FPS)	10.6	13.7
Hydraulic Depth (D) (FT)	3.6	5.8
$Fr = v/\sqrt{gD}$	0.98	1.00
Max. Degradation (After 10 yr, Exist. Cond.) (FT)	8.2	8.2
Degradation @ Sta. 52+00 (2/15 x 8.2) (FT)	1.1	1.1
Flood Wall Scour Y_1 (0.73) Cos θ (FT)	2.6	4.2
Antidune Scour Y_1 ($0.14\pi Fr^2$) Cos θ (FT)	1.5	2.5
Total Scour (FT)	5.2	7.8

TABLE 2

SCOUR CALCULATIONS INFILTRATION GALLERY AT Sta. 68+00 (Upstream from Blacks Arroyo) (Reach 7, $\theta \approx 0°$)

Design Storm	10-yr	100-yr
Peak Flow (Existing conditions) (CFS)	4,210	10,340
Velocity (V) (FPS)	10.0	13.2
Hydraulic Depth (D) (FT)	3.1	5.4
$Fr = v/\sqrt{gD}$	1.00	1.00
Max. Degradation (After 10 yr, Exist. Cond.) (FT)	8.1	8.1
Degradation @ Sta. 74+00 (3/17 x 8.1) (FT)	1.4	1.4
Antidune Scour Y_1 $(0.14\pi Fr^2)$ Cos θ (FT)	1.4	2.4
Total Scour (FT)	2.8	3.8