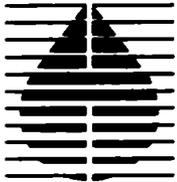


November 20, 2000

CITY OF PHOENIX
RIO SALADO PROJECT
LOW FLOW CHANNEL PHASE II DRILLING
5TH STREET TO 28TH STREET
PHOENIX, ARIZONA



HARGIS+ASSOCIATES, INC.



HARGIS + ASSOCIATES, INC.

HYDROGEOLOGY • ENGINEERING

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CITY OF PHOENIX
RIO SALADO PROJECT
LOW FLOW CHANNEL PHASE II DRILLING
5TH STREET TO 28TH STREET
PHOENIX, ARIZONA

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CITY OF PHOENIX
RIO SALADO PROJECT
LOW FLOW CHANNEL PHASE II DRILLING
5TH STREET TO 28TH STREET
PHOENIX, ARIZONA

1.0 INTRODUCTION

This report has been prepared to summarize results of soils data collected in October 2000 at the Rio Salado Project Phase II Low Flow Channel in Phoenix, Arizona. Preparation of the Low Flow Channel of the Salt River is a cooperative effort of the City of Phoenix, and the Maricopa County Flood Control District. The Low Flow Channel was designed by the Corps of Engineers, U.S. Army Engineer District, Los Angeles.

Landfill material has been previously encountered during excavation of the Rio Salado Phase I Low Flow Channel. Hargis + Associates, Inc. (H+A) was retained to collect and analyze samples of this material. The results of this investigation have been summarized in a previous report (H+A, 2000). The Phase II Drilling project consisted of drilling approximately 39 boreholes along the alignment of the low flow channel in the bed of the Salt River between approximately 5th Street and 28th Street. The boreholes were drilled to determine if landfill debris is present in the low flow channel alignment. The boreholes were to be drilled to a depth of at least 30 feet unless landfill debris was encountered,

Thirty of the original 39 soil borings were drilled along the alignment of the low flow channel in the bed of the Salt River between approximately 5th Street and 28th Street. Six of these boring locations were inaccessible due to standing water from recent storms and could not be drilled. Three of these borings were unable to be completed due to time constraints. The borings were drilled by Layne Christensen Company using a casing hammer drill rig. An on-site geologist provided by H+A logged the cuttings from the boreholes (Appendix A). All soil borings were grouted upon completion.

2.0 SOIL BORING SAMPLES

One soil sample was composited at each borehole. These samples are identified by the surveyed point identifier or the flow control structure associated with the boring. The depth interval over which they were composited is also listed with the identifier. These samples were analyzed for total recoverable petroleum hydrocarbons (TPH) by U. S. Environmental Protection Agency (EPA) Method 418.1 and gasoline range organics (GRO), diesel range organics (DRO), and oil range organics (ORO) by EPA Method 8015 (Table 1; Appendix B). A methanol extraction was performed in the field for samples collected for analysis of 8015 GRO.

TPH was detected in nine samples at concentrations ranging from 21 milligrams per kilogram (mg/kg) at boring #97 to 96 mg/kg at the boring associated with guide dike 24. No organic compounds were detected in samples submitted for analysis of 8015 GRO, DRO, ORO (Table 1).

No evidence of accumulated landfill material was found in any of these borings. A few borings contained some foreign material. Clear, green, and brown glass fragments were found between 5 and 10 feet below land surface (bls) in the guide dike 24 boring. Concrete and a few metal fragments were also found at this location at a depth of 9 to 10 feet bls. The boring at guide dike 27 contained newspaper at 1 foot bls and a piece of plastic sheeting at 5 feet bls. Boring #96 contained concrete and possibly rebar at 3 feet bls. There were several large slabs of reinforced concrete, rebar, and refuse in the area.



3.0 REFERENCES CITED

Hargis + Associates, Inc. (H+A), 2000. Soil Sampling, City of Phoenix, Rio Salado Project, Low Flow Channel Phase I, 19th Avenue to 7th street, Phoenix, Arizona. Prepared for the City of Phoenix; September 11, 2000.

TABLE 1
RESULTS OF ANALYSIS VOLATILE ORGANIC COMPOUNDS

SAMPLE ID/DATE SAMPLED	418.1 – TRPH	8015-GRO	8015 – DRO	8015 – ORO
#1(0-30)	<20	<20	<30	<100
#3(0-30)	<20	<20	<30	<100
#5(0-30)	<20	<20	<30	<100
#6(0-30)	<20	<20	<30	<100
#9(0-30)	<20	<20	<30	<100
#10(0-30)	<20	<20	<30	<100
GD-22(0-30)	<20	<20	<30	<100
GD-23(0-30)	<20	<20	<30	<100
GD-24(0-30)	<20	<20	<30	<100
GD-25(0-30)	<20	<20	<30	<100
GD-26(0-30)	<20	<20	<30	<100
#51(0-30)	<20	<20	<30	<100
GD-27(0-30)	<20	<20	<30	<100
GD-28(0-30)	<20	<20	<30	<100
#71(0-30)	<20	<20	<30	<100
#72(0-30)	<20	<20	<30	<100
#74(0-30)	<20	<20	<30	<100
#76(0-30)	<20	<20	<30	<100
#79(0-30)	<20	<20	<30	<100
#81(0-30)	<20	<20	<30	<100
GD-33(0-30)	<20	<20	<30	<100
GD-34(0-30)	<20	<20	<30	<100
#96(0-30)	<20	<20	<30	<100
#97(0-30)	<20	<20	<30	<100
#98(0-50)	<20	<20	<30	<100
#102(0-30)	<20	<20	<30	<100
GD-35(0-30)	<20	<20	<30	<100
GD-36(0-30)	<20	<20	<30	<100
#103(0-30)	<20	<20	<30	<100
#117(0-30)	<20	<20	<30	<100

Note: Shading indicates detects

TRPH = Total Recoverable Petroleum Hydrocarbons

GRO = Gasoline Range Organics (C6-C12)

DRO = Diesel Range Organics (C10-C22)

ORO = Oil Range Organics (C22-C32)

(<) = Less than; numerical value is less than the Limit of Detection for that compound

TABLE 1
RESULTS OF ANALYSIS VOLATILE ORGANIC COMPOUNDS

SAMPLE ID/DATE SAMPLED	418.1 – TRPH	8015-GRO	8015 – DRO	8015 – ORO
#1(0-30)	<20	<20	<30	<100
#3(0-30)	<20	<20	<30	<100
#5(0-30)	<20	<20	<30	<100
#6(0-30)	<20	<20	<30	<100
#9(0-30)	42	<20	<30	<100
#10(0-30)	<20	<20	<30	<100
GD-22(0-30)	24	<20	<30	<100
GD-23(0-30)	<20	<20	<30	<100
GD-24(0-30)	96	<20	<30	<100
GD-25(0-30)	<20	<20	<30	<100
GD-26(0-30)	24	<20	<30	<100
#51(0-30)	25	<20	<30	<100
GD-27(0-30)	<20	<20	<30	<100
GD-28(0-30)	<20	<20	<30	<100
#71(0-30)	<20	<20	<30	<100
#72(0-30)	24	<20	<30	<100
#74(0-30)	42	<20	<30	<100
#76(0-30)	<20	<20	<30	<100
#79(0-30)	<20	<20	<30	<100
#81(0-30)	<20	<20	<30	<100
GD-33(0-30)	<20	<20	<30	<100
GD-34(0-30)	<20	<20	<30	<100
#96(0-30)	<20	<20	<30	<100
#97(0-30)	21	<20	<30	<100
#98(0-50)	76	<20	<30	<100
#102(0-30)	<20	<20	<30	<100
GD-35(0-30)	<20	<20	<30	<100
GD-36(0-30)	<20	<20	<30	<100
#103(0-30)	<20	<20	<30	<100
#117(0-30)	<20	<20	<30	<100

Note: Shading indicates detects

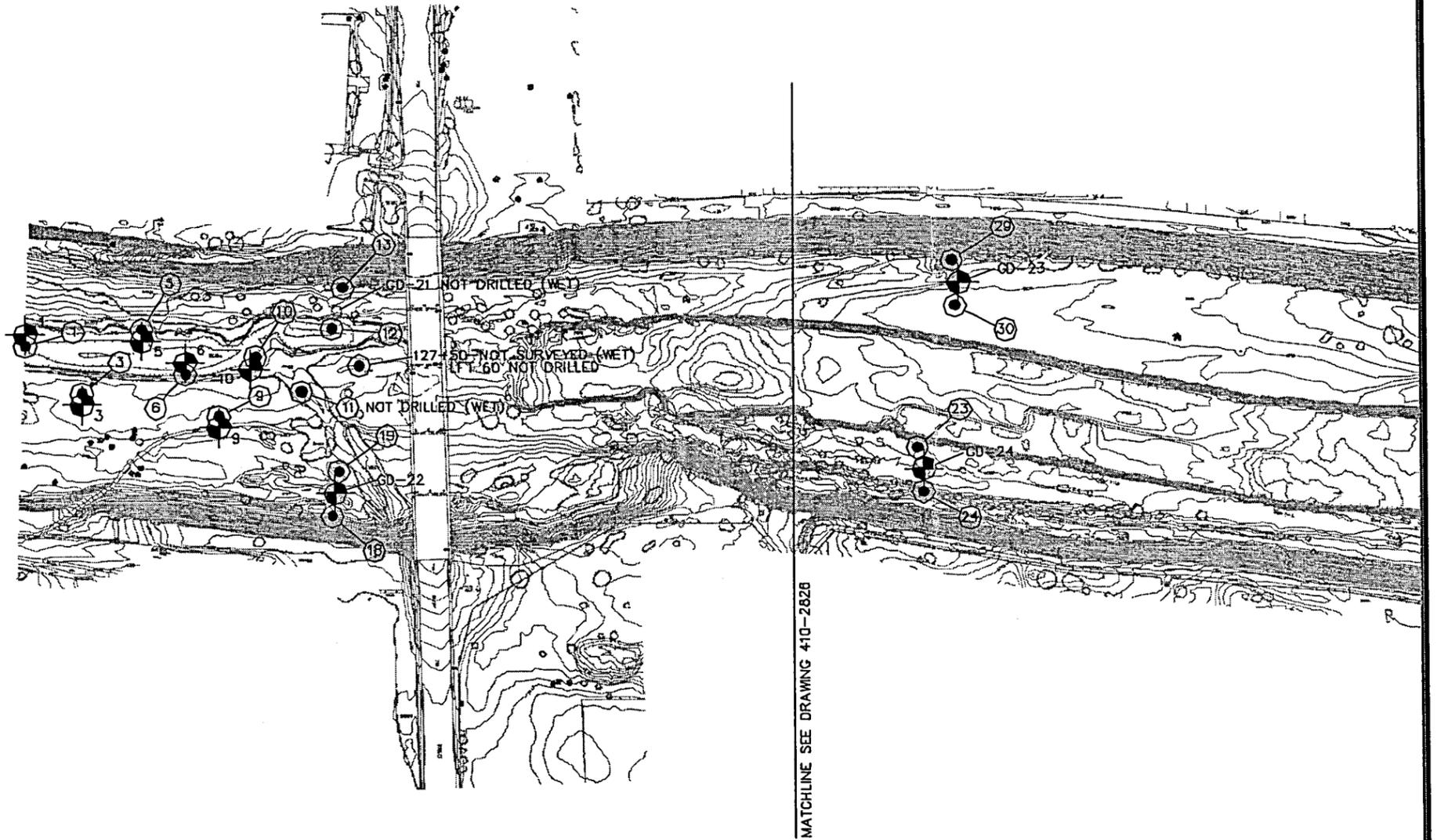
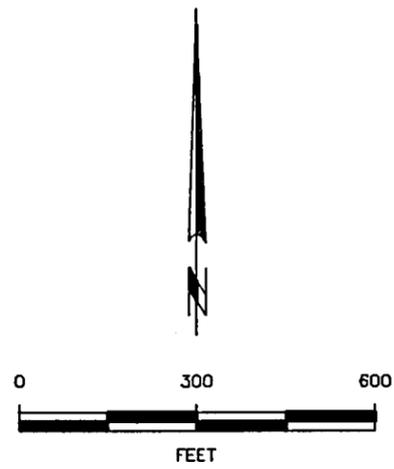
TRPH = Total Recoverable Petroleum Hydrocarbons

GRO = Gasoline Range Organics (C6-C12)

DRO = Diesel Range Organics (C10-C22)

ORO = Oil Range Organics (C22-C32)

(<) = Less than; numerical value is less than the Limit of Detection for that compound



EXPLANATION

- ①15 — ● SURVEY POINT AND IDENTIFIER
- GD-36 — ● BORING LOCATION AND IDENTIFIER

FIGURE 1A. CITY OF PHOENIX - RIO SALADO PROJECT PHASE II BORING LOCATIONS

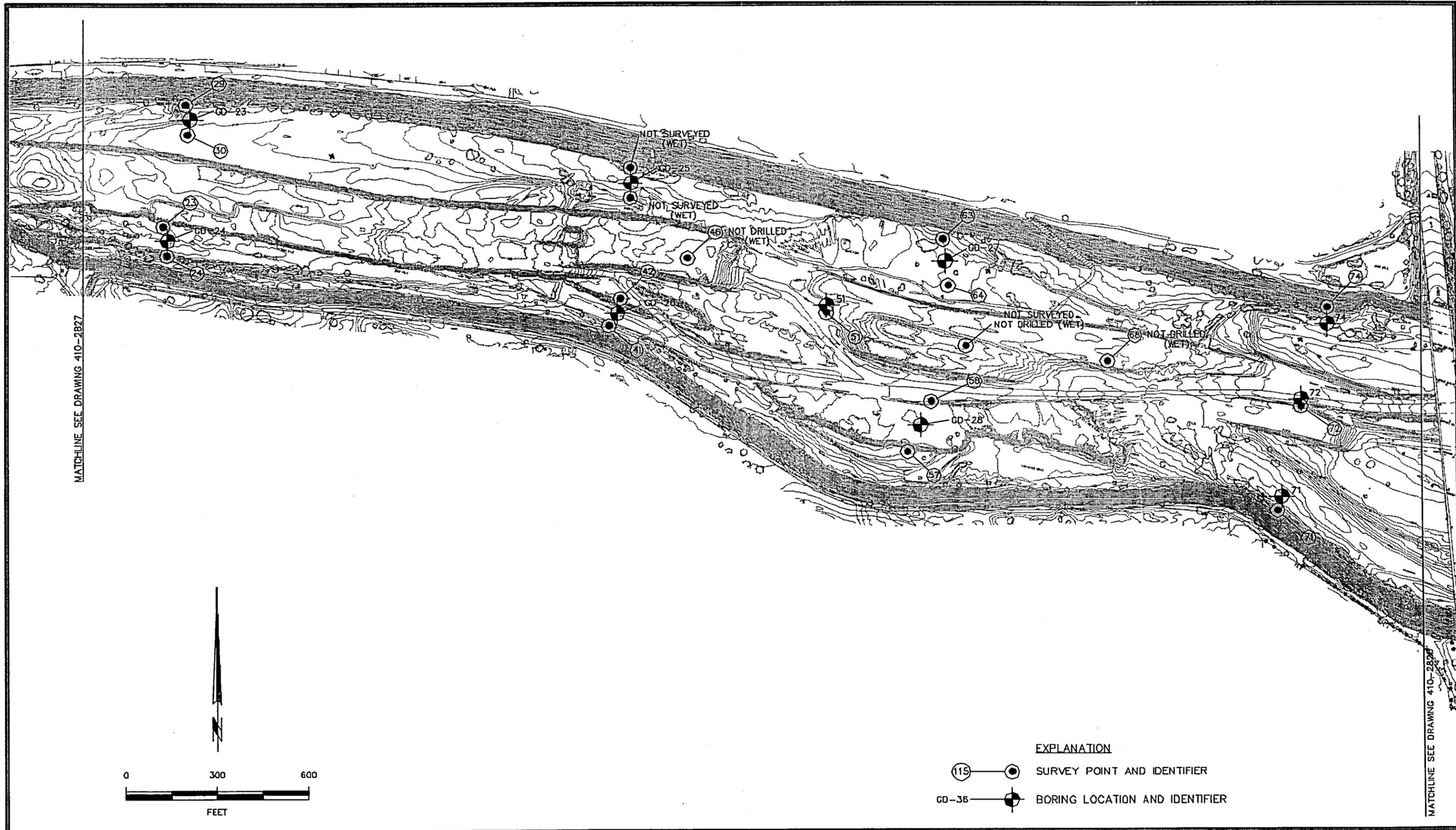


FIGURE 1B. CITY OF PHOENIX - RIO SALADO PHASE II BORING LOCATIONS



**FIGURE 1C. CITY OF PHOENIX - RIO SALADO PHASE II
BORING LOCATIONS**

TABLE A-27
LITHOLOGIC LOG FOR EXPLORATORY BORING NO. GD-35

DEPTH INTERVAL (feet below land surface)		DESCRIPTION OF MATERIAL
0-1	GP	POORLY GRADED GRAVEL WITH SAND Multicolored, dry
1-5	GM	SILTY GRAVEL WITH SAND Brown to multicolored; sand fine- to coarse-grained; silt nonplastic.
5-10	SM-GM	SILTY SAND WITH GRAVEL Brown to multicolored; sand fine- to coarse-grained; silt nonplastic, moist.
10-13	GM	SILTY GRAVEL WITH SAND Brown to multicolored; sand fine- to coarse-grained; silt nonplastic, wet.
13-30	SM-GM	SILTY SAND WITH GRAVEL/SILTY GRAVEL WITH SAND Brown to multicolored; sand fine- to coarse-grained; silt nonplastic, trace clay. Wet at 21 feet. Decrease in moisture at 28 feet. Cobbles at 29 to 30 feet. Collect sample GD-35(0-30).
TOTAL DEPTH = 30 FEET		

TABLE A-28

LITHOLOGIC LOG FOR EXPLORATORY BORING NO. GD-36

DEPTH INTERVAL (feet below land surface)		DESCRIPTION OF MATERIAL
0-7	GM-SM	SILTY GRAVEL WITH SAND Brown to multicolored; sand fine- to coarse-grained; silt nonplastic, dry. Slightly moist at 6 feet. Boulder at 7 feet.
7-27	SM-GM	SILTY SAND WITH GRAVEL Brown to multicolored; sand fine- to coarse-grained; silt nonplastic. Increase in sand content at 8 feet, trace clay. Cobble fragments (boulder) at 12 feet. Increase in gravel content at 15 feet, trace clay. Boulders and cobbles at 16 feet. Increase in coarse-grained sand at 18 feet. Boulders at 20 feet. Increase in fine-grained sand at 22 feet. Change in color to reddish-brown at 23 feet. Boulder at 24 feet. Cobbles fragments (boulder) at 26 feet.
27-30	GM-SM	SILTY GRAVEL WITH SAND Brown to multicolored; sand fine- to coarse-grained; silt nonplastic, trace clay. Collect sample GD-36(0-30).
<hr/> TOTAL DEPTH = 30 FEET		

TABLE A-25
LITHOLOGIC LOG FOR EXPLORATORY BORING NO. 98

DEPTH INTERVAL (feet below land surface)		DESCRIPTION OF MATERIAL
0-22	SM	SILTY SAND Brown; sand fine- to coarse-grained; silt nonplastic, dry. Increase in gravel content at 12 feet.
22-34	SM-GM	SILTY GRAVEL WITH SAND/SILTY SAND WITH GRAVEL Reddish brown; sand fine- to coarse-grained; silt nonplastic, moist. Cobbles at 25 to 26 feet. Wetter at 31.5 feet.
34-42	SM	SILTY SAND WITH GRAVEL Brown; sand fine- to coarse-grained; silt nonplastic, trace clay, wet.
42-44	SM-GM	SILTY SAND WITH GRAVEL/SILTY GRAVEL WITH SAND Brown to multicolored; increase in coarse-grained material.
44-50	SM	SILTY SAND WITH GRAVEL Brown to multicolored; sand fine- to coarse-grained; silt nonplastic, trace clay. Cobble at 47 to 48 feet. Collect sample #98(0-30).
<hr/> TOTAL DEPTH = 50 FEET		

TABLE A-26

LITHOLOGIC LOG FOR EXPLORATORY BORING NO. 102

DEPTH INTERVAL (feet below land surface)		DESCRIPTION OF MATERIAL
0-4	SP-GP	POORLY GRADED SAND WITH GRAVEL Brown to multicolored; moist.
4-6	SM-GM	SILTY SAND WITH GRAVEL Brown to multicolored; sand fine- to coarse-grained; silt nonplastic, moist. Boulder at 5 feet.
6-9	SP-GP	POORLY GRADED SAND WITH GRAVEL Brown to multicolored. Cobble fragments (boulders) at 8 feet.
9-11	SM-GM	SILTY SAND WITH GRAVEL Brown to multicolored; sand fine- to coarse-grained; silt nonplastic, trace clay, wet.
11-14	GM-SM	SILTY GRAVEL WITH SAND Brown to multicolored; sand fine- to coarse-grained; silt nonplastic. Granitic boulder at 12 feet.
14-23	SM-GM	SILTY SAND WITH GRAVEL Brown to multicolored; sand fine- to coarse-grained; silt nonplastic. Quartzite boulder at 17 feet. Red boulder at 22 feet.
23-27	GM-SM	SILTY GRAVEL WITH SAND Brown to multicolored; sand fine- to coarse-grained; silt nonplastic. Rhyolite boulder at 26 feet.
27-28	SM-GM	SILTY SAND WITH GRAVEL Brown to multicolored; sand fine- to coarse-grained; silt nonplastic. Cobble fragments (boulder) at 28 feet.
28-30	GM-SM	SILTY GRAVEL WITH SAND Brown to multicolored; sand fine- to coarse-grained; silt nonplastic. Collect sample #102(0-30).
		TOTAL DEPTH = 30 FEET

TABLE A-23
LITHOLOGIC LOG FOR EXPLORATORY BORING NO. 96

DEPTH INTERVAL (feet below land surface)		DESCRIPTION OF MATERIAL
0-1	GP	POORLY GRADED GRAVEL WITH SAND Brown to multicolored; sand fine- to coarse-grained; silt nonplastic.
1-9	SM-GM	SILTY GRAVEL AND SAND Brown to multicolored; sand fine- to coarse-grained; silt nonplastic, dry. Concrete and rebar from 3 to 5 feet. Moist at 6 feet. Softer drilling and moist at 9 feet.
9-12	GM	SILTY GRAVEL WITH SAND Brown to multicolored; sand fine- to coarse-grained. Cobbles coated with fines.
12-30	SM-GM	SILTY GRAVEL AND SAND Brown to multicolored; sand fine- to coarse-grained; silt nonplastic. Increase in sand content and decrease in cobble content at 20 feet. Collect #96(0-30).
TOTAL DEPTH = 30 FEET		

TABLE A-24
LITHOLOGIC LOG FOR EXPLORATORY BORING NO. 97

DEPTH INTERVAL (feet below land surface)		DESCRIPTION OF MATERIAL
0-3	SW	WELL-GRADED SAND WITH GRAVEL Brown to multicolored; sand fine- to coarse-grained, moist. Boulders at 2 and 3 feet.
3-10	SM	SILTY SAND Brown; sand fine-grained; silt nonplastic. Boulder at 5, 6 and 7 feet. Cobbles at 9 feet. Slightly moist at 9.5 feet.
10-18	SM-GM	SILTY GRAVEL WITH SAND Brown to multicolored; sand fine- to coarse-grained; silt nonplastic. Silt content varying with depth, dry. Slightly moist at 15 feet.
18-20	SP	POORLY GRADED SAND WITH GRAVEL Brown to multicolored; sand coarse-grained.
20-26	SM-GM	SILTY SAND WITH GRAVEL Brown to multicolored; sand fine- to coarse-grained; silt nonplastic; trace black clay; very moist; hard drilling.
26-30	SM	SILTY SAND WITH GRAVEL Brown; sand fine- to coarse-grained; silt nonplastic, very moist. Collect sample #97(0-30).
<hr/> TOTAL DEPTH = 30 FEET		

TABLE A-21
LITHOLOGIC LOG FOR EXPLORATORY BORING NO. GD-33

DEPTH INTERVAL (feet below land surface)		DESCRIPTION OF MATERIAL
0-2	ML	SANDY SILT WITH GRAVEL Medium brown; soft, nonplastic silt; sand fine- to coarse-grained; dry.
2-8	SM	SILTY SAND WITH GRAVEL Medium brown to multicolored; sand fine- to coarse-grained; silt nonplastic. Increase in cobble content at 7 feet.
8-13	GM	SILTY GRAVEL WITH SAND Multicolored; sand fine- to coarse-grained; silt nonplastic. Cobbles and boulders at 8 to 9 feet. Hard drilling.
13-19	SM-GM	SILTY SAND WITH GRAVEL Medium brown to multicolored; sand fine- to coarse-grained; silt nonplastic. Damp.
19-24	GM	SILTY GRAVEL WITH SAND Medium brown to multicolored; sand fine- to coarse-grained; silt nonplastic.
24-30	SM-GM	SILTY SAND WITH GRAVEL/SILTY GRAVEL WITH SAND Multicolored; sand fine- to coarse-grained; silt nonplastic. Wet. Collect sample GD-33(0-30).
<hr/> TOTAL DEPTH = 30 FEET		

TABLA A-22

LITHOLOGIC LOG FOR EXPLORATORY BORING NO. GD-34

DEPTH INTERVAL (feet below land surface)		DESCRIPTION OF MATERIAL
0-5	SP-GP	POORLY GRADED SAND AND GRAVEL Multicolored; sand poorly graded; gravel poorly graded; little to no fines; slightly moist. Boulder at 2 and 5 feet.
5-12	SM	SILTY SAND Brown; sand fine-grained; silt nonplastic, dry. Increase in cobble content at 7 feet, slightly moist, reddish-brown.
12-30	SM-GM	SILTY GRAVEL WITH SAND Multicolored; increase in moisture content, Increase in coarse-grained sand at 15 feet. Boulder at 26 feet. Collect sample GD-34(0-33).
TOTAL DEPTH = 30 FEET		

TABLE A-19
LITHOLOGIC LOG FOR EXPLORATORY BORING NO. 79

DEPTH INTERVAL (feet below land surface)		DESCRIPTION OF MATERIAL
0-7	GP	POORLY GRADED GRAVEL WITH SAND Multicolored; sand fine- to coarse-grained. Boulder at 4 to 5 feet.
7-12	SM-GM	SILTY SAND WITH GRAVEL Brown to multicolored; sand fine- to coarse-grained; silt nonplastic, moist. Cobbles at 10 feet.
12-19	SM	SILTY SAND WITH GRAVEL Brown; sand fine- to coarse-grained; silt nonplastic. Cobbles at 14 feet. Cobbles at 17 feet.
19-30	SM-GM	SILTY SAND WITH GRAVEL Brown to multicolored; sand fine- to coarse-grained; silt nonplastic. Cobbles at 21 feet. Wet at 25 feet. Boulder at 27 feet. Collect sample #79(0-30).
<hr/> TOTAL DEPTH = 30 FEET		

TABLE A-20
LITHOLOGIC LOG FOR EXPLORATORY BORING NO. 81

DEPTH INTERVAL (feet below land surface)		DESCRIPTION OF MATERIAL
0-7	GP	POORLY GRADED GRAVEL Multicolored; moist.
7-30	SM-GM	SILTY SAND WITH GRAVEL Brown to multicolored; sand fine- to coarse-grained; silt nonplastic. Boulder at 8 feet. Very moist at 10 feet; increase in coarse-grained sand content. Boulder at 11 feet. Cobbles at 13 feet. Boulder at 14 feet. Cobble fragments (boulder) at 17 to 20 feet. Decrease in silt content at 20 feet. Boulder at 23 feet. Increase in silt content at 26 feet. Cobble fragments (boulder) at 29 feet. Collect sample #81(0-30)
<hr/> TOTAL DEPTH = 30 FEET		

TABLE A-17

LITHOLOGIC LOG FOR EXPLORATORY BORING NO. 74

DEPTH INTERVAL (feet below land surface)	DESCRIPTION OF MATERIAL	
0-17	SM-GM	GRAVEL AND SAND WITH SILT Poorly sorted sand and gravel with cobbles and silt. Non plastic fines. Dry, loose formation, drills fast to 12 feet. At 12 feet formation harder, moist. Cobble horizon at 17feet.
17-30	SM	SILTY SAND Poorly graded medium brown silty sand with multi colored, well rounded gravel. Damp, moderately hard formation, drills smooth, slow. Increase in silt content (TR/35/40/25) and slightly plastic fines at 23 feet. Interbedded cobbles at 23 and 28 feet. Collect sample #74(0-30).
TOTAL DEPTH = 30 FEET		

TABLE A-18
LITHOLOGIC LOG FOR EXPLORATORY BORING NO. 76

DEPTH INTERVAL (feet below land surface)		DESCRIPTION OF MATERIAL
0-7	SP	POORLY GRADED SAND WITH GRAVEL Poorly sorted light brown sand with gravel and minor cobbles. Dry, loose. Becomes moist at 5 feet.
7-16	SP-GP	POORLY GRADED SAND AND GRAVEL Similar to above with increase in gravel content. Formation very moist at 12 feet. Drilling slow at 16 feet, hard formation, cobbles.
16-24	SM	SILTY SAND WITH GRAVEL Brown, poorly sorted sand with multi colored, well rounded gravel and silt, non plastic fines, very moist, moderately hard formation. Becomes slightly reddish brown at 19 feet. Boulder at 21 feet.
24-30	SM-GM	SILTY SAND AND GRAVEL Same as above with increase in gravel content. Very moist, moderately hard formation. Cobbles at 28 feet. Collect sample #76(0-30). Water in borehole at 25 feet.
<hr/> TOTAL DEPTH = 30 FEET		

TABLE A-15

LITHOLOGIC LOG FOR EXPLORATORY BORING NO. 71

DEPTH INTERVAL (feet below land surface)		DESCRIPTION OF MATERIAL
0-5	SM-GM	SILTY SAND AND GRAVEL Poorly sorted light brown sand and multicolored gravel with silt and cobbles. Dry, loose, drills fast.
5-9	GM	SANDY GRAVEL Fine to coarse, multicolored gravel and cobbles with sand and silt. Non plastic fines. Moist, hard formation, drills slow.
9-17	SM	SILTY SAND Poorly sorted brown sand with multicolored fine to medium gravel and non plastic fines. Damp, formation loose, drills fast.
17-30	SM-GM	SILTY SAND AND GRAVEL Similar to above. Poorly sorted sand and gravel with cobbles and silt. Very moist, moderately hard. Interbedded cobbles at 17 and 21 feet. Becomes very moist at 25 feet, slightly plastic fines. Collect sample #71(0-30).
<hr/>		
TOTAL DEPTH = 30 FEET		

TABLE A-16

LITHOLOGIC LOG FOR EXPLORATORY BORING NO. 72

DEPTH INTERVAL (feet below land surface)		DESCRIPTION OF MATERIAL
0-30	SM-GM	SILTY GRAVEL AND SAND Brown to multicolored poorly sorted sand and gravel with silt and interbedded cobbles. Slightly plastic fines at 17 feet. Dry at land surface, becoming moist at 6 feet, very moist at 8 feet. Formation moderately hard throughout. Cobble horizons at 20 and 24 feet. Collect sample #72(0-30).
TOTAL DEPTH = 30 FEET		

TABLE A-13

LITHOLOGIC LOG FOR EXPLORATORY BORING NO. GD-27

DEPTH INTERVAL (feet below land surface)	DESCRIPTION OF MATERIAL	
0-8	SW	WELL-GRADED SAND Medium to coarse sand with gravel. Gravel increases with depth. At 7 feet, slightly moist, loose drills fast. Boulder at 3 feet. At 1 foot, newspaper in cuttings At 5 feet, clear plastic in cuttings.
8-30	SP-GP	POORLY GRADED SAND AND GRAVEL Gravels and sand with interbedded cobbles. Alternating units of fine to coarse sediments with depth. Moist, fine units drill fast, coarse units drill slower, uniform. Top of fine units at 16, 23, and 28 feet. Collect sample GD-27(0-30).
TOTAL DEPTH = 30 FEET		

TABLE A-14
LITHOLOGIC LOG FOR EXPLORATORY BORING NO. GD-28

DEPTH INTERVAL (feet below land surface)		DESCRIPTION OF MATERIAL
0-15	SM-GM	SILTY SAND AND GRAVEL Poorly sorted brown sand and well rounded multi colored gravel with silt and trace cobbles, slightly plastic fines. Dry at surface, becomes moist at 1 foot. Dry at 5 feet to moist at 8 feet. Formation moderately hard, drills slow and uniform.
15-20	SP	POORLY GRADED SILTY SAND Medium brown sand with silt, trace gravel. Non plastic fines. Moist, moderately hard, drills faster than above. Boulder at 17 feet.
20-25	SM-GM	SILTY SAND AND GRAVEL Similar to above, moisture increasing with depth. Formation drills slow, smooth to 25 feet.
25-30	SM	SILTY SAND Poorly sorted fine to coarse silty sand with gravel and minor interbedded cobbles. Damp, loose, drills smooth, fast. Collect sample GD-28(0-30). Water in borehole at 23 feet bls.
TOTAL DEPTH = 30 FEET		

TABLE A-11

LITHOLOGIC LOG FOR EXPLORATORY BORING NO. GD-26

DEPTH INTERVAL (feet below land surface)	DESCRIPTION OF MATERIAL	
0-3	SM-GM	SILTY SAND AND GRAVEL Poorly sorted light brown, silty sand and gravel with cobbles. Dry, loose, drills fast. Silt content increases at 2 feet.
3-5	SW	WELL-GRADED SAND Light brown fine sand with gravel. Moist, loose.
5-30	SM-GM	SILTY SAND AND GRAVEL Poorly sorted silty sand and gravel with interbedded cobbles. Moist, moderately hard, drills uniformly to 11 feet. At 11 feet, cobble horizon to 13 feet. At 27 feet, formation finer, looser, drills fast. Collect sample GD-26(0-30).
TOTAL DEPTH = 30 FEET		

TABLE A-12
LITHOLOGIC LOG FOR EXPLORATORY BORING NO. 51

DEPTH INTERVAL (feet below land surface)		DESCRIPTION OF MATERIAL
0-8	SM-GM	SILTY SAND AND GRAVEL Light brown silty sand and gravel with cobbles, possible trace clay. Moist, loose, drills fast to 8 feet.
8-12	GP	POORLY GRADED GRAVEL WITH SAND Medium brown poorly sorted gravel with sand and cobbles. Harder formation than above. Drills evenly slow to 12 feet.
12-25	SM-GM	SILTY SAND AND GRAVEL Similar to above. Slightly plastic silt and clay, drills fast, smooth. Moisture increasing with depth.
25-30	GM	SILTY GRAVEL Poorly sorted gravel with cobbles in sand, silt matrix. Slightly plastic fines on cobble surfaces. Very moist. Collect sample #51(0-30). Water in boring at 17 feet bls.
TOTAL DEPTH = 30 FEET		

TABLE A-9
LITHOLOGIC LOG FOR EXPLORATORY BORING NO. GD-24

DEPTH INTERVAL (feet below land surface)	DESCRIPTION OF MATERIAL	
0-2	GW	WELL-GRADED GRAVEL Large multi colored gravel, little to no fines. Loose, slightly moist.
2-10	SM	SILTY SAND Poorly graded brown silty sand with gravel. Dry, loose, drills smooth, even. Small pieces of glass in cuttings. At 9 feet, some concrete in cuttings. At 10 feet, some metal shavings (bit?).
10-15	GP-SP	POORLY GRADED GRAVEL AND SAND Gravel and sand with cobbles. Becoming coarser and moist with depth to cobble horizon at 15 feet.
15-30	SM-GM	SILTY SAND AND GRAVEL Poorly sorted silty sand and gravel with minor cobbles. Moist, moderately hard, drills evenly. Becomes darker brown and very moist at 22 feet. Collect sample GD-24(0-30).
TOTAL DEPTH = 30 FEET		

TABLE A-10

LITHOLOGIC LOG FOR EXPLORATORY BORING NO. GD-25

DEPTH INTERVAL (feet below land surface)		DESCRIPTION OF MATERIAL
0-16	SM-GM	SILTY SAND AND GRAVEL Poorly sorted medium brown sands and gravels with cobbles and trace clay and boulders. Slightly moist, loose, drills fast. Formation becomes very moist at 9 feet, decrease in cobbles and silt content. Boulder or cobbles at 6 feet and 8 feet.
16-22	SW	WELL-GRADED SAND Medium and coarse sand, trace gravel. Very moist, loose, drills fast to 18 feet, formation becomes harder.
22-30	SM	SILTY SAND Silty sand with gravel, minor inclusions of cobbles. Very moist, drills smooth, slow. Collect sample GD-25(0-30).
TOTAL DEPTH = 30 FEET		

TABLE A-7
LITHOLOGIC LOG FOR EXPLORATORY BORING NO. GD-22

DEPTH INTERVAL (feet below land surface)		DESCRIPTION OF MATERIAL
0-5	SW	WELL-GRADED SAND Well sorted medium sand, minor fine and coarse sand. Dry, loose, drills fast. Root fragments and organic material present near surface.
5-17	SP-GP	POORLY GRADED SAND AND GRAVEL Poorly sorted gravelly sand with minor cobbles. Gravel and cobbles well rounded. Moist, loose. At 16 feet, boulder.
17-30	SM-GM	SILTY SAND AND GRAVEL Poorly sorted sand and gravel with silt. Well rounded gravels, non plastic silt. Very moist at 17 feet. Formation becomes harder with depth. Gravels and cobbles increase with depth. Collect sample GD-22(0-30).
<hr/> TOTAL DEPTH = 30 FEET		

TABLE A-8

LITHOLOGIC LOG FOR EXPLORATORY BORING NO. GD-23

DEPTH INTERVAL (feet below land surface)		DESCRIPTION OF MATERIAL
0-7	SP-GP	POORLY GRADED SAND AND GRAVEL Sand and gravel with cobbles. Slightly moist, loose, drills fast.
7-11	SW	WELL-GRADED SAND Well sorted medium sand with gravel. Some fine and coarse sand. Well rounded gravel. Moist, loose.
11-18	SP-GP	POORLY GRADED SAND AND GRAVEL Sand and gravel. Fewer cobbles and more silt than above with. moist, formation harder, drills slower. Cobble horizons at 14 and 16 feet.
18-30	SM-GM	SILTY SAND AND GRAVEL Silty, poorly sorted sand and gravel. Well rounded gravels and cobbles. Non plastic silt. At 22 feet, cobbles. Formation becoming finer at 24 feet. Trace of clay in silt. Collect sample GD-23(0-30).
<hr/> TOTAL DEPTH = 30 FEET		

TABLE A-5

LITHOLOGIC LOG FOR EXPLORATORY BORING NO. 9

DEPTH INTERVAL (feet below land surface)	DESCRIPTION OF MATERIAL	
0-11	SP-GP	POORLY GRADED SAND AND GRAVEL Sand and gravel with well-rounded cobbles, trace silt . Dry, loose, drills fast. At 8 feet, formation moist.
11-16	SP	POORLY GRADED SAND Sand with gravel and silt. Moist, loose, no odor. At 15 feet, boulder.
16-30	SM	SILTY SAND Poorly sorted sand with silt, interbedded cobbles. Wet, loose, drills fast. At 26 feet, boulder or cobbles. Collect sample #9(0-30).
TOTAL DEPTH = 30 FEET		

TABLE A-6
LITHOLOGIC LOG FOR EXPLORATORY BORING NO. 10

DEPTH INTERVAL (feet below land surface)		DESCRIPTION OF MATERIAL
0-3	Fill	Sand, gravel, and cobbles placed for access to site. Dark moist organic material from former pond at 2 feet.
3-12	GP-SP	POORLY GRADED GRAVEL AND SAND Gravel and sand. Loose, damp. Formation becomes harder at 8 feet.
12-14	SW	WELL-GRADED SAND Medium sand. Minor gravel and silt. Moist, loose.
14-21	SP	POORLY GRADED SAND SAA, increase in gravel and silt content. Drills smooth, even to 21 feet.
21-24	GP	POORLY GRADED GRAVEL Gravel, cobbles, and boulders. Very coarse unit. Hard, drills slow.
24-30	SP-GP	POORLY GRADED SAND AND GRAVEL Sand and gravel. Formation wet, drills smooth and fast. Collect sample #10(0-30).
<hr/> TOTAL DEPTH = 30 FEET		

TABLE A-3
LITHOLOGIC LOG FOR EXPLORATORY BORING NO. 5

DEPTH INTERVAL (feet below land surface)		DESCRIPTION OF MATERIAL
0-10	SP-GP	POORLY GRADED SAND AND GRAVEL Brown sand and gravel with well-rounded cobbles, little to no fines; loose/easy drilling at surface, formation harder with depth; moist, no odors. Boulder at 8 feet.
10-12	SW	WELL-GRADED SAND Medium brown well sorted well-rounded medium sand, loose, dry. Becomes coarser with depth.
12-25	SP-GP	POORLY GRADED SAND AND GRAVEL Medium brown sand and gravel, interbedded cobbles, well-rounded little to no silt loose/easy drilling, moist, no odors.
25-30	SM-GM	SILTY SAND AND GRAVEL Poorly graded sand and gravel, interbedded cobbles; moderately loose, very moist at 25 feet, no odors. Water standing in boring at 4 feet bls. Collect sample #5(0-30).
TOTAL DEPTH = 30 FEET		

TABLE A-4

LITHOLOGIC LOG FOR EXPLORATORY BORING NO. 6

DEPTH INTERVAL (feet below land surface)		DESCRIPTION OF MATERIAL
0-20	SP-GP	POORLY GRADED SAND AND GRAVEL Light brown sand and gravel with well rounded multi-colored cobbles; loose/easy drilling, dry, no odors. Formation becomes harder with depth. Cobble horizon at 6, 8, 12, and 17 feet.
20-30	SM-GM	SILTY SAND WITH GRAVEL Poorly graded silty sand and gravel minor cobbles, well rounded gravel. Formation loose/ drills fast, damp, no odors. At 30 feet, trace of clay in silt matrix, slightly plastic. Collect sample #6(0-30).
TOTAL DEPTH = 30 FEET		

TABLE A-1
LITHOLOGIC LOG FOR EXPLORATORY BORING NO. 1

DEPTH INTERVAL (feet below land surface)		DESCRIPTION OF MATERIAL
0-12	SM	SILTY SAND WITH GRAVEL Medium brown, poorly graded sand; with silt, well-rounded gravel, and cobbles to 10 inches; loose/easy drilling, damp, no odors. At 6 feet, formation drier. Boulder at 8 feet.
12-19	SM-GM	SILTY GRAVEL AND SAND Same as above with increase in gravel content; formation very hard 12-14 feet, drills harder. Boulder at 17 feet.
19-21	SM	SILTY SAND WITH GRAVEL Brown, fine to coarse, poorly graded sand; with some fine gravel; slightly harder drilling, damp, no odors. Matrix slightly clayey.
21-30	SM-GM	SILTY GRAVEL AND SAND Poorly graded sand and gravel, well-rounded gravel and cobbles; moderately loose, damp, no odors. At 24 feet, formation dark brown, very moist. At 27 feet, increase in cobbles, matrix slightly reddish, clayey. Water coming into hole approximately 6 feet bls. Collect sample #1(0-30).
TOTAL DEPTH = 30 FEET		

TABEL A-2

LITHOLOGIC LOG FOR EXPLORATORY BORING NO. 3

DEPTH INTERVAL (feet below land surface)		DESCRIPTION OF MATERIAL
0-14	SP-GP	POORLY GRADED SAND AND GRAVEL Brown sand and gravel with well-rounded cobbles; loose/easy drilling, dry, no odors. Cobble horizon at 5 to 7 feet.
14-20	GP	POORLY GRADED GRAVEL WITH SAND Brown sand and multicolored gravel with well-rounded cobbles; formation hard, drilling slow, damp at 14 feet, no odors.
20-30	SM	SILTY SAND WITH GRAVEL Brown poorly graded sand with gravel and silt; well-rounded gravel; non-plastic fines; loose formation, easy drilling, damp, no odors. Boulder at 27 feet. Collect sample #3(0-30).
<hr/> TOTAL DEPTH = 30 FEET		

Table

A-22	LITHOLOGIC LOG FOR EXPLORATORY BORING NO. GD-34
A-23	LITHOLOGIC LOG FOR EXPLORATORY BORING NO. 96
A-24	LITHOLOGIC LOG FOR EXPLORATORY BORING NO. 97
A-25	LITHOLOGIC LOG FOR EXPLORATORY BORING NO. 98
A-26	LITHOLOGIC LOG FOR EXPLORATORY BORING NO. 102
A-27	LITHOLOGIC LOG FOR EXPLORATORY BORING NO. GD-35
A-28	LITHOLOGIC LOG FOR EXPLORATORY BORING NO. GD-36
A-29	LITHOLOGIC LOG FOR EXPLORATORY BORING NO. 103
A-30	LITHOLOGIC LOG FOR EXPLORATORY BORING NO. 117

APPENDIX A

LITHOLOGIC LOGS FOR EXPLORATORY BORINGS

TABLES

A-1	LITHOLOGIC LOG FOR EXPLORATORY BORING NO. 1
A-2	LITHOLOGIC LOG FOR EXPLORATORY BORING NO. 3
A-3	LITHOLOGIC LOG FOR EXPLORATORY BORING NO. 5
A-4	LITHOLOGIC LOG FOR EXPLORATORY BORING NO. 6
A-5	LITHOLOGIC LOG FOR EXPLORATORY BORING NO. 9
A-6	LITHOLOGIC LOG FOR EXPLORATORY BORING NO. 10
A-7	LITHOLOGIC LOG FOR EXPLORATORY BORING NO. GD-22
A-8	LITHOLOGIC LOG FOR EXPLORATORY BORING NO. GD-23
A-9	LITHOLOGIC LOG FOR EXPLORATORY BORING NO. GD-24
A-10	LITHOLOGIC LOG FOR EXPLORATORY BORING NO. GD-25
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A-12	LITHOLOGIC LOG FOR EXPLORATORY BORING NO. 51
A-13	LITHOLOGIC LOG FOR EXPLORATORY BORING NO. GD-27
A-14	LITHOLOGIC LOG FOR EXPLORATORY BORING NO. GD-28
A-15	LITHOLOGIC LOG FOR EXPLORATORY BORING NO. 71
A-16	LITHOLOGIC LOG FOR EXPLORATORY BORING NO. 72
A-17	LITHOLOGIC LOG FOR EXPLORATORY BORING NO. 74
A-18	LITHOLOGIC LOG FOR EXPLORATORY BORING NO. 76
A-19	LITHOLOGIC LOG FOR EXPLORATORY BORING NO. 79
A-20	LITHOLOGIC LOG FOR EXPLORATORY BORING NO. 81
A-21	LITHOLOGIC LOG FOR EXPLORATORY BORING NO. GD-33

APPENDIX A

LITHOLOGIC LOGS FOR EXPLORATORY BORINGS

TABLE A-29

LITHOLOGIC LOG FOR EXPLORATORY BORING NO. 103

DEPTH INTERVAL (feet below land surface)		DESCRIPTION OF MATERIAL
0-1	GP	POORLY GRADED GRAVEL Multicolored, well-rounded boulders and fine- to coarse-cobbles, dry, loose.
1-11	GM	SILTY GRAVEL WITH SAND Multicolored, well-rounded cobbles and gravel; medium brown fine- to coarse-grained sand, non-plastic fines. Moist at 5 feet. Formation loose to 6 feet, moderately hard 6 to 11 feet.
11-21	SM-GM	SILTY GRAVEL AND SAND Multicolored gravel; fine- to coarse-grained medium brown sand; non-plastic fines, moist, moderately loose, drills fast. Cobbles at 13, 15, and 18 feet.
21-24	GM	SILTY GRAVEL WITH SAND Brown to multicolored; sand fine- to coarse-grained; non-plastic, moderately hard.
24-30	SM-GM	SILTY GRAVEL AND SAND Multicolored gravel; fine- to coarse-grained medium brown sand; non-plastic fines, trace clay, damp, moderately loose. Collect sample #103(0-30).
TOTAL DEPTH = 30 FEET		

TABLE A-30
LITHOLOGIC LOG FOR EXPLORATORY BORING NO. 117

DEPTH INTERVAL (feet below land surface)		DESCRIPTION OF MATERIAL
0-3	SM	SILTY SAND WITH GRAVEL Brown; sand fine- to coarse-grained (TR/20/60/20), moist.
3-17	SM-GM	SILTY SAND WITH GRAVEL Brown to multicolored; sand fine- to coarse-grained. Quartzite boulder at 6 feet. Increase in gravel content at 7 feet, trace clay. Cobble fragments (boulder) from 8 to 10 feet. Increase in clay at 10 feet. Boulder and cobbles at 12 and 13 feet. Increase in moisture content at 13 feet.
17-20	GM-SM	SILTY GRAVEL WITH SAND Brown to multicolored; sand fine- to coarse-grained; silt nonplastic, decrease in clay content. Cobble fragments (boulder) at 18 feet.
20-30	SM-GM	SILTY SAND WITH GRAVEL Brown to multicolored; sand fine- to coarse-grained; silt nonplastic, trace clay. Increase in fine-grained sand at 23 feet. Increase in moisture content at 25 feet. Increase in coarse-grained sand at 26 feet. Collect sample #117(0-30).
<hr/> TOTAL DEPTH = 30 FEET		

APPENDIX “A”
GROUNDWATER CONTINGENCY RESPONSE PLAN
AND
SITE GROUNDWATER MONITORING PLAN

*Prose
A.124.9*

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

**Rio Salado – Phoenix Reach
Low Flow Channel Project – Phase 2
FCD 2000C014
PCN 124-01-31**

ERRATA TO APPENDIX “A”

Errata to Appendix “A” - Groundwater Contingency Response plan

Page 4

Subsection 5.1.1 – Work Zone Definition; Add the following sentence to follow the first sentence – “Exclusion zones will be established only as required should unacceptable or hazardous materials be encountered, and as determined necessary by the Engineer in consultation with environmental staff and the Contractor.”

Page 5

Subsection 5.2 – Personal Protective Equipment (PPE); The use of PPE typically will occur only after unacceptable contaminant exposures have been identified through monitoring and testing, and if the Contractor continues to work in the area(s) where such exposure has been identified.

Page 6

Subsection 5.3 – Modification To Work Schedules; The requirement outlined in this subsection, at the direction of the Engineer, may not be required depending on the results of the test pit groundwater testing as outlined in Subsection 107.5.4, Degraded Groundwater.

**RIO SALADO HABITAT RESTORATION PROJECT
GROUNDWATER CONTINGENCY RESPONSE PLAN
CITY OF PHOENIX, ARIZONA**

Submitted To:

City of Phoenix Engineering &
Architectural Services Department
200 West Washington Street, 7th Floor
Phoenix, Arizona 85003-1611

Submitted By:

AGRA Earth & Environmental, Inc.
3232 West Virginia Avenue
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February 10, 2000

AGRA JOB NO. 0-114-002022

**RIO SALADO HABITAT RESTORATION PROJECT
GROUNDWATER CONTINGENCY RESPONSE PLAN
CITY OF PHOENIX, ARIZONA**

Submitted To:

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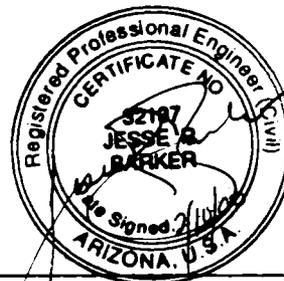
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TABLE 1	Summary of Action Level Calculations for Daylighted Groundwater Exposure Scenario
TABLE 2	Potential Chemical Hazards
TABLE 3	Response



1.0 INTRODUCTION

At the request of the City of Phoenix, AGRA Earth & Environmental, Inc. (AGRA) has prepared this Groundwater Contingency Response Plan for the Rio Salado Habitat Restoration Project. The scope of this Groundwater Contingency Response Plan is based on conversations between AGRA and City of Phoenix personnel, and the results of the Risk Management Assessment and Monitoring Program Report (RMA; AGRA, 2000). The Groundwater Contingency Response Plan is intended to 1) augment the Rio Salado Habitat Restoration Project site-specific Health and Safety Plan, and 2) outline the procedures to be implemented in the event that daylighted groundwater (*i.e.*, groundwater present at the surface, either in excavations, in ponds, or flowing), containing concentrations of constituents of concern (COC) above risk-based action levels (RBALs) established in the RMA, is encountered during construction activities.

2.0 BACKGROUND

The City of Phoenix, in conjunction with the United States Army Corps of Engineers (USACE) and the Maricopa County Flood Control District, is proposing to undertake an environmental restoration project for a five mile reach (Phoenix Reach) along the Salt River in the City of Phoenix, Arizona. This project is part of the overall Rio Salado Habitat Restoration project along the urban reaches of the Salt River. Currently, the Phoenix Reach is a dry river bed with minimal or no vegetation and/or habitat and the area surrounding this portion of the Salt River has been used for gravel mining, landfills and other industrial activities. The overall objective of the restoration project is to enhance riparian habitat along the Phoenix Reach in order to restore local flora and fauna and provide incidental recreational opportunities.

The plan for the Phoenix Reach is to use shallow groundwater to create a perennial low flow channel in the river bed. Initially, this groundwater may be brought to the surface during construction of the low flow channel and associated features and will then be discharged downstream of the construction area, either within or downstream of the restored reach.

The ground water underlying the project area has been found to be contaminated with varying levels of industrial chemicals. Therefore, an assessment of risk to human health from this water was completed to increase worker safety and ensure that groundwater discharged to the surface downstream of the project will not endanger public health during or following construction. Appropriate RBALs, which are protective of human receptors likely to be in the general vicinity during the restoration project, were established for COC in the RMA and Monitoring Program developed by AGRA for the City of Phoenix. The evaluation indicated that exposure to daylighted groundwater, as the primary source of COC, posed the highest potential risk, and that the on-site trench worker had the greatest risk of exposure. Consequently, exposure to daylighted groundwater containing concentrations of COC above the RBALs is not permissible.

3.0 RISK-BASED ACTION LEVELS

The Rio Salado RMA was conducted to identify allowable RBALs which would be protective of human health for receptor populations over the entire project area, regardless of location, throughout the duration of construction for the Rio Salado Habitat Restoration Project. The analysis focused on daylighted groundwater, sediment and air, and the potential effects of human contact with these media during construction of the project components. The evaluation has utilized exposure routes including dermal contact, inhalation and ingestion to evaluate risk potential. The RBALs do not predict a concentration which may be present at a given location at a given time. Actual concentrations may be subject to change over time, as affected groundwater moves through the project area. Overall, the result of the RMA has indicated that appropriately managing risk in groundwater will address risk posed by other media.

Table 1 provides a summary of RBALs derived utilizing the site-specific parameters and algorithms for exposure in daylighted groundwater. Of the compounds reported in groundwater from several locations adjacent to the project area, maximum concentrations of 1,1-dichloroethene, 1,2-dichloroethane, benzene, toluene, tetrachloroethene, trichloroethane, vinyl chloride, arsenic and mercury were reported at levels which exceed the most stringent action level.

4.0 POTENTIAL CONSTITUENTS OF CONCERN

The historic groundwater data and the results of the RMA indicated that the following contaminants present in the groundwater have the greatest potential to be COC in the Phoenix Reach:

1,1-dichloroethene	1,2-dichloroethane
benzene	toluene
tetrachloroethene	trichloroethene
mercury	arsenic
vinyl chloride	

Additionally, a statistical summary of all analytical data indicated that Polynuclear Aromatic Hydrocarbons (PAHs) and methyl-tertiary butyl ether (MTBE) were not evaluated at any of the available sites in the vicinity of the Phoenix Reach. These are analytes commonly associated with many types of industrial processes and petroleum releases; therefore, all PAHs and MTBE were included as potential COC.

Each of these chemical classes contains contaminants that have similar chemical properties and structures and, therefore, similar toxicological effects on humans. Table 2 provides a summary of the routes of entry, and potential acute and chronic health effects. It should be

noted that the health effects listed in Table 2 would result from overexposure to these compounds, and that daylighted groundwater sampling for these compounds is required before it can be determined if overexposure will occur during restoration activities at the Phoenix Reach.

5.0 GROUNDWATER CONTINGENCY RESPONSE PLAN TO MINIMIZE WORKER RISK

The Groundwater Contingency Response Plan is intended to augment the Rio Salado Habitat Restoration Project site-specific Health and Safety Plan, and to outline the procedures to be implemented in the event that daylighted groundwater containing concentrations of COC above RBALs established in the RMA, is encountered during construction activities. The Groundwater Contingency Response Plan addresses engineering controls, modifications to personal protective equipment, modifications to work schedules, water sampling procedures, and appropriate laboratory sample analysis to minimize or mitigate exposure to daylighted groundwater containing contaminant concentrations above the RBALs. This document is intended to supplement the site-specific Health and Safety Plan in regards to this issue. The site-specific Health and Safety Plan should be consulted on all health and safety issues not specifically addressed by this Groundwater Contingency Response Plan.

AGRA has identified three potential contingency response scenarios:

- Scenario 1 daylighted groundwater is encountered for which no information concerning the COC is available;
- Scenario 2 daylighted groundwater which is known to contain concentrations of COC above the prescribed RBALs is encountered; and
- Scenario 3 daylighted groundwater is encountered that is not believed to contain concentrations of COC above the RBALs, but site-specific conditions warrant further investigation. These conditions may include odor, visible contamination, or reported worker discomfort as a result of contact with daylighted groundwater.

Groundwater Contingency Response Scenario 1 occurs if daylighted groundwater is encountered in areas of the project for which no information is available regarding the concentrations of potential COC present. Since little data are available for COC concentrations in groundwater beneath the Rio Salado channel at this time, this contingency response scenario will occur most frequently, especially at the beginning of the project.

Groundwater Contingency Response Scenario 2 conditions are present if daylighted groundwater containing concentrations of COC known to be above the RBALS is encountered.

This scenario may occur more frequently in later phases of the project after daylighted groundwater monitoring and sampling data have been collected in the project area.

Under Groundwater Contingency Response Scenario 3 conditions, daylighted groundwater is believed to contain concentrations of COC below RBALS. However, site-specific conditions such as odor, visible contamination, or reported worker discomfort as a result of contact with daylighted groundwater indicate that additional investigation is appropriate. This scenario may occur at any time during the project.

5.1 SITE CONTROL MEASURES

AGRA feels that site control measures in some form should be implemented at all times during the construction activities. The implementation of site measures will vary according to the contingency response scenario encountered or anticipated.

5.1.1 Work Zone Definition

In order to minimize exposure potential, AGRA recommends the establishment of an exclusion zone surrounding construction activities. The exclusion zone should be designed to restrict access to unauthorized personnel, but accommodate necessary equipment. Fencing and road barriers may be appropriate to restrict public vehicle and foot traffic. Caution tape and posted signs and placards indicating restricted access should be placed in appropriate locations surrounding the construction site. Additional personnel responsible for restricting site access may also be appropriate, depending upon the size of the exclusion zone or the applicable scenario.

If unusual site conditions such as strong odors or staining or worker discomfort related to contact with daylighted groundwater or sediment are reported, site personnel should be removed from the immediate area until the potential for adverse impacts to health or safety can be evaluated. Site access should be restricted to those personnel responsible for assessing the site conditions.

Whenever possible, avoid ponded water, damp sediments, or discolored areas. Avoid sitting or laying on the ground, or leaning against excavation sidewalls to the maximum extent practicable.

In the event that sediments associated with daylighted groundwater containing elevated concentrations of COC (above RBALS) becomes dry, routine dust suppression techniques (*i.e.* periodic water truck sprinkling) may be considered if airborne dust occurs.

5.1.2 Air Monitoring

Monitoring and analysis of the breathing zone at test borings that encounter daylighted groundwater can also provide information prior to field construction activities. Personal air samples may be collected in the breathing zone of selected workers engaged in tasks which place the workers near daylighted groundwater for extended periods of time; however, the sensitivity of these personal devices may be limited to concentrations above the RBALs.

Air monitoring for exposure during field operations should be conducted to provide further assurance that no health hazard is present at the site. Volatile organic compounds (VOC) monitoring with a photoionization detector (PID) or flame ionization detector (FID) or equivalent can be performed during excavation activities; however, these instruments may not be sensitive enough to detect airborne VOCs at concentrations at or below the RBALs. Air monitoring that is more sensitive but requires a longer duration can be performed at an excavation site prior to the initiation of field activities.

5.1.3 Training

Limited training is required at all sites where hazardous substances are present, even if it can be demonstrated that no exposure to concentrations above action levels will occur. In general, the limited training must include information regarding the health effects of exposure to the substance(s) to which employees potentially may be exposed, and information regarding actions to minimize exposure. The training should include communication of the content of both the site-specific Health and Safety Plan and this Groundwater Contingency Response Plan.

5.2 PERSONAL PROTECTIVE EQUIPMENT (PPE)

Personal protective equipment (PPE) will be required for certain field operations, based on the potential for contaminant exposures. It is anticipated that United States Environmental Protection Agency (EPA) Level D protection as recommended by the site Health and Safety Plan will be appropriate for most site activities which do not involve contact with daylighted groundwater. The results of the RMA indicated that exposure to groundwater containing concentrations of COC above the RBALs is not permissible. Under Scenario 1 conditions, the concentrations of potential COC present in the daylighted groundwater, if contacted, are not known. Under Scenario 2 conditions, the concentrations of potential COC present in contacted daylighted groundwater are known to exceed the RBALs. Unusual site conditions such as odor, present in Scenario 3 conditions, warrant additional investigation to determine the potential for negative impacts to health and safety. The following PPE is required to minimize worker exposure when daylighted groundwater is encountered in Scenario 2 conditions and until concentrations of COC below the RBALs can be established in Scenario 1 conditions. The PPE may also be required for those personnel involved with additional

investigation activities. If the concentrations of COC present are below the RBALs, Level D PPE will be appropriate. This list does not include PPE that may be required to minimize risk to workers from physical hazards.

1. Chemical-resistant clothing - Criteria used to select protective clothing must include consideration of heat stress in addition to liquid/dirt and chemical resistance. Selected clothing should be made of a breathable material in order to address heat stress issues.
2. Boots - Polyvinyl chloride (PVC) boots should afford adequate protection against incidental contact with daylighted groundwater exhibiting concentrations of COC above RBALs. These will be steel-toed boots as appropriate for the work tasks being performed.
3. Gloves - Chemical-resistant PVC gloves will be worn if daylighted groundwater is encountered.

If disposable chemical-resistant clothing is utilized, its disposal must be properly managed.

Respiratory protection may be required based upon the results of air monitoring performed in the work area. Additional personal protective equipment should be utilized based on an assessment of exposures.

5.3 MODIFICATION TO WORK SCHEDULES

When daylighted groundwater is initially encountered in a construction area, work should cease immediately. If the concentrations of COC in the daylighted groundwater are unknown, the personnel responsible for sampling and monitoring the daylighted groundwater should be notified immediately so that a water sample can be collected for monitoring and laboratory analysis. Work may proceed after the appropriate water sample has been collected, but before the concentrations of COC in the daylighted groundwater are known, only after the appropriate PPE identified in Section 5.2 has been donned and only if contact with the daylighted groundwater can be avoided.

Work in areas where unusual site conditions are reported will cease until the nature and cause of the conditions can be adequately investigated. Workers will be removed from the area as a precaution.

5.4 MONITORING AND SAMPLING

A sample of daylighted groundwater encountered during construction in any previously unsampled area should be collected and analyzed for the list of COC. The list consists of the VOCs and metals which were present at concentrations above RBALs in groundwater samples collected from locations adjacent to the site. PAHs and MTBE are included in the preliminary list of monitored potential COC for daylighted groundwater until sufficient information

regarding concentrations can be collected to establish or disregard MTBE or any PAH constituents as a COC. Additionally, daylighted groundwater should be monitored for physical parameters including turbidity, total suspended solids (TSS), total dissolved solids (TDS), pH, and specific conductance. Monitoring of these parameters will assist evaluating of changes in general conditions of the water chemistry at the Site. Sampling and analysis at previously unsampled locations will be conducted in accordance with the site water quality sampling and analysis plan or monitoring plan.

Sampling and monitoring of daylighted groundwater in areas where COC concentrations are known to exceed the RBALs will be addressed in the site monitoring plan. Sampling locations and frequency, field parameters, and laboratory analysis will be specified by the site monitoring plan.

Sampling and monitoring of daylighted groundwater in areas which fall into the Groundwater Contingency Response Scenario 3 category may or may not be included in the site monitoring plan. The investigation of the unusual site conditions may require additional monitoring and sampling of the daylighted groundwater or sediment in the area. This sampling will be conducted in accordance with the site monitoring plan for the COC and for other constituents, as appropriate, to determine the nature and cause of the unusual conditions.

5.5 SUMMARY OF RESPONSE

Table 3 presents a summary of the anticipated response for each of the contingency response scenarios described above. The applicability of required actions for each contingency response scenario are indicated in the appropriate column.

5.6 OVEREXPOSURE

Any employee at this site who develops signs or symptoms indicating possible overexposure involving contaminated daylighted groundwater or sediment will be required to seek medical attention within 24 hours, and to notify his or her supervisor. The incident will be reported as soon as possible in writing. The worker's employer shall ensure that the employee is appropriately tested for the listed COC, to determine if overexposure is the cause of the employee's reported symptoms. A physician's written opinion will be required prior to the employee's return to normal site activities.

5.7 EMERGENCY RESPONSE NOTIFICATION REQUIREMENTS

Although every attempt will be made to prevent exposure to COC which may be present in daylighted groundwater at the site, an emergency situation may arise. If an emergency situation does occur, site personnel should refer to the Emergency Response Contingency Plan of the site Health and Safety Plan

**SITE GROUNDWATER
MONITORING PLAN**

SITE GROUNDWATER MONITORING PLAN

The City of Phoenix in conjunction with the Army Corps of Engineers (USACE) along with the Flood Control District of Maricopa County is constructing a restoration project in the Salt River extending from the 24th street bridge to 19th avenue. Based on available groundwater data in the project area, degraded groundwater may exist beneath the site. Work for the Rio Salado restoration project will be conducted in these areas of potential degraded groundwater. Consequently, the District along with the City of Phoenix has developed a groundwater sampling plan to assess the water quality at locations where groundwater is encountered during the project. This information will be provided to the Contractor and will be used to evaluate whether to implement the Groundwater Contingency Plan (Appendix __) during construction activities. The sampling plan for the project will include monitoring at existing monitor wells to establish baseline data for the low flow channel as well as groundwater sampling at the excavations and at dewatering sumps or wells installed by the Contractor.

This monitoring plan is presented as a guideline for personnel who perform the sampling as well as to inform the Contractor about the types of activities that will take place during construction, and the information that will be recorded and available for public review. A more detailed, site-specific sampling plan may be developed, particularly in response to the construction of dewatering points. If the Contractor elects to do additional sampling for their own purposes, it shall be in general accordance with this plan or with another plan subject to review by the Engineer.

A. Monitoring Well Purging

- Purging must be performed on all wells prior to sample collections. Depending on the stability of pH and conductivity readings, three or more borehole volumes of groundwater in casing and backfill (filter pack) shall be withdrawn prior to sample collection. The volume of water present in each well shall be computed using the length of the water column, monitoring well inside diameter, borehole diameter, length of filter pack and porosity estimate for the filter pack. Volume discharged may be estimated using any applicable method.
- Several general methods are used for well purging. Well purging may be achieved using bailers, bladder pumps and submersible pumps. The specific pumping method shall be chosen based on depth to groundwater, diameter of well, existing well configuration and contaminant (s) of concern. In all cases, pH, specific conductance, temperature, and purge volume values will be entered in the field manual. (See field information). Field parameters will be measured periodically during the discharge period. When the field parameters remain at plus or minus ten percent over successive readings the well is ready for sampling.
- Generally, the wells shall be sampled in order from the least contaminated to the most contaminated, if known. All sampling equipment shall be inspected for damage, and repaired if necessary, prior to arriving on-site

B. Monitoring Well Sampling

A sampling schedule will be developed that describes sampling locations and frequency. Initially, frequent sampling of existing wells will be scheduled. That data will be combined with the other monitoring well information available from monitoring at City of Phoenix and ACOE wells to make statistical inferences on the quality of groundwater beneath the site. Data will be used to

anticipate specific problem areas prior to construction activities in the channel and also to identify areas where groundwater degradation is not present. Subsequent sampling schedules will be dependent on analytical results. A description of groundwater sampling protocol for the monitoring wells and dewatering wells has been provided in Section C.

C. Well Sampling Protocol

- Open well and obtain water levels if accessible. Water levels shall be measured from a reference measuring point. A low flow sampling port or access for a portable submersible sampling pump must be provided at the dewatering wells.
- Use a clean, decontaminated stainless steel or Teflon bailer and a spool of polypropylene rope or equivalent bailer cord (Teflon-coated stainless steel cable) to sample well, unless a dedicated pump and low flow sampling port is available.
- Tie a bowline knot through the bailer loop and attach to well casing or wrist and lower into well.
- Record all measurements in the field manual (see field information).
- Measure pH and specific conductance
- Monitor field parameters (pH, specific conductance, and temperature) periodically during purging process. When purge volume is equal to 3 casing volumes, and or when field parameters are within plus or minus five percent (+ or – 5%) over successive readings the well is ready for sampling.
- Sampling procedures must be consistent with EPA protocol (“Handbook for Sampling and Sample Preservation of Water and Wastewater”, EPA-600/4-82-029, “Guidelines Establishing Test Procedures for the Analyses of Pollutants Under the Clean Water Act”, 40 CFR 136, and “Test Methods for Evaluating Solid Wastes,” EPA SW-846).
- Rinse sample containers, without preservatives, with sample water before final collection.
- For volatile analyses add preservative (or order pre-preserved from lab) to sample vial and fill vials at the rate of 100 milliliters per minute (24 seconds for 40 milliliter vial); form positive meniscus over vial brim and cap. After capping, invert vial, gently tap and look for air bubbles. If bubbles are present, uncap vial, add more water and repeat procedure.
- Label each sample container with project number, sample location, well owner, date, military time, samplers initials, preservative and analysis required.
- Record all information in field manual.

D. Sampling at Open Excavations

If it is necessary to sample at an open excavation, the following procedures should be followed:

- Identify an accessible point as close as possible to the point where water is entering the excavation, if distinguishable, and sample at that location. Access point should be free of any foreign debris (i.e., municipal waste) other than native soil material in the excavation which could introduce bias to the sampling and analytical results. Chemical resistant polyvinyl chloride surgical gloves and boots should be worn if it is necessary to contact the water at the sampling location. Prior to sampling, measure and record pH, temperature, and specific conductance.
- Place the sampling device, typically a bailer as described above, a minimum of several inches below the surface of the water. Avoid touching the bottom or otherwise creating turbid conditions in the water.
- Wait a brief period of time for the water conditions around the sampling device to return to equilibrium.
- Obtain the sample in accordance with EPA sampling procedures outlined in Section C.

E. Analytical Methods

- Water samples collected from wells and excavations should be immediately wrapped in plastic (glass bottles only) and placed in an ice chest packed with ice and cooled to 4 degrees celsius and submitted to the laboratory with a chain of custody. Samples will be preserved and analyzed for volatile, semi-volatile organic compounds RCRA metals and physical parameters using the laboratory methods as outlined in the Table of Analytical Methods.

Table 1. Analytical Methods

Analysis	Method	Container	Preservation	Maximum holding time
Volatile organic compounds	8260B	3 * 40-ml VOA (glass)	HCL	14 days
Semi-volatile compounds	8270C	2 * 1-liter (amber glass)	None	7 days/ 40 days
Total Dissolved Solids	160.1	1 * 1 Liter (plastic)		7 days
Turbidity	180.1	1* 1 Liter (plastic)		48 hours
Total Suspended Solids	160.2	1* 1 Liter (plastic)		7days
RCRA metals	6010B/ 7470	1 * Liter (plastic)	HNO3 to pH<2	7 days/ 40 days

Historic groundwater data has indicated that specific contaminants of concern (list from GW contingency plan) may be present in the groundwater beneath the site. A list of these contaminants is provided in Table 2.

Table 2. Contaminants of Concern

1,1 – dichloroethene	1,2 – dichloroethane
Benzene	Toluene
Tetrachoroethene	Trichloroethene
Mercury	Arsenic
Vinyl chloride	

E. Quality Control

Sample Documentation

- Field Form
- Chain of Custody Form
- EPA Sample tags
- Custody Seals
- SAS Packing lists
- Sample Identification Matrix Forms

QA/QC Samples

- **Travel blank**
Include a travel blank from the laboratory to insure against the introduction of contamination during the transport of the samples.
- **Field duplicates**
Field blanks will be collected to assess the accuracy of the laboratory analyses. One well will be chosen for the duplicate sample. Sample should be labeled different than that of the well samples to insure that there is no bias introduced during the analytical process.
- **Equipment blanks**
If a dedicated hand bailer is used to purge the wells, an equipment blank should be collected to insure against equipment contamination. The bailer will be rinsed with deionized or distilled water prior to collecting equipment control sample.

Field Information

Field information should be recorded in a bound field book. Information to be recorded includes the following:

- Date and time of starting work and weather conditions
- Names of field personnel performing work
- Project name
- Description of site conditions and unusual circumstances
- Location of sample site, including map reference, if relevant
- Equipment ID numbers
- Details of actual work effort, particularly any deviations from the field operations plan or standard operating procedure.
- Field observations (i.e., discoloration in sample, equipment activity in the vicinity of the well).
- Field measurements (including pH, EC, temperature and depth to groundwater below top of well casing) on whether or not the discharge water will require treatment.

APPENDIX “B”

HEALTH AND SAFETY PLAN

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

**Rio Salado – Phoenix Reach
Low Flow Channel Project – Phase 2
FCD 2000C014
PCN 124-01-31**

ERRATA TO APPENDIX “B”

Errata to Appendix “B” – Health and Safety Plan

Page 3

Under Certified Industrial Hygienist; Stop Work Orders will be issued only by the Engineer.

APPENDIX “C”
GROUNDWATER DEWATERING REPORT FORM

APPENDIX “D”

WASTE REMOVAL REPORT FORM

RIO SALADO PROJECT WASTE REMOVAL REPORT FORM

I. **Instructions:** The purpose of this report is to provide a detailed record of any waste materials that are encountered and removed from the project area. All descriptions must be thorough and reported within 14 days of the removal of any solid wastes. Attach additional pages if necessary.

II. Describe the location where the wastes were encountered.

III. Provide a detailed description of the type of waste material. Attach notes or photographs if available.

IV. Describe the procedures used to excavate, handle, store and dispose of the wastes, including the names of any subcontractors. Include the dimensions of the excavation, if any.

V. Describe the disposal method and location. Attach any related documentation such as waste manifests, weigh tickets, hauling receipts, etc. Provide a contact name and number at the disposal facility.

I (we) _____ hereby swear that all information
(print name and title)

provided above is true and correct to the best of my (our) knowledge and belief.

Signature _____ Date _____

Hargis & Associates, Inc. - Tempe
 1400 E. Southern Ave., Ste. 620
 Tempe, AZ 85282
 Attention: Terry Turner

Client Project ID: COP Rio Salado Project 0 II/731.03
 Report Number: PJJ0344

Sampled: 10/20/00
 Received: 10/20/00

METHOD BLANK/QC DATA

INORGANICS

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC %REC	Limits RPD	RPD Limit	Data Qualifiers
<u>Batch: P0J2429 Extracted: 10/24/00</u>									
Duplicate Analyzed: 10/25/00 (P0J2429-DUP1)									
Percent Solids	92.5	0.0100	%		93.1		0.647	20	

Beth Price
 Project Manager

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Report Number: PJJ0344

Sampled: 10/20/00
Received: 10/20/00

DETECTED BLANK/OC DATA

DATA QUALIFIERS AND DEFINITIONS

- M** The MS and/or MSD were outside of the acceptance limits due to sample matrix interference. See Blank Spike (LCS).
ND Analyte NOT DETECTED at or above the reporting limit
NR Not reported.
RPD Relative Percent Difference

Beth Price
Project Manager

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Sampled: 10/20/00

Report Number: PJJ0344

Received: 10/20/00

METHOD BLANK/QC DATA
EXTRACTABLE FUEL HYDROCARBONS (ADHS 8015AZR1)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: P0J2722 Extracted: 10/27/00										
Blank Analyzed: 10/31/00 (P0J2722-BLK1)										
DRO (C10-C22)	ND	30	mg/kg							
DRO (C22-C32)	ND	100	mg/kg							
Total (C10-C32)	ND	130	mg/kg							
Surrogate: n-Docosane	103		mg/kg	100		103	70-130			
ACS Analyzed: 10/31/00 (P0J2722-BS1)										
DRO (C10-C22)	236	30	mg/kg	250		94.4	70-130			
DRO (C22-C32)	229	100	mg/kg	250		91.6	70-130			
Surrogate: n-Docosane	103		mg/kg	100		103	70-130			
Matrix Spike Analyzed: 10/31/00 (P0J2722-MS1) Source: PJJ0344-02										
DRO (C10-C22)	234	30	mg/kg	250	ND	93.6	70-130			
DRO (C22-C32)	246	100	mg/kg	250	ND	98.4	70-130			
Surrogate: n-Docosane	103		mg/kg	100		103	70-130			
Matrix Spike Dup Analyzed: 10/31/00 (P0J2722-MSD1) Source: PJJ0344-02										
DRO (C10-C22)	235	30	mg/kg	250	ND	94.0	70-130	0.426	20	
DRO (C22-C32)	253	100	mg/kg	250	ND	101	70-130	2.81	20	
Surrogate: n-Docosane	103		mg/kg	100		103	70-130			

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 Received: 10/20/00

METHOD BLANK/QC DATA

VOLATILE FUEL HYDROCARBONS (ADHS 8015AZR1)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: P0J2707 Extracted: 10/20/00										
Blank Analyzed: 10/27/00 (P0J2707-BLK1)										
Volatile Fuel Hydrocarbons	ND	20	mg/kg							
Surrogate: 4-BFB (FID)	0.851		mg/kg	1.00		85.1	70-130			
LCS Analyzed: 10/27/00 (P0J2707-BS2)										
Volatile Fuel Hydrocarbons	39.2	20	mg/kg	50.0		78.4	70-130			
Surrogate: 4-BFB (FID)	1.05		mg/kg	1.00		105	70-130			
Duplicate Analyzed: 10/27/00 (P0J2707-DUP1)										
					Source: PJJ0344-02					
Volatile Fuel Hydrocarbons	ND	20	mg/kg		ND				20	
Surrogate: 4-BFB (FID)	0.775		mg/kg	0.913		84.9	70-130			
Matrix Spike Analyzed: 10/27/00 (P0J2707-MS2)										
					Source: PJJ0344-02					
Volatile Fuel Hydrocarbons	35.9	20	mg/kg	45.7	ND	78.6	70-130			
Surrogate: 4-BFB (FID)	0.991		mg/kg	0.913		109	70-130			

Beth Price
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 Received: 10/20/00

INORGANICS

Analyte	Method	Batch	Reporting Limit %	Sample Result %	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: PJJ0344-02 (#98(0-50) - Soil)								
Percent Solids	EPA 160.3	P0J2429	0.0100	95.0	1	10/24/00	10/25/00	
Sample ID: PJJ0344-03 (#102(0-30) - Soil)								
Percent Solids	EPA 160.3	P0J2429	0.0100	92.5	1	10/24/00	10/25/00	
Sample ID: PJJ0344-04 (GD-36(30-0) - Soil)								
Percent Solids	EPA 160.3	P0J2429	0.0100	92.0	1	10/24/00	10/25/00	
Sample ID: PJJ0344-05 (#103(0-30) - Soil)								
Percent Solids	EPA 160.3	P0J2429	0.0100	92.0	1	10/24/00	10/25/00	
Sample ID: PJJ0344-06 (#117(0-30) - Soil)								
Percent Solids	EPA 160.3	P0J2429	0.0100	93.1	1	10/24/00	10/25/00	

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Beth Price
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PJJ0344
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Sampled: 10/20/00
 Received: 10/20/00

METHOD BLANK/QC DATA

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (ADHS METHOD 418.1 AZ)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC %REC	%REC Limits	RPD RPD	RPD Limit	Data Qualifiers
Batch: P0J2525 Extracted: 10/25/00										
Blank Analyzed: 10/25/00 (P0J2525-BLK1)										
Total Recoverable Hydrocarbons	ND	20	mg/kg dry wt. wet							
LCS Analyzed: 10/25/00 (P0J2525-BS1)										
Total Recoverable Hydrocarbons	116	20	mg/kg dry wt. wet	100		116	110-150			
Duplicate Analyzed: 10/25/00 (P0J2525-DUP1)										
Total Recoverable Hydrocarbons	69.9	20	mg/kg dry wt. dry		76			8.36	30	
Matrix Spike Analyzed: 10/25/00 (P0J2525-MS1)										
Total Recoverable Hydrocarbons	237	20	mg/kg dry wt. dry	105	76	153	65-130			M

Beth Price
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 Report Number: PJJ0344

Sampled: 10/20/00
 Received: 10/20/00

EXTRACTABLE FUEL HYDROCARBONS (ADHS 8015AZR1)

Analyte	Method	Batch	Reporting Limit mg/kg	Sample Result mg/kg	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: PJJ0344-02 (#98(0-50) - Soil)								
DRO (C10-C22)	ADHS 8015AZR1	P0J2722	30	ND	1	10/27/00	10/31/00	
ORO (C22-C32)	ADHS 8015AZR1	P0J2722	100	ND	1	10/27/00	10/31/00	
Total (C10-C32)	ADHS 8015AZR1	P0J2722	130	ND	1	10/27/00	10/31/00	
<i>Surrogate: n-Docosane (70-130%)</i>				99.1 %				
Sample ID: PJJ0344-03 (#102(0-30) - Soil)								
DRO (C10-C22)	ADHS 8015AZR1	P0J2722	30	ND	1	10/27/00	10/31/00	
ORO (C22-C32)	ADHS 8015AZR1	P0J2722	100	ND	1	10/27/00	10/31/00	
Total (C10-C32)	ADHS 8015AZR1	P0J2722	130	ND	1	10/27/00	10/31/00	
<i>Surrogate: n-Docosane (70-130%)</i>				99.9 %				
Sample ID: PJJ0344-04 (GD-36(30-0) - Soil)								
DRO (C10-C22)	ADHS 8015AZR1	P0J2722	30	ND	1	10/27/00	10/31/00	
ORO (C22-C32)	ADHS 8015AZR1	P0J2722	100	ND	1	10/27/00	10/31/00	
Total (C10-C32)	ADHS 8015AZR1	P0J2722	130	ND	1	10/27/00	10/31/00	
<i>Surrogate: n-Docosane (70-130%)</i>				100 %				
Sample ID: PJJ0344-05 (#103(0-30) - Soil)								
DRO (C10-C22)	ADHS 8015AZR1	P0J2722	30	ND	1	10/27/00	10/31/00	
ORO (C22-C32)	ADHS 8015AZR1	P0J2722	100	ND	1	10/27/00	10/31/00	
Total (C10-C32)	ADHS 8015AZR1	P0J2722	130	ND	1	10/27/00	10/31/00	
<i>Surrogate: n-Docosane (70-130%)</i>				98.5 %				
Sample ID: PJJ0344-06 (#117(0-30) - Soil)								
DRO (C10-C22)	ADHS 8015AZR1	P0J2722	30	ND	1	10/27/00	10/31/00	
ORO (C22-C32)	ADHS 8015AZR1	P0J2722	100	ND	1	10/27/00	10/31/00	
Total (C10-C32)	ADHS 8015AZR1	P0J2722	130	ND	1	10/27/00	10/31/00	
<i>Surrogate: n-Docosane (70-130%)</i>				102 %				

DEL MAR ANALYTICAL, PHOENIX (AZ0426)

Beth Price
 Project Manager

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 Tempe, AZ 85282
 Attention: Terry Turner

Client Project ID: COP Rio Salado Project 0 II/731.03

Sampled: 10/20/00
 Received: 10/20/00

Report Number: PJJ0344

VOLATILE FUEL HYDROCARBONS (ADHS 8015AZR1)

Analyte	Method	Batch	Reporting Limit mg/kg	Sample Result mg/kg	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: PJJ0344-01 (TB-102000 - Soil)								
Volatile Fuel Hydrocarbons	ADHS 8015AZR1	P0J2707	20	ND	1	10/20/00	10/27/00	
<i>Surrogate: 4-BFB (FID) (70-130%)</i>				85.1 %				
Sample ID: PJJ0344-02 (#98(0-50) - Soil)								
Volatile Fuel Hydrocarbons	ADHS 8015AZR1	P0J2707	20	ND	1	10/20/00	10/27/00	
<i>Surrogate: 4-BFB (FID) (70-130%)</i>				78.4 %				
The reporting limit for this sample was adjusted by a factor of 0.913 to account for the applicable preparation factor.								
Sample ID: PJJ0344-03 (#102(0-30) - Soil)								
Volatile Fuel Hydrocarbons	ADHS 8015AZR1	P0J2707	20	ND	1	10/20/00	10/27/00	
<i>Surrogate: 4-BFB (FID) (70-130%)</i>				95.5 %				
The reporting limit for this sample was adjusted by a factor of 0.939 to account for the applicable preparation factor.								
Sample ID: PJJ0344-04 (GD-36(30-0) - Soil)								
Volatile Fuel Hydrocarbons	ADHS 8015AZR1	P0J2707	20	ND	1	10/20/00	10/27/00	
<i>Surrogate: 4-BFB (FID) (70-130%)</i>				85.8 %				
The reporting limit for this sample was adjusted by a factor of 0.943 to account for the applicable preparation factor.								
Sample ID: PJJ0344-05 (#103(0-30) - Soil)								
Volatile Fuel Hydrocarbons	ADHS 8015AZR1	P0J2707	20	ND	1	10/20/00	10/27/00	
<i>Surrogate: 4-BFB (FID) (70-130%)</i>				86.7 %				
The reporting limit for this sample was adjusted by a factor of 0.966 to account for the applicable preparation factor.								
Sample ID: PJJ0344-06 (#117(0-30) - Soil)								
Volatile Fuel Hydrocarbons	ADHS 8015AZR1	P0J2707	20	ND	1	10/20/00	10/27/00	
<i>Surrogate: 4-BFB (FID) (70-130%)</i>				84.3 %				
The reporting limit for this sample was adjusted by a factor of 0.995 to account for the applicable preparation factor.								

DEL MAR ANALYTICAL, PHOENIX (AZ0426

Beth Price
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 1400 E. Southern Ave., Ste. 620
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 Attention: Terry Turner

Client Project ID: COP Rio Salado Project 0 II/731.03
 Report Number: PJJ0344

Sampled: 10/20/00
 Received: 10/20/00
 Issued: 11/01/00

CASE NARRATIVE

LABORATORY NUMBER	SAMPLE DESCRIPTION	SAMPLE MATRIX
PJJ0344-01	TB-102000	Soil
PJJ0344-02	#98(0-50)	Soil (95.02% dry wt.)
PJJ0344-03	#102(0-30)	Soil (92.50% dry wt.)
PJJ0344-04	GD-36(30-0)	Soil (91.99% dry wt.)
PJJ0344-05	#103(0-30)	Soil (92.04% dry wt.)
PJJ0344-06	#117(0-30)	Soil (93.09% dry wt.)

SAMPLE RECEIPT: Samples were received intact, on ice, and with chain of custody documentation. Soil samples requiring volatile analysis were received in Methanol Kit(s).

HOLDING TIMES: Holding times were met.

PRESERVATION: Samples requiring preservation were verified prior to sample analysis.

QA/QC CRITERIA: All analyses met method criteria.

OBSERVATIONS: No significant observations were made.

SUBCONTRACTED: No analyses were subcontracted to an outside laboratory.

DEL MAR ANALYTICAL, PHOENIX (AZ0426)


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PJJ0344
 1 of 10

Hargis & Associates, Inc. - Tempe
 1400 E. Southern Ave., Ste. 620
 Tempe, AZ 85282
 Attention: Terry Turner

Client Project ID: COP Rio Salado Project 0 II/731.03
 Report Number: PJJ0344

Sampled: 10/20/00
 Received: 10/20/00

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (ADHS METHOD 418.1 AZ)

Analyte	Method	Batch	Reporting Limit mg/kg	Sample Result mg/kg	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: PJJ0344-02 (#98(0-50) - Soil)								
Total Recoverable Hydrocarbons	ADHS 418.1 AZ	P0J2525	20	76	1	10/25/00	10/25/00	
Sample ID: PJJ0344-03 (#102(0-30) - Soil)								
Total Recoverable Hydrocarbons	ADHS 418.1 AZ	P0J2525	20	ND	1	10/25/00	10/25/00	
Sample ID: PJJ0344-04 (GD-36(30-0) - Soil)								
Total Recoverable Hydrocarbons	ADHS 418.1 AZ	P0J2525	20	ND	1	10/25/00	10/25/00	
Sample ID: PJJ0344-05 (#103(0-30) - Soil)								
Total Recoverable Hydrocarbons	ADHS 418.1 AZ	P0J2525	20	ND	1	10/25/00	10/25/00	
Sample ID: PJJ0344-06 (#117(0-30) - Soil)								
Total Recoverable Hydrocarbons	ADHS 418.1 AZ	P0J2525	20	ND	1	10/25/00	10/25/00	

DEL MAR ANALYTICAL, PHOENIX (AZ0426)

Beth Price
 Project Manager

PJJ0344
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Hargis & Associates, Inc. - Tempe 1400 E. Southern Ave., Ste. 620 Tempe, AZ 85282 Attention: Terry Turner	Client Project ID: COP Rio Salado Project 0 II/731.03 Report Number: PJJ0325	Sampled: 10/19/00 Received: 10/19/00
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METHOD BLANK QC DATA

DATA QUALIFIERS AND DEFINITIONS

- ND** Analyte NOT DETECTED at or above the reporting limit
- NR** Not reported.
- RPD** Relative Percent Difference

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST FORM

PROJECT NAME COP Rio Salado Project #1		PROJECT No./TASK No. 731.03		SAMPLE CONTAINERS		ANALYSES REQUESTED		ESTIMATED CONCENTRATION RANGE (PPM) FOR VOAS		SPECIAL HANDLING		LABORATORY INFORMATION		
PROJECT MANAGER T.M. Turner		Phone No. 480-345-0588		60ml Amber Glass 8.0g Soil Jar		8015 GRD 8015 PRO GRD TPH-118.1 SPU PPL METALS TCLP Characterization				Hold SLPJCLP For later Analysis		DMA		
QA MANAGER T.M. Turner		FAX No. 480-730-0508										Normal TAT		
SAMPLER (SIGNATURE) [Signature]		SAMPLER (PRINTED) Stacia Berryman										REMARKS		
LAB ID	SAMPLE ID	SAMPLE COLLECTION		MATRIX			PRESERVATION							
		Date	Time	Soil	Ground water	Surface water	Lab Prep	HCl	HNO3	NaOH	H2SO4			Ice	MeOH
PJ0325	TT3-101900	10/19/00	0707				X							
	02 #11(0-30)		0826	X										
	03 #11(0-30)			X										
	03 GD-33(0-30)		11044	X										
	04 #17(0-30)		1155	X										
	05 #96(0-30)		1409	X										
	06 GD-34(0-30)		1516	X										
	07 GD-35(0-30)		1629	X										
				X										

Total number of Containers per analysis: 7 30 Total No. of Containers: 37

Relinquished by [Signature]	Date 10/19/00	Received by [Signature]	Date 10/19/00	INSTRUCTIONS 1. Fill out form completely except for shaded areas (lab use only); sign only after verified for completeness. 2. Complete in ballpoint pen. Draw one line through errors, initial and date correction. 3. Indicate number of sample containers in analysis request space; indicate choice with , or x. 4. Note applicable preservatives, special instructions, and deviations from typical environmental samples. 5. Consult project QA documents for specific instructions.	Shipment Method: <u>Hand Delivered</u> Send Results to: <u>T.M. Turner</u> <input type="checkbox"/> 2365 NORTHSIDE DRIVE, SUITE C-100 SAN DIEGO, CA 92108 (619) 521-0165 <input checked="" type="checkbox"/> 1400 EAST SOUTHERN AVENUE, SUITE 620 TEMPE, AZ 85282 (480) 345-0888 <input type="checkbox"/> 1820 EAST RIVER ROAD, SUITE 100 TUCSON, AZ 85718 (520) 881-7300
Company HFA	Time 1731	Company LLO	Time 1731		
Relinquished by [Signature]	Date 10/19/00	Received by [Signature]	Date 10/19/00	Sample Receipt: <u>Temp 50C</u> <input checked="" type="checkbox"/> No. of containers correct <input checked="" type="checkbox"/> Received good condition/cold <input checked="" type="checkbox"/> custody seals secure <input checked="" type="checkbox"/> conforms to COC document	Send invoice to San Diego, CA Attn: Accounts Payable
Company LLO	Time 1731	Laboratory D-mgr	Time 1731		

Hargis & Associates, Inc. - Tempe
 1400 E. Southern Ave., Ste. 620
 Tempe, AZ 85282
 Attention: Terry Turner

Client Project ID: COP Rio Salado Project 0 II/731.03
 Report Number: PJJ0325

Sampled: 10/19/00
 Received: 10/19/00

METHOD BLANK/QC DATA

VOLATILE FUEL HYDROCARBONS (ADHS 8015AZR1)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: P0J2503 Extracted: 10/19/00										
Blank Analyzed: 10/25/00 (P0J2503-BLK1)										
olatile Fuel Hydrocarbons	ND	20	mg/kg				70-130			
urrogate: 4-BFB (FID)	0.811		mg/kg	1.00		81.1	70-130			
LCS Analyzed: 10/25/00 (P0J2503-BS2)										
olatile Fuel Hydrocarbons	35.5	20	mg/kg	47.6		74.6	70-130			
urrogate: 4-BFB (FID)	0.976		mg/kg	0.952		103	70-130			
Duplicate Analyzed: 10/25/00 (P0J2503-DUP1)										
					Source: PJJ0325-02					
olatile Fuel Hydrocarbons	ND	20	mg/kg		ND				20	
urrogate: 4-BFB (FID)	0.763		mg/kg	0.952		80.1	70-130			
Matrix Spike Analyzed: 10/25/00 (P0J2503-MS2)										
					Source: PJJ0325-02					
olatile Fuel Hydrocarbons	37.0	20	mg/kg	47.6	ND	77.7	70-130			
urrogate: 4-BFB (FID)	0.982		mg/kg	0.952		103	70-130			



2852 Alton Ave., Irvine, CA 92606 (949) 261-1022 FAX (949) 261-1228
 1014 E. Cooley Dr., Suite A, Colton, CA 92324 (909) 370-4667 FAX (909) 370-1046
 16525 Sherman Way, Suite C-11, Van Nuys, CA 92406 (818) 779-1844 FAX (818) 779-1843
 9484 Chesapeake Dr., Suite 805, San Diego, CA 92123 (619) 505-9596 FAX (619) 505-9689
 9830 South 51st St., Suite B-120, Phoenix, AZ 85044 (480) 785-0043 FAX (480) 785-0851

Hargis & Associates, Inc. - Tempe
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 Tempe, AZ 85282
 Attention: Terry Turner

Client Project ID: COP Rio Salado Project 0 II/731.03
 Report Number: PJJ0325

Sampled: 10/19/00
 Received: 10/19/00

METHOD BLANK QC DATA

INORGANICS

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: P0J2016 Extracted: 10/20/00										
Duplicate Analyzed: 10/20/00 (P0J2016-DUP1)										
Percent Solids	94.2	0.0100	%		93.7			0.532	20	

Source: PJJ0325-02

Beth Price
 Project Manager

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Hargis & Associates, Inc. - Tempe
 1400 E. Southern Ave., Ste. 620
 Tempe, AZ 85282
 Attention: Terry Turner

Client Project ID: COP Rio Salado Project 0 II/731.03
 Report Number: PJJ0325

Sampled: 10/19/00
 Received: 10/19/00

METHOD BLANK/LIC DATA

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (ADHS METHOD 418.1 AZ)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: P0J2420 Extracted: 10/24/00										
Blank Analyzed: 10/24/00 (P0J2420-BLK1)										
Total Recoverable Hydrocarbons	ND	20	mg/kg dry wt. wet							
ICS Analyzed: 10/24/00 (P0J2420-BS1)										
Total Recoverable Hydrocarbons	110	20	mg/kg dry wt. wet	100		110	110-150			
Duplicate Analyzed: 10/24/00 (P0J2420-DUP1)										
Total Recoverable Hydrocarbons	ND	20	mg/kg dry wt. dry		Source: PJJ0325-02 ND			2.47	30	
Matrix Spike Analyzed: 10/24/00 (P0J2420-MS1)										
Total Recoverable Hydrocarbons	98.7	20	mg/kg dry wt. dry	107	Source: PJJ0325-02 ND	81.0	65-130			

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 Attention: Terry Turner

Client Project ID: COP Rio Salado Project 0 II/731.03
 Report Number: PJJ0325

Sampled: 10/19/00
 Received: 10/19/00

METHOD BLANK/QC DATA

EXTRACTABLE FUEL HYDROCARBONS (ADHS 8015AZR1)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC %REC	%REC Limits	RPD RPD	RPD Limit	Data Qualifiers
Batch: P0J2515 Extracted: 10/25/00										
Blank Analyzed: 10/26/00 (P0J2515-BLK1)										
DRO (C10-C22)	ND	30	mg/kg							
ORO (C22-C32)	ND	100	mg/kg							
Total (C10-C32)	ND	130	mg/kg							
Surrogate: <i>n</i> -Docosane	110		mg/kg	100		110	70-130			
LCS Analyzed: 10/26/00 (P0J2515-BS1)										
DRO (C10-C22)	264	30	mg/kg	250	ND	106	70-130			
ORO (C22-C32)	263	100	mg/kg	250	ND	105	70-130			
Surrogate: <i>n</i> -Docosane	110		mg/kg	100		110	70-130			
Matrix Spike Analyzed: 10/26/00 (P0J2515-MS1) Source: PJJ0328-01										
DRO (C10-C22)	280	30	mg/kg	250	ND	112	70-130			
ORO (C22-C32)	275	100	mg/kg	250	ND	110	70-130			
Surrogate: <i>n</i> -Docosane	114		mg/kg	100		114	70-130			
Matrix Spike Dup Analyzed: 10/26/00 (P0J2515-MSD1) Source: PJJ0328-01										
DRO (C10-C22)	255	30	mg/kg	250	ND	102	70-130	9.35	20	
ORO (C22-C32)	253	100	mg/kg	250	ND	101	70-130	8.33	20	
Surrogate: <i>n</i> -Docosane	107		mg/kg	100		107	70-130			

Beth Price
 Project Manager

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Hargis & Associates, Inc. - Tempe
 1400 E. Southern Ave., Ste. 620
 Tempe, AZ 85282
 Attention: Terry Turner

Client Project ID: COP Rio Salado Project 0 II/731.03
 Report Number: PJJ0325

Sampled: 10/19/00
 Received: 10/19/00

VOLATILE FUEL HYDROCARBONS (ADHS 8015AZR1)

Analyte	Method	Batch	Reporting Limit mg/kg	Sample Result mg/kg	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: PJJ0325-01 (TB-101900 - Soil)								
Volatile Fuel Hydrocarbons	ADHS 8015AZR1	P0J2503	20	ND	1	10/19/00	10/25/00	
<i>Surrogate: 4-BFB (FID) (70-130%)</i>				83.4 %				
Sample ID: PJJ0325-02 (#81(0-30) - Soil)								
Volatile Fuel Hydrocarbons	ADHS 8015AZR1	P0J2503	20	ND	1	10/19/00	10/25/00	
<i>Surrogate: 4-BFB (FID) (70-130%)</i>				86.4 %				
The reporting limit for this sample was adjusted by a factor of 0.952 to account for the applicable preparation factor.								
Sample ID: PJJ0325-03 (GD-33(0-30) - Soil)								
Volatile Fuel Hydrocarbons	ADHS 8015AZR1	P0J2503	20	ND	1	10/19/00	10/25/00	
<i>Surrogate: 4-BFB (FID) (70-130%)</i>				84.1 %				
The reporting limit for this sample was adjusted by a factor of 0.948 to account for the applicable preparation factor.								
Sample ID: PJJ0325-04 (#97(0-30) - Soil)								
Volatile Fuel Hydrocarbons	ADHS 8015AZR1	P0J2503	20	ND	1	10/19/00	10/25/00	
<i>Surrogate: 4-BFB (FID) (70-130%)</i>				83.3 %				
The reporting limit for this sample was adjusted by a factor of 0.948 to account for the applicable preparation factor.								
Sample ID: PJJ0325-05 (#96(0-30) - Soil)								
Volatile Fuel Hydrocarbons	ADHS 8015AZR1	P0J2503	17	ND	1	10/19/00	10/25/00	
<i>Surrogate: 4-BFB (FID) (70-130%)</i>				81.6 %				
The reporting limit for this sample was adjusted by a factor of 0.83 to account for the applicable preparation factor.								
Sample ID: PJJ0325-06 (GD-34(0-30) - Soil)								
Volatile Fuel Hydrocarbons	ADHS 8015AZR1	P0J2503	20	ND	1	10/19/00	10/25/00	
<i>Surrogate: 4-BFB (FID) (70-130%)</i>				82.5 %				
The reporting limit for this sample was adjusted by a factor of 0.948 to account for the applicable preparation factor.								
Sample ID: PJJ0325-07 (GD-35(0-30) - Soil)								
Volatile Fuel Hydrocarbons	ADHS 8015AZR1	P0J2503	20	ND	1	10/19/00	10/25/00	
<i>Surrogate: 4-BFB (FID) (70-130%)</i>				81.7 %				
The reporting limit for this sample was adjusted by a factor of 0.939 to account for the applicable preparation factor.								

DEL MAR ANALYTICAL, PHOENIX (AZ0426)

Beth Price
Project Manager

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Hargis & Associates, Inc. - Tempe 1400 E. Southern Ave., Ste. 620 Tempe, AZ 85282 Attention: Terry Turner	Client Project ID: COP Rio Salado Project 0 II/731.03	Sampled: 10/19/00
	Report Number: PJJ0325	Received: 10/19/00

INORGANICS

Analyte	Method	Batch	Reporting Limit %	Sample Result %	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: PJJ0325-02 (#81(0-30) - Soil)								
Percent Solids	EPA 160.3	P0J2016	0.0100	93.7	1	10/20/00	10/20/00	
Sample ID: PJJ0325-03 (GD-33(0-30) - Soil)								
Percent Solids	EPA 160.3	P0J2016	0.0100	93.8	1	10/20/00	10/20/00	
Sample ID: PJJ0325-04 (#97(0-30) - Soil)								
Percent Solids	EPA 160.3	P0J2016	0.0100	97.7	1	10/20/00	10/20/00	
Sample ID: PJJ0325-05 (#96(0-30) - Soil)								
Percent Solids	EPA 160.3	P0J2016	0.0100	93.0	1	10/20/00	10/20/00	
Sample ID: PJJ0325-06 (GD-34(0-30) - Soil)								
Percent Solids	EPA 160.3	P0J2016	0.0100	89.4	1	10/20/00	10/20/00	
Sample ID: PJJ0325-07 (GD-35(0-30) - Soil)								
Percent Solids	EPA 160.3	P0J2016	0.0100	93.5	1	10/20/00	10/20/00	

Beth Price
Project Manager

DEL MAR ANALYTICAL, PHOENIX (AZ0426

PJJ0325

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Hargis & Associates, Inc. - Tempe
 1400 E. Southern Ave., Ste. 620
 Tempe, AZ 85282
 Attention: Terry Turner

Client Project ID: COP Rio Salado Project 0 II/731.03

Report Number: PJJ0325

Sampled: 10/19/00
 Received: 10/19/00

EXTRACTABLE FUEL HYDROCARBONS (ADHS 8015AZR1)

Analyte	Method	Batch	Reporting Limit mg/kg	Sample Result mg/kg	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: PJJ0325-02 (#81(0-30) - Soil)								
DRO (C10-C22)	ADHS 8015AZR1	P0J2515	30	ND	1	10/25/00	10/26/00	
ORO (C22-C32)	ADHS 8015AZR1	P0J2515	100	ND	1	10/25/00	10/26/00	
Total (C10-C32)	ADHS 8015AZR1	P0J2515	130	ND	1	10/25/00	10/26/00	
<i>Surrogate: n-Docosane (70-130%)</i>				105 %				
Sample ID: PJJ0325-03 (GD-33(0-30) - Soil)								
DRO (C10-C22)	ADHS 8015AZR1	P0J2515	30	ND	1	10/25/00	10/27/00	
ORO (C22-C32)	ADHS 8015AZR1	P0J2515	100	ND	1	10/25/00	10/27/00	
Total (C10-C32)	ADHS 8015AZR1	P0J2515	130	ND	1	10/25/00	10/27/00	
<i>Surrogate: n-Docosane (70-130%)</i>				110 %				
Sample ID: PJJ0325-04 (#97(0-30) - Soil)								
DRO (C10-C22)	ADHS 8015AZR1	P0J2515	30	ND	1	10/25/00	10/27/00	
ORO (C22-C32)	ADHS 8015AZR1	P0J2515	100	ND	1	10/25/00	10/27/00	
Total (C10-C32)	ADHS 8015AZR1	P0J2515	130	ND	1	10/25/00	10/27/00	
<i>Surrogate: n-Docosane (70-130%)</i>				111 %				
Sample ID: PJJ0325-05 (#96(0-30) - Soil)								
DRO (C10-C22)	ADHS 8015AZR1	P0J2515	30	ND	1	10/25/00	10/27/00	
ORO (C22-C32)	ADHS 8015AZR1	P0J2515	100	ND	1	10/25/00	10/27/00	
Total (C10-C32)	ADHS 8015AZR1	P0J2515	130	ND	1	10/25/00	10/27/00	
<i>Surrogate: n-Docosane (70-130%)</i>				107 %				
Sample ID: PJJ0325-06 (GD-34(0-30) - Soil)								
DRO (C10-C22)	ADHS 8015AZR1	P0J2515	30	ND	1	10/25/00	10/27/00	
ORO (C22-C32)	ADHS 8015AZR1	P0J2515	100	ND	1	10/25/00	10/27/00	
Total (C10-C32)	ADHS 8015AZR1	P0J2515	130	ND	1	10/25/00	10/27/00	
<i>Surrogate: n-Docosane (70-130%)</i>				102 %				



Hargis & Associates, Inc. - Tempe 1400 E. Southern Ave., Ste. 620 Tempe, AZ 85282 Attention: Terry Turner	Client Project ID: COP Rio Salado Project 0 II/731.03 Report Number: PJJ0325	Sampled: 10/19/00 Received: 10/19/00
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EXTRACTABLE FUEL HYDROCARBONS (ADHS 8015AZR1)

Analyte	Method	Batch	Reporting Limit mg/kg	Sample Result mg/kg	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: PJJ0325-07 (GD-35(0-30) - Soil)								
DRO (C10-C22)	ADHS 8015AZR1	P0J2515	30	ND	1	10/25/00	10/27/00	
ORO (C22-C32)	ADHS 8015AZR1	P0J2515	100	ND	1	10/25/00	10/27/00	
Total (C10-C32)	ADHS 8015AZR1	P0J2515	130	ND	1	10/25/00	10/27/00	
<i>Surrogate: n-Docosane (70-130%)</i>				<i>101 %</i>				

Beth Price
Project Manager

DEL MAR ANALYTICAL, PHOENIX (AZ0426)

PJJ0325

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Hargis & Associates, Inc. - Tempe 1400 E. Southern Ave., Ste. 620 Tempe, AZ 85282 Attention: Terry Turner	Client Project ID: COP Rio Salado Project 0 II/731.03 Report Number: PJJ0325	Sampled: 10/19/00 Received: 10/19/00 Issued: 10/30/00
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CASE NARRATIVE

LABORATORY NUMBER	SAMPLE DESCRIPTION	SAMPLE MATRIX
PJJ0325-01	TB-101900	Soil
PJJ0325-02	#81(0-30)	Soil (93.70% dry wt.)
PJJ0325-03	GD-33(0-30)	Soil (93.80% dry wt.)
PJJ0325-04	#97(0-30)	Soil (97.70% dry wt.)
PJJ0325-05	#96(0-30)	Soil (93.00% dry wt.)
PJJ0325-06	GD-34(0-30)	Soil (89.40% dry wt.)
PJJ0325-07	GD-35(0-30)	Soil (93.50% dry wt.)

SAMPLE RECEIPT: Samples were received intact, on ice, and with chain of custody documentation. Soil samples requiring volatile analysis were received in Methanol Kit(s).

HOLDING TIMES: Holding times were met.

PRESERVATION: Samples requiring preservation were verified prior to sample analysis.

QA/QC CRITERIA: All analyses met method criteria.

OBSERVATIONS: No significant observations were made.

SUBCONTRACTED: No analyses were subcontracted to an outside laboratory.

DEL MAR ANALYTICAL, PHOENIX (AZ0426)


 Beth Price
 Project Manager

PJJ0325
 1 of 11

Hargis & Associates, Inc. - Tempe
 1400 E. Southern Ave., Ste. 620
 Tempe, AZ 85282
 Attention: Terry Turner

Client Project ID: COP Rio Salado Project 0 II/731.03
 Report Number: PJJ0325

Sampled: 10/19/00
 Received: 10/19/00

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (ADHS METHOD 418.1 AZ)

Analyte	Method	Batch	Reporting Limit mg/kg	Sample Result mg/kg	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: PJJ0325-02 (#81(0-30) - Soil)								
Total Recoverable Hydrocarbons	ADHS 418.1 AZ	POJ2420	20	ND	1	10/24/00	10/24/00	
Sample ID: PJJ0325-03 (GD-33(0-30) - Soil)								
Total Recoverable Hydrocarbons	ADHS 418.1 AZ	POJ2420	20	ND	1	10/24/00	10/24/00	
Sample ID: PJJ0325-04 (#97(0-30) - Soil)								
Total Recoverable Hydrocarbons	ADHS 418.1 AZ	POJ2420	20	21	1	10/24/00	10/24/00	
Sample ID: PJJ0325-05 (#96(0-30) - Soil)								
Total Recoverable Hydrocarbons	ADHS 418.1 AZ	POJ2420	20	ND	1	10/24/00	10/24/00	
Sample ID: PJJ0325-06 (GD-34(0-30) - Soil)								
Total Recoverable Hydrocarbons	ADHS 418.1 AZ	POJ2420	20	ND	1	10/24/00	10/24/00	
Sample ID: PJJ0325-07 (GD-35(0-30) - Soil)								
Total Recoverable Hydrocarbons	ADHS 418.1 AZ	POJ2420	20	ND	1	10/24/00	10/24/00	

Beth Price
 Project Manager

DEL MAR ANALYTICAL, PHOENIX (AZ0426)

PJJ0325
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Hargis & Associates, Inc. - Tempe
 1400 E. Southern Ave., Ste. 620
 Tempe, AZ 85282
 Attention: Terry Turner

Client Project ID: City Of Phoenix Rio Salado II 731.03

Report Number: PJJ0294

Sampled: 10/18/00

Received: 10/18/00

METHOD BLANK/QC DATA

DATA QUALIFIERS AND DEFINITIONS

- M** The MS and/or MSD were outside of the acceptance limits due to sample matrix interference. See Blank Spike (LCS).
- ND** Analyte NOT DETECTED at or above the reporting limit
- NR** Not reported.
- RPD** Relative Percent Difference



Hargis & Associates, Inc. - Tempe
 1400 E. Southern Ave., Ste. 620
 Tempe, AZ 85282
 Attention: Terry Turner

Client Project ID: City Of Phoenix Rio Salado II 731.03
 Report Number: PJJ0294

Sampled: 10/18/00
 Received: 10/18/00

METHOD BLANK/OC DATA

VOLATILE FUEL HYDROCARBONS (ADHS 8015AZR1)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC %REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: P0J2409 Extracted: 10/18/00										
Blank Analyzed: 10/24/00 (P0J2409-BLK1)										
Volatiles Fuel Hydrocarbons	ND	20	mg/kg							
Surrogate: 4-BFB (FID)	0.826		mg/kg	1.00		82.6	70-130			
LCS Analyzed: 10/24/00 (P0J2409-BS2)										
Volatiles Fuel Hydrocarbons	39.6	20	mg/kg	50.0		79.2	70-130			
Surrogate: 4-BFB (FID)	1.05		mg/kg	1.00		108	70-130			
Duplicate Analyzed: 10/24/00 (P0J2409-DUP1)										
Volatiles Fuel Hydrocarbons	ND	20	mg/kg		Source: PJJ0294-02	ND			20	
Surrogate: 4-BFB (FID)	0.779		mg/kg	0.917		85.0	70-130			
Matrix Spike Analyzed: 10/24/00 (P0J2409-MS2)										
Volatiles Fuel Hydrocarbons	36.0	20	mg/kg	45.9	Source: PJJ0294-02	ND	78.4	70-130		
Surrogate: 4-BFB (FID)	0.993		mg/kg	0.917		108	70-130			

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 Attention: Terry Turner

Client Project ID: City Of Phoenix Rio Salado II 731.03
 Report Number: PJJ0294

Sampled: 10/18/00
 Received: 10/18/00

METHOD BLANK (QC DATA)

INORGANICS

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: P0J1919 Extracted: 10/19/00										
Duplicate Analyzed: 10/20/00 (P0J1919-DUP1)										
Percent Solids	95.9	0.0100	%		96.1			0.208	20	

Source: PJJ0294-07

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 Project Manager

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 Report Number: PJJ0294

Sampled: 10/18/00
 Received: 10/18/00

METHOD BLANK/QC DATA

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (ADHS METHOD 418.1 AZ)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
<u>Batch: P0J2428 Extracted: 10/24/00</u>										
Blank Analyzed: 10/24/00 (P0J2428-BLK1)										
Total Recoverable Hydrocarbons	ND	20	mg/kg dry wt. wet							
CS Analyzed: 10/24/00 (P0J2428-BS1)										
Total Recoverable Hydrocarbons	127	20	mg/kg dry wt. wet	100		127	110-150			
Duplicate Analyzed: 10/24/00 (P0J2428-DUP1)										
Total Recoverable Hydrocarbons	ND	20	mg/kg dry wt. dry		Source: PJJ0294-02 ND			23.5	30	
Matrix Spike Analyzed: 10/24/00 (P0J2428-MS1)										
Total Recoverable Hydrocarbons	113	20	mg/kg dry wt. dry	105	Source: PJJ0294-02 ND	96.2	65-130			

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 Report Number: PJJ0294

Sampled: 10/18/00
 Received: 10/18/00

METHOD BLANK/00 DATA

EXTRACTABLE FUEL HYDROCARBONS (ADHS 8015AZR1)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC %REC	%REC Limits	RPD RPD	RPD Limit	Data Qualifiers
Batch: P0J1904 Extracted: 10/19/00										
Blank Analyzed: 10/19/00 (P0J1904-BLK1)										
DRO (C10-C22)	ND	30	mg/kg							
ORO (C22-C32)	ND	100	mg/kg							
Total (C10-C32)	ND	130	mg/kg							
Surrogate: <i>n</i> -Docosane	75.5		mg/kg	100		75.5	70-130			
LCS Analyzed: 10/19/00 (P0J1904-BS1)										
DRO (C10-C22)	233	30	mg/kg	250		93.2	70-130			
ORO (C22-C32)	190	100	mg/kg	250		76.0	70-130			
Surrogate: <i>n</i> -Docosane	85.9		mg/kg	100		85.9	70-130			
Matrix Spike Analyzed: 10/19/00 (P0J1904-MS1)										
					Source: PJJ0294-07					
DRO (C10-C22)	223	30	mg/kg	250	ND	89.2	70-130			
ORO (C22-C32)	141	100	mg/kg	250	ND	56.4	70-130			M
Surrogate: <i>n</i> -Docosane	86.7		mg/kg	100		86.7	70-130			
Matrix Spike Dup Analyzed: 10/19/00 (P0J1904-MSD1)										
					Source: PJJ0294-07					
DRO (C10-C22)	231	30	mg/kg	250	ND	92.4	70-130	3.52	20	
ORO (C22-C32)	167	100	mg/kg	250	ND	66.8	70-130	16.9	20	M
Surrogate: <i>n</i> -Docosane	87.3		mg/kg	100		87.3	70-130			

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Report Number: PJJ0294

Sampled: 10/18/00
 Received: 10/18/00

VOLATILE FUEL HYDROCARBONS (ADHS 8015AZR1)

Analyte	Method	Batch	Reporting Limit mg/kg	Sample Result mg/kg	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: PJJ0294-01 (TB-101800 - Soil)								
Volatile Fuel Hydrocarbons	ADHS 8015AZR1	P0J2409	20	ND	1	10/18/00	10/24/00	
<i>Surrogate: 4-BFB (FID) (70-130%)</i>				86.4 %				
Sample ID: PJJ0294-02 (GD-23(0-30) - Soil)								
Volatile Fuel Hydrocarbons	ADHS 8015AZR1	P0J2409	20	ND	1	10/18/00	10/24/00	
<i>Surrogate: 4-BFB (FID) (70-130%)</i>				85.5 %				
The reporting limit for this sample was adjusted by a factor of 0.917 to account for the applicable preparation factor.								
Sample ID: PJJ0294-03 (GD-25(0-30) - Soil)								
Volatile Fuel Hydrocarbons	ADHS 8015AZR1	P0J2409	20	ND	1	10/18/00	10/24/00	
<i>Surrogate: 4-BFB (FID) (70-130%)</i>				87.2 %				
The reporting limit for this sample was adjusted by a factor of 0.951 to account for the applicable preparation factor.								
Sample ID: PJJ0294-04 (#71(0-30) - Soil)								
Volatile Fuel Hydrocarbons	ADHS 8015AZR1	P0J2409	20	ND	1	10/18/00	10/24/00	
<i>Surrogate: 4-BFB (FID) (70-130%)</i>				88.2 %				
The reporting limit for this sample was adjusted by a factor of 0.943 to account for the applicable preparation factor.								
Sample ID: PJJ0294-05 (#74(0-30) - Soil)								
Volatile Fuel Hydrocarbons	ADHS 8015AZR1	P0J2409	20	ND	1	10/18/00	10/24/00	
<i>Surrogate: 4-BFB (FID) (70-130%)</i>				86.0 %				
The reporting limit for this sample was adjusted by a factor of 0.93 to account for the applicable preparation factor.								
Sample ID: PJJ0294-06 (#76(0-30) - Soil)								
Volatile Fuel Hydrocarbons	ADHS 8015AZR1	P0J2409	20	ND	1	10/18/00	10/24/00	
<i>Surrogate: 4-BFB (FID) (70-130%)</i>				85.1 %				
The reporting limit for this sample was adjusted by a factor of 0.922 to account for the applicable preparation factor.								
Sample ID: PJJ0294-07 (#79(0-30) - Soil)								
Volatile Fuel Hydrocarbons	ADHS 8015AZR1	P0J2409	20	ND	1	10/18/00	10/24/00	
<i>Surrogate: 4-BFB (FID) (70-130%)</i>				85.4 %				
The reporting limit for this sample was adjusted by a factor of 0.93 to account for the applicable preparation factor.								

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Beth Price
 Project Manager

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 Attention: Terry Turner

Client Project ID: City Of Phoenix Rio Salado II 731.03

Sampled: 10/18/00

Report Number: PJJ0294

Received: 10/18/00

INORGANICS

Analyte	Method	Batch	Reporting Limit %	Sample Result %	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: PJJ0294-02 (GD-23(0-30) - Soil)								
Percent Solids	EPA 160.3	P0J1919	0.0100	94.9	1	10/19/00	10/20/00	
Sample ID: PJJ0294-03 (GD-25(0-30) - Soil)								
Percent Solids	EPA 160.3	P0J1919	0.0100	94.1	1	10/19/00	10/20/00	
Sample ID: PJJ0294-04 (#71(0-30) - Soil)								
Percent Solids	EPA 160.3	P0J1919	0.0100	94.8	1	10/19/00	10/20/00	
Sample ID: PJJ0294-05 (#74(0-30) - Soil)								
Percent Solids	EPA 160.3	P0J1919	0.0100	95.4	1	10/19/00	10/20/00	
Sample ID: PJJ0294-06 (#76(0-30) - Soil)								
Percent Solids	EPA 160.3	P0J1919	0.0100	93.1	1	10/19/00	10/20/00	
Sample ID: PJJ0294-07 (#79(0-30) - Soil)								
Percent Solids	EPA 160.3	P0J1919	0.0100	96.1	1	10/19/00	10/20/00	

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 Project Manager

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Hargis & Associates, Inc. - Tempe Client Project ID: City Of Phoenix Rio Salado II 731.03 Sampled: 10/18/00
 1400 E. Southern Ave., Ste. 620 Report Number: PJJ0294 Received: 10/18/00
 Tempe, AZ 85282
 Attention: Terry Turner

EXTRACTABLE FUEL HYDROCARBONS (ADHS 8015AZR1)

Analyte	Method	Batch	Reporting Limit mg/kg	Sample Result mg/kg	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: PJJ0294-02 (GD-23(0-30) - Soil)								
DRO (C10-C22)	ADHS 8015AZR1	POJ1904	30	ND	1	10/19/00	10/19/00	
ORO (C22-C32)	ADHS 8015AZR1	POJ1904	100	ND	1	10/19/00	10/19/00	
Total (C10-C32)	ADHS 8015AZR1	POJ1904	130	ND	1	10/19/00	10/19/00	
<i>Surrogate: n-Docosane (70-130%)</i>				74.1 %				
Sample ID: PJJ0294-03 (GD-25(0-30) - Soil)								
DRO (C10-C22)	ADHS 8015AZR1	POJ1904	30	ND	1	10/19/00	10/19/00	
ORO (C22-C32)	ADHS 8015AZR1	POJ1904	100	ND	1	10/19/00	10/19/00	
Total (C10-C32)	ADHS 8015AZR1	POJ1904	130	ND	1	10/19/00	10/19/00	
<i>Surrogate: n-Docosane (70-130%)</i>				72.9 %				
Sample ID: PJJ0294-04 (#71(0-30) - Soil)								
DRO (C10-C22)	ADHS 8015AZR1	POJ1904	30	ND	1	10/19/00	10/19/00	
ORO (C22-C32)	ADHS 8015AZR1	POJ1904	100	ND	1	10/19/00	10/19/00	
Total (C10-C32)	ADHS 8015AZR1	POJ1904	130	ND	1	10/19/00	10/19/00	
<i>Surrogate: n-Docosane (70-130%)</i>				72.8 %				
Sample ID: PJJ0294-05 (#74(0-30) - Soil)								
DRO (C10-C22)	ADHS 8015AZR1	POJ1904	30	ND	1	10/19/00	10/19/00	
ORO (C22-C32)	ADHS 8015AZR1	POJ1904	100	ND	1	10/19/00	10/19/00	
Total (C10-C32)	ADHS 8015AZR1	POJ1904	130	ND	1	10/19/00	10/19/00	
<i>Surrogate: n-Docosane (70-130%)</i>				73.4 %				
Sample ID: PJJ0294-06 (#76(0-30) - Soil)								
DRO (C10-C22)	ADHS 8015AZR1	POJ1904	30	ND	1	10/19/00	10/19/00	
ORO (C22-C32)	ADHS 8015AZR1	POJ1904	100	ND	1	10/19/00	10/19/00	
Total (C10-C32)	ADHS 8015AZR1	POJ1904	130	ND	1	10/19/00	10/19/00	
<i>Surrogate: n-Docosane (70-130%)</i>				72.6 %				



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 16525 Sherman Way, Suite C-11, Van Nuys, CA 92406 (818) 779-1844 FAX (818) 779-1843
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 Attention: Terry Turner

Client Project ID: City Of Phoenix Rio Salado II 731.03
 Report Number: PJJ0294

Sampled: 10/18/00
 Received: 10/18/00

EXTRACTABLE FUEL HYDROCARBONS (ADHS 8015AZR1)

Analyte	Method	Batch	Reporting Limit mg/kg	Sample Result mg/kg	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: PJJ0294-07 (#79(0-30) - Soil)								
DRO (C10-C22)	ADHS 8015AZR1	P0J1904	30	ND	1	10/19/00	10/19/00	
ORO (C22-C32)	ADHS 8015AZR1	P0J1904	100	ND	1	10/19/00	10/19/00	
Total (C10-C32)	ADHS 8015AZR1	P0J1904	130	ND	1	10/19/00	10/19/00	
<i>Surrogate: n-Docosane (70-130%)</i>				72.3 %				

Beth Price
 Project Manager

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 Attention: Terry Turner

Client Project ID: City Of Phoenix Rio Salado II 731.03
 Report Number: PJJ0294

Sampled: 10/18/00
 Received: 10/18/00
 Issued: 10/31/00

CASE NARRATIVE

LABORATORY NUMBER	SAMPLE DESCRIPTION	SAMPLE MATRIX
PJJ0294-01	TB-101800	Soil
PJJ0294-02	GD-23(0-30)	Soil (94.90% dry wt.)
PJJ0294-03	GD-25(0-30)	Soil (94.10% dry wt.)
PJJ0294-04	#71(0-30)	Soil (94.80% dry wt.)
PJJ0294-05	#74(0-30)	Soil (95.40% dry wt.)
PJJ0294-06	#76(0-30)	Soil (93.10% dry wt.)
PJJ0294-07	#79(0-30)	Soil (96.10% dry wt.)

SAMPLE RECEIPT: Samples were received intact, on ice, and with chain of custody documentation. Soil samples requiring volatile analysis were received in Methanol Kit(s).

HOLDING TIMES: Holding times were met.

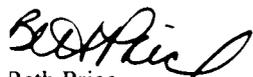
PRESERVATION: Samples requiring preservation were verified prior to sample analysis.

QA/QC CRITERIA: All analyses met method criteria.

OBSERVATIONS: No significant observations were made.

SUBCONTRACTED: No analyses were subcontracted to an outside laboratory.

DEL MAR ANALYTICAL, PHOENIX (AZ0426)


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Client Project ID: City Of Phoenix Rio Salado II 731.03
 Report Number: PJJ0294

Sampled: 10/18/00
 Received: 10/18/00

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (ADHS METHOD 418.1 AZ)

Analyte	Method	Batch	Reporting Limit mg/kg	Sample Result mg/kg	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: PJJ0294-02 (GD-23(0-30) - Soil)								
Total Recoverable Hydrocarbons	ADHS 418.1 AZ	P0J2428	20	ND	1	10/24/00	10/24/00	
Sample ID: PJJ0294-03 (GD-25(0-30) - Soil)								
Total Recoverable Hydrocarbons	ADHS 418.1 AZ	P0J2428	20	ND	1	10/24/00	10/24/00	
Sample ID: PJJ0294-04 (#71(0-30) - Soil)								
Total Recoverable Hydrocarbons	ADHS 418.1 AZ	P0J2428	20	ND	1	10/24/00	10/24/00	
Sample ID: PJJ0294-05 (#74(0-30) - Soil)								
Total Recoverable Hydrocarbons	ADHS 418.1 AZ	P0J2428	20	42	1	10/24/00	10/24/00	
Sample ID: PJJ0294-06 (#76(0-30) - Soil)								
Total Recoverable Hydrocarbons	ADHS 418.1 AZ	P0J2428	20	ND	1	10/24/00	10/24/00	
Sample ID: PJJ0294-07 (#79(0-30) - Soil)								
Total Recoverable Hydrocarbons	ADHS 418.1 AZ	P0J2428	20	ND	1	10/24/00	10/24/00	

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Attention: Terry Turner

Client Project ID: COP Rio Salado Phase II 731.03

Report Number: PJJ0261

Sampled: 10/17/00
Received: 10/17/00

METHOD BLANK/QC DATA

DATA QUALIFIERS AND DEFINITIONS

- ND** Analyte NOT DETECTED at or above the reporting limit
- NR** Not reported.
- RPD** Relative Percent Difference

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Client Project ID: COP Rio Salado Phase II 731.03

Report Number: PJJ0261

Sampled: 10/17/00
 Received: 10/17/00

METHOD BLANK/CIC DATA

VOLATILE FUEL HYDROCARBONS (ADHS 8015AZR1)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC %REC	Limits	RPD	RPD Limit	Data Qualifiers
Batch: P0J2309 Extracted: 10/17/00										
Blank Analyzed: 10/23/00 (P0J2309-BLK1)										
Volatile Fuel Hydrocarbons	ND	20	mg/kg							
surrogate: 4-BFB (FID)	0.891		mg/kg	1.00		89.1	70-130			
LCS Analyzed: 10/23/00 (P0J2309-BS2)										
Volatile Fuel Hydrocarbons	38.6	20	mg/kg	50.0		77.2	70-130			
surrogate: 4-BFB (FID)	1.05		mg/kg	1.00		105	70-130			
Duplicate Analyzed: 10/23/00 (P0J2309-DUP1)										
Volatile Fuel Hydrocarbons	ND	20	mg/kg		Source: PJJ0261-02 ND				20	
surrogate: 4-BFB (FID)	0.816		mg/kg	0.935		87.3	70-130			
Matrix Spike Analyzed: 10/23/00 (P0J2309-MS2)										
Volatile Fuel Hydrocarbons	36.5	20	mg/kg	46.7	Source: PJJ0261-02 ND	78.2	70-130			
surrogate: 4-BFB (FID)	0.988		mg/kg	0.935		106	70-130			

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METHOD BLANK/QC DATA

INORGANICS

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: P0J1817 Extracted: 10/18/00										
Duplicate Analyzed: 10/20/00 (P0J1817-DUP1)										
Percent Solids	96.6	0.0100	%		96.7			0.103	20	

Source: PJJ0261-07

Beth Price
Project Manager

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Client Project ID: COP Rio Salado Phase II 731.03

Report Number: PJJ0261

Sampled: 10/17/00
 Received: 10/17/00

METHOD BLANK/OQ DATA

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (ADHS METHOD 418.1 AZ)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: P0J2310 Extracted: 10/23/00										
Blank Analyzed: 10/23/00 (P0J2310-BLK1)										
Total Recoverable Hydrocarbons	ND	20	mg/kg dry wt. wet							
CS Analyzed: 10/23/00 (P0J2310-BS1)										
Total Recoverable Hydrocarbons	127	20	mg/kg dry wt. wet	100		127	110-150			
Duplicate Analyzed: 10/23/00 (P0J2310-DUP1)										
Total Recoverable Hydrocarbons	20.9	20	mg/kg dry wt. dry		24			13.8	30	
Matrix Spike Analyzed: 10/23/00 (P0J2310-MS1)										
Total Recoverable Hydrocarbons	134	20	mg/kg dry wt. dry	103	24	107	65-130			

Beth Price
 Project Manager

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Client Project ID: COP Rio Salado Phase II 731.03

Report Number: PJJ0261

Sampled: 10/17/00
 Received: 10/17/00

METHOD BLANK QC DATA

EXTRACTABLE FUEL HYDROCARBONS (ADHS 8015AZR1)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC %REC	%REC Limits	RPD RPD	RPD Limit	Data Qualifiers
Batch: P0J1805 Extracted: 10/18/00										
Blank Analyzed: 10/18/00 (P0J1805-BLK1)										
DRO (C10-C22)	ND	30	mg/kg							
ORO (C22-C32)	ND	100	mg/kg							
Total (C10-C32)	ND	130	mg/kg							
Surrogate: n-Docosane	85.9		mg/kg	100		85.9	70-130			
LCS Analyzed: 10/18/00 (P0J1805-BS1)										
DRO (C10-C22)	228	30	mg/kg	250		91.2	70-130			
ORO (C22-C32)	195	100	mg/kg	250		78.0	70-130			
Surrogate: n-Docosane	93.3		mg/kg	100		93.3	70-130			
Matrix Spike Analyzed: 10/18/00 (P0J1805-MS1) Source: PJJ0236-04										
DRO (C10-C22)	229	30	mg/kg	250	ND	91.6	70-130			
ORO (C22-C32)	185	100	mg/kg	250	ND	74.0	70-130			
Surrogate: n-Docosane	91.7		mg/kg	100		91.7	70-130			
Matrix Spike Dup Analyzed: 10/18/00 (P0J1805-MSD1) Source: PJJ0236-04										
DRO (C10-C22)	229	30	mg/kg	250	ND	91.6	70-130	0	20	
ORO (C22-C32)	182	100	mg/kg	250	ND	72.8	70-130	1.63	20	
Surrogate: n-Docosane	90.8		mg/kg	100		90.8	70-130			

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VOLATILE FUEL HYDROCARBONS (ADHS 8015AZR1)

Analyte	Method	Batch	Reporting Limit mg/kg	Sample Result mg/kg	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: PJJ0261-01 (TB-101700 - Soil)								
Volatile Fuel Hydrocarbons	ADHS 8015AZR1	P0J2309	20	ND	1	10/17/00	10/23/00	
<i>Surrogate: 4-BFB (FID) (70-130%)</i>				87.3 %				
Sample ID: PJJ0261-02 (GD-27(0-30) - Soil)								
Volatile Fuel Hydrocarbons	ADHS 8015AZR1	P0J2309	20	ND	1	10/17/00	10/23/00	
<i>Surrogate: 4-BFB (FID) (70-130%)</i>				86.4 %				
The reporting limit for this sample was adjusted by a factor of 0.935 to account for the applicable preparation factor.								
Sample ID: PJJ0261-03 (#51(0-30) - Soil)								
Volatile Fuel Hydrocarbons	ADHS 8015AZR1	P0J2309	20	ND	1	10/17/00	10/23/00	
<i>Surrogate: 4-BFB (FID) (70-130%)</i>				86.9 %				
The reporting limit for this sample was adjusted by a factor of 0.913 to account for the applicable preparation factor.								
Sample ID: PJJ0261-04 (GD28(0-30) - Soil)								
Volatile Fuel Hydrocarbons	ADHS 8015AZR1	P0J2309	20	ND	1	10/17/00	10/23/00	
<i>Surrogate: 4-BFB (FID) (70-130%)</i>				71.6 %				
The reporting limit for this sample was adjusted by a factor of 0.948 to account for the applicable preparation factor.								
Sample ID: PJJ0261-05 (GD26(0-30) - Soil)								
Volatile Fuel Hydrocarbons	ADHS 8015AZR1	P0J2309	20	ND	1	10/17/00	10/23/00	
<i>Surrogate: 4-BFB (FID) (70-130%)</i>				86.7 %				
The reporting limit for this sample was adjusted by a factor of 0.926 to account for the applicable preparation factor.								
Sample ID: PJJ0261-06 (GD24(0-30) - Soil)								
Volatile Fuel Hydrocarbons	ADHS 8015AZR1	P0J2309	20	ND	1	10/17/00	10/24/00	
<i>Surrogate: 4-BFB (FID) (70-130%)</i>				73.9 %				
The reporting limit for this sample was adjusted by a factor of 0.948 to account for the applicable preparation factor.								
Sample ID: PJJ0261-07 (#72(0-30) - Soil)								
Volatile Fuel Hydrocarbons	ADHS 8015AZR1	P0J2309	20	ND	1	10/17/00	10/23/00	
<i>Surrogate: 4-BFB (FID) (70-130%)</i>				84.0 %				
The reporting limit for this sample was adjusted by a factor of 0.926 to account for the applicable preparation factor.								

DEL MAR ANALYTICAL, PHOENIX (AZ0426)

Beth Price
Project Manager

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 9830 South 51st St., Suite B-120, Phoenix, AZ 85044 (480) 785-0043 FAX (480) 785-0851

Hargis & Associates, Inc. - Tempe
 1400 E. Southern Ave., Ste. 620
 Tempe, AZ 85282
 Attention: Terry Turner

Client Project ID: COP Rio Salado Phase II 731.03

Sampled: 10/17/00
 Received: 10/17/00

Report Number: PJJ0261

INORGANICS

Analyte	Method	Batch	Reporting Limit %	Sample Result %	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: PJJ0261-02 (GD-27(0-30) - Soil)								
Percent Solids	EPA 160.3	POJ1817	0.0100	93.1	1	10/18/00	10/20/00	
Sample ID: PJJ0261-03 (#51(0-30) - Soil)								
Percent Solids	EPA 160.3	POJ1817	0.0100	94.0	1	10/18/00	10/20/00	
Sample ID: PJJ0261-04 (GD28(0-30) - Soil)								
Percent Solids	EPA 160.3	POJ1817	0.0100	98.0	1	10/18/00	10/20/00	
Sample ID: PJJ0261-05 (GD26(0-30) - Soil)								
Percent Solids	EPA 160.3	POJ1817	0.0100	96.0	1	10/18/00	10/20/00	
Sample ID: PJJ0261-06 (GD24(0-30) - Soil)								
Percent Solids	EPA 160.3	POJ1817	0.0100	96.3	1	10/18/00	10/20/00	
Sample ID: PJJ0261-07 (#72(0-30) - Soil)								
Percent Solids	EPA 160.3	POJ1817	0.0100	96.7	1	10/18/00	10/20/00	

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 1400 E. Southern Ave., Ste. 620
 Tempe, AZ 85282
 Attention: Terry Turner

Client Project ID: COP Rio Salado Phase II 731.03

Report Number: PJJ0261

Sampled: 10/17/00

Received: 10/17/00

EXTRACTABLE FUEL HYDROCARBONS (ADHS 8015AZR1)

Analyte	Method	Batch	Reporting Limit mg/kg	Sample Result mg/kg	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: PJJ0261-02 (GD-27(0-30) - Soil)								
DRO (C10-C22)	ADHS 8015AZR1	POJ1805	30	ND	1	10/18/00	10/18/00	
ORO (C22-C32)	ADHS 8015AZR1	POJ1805	100	ND	1	10/18/00	10/18/00	
Total (C10-C32)	ADHS 8015AZR1	POJ1805	130	ND	1	10/18/00	10/18/00	
Surrogate: <i>n</i> -Docosane (70-130%)				77.1 %				
Sample ID: PJJ0261-03 (#51(0-30) - Soil)								
DRO (C10-C22)	ADHS 8015AZR1	POJ1805	30	ND	1	10/18/00	10/18/00	
ORO (C22-C32)	ADHS 8015AZR1	POJ1805	100	ND	1	10/18/00	10/18/00	
Total (C10-C32)	ADHS 8015AZR1	POJ1805	130	ND	1	10/18/00	10/18/00	
Surrogate: <i>n</i> -Docosane (70-130%)				76.7 %				
Sample ID: PJJ0261-04 (GD28(0-30) - Soil)								
DRO (C10-C22)	ADHS 8015AZR1	POJ1805	30	ND	1	10/18/00	10/18/00	
ORO (C22-C32)	ADHS 8015AZR1	POJ1805	100	ND	1	10/18/00	10/18/00	
Total (C10-C32)	ADHS 8015AZR1	POJ1805	130	ND	1	10/18/00	10/18/00	
Surrogate: <i>n</i> -Docosane (70-130%)				76.0 %				
Sample ID: PJJ0261-05 (GD26(0-30) - Soil)								
DRO (C10-C22)	ADHS 8015AZR1	POJ1805	30	ND	1	10/18/00	10/18/00	
ORO (C22-C32)	ADHS 8015AZR1	POJ1805	100	ND	1	10/18/00	10/18/00	
Total (C10-C32)	ADHS 8015AZR1	POJ1805	130	ND	1	10/18/00	10/18/00	
Surrogate: <i>n</i> -Docosane (70-130%)				76.1 %				
Sample ID: PJJ0261-06 (GD24(0-30) - Soil)								
DRO (C10-C22)	ADHS 8015AZR1	POJ1805	30	ND	1	10/18/00	10/18/00	
ORO (C22-C32)	ADHS 8015AZR1	POJ1805	100	ND	1	10/18/00	10/18/00	
Total (C10-C32)	ADHS 8015AZR1	POJ1805	130	ND	1	10/18/00	10/18/00	
Surrogate: <i>n</i> -Docosane (70-130%)				85.1 %				



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Hargis & Associates, Inc. - Tempe Client Project ID: COP Rio Salado Phase II 731.03
 1400 E. Southern Ave., Ste. 620 Tempe, AZ 85282 Report Number: PJJ0261
 Attention: Terry Turner Sampled: 10/17/00
 Received: 10/17/00

EXTRACTABLE FUEL HYDROCARBONS (ADHS 8015AZR1)

Analyte	Method	Batch	Reporting Limit mg/kg	Sample Result mg/kg	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: PJJ0261-07 (#72(0-30) - Soil)								
DRO (C10-C22)	ADHS 8015AZR1	P0J1805	30	ND	1	10/18/00	10/18/00	
ORO (C22-C32)	ADHS 8015AZR1	P0J1805	100	ND	1	10/18/00	10/18/00	
Total (C10-C32)	ADHS 8015AZR1	P0J1805	130	ND	1	10/18/00	10/18/00	
<i>Surrogate: n-Docosane (70-130%)</i>				76.7 %				

Beth Price
 Project Manager

DEL MAR ANALYTICAL, PHOENIX (AZ0426)

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Hargis & Associates, Inc. - Tempe
 1400 E. Southern Ave., Ste. 620
 Tempe, AZ 85282
 Attention: Terry Turner

Client Project ID: COP Rio Salado Phase II 731.03
 Report Number: PJJ0261

Sampled: 10/17/00
 Received: 10/17/00
 Issued: 10/27/00

CASE NARRATIVE

LABORATORY NUMBER	SAMPLE DESCRIPTION	SAMPLE MATRIX
PJJ0261-01	TB-101700	Soil
PJJ0261-02	GD-27(0-30)	Soil (93.10% dry wt.)
PJJ0261-03	#51(0-30)	Soil (94.00% dry wt.)
PJJ0261-04	GD28(0-30)	Soil (98.00% dry wt.)
PJJ0261-05	GD26(0-30)	Soil (96.00% dry wt.)
PJJ0261-06	GD24(0-30)	Soil (96.30% dry wt.)
PJJ0261-07	#72(0-30)	Soil (96.70% dry wt.)

SAMPLE RECEIPT: Samples were received intact, on ice, and with chain of custody documentation. Soil samples requiring volatile analysis were received in Methanol Kit(s).

HOLDING TIMES: Holding times were met.

PRESERVATION: Samples requiring preservation were verified prior to sample analysis.

QA/QC CRITERIA: All analyses met method criteria.

OBSERVATIONS: No significant observations were made.

SUBCONTRACTED: No analyses were subcontracted to an outside laboratory.

DEL MAR ANALYTICAL, PHOENIX (AZ0426)


 Beth Price
 Project Manager

PJJ0261
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Hargis & Associates, Inc. - Tempe
 1400 E. Southern Ave., Ste. 620
 Tempe, AZ 85282
 Attention: Terry Turner

Client Project ID: COP Rio Salado Phase II 731.03
 Report Number: PJJ0261

Sampled: 10/17/00
 Received: 10/17/00

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (ADHS METHOD 418.1 AZ)

Analyte	Method	Batch	Reporting Limit mg/kg	Sample Result mg/kg	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: PJJ0261-02 (GD-27(0-30) - Soil)								
Total Recoverable Hydrocarbons	ADHS 418.1 AZ	P0J2310	20	ND	1	10/23/00	10/23/00	
Sample ID: PJJ0261-03 (#51(0-30) - Soil)								
Total Recoverable Hydrocarbons	ADHS 418.1 AZ	P0J2310	20	25	1	10/23/00	10/23/00	
Sample ID: PJJ0261-04 (GD28(0-30) - Soil)								
Total Recoverable Hydrocarbons	ADHS 418.1 AZ	P0J2310	20	ND	1	10/23/00	10/23/00	
Sample ID: PJJ0261-05 (GD26(0-30) - Soil)								
Total Recoverable Hydrocarbons	ADHS 418.1 AZ	P0J2310	20	24	1	10/23/00	10/23/00	
Sample ID: PJJ0261-06 (GD24(0-30) - Soil)								
Total Recoverable Hydrocarbons	ADHS 418.1 AZ	P0J2310	20	96	1	10/23/00	10/23/00	
Sample ID: PJJ0261-07 (#72(0-30) - Soil)								
Total Recoverable Hydrocarbons	ADHS 418.1 AZ	P0J2310	20	24	1	10/23/00	10/23/00	

DEL MAR ANALYTICAL, PHOENIX (AZ0426)

Beth Price
 Project Manager

PJJ0261

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PROJECT NAME <u>COP Rio Salado Phase II</u>		PROJECT No./TASK No. <u>731.07</u>		SAMPLE CONTAINERS		ANALYSES REQUESTED		ESTIMATED CONCENTRATION RANGE (ppb) FOR VOAS		SPECIAL HANDLING		LABORATORY INFORMATION		
PROJECT MANAGER <u>T.M. Turner</u>		Phone No. <u>480 345-0508</u>		5015 DRG, JRO TPH - HPL X SLEP METAL T...						X Hold > 24 Hrs Low...		David FTX		
QA MANAGER <u>T.M. Turner</u>		FAX No. <u>730-0508</u>										N... TAF		
SAMPLER (SIGNATURE) <u>[Signature]</u>		SAMPLER (PRINTED) <u>Stacia Berryman</u> <u>MICHAEL F WIESE</u>										REMARKS		
LAB ID	SAMPLE ID	SAMPLE COLLECTION		MATRIX			PRESERVATION							
		Date	Time	Soil	Ground water	Surface water	HCl	HNO3	NaOH					H2SO4	Ice	Other
<u>P5576</u>	<u>#10 (0-30)</u>	<u>10/16/00</u>	<u>16:38</u>	<u>X</u>										
Total number of Containers per analysis: <u>5</u>													Total No. of Containers: <u>5</u>	

Relinquished by <u>[Signature]</u> HSA Company		Date <u>10/16/00</u> Time <u>17:40</u>	Received by <u>[Signature]</u> LLD Company		Date <u>10/16/00</u> Time <u>17:40</u>	INSTRUCTIONS 1. Fill out form completely except for shaded areas (lab use only); sign only after verified for completeness 2. Complete in ballpoint pen. Draw one line through errors, initial and date correction. 3. Indicate number of sample containers in analysis request space; indicate choice with , or x. 4. Note applicable preservatives, special instructions, and deviations from typical environmental samples. 5. Consult project QA documents for specific instructions.				Shipment Method: <u>Hand Delivered</u> Send Results to: <u>T.M. Turner</u> <input type="checkbox"/> 2365 NORTHSIDE DRIVE, SUITE C-100 SAN DIEGO, CA 92108 (619) 521-0165 <input checked="" type="checkbox"/> 1400 EAST SOUTHERN AVENUE, SUITE 620 TEMPE, AZ 85282 (480) 345-0888 <input type="checkbox"/> 1820 EAST RIVER ROAD, SUITE 100 TUCSON, AZ 85718 (520) 881-7300			
Relinquished by <u>[Signature]</u> Company		Date <u>10/16/00</u> Time <u>17:40</u>	Received by: <u>[Signature]</u> D-MGR Laboratory		Date <u>10/16/00</u> Time <u>17:40</u>	Sample Receipt: <u>Temp 4.0C</u> <input checked="" type="checkbox"/> No. of containers correct <input checked="" type="checkbox"/> received good condition/cold <input type="checkbox"/> custody seals secure <input checked="" type="checkbox"/> conforms to COC document				Send invoice to San Diego, CA Attn: Accounts Payable			

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST FORM

PROJECT NAME		PROJECT No./TASK No.		SAMPLE CONTAINERS		ANALYSES REQUESTED		ESTIMATED CONCENTRATION RANGE (ppb) FOR VOA'S		SPECIAL HANDLING		LABORATORY INFORMATION						
<u>COP Rio Grande Phase II</u>		<u>731 03</u>																
PROJECT MANAGER		Phone No. <u>490 345-0588</u>																
QA MANAGER		FAX No. <u>490 730-0528</u>																
SAMPLER (SIGNATURE)		SAMPLER (PRINTED)																
<i>[Signature]</i>		<u>Michael Ferguson</u>																
LAB ID	SAMPLE ID	SAMPLE COLLECTION		MATRIX		PRESER-VATION		Soil	Ground water	Surface water	HCl	HNO3	NaOH	H2SO4	Ice	H2O2	Other	Remarks
		Date	Time															
<u>P50286-01</u>	<u>TS-101600</u>	<u>10/16/00</u>	<u>0800</u>															
<u>-02</u>	<u>#9 (0-30)</u>		<u>0831</u>	X				X										
<u>-02</u>	<u>#10 (0-30)</u>		<u>↓</u>	X														
<u>-03</u>	<u>#6 (0-30)</u>		<u>1137</u>	X														
<u>-03</u>	<u>↓</u>		<u>↓</u>	X														
<u>-04</u>	<u>#1 (0-30)</u>		<u>1141</u>	Y														
<u>-04</u>	<u>↓</u>		<u>↓</u>	Y														
<u>-05</u>	<u>#5 (0-30)</u>		<u>1305</u>	X														
<u>-05</u>	<u>↓</u>		<u>↓</u>	X														
<u>-06</u>	<u>#3 (0-30)</u>		<u>1412</u>	X														
<u>-06</u>	<u>↓</u>		<u>↓</u>	X														
<u>-07</u>	<u>#2 (0-30)</u>		<u>1535</u>	X														
<u>-07</u>	<u>↓</u>		<u>↓</u>	X														
<u>-08</u>	<u>#10 (0-30)</u>		<u>1638</u>	X														

Total number of Containers per analysis: 830 Total No. of Containers: 380 + 43

Relinquished by <u>[Signature]</u>	Date <u>11/16/00</u>	Received by <u>[Signature]</u>	Date <u>11/16/00</u>	INSTRUCTIONS 1. Fill out form completely except for shaded areas (lab use only); sign only after verified for completeness. 2. Complete in ballpoint pen. Draw one line through errors, initial and date correction. 3. Indicate number of sample containers in analysis request space; indicate choice with \checkmark or \times . 4. Note applicable preservatives, special instructions, and deviations from typical environmental samples. 5. Consult project QA documents for specific instructions.	Shipment Method: <u>Hand Delivered</u> Send Results to: <u>T.M. Turner</u> <input type="checkbox"/> 2365 NORTHSIDE DRIVE, SUITE C-100 SAN DIEGO, CA 92108 (619) 521-0165 <input checked="" type="checkbox"/> 1400 EAST SOUTHERN AVENUE, SUITE 620 TEMPE, AZ 85282 (480) 345-0888 <input type="checkbox"/> 1820 EAST RIVER ROAD, SUITE 100 TUCSON, AZ 85718 (520) 881-7300
Company <u>[Signature]</u>	Time <u>1745</u>	Company <u>CLD</u>	Time <u>1745</u>		
Relinquished by <u>[Signature]</u>	Date <u>11/16/00</u>	Received by <u>[Signature]</u>	Date <u>11/16/00</u>	Sample Receipt: <u>Temp 40C</u> <input checked="" type="checkbox"/> No. of containers correct <input checked="" type="checkbox"/> received good condition/cold <input checked="" type="checkbox"/> custody seals secure <input type="checkbox"/> conforms to COC document	Send invoice to San Diego, CA Attn: Accounts Payable
Company <u>[Signature]</u>	Time <u>1745</u>	Laboratory <u>D-MAR</u>	Time <u>1745</u>		

Hargis & Associates, Inc. - Tempe
 1400 E. Southern Ave., Ste. 620
 Tempe, AZ 85282
 Attention: Terry Turner

Client Project ID: COP Rio Salado Phase II 731.03
 Report Number: PJJ0236

Sampled: 10/16/00
 Received: 10/16/00

METHOD BLANK/CIC DATA

INORGANICS

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC %REC	Limits RPD	RPD Limit	Data Qualifiers
Batch: P0J1817 Extracted: 10/18/00									
Duplicate Analyzed: 10/20/00 (P0J1817-DUP1)									
Percent Solids	96.6	0.0100	%		96.7		0.103	20	

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Tempe, AZ 85282
Attention: Terry Turner

Client Project ID: COP Rio Salado Phase II 731.03

Report Number: PJJ0236

Sampled: 10/16/00
Received: 10/16/00

METHOD BLANK/QC DATA

DATA QUALIFIERS AND DEFINITIONS

- M-HA** Due to high levels of analyte in the sample, the MS/MSD calculation does not provide useful spike recovery information
See LCS.
- ND** Analyte NOT DETECTED at or above the reporting limit
- NR** Not reported.
- RPD** Relative Percent Difference

Beth Price
Project Manager

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 1400 E. Southern Ave., Ste. 620
 Tempe, AZ 85282
 Attention: Terry Turner

Client Project ID: COP Rio Salado Phase II 731.03
 Report Number: PJJ0236

Sampled: 10/16/00
 Received: 10/16/00

METHOD BLANK/00 DATA
EXTRACTABLE FUEL HYDROCARBONS (ADHS 8015AZR1)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC %REC	Limits RPD	RPD Limit	Data Qualifiers
Batch: P0J1805 Extracted: 10/18/00									
Blank Analyzed: 10/18/00 (P0J1805-BLK1)									
DRO (C10-C22)	ND	30	mg/kg						
URO (C22-C32)	ND	100	mg/kg						
Total (C10-C32)	ND	130	mg/kg						
Surrogate: n-Docosane	85.9		mg/kg	100		85.9	70-130		
LCS Analyzed: 10/18/00 (P0J1805-BS1)									
DRO (C10-C22)	228	30	mg/kg	250		91.2	70-130		
URO (C22-C32)	195	100	mg/kg	250		78.0	70-130		
Surrogate: n-Docosane	93.3		mg/kg	100		93.3	70-130		
Matrix Spike Analyzed: 10/18/00 (P0J1805-MS1)									
					Source: PJJ0236-04				
DRO (C10-C22)	229	30	mg/kg	250	ND	91.6	70-130		
URO (C22-C32)	185	100	mg/kg	250	ND	74.0	70-130		
Surrogate: n-Docosane	91.7		mg/kg	100		91.7	70-130		
Matrix Spike Dup Analyzed: 10/18/00 (P0J1805-MSD1)									
					Source: PJJ0236-04				
DRO (C10-C22)	229	30	mg/kg	250	ND	91.6	70-130	0	20
URO (C22-C32)	182	100	mg/kg	250	ND	72.8	70-130	1.63	20
Surrogate: n-Docosane	90.8		mg/kg	100		90.8	70-130		

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 1400 E. Southern Ave., Ste. 620
 Tempe, AZ 85282
 Attention: Terry Turner

Client Project ID: COP Rio Salado Phase II 731.03
 Report Number: PJJ0236

Sampled: 10/16/00
 Received: 10/16/00

METHOD BLANK/QC DATA

VOLATILE FUEL HYDROCARBONS (ADHS 8015AZR1)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: P0J1905 Extracted: 10/16/00										
Blank Analyzed: 10/19/00 (P0J1905-BLK1)										
Volatile Fuel Hydrocarbons	ND	20	mg/kg							
Surrogate: 4-BFB (FID)	0.789		mg/kg	1.00		78.9	70-130			
LCS Analyzed: 10/19/00 (P0J1905-BS2)										
Volatile Fuel Hydrocarbons	38.6	20	mg/kg	50.0		77.2	70-130			
Surrogate: 4-BFB (FID)	1.02		mg/kg	1.00		102	70-130			
Duplicate Analyzed: 10/19/00 (P0J1905-DUP1)										
Volatile Fuel Hydrocarbons	ND	20	mg/kg		Source: PJJ0236-02 ND				20	
Surrogate: 4-BFB (FID)	0.728		mg/kg	0.917		79.4	70-130			
Matrix Spike Analyzed: 10/19/00 (P0J1905-MS2)										
Volatile Fuel Hydrocarbons	41.0	20	mg/kg	50.0	Source: PJJ0236-01 ND	82.0	70-130			
Surrogate: 4-BFB (FID)	1.07		mg/kg	1.00		107	70-130			

Beth Price
 Project Manager

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Hargis & Associates, Inc. - Tempe Client Project ID: COP Rio Salado Phase II 731.03
 1400 E. Southern Ave., Ste. 620 Tempe, AZ 85282 Report Number: PJJ0236
 Attention: Terry Turner Sampled: 10/16/00
 Received: 10/16/00

INORGANICS

Analyte	Method	Batch	Reporting Limit %	Sample Result %	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: PJJ0236-02 (#9(0-30) - Soil)								
Percent Solids	EPA 160.3	P0J1817	0.0100	96.2	1	10/18/00	10/20/00	
Sample ID: PJJ0236-03 (#6(0-30) - Soil)								
Percent Solids	EPA 160.3	P0J1817	0.0100	93.5	1	10/18/00	10/20/00	
Sample ID: PJJ0236-04 (#1(0-30) - Soil)								
Percent Solids	EPA 160.3	P0J1817	0.0100	94.8	1	10/18/00	10/20/00	
Sample ID: PJJ0236-05 (#5(0-30) - Soil)								
Percent Solids	EPA 160.3	P0J1817	0.0100	93.9	1	10/18/00	10/20/00	
Sample ID: PJJ0236-06 (#3(0-30) - Soil)								
Percent Solids	EPA 160.3	P0J1817	0.0100	93.9	1	10/18/00	10/20/00	
Sample ID: PJJ0236-07 (GD-22(0-30) - Soil)								
Percent Solids	EPA 160.3	P0J1817	0.0100	94.5	1	10/18/00	10/20/00	
Sample ID: PJJ0236-08 (#10(0-30) - Soil)								
Percent Solids	EPA 160.3	P0J1817	0.0100	89.0	1	10/18/00	10/20/00	

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Beth Price
 Project Manager

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Hargis & Associates, Inc. - Tempe
 1400 E. Southern Ave., Ste. 620
 Tempe, AZ 85282
 Attention: Terry Turner

Client Project ID: COP Rio Salado Phase II 731.03

Sampled: 10/16/00
 Received: 10/16/00

Report Number: PJJ0236

METHOD BLANK/OC DATA

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (ADHS METHOD 418.1 AZ)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC %REC	%REC Limits	RPD RPD	RPD Limit	Data Qualifiers
Batch: P0J2004 Extracted: 10/20/00										
Blank Analyzed: 10/20/00 (P0J2004-BLK1)										
Total Recoverable Hydrocarbons	ND	20	mg/kg dry wt. wet							
LCS Analyzed: 10/20/00 (P0J2004-BS1)										
Total Recoverable Hydrocarbons	127	20	mg/kg dry wt. wet	100		127	110-150			
Duplicate Analyzed: 10/20/00 (P0J2004-DUP1)										
Total Recoverable Hydrocarbons	10900	200	mg/kg dry wt. dry		11000			0.913	30	
Matrix Spike Analyzed: 10/20/00 (P0J2004-MS1)										
Total Recoverable Hydrocarbons	10100	200	mg/kg dry wt. dry	103	11000	-874	65-130			M-HA

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Client Project ID: COP Rio Salado Phase II 731.03

Sampled: 10/16/00
 Received: 10/16/00

Report Number: PJJ0236

VOLATILE FUEL HYDROCARBONS (ADHS 8015AZR1)

Analyte	Method	Batch	Reporting Limit mg/kg	Sample Result mg/kg	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: PJJ0236-01 (TB-101600 - Soil)								
Volatile Fuel Hydrocarbons	ADHS 8015AZR1	POJ1905	20	ND	1	10/16/00	10/19/00	
				75.1 %				
<i>Surrogate: 4-BFB (FID) (70-130%)</i>								
Sample ID: PJJ0236-02 (#9(0-30) - Soil)								
Volatile Fuel Hydrocarbons	ADHS 8015AZR1	POJ1905	20	ND	1	10/16/00	10/19/00	
				77.5 %				
<i>Surrogate: 4-BFB (FID) (70-130%)</i>								
The reporting limit for this sample was adjusted by a factor of 0.917 to account for the applicable preparation factor.								
Sample ID: PJJ0236-03 (#6(0-30) - Soil)								
Volatile Fuel Hydrocarbons	ADHS 8015AZR1	POJ1905	20	ND	1	10/16/00	10/19/00	
				84.7 %				
<i>Surrogate: 4-BFB (FID) (70-130%)</i>								
The reporting limit for this sample was adjusted by a factor of 0.922 to account for the applicable preparation factor.								
Sample ID: PJJ0236-04 (#1(0-30) - Soil)								
Volatile Fuel Hydrocarbons	ADHS 8015AZR1	POJ1905	20	ND	1	10/16/00	10/19/00	
				82.9 %				
<i>Surrogate: 4-BFB (FID) (70-130%)</i>								
The reporting limit for this sample was adjusted by a factor of 0.926 to account for the applicable preparation factor.								
Sample ID: PJJ0236-05 (#5(0-30) - Soil)								
Volatile Fuel Hydrocarbons	ADHS 8015AZR1	POJ1905	20	ND	1	10/16/00	10/19/00	
				83.8 %				
<i>Surrogate: 4-BFB (FID) (70-130%)</i>								
The reporting limit for this sample was adjusted by a factor of 0.93 to account for the applicable preparation factor.								
Sample ID: PJJ0236-06 (#3(0-30) - Soil)								
Volatile Fuel Hydrocarbons	ADHS 8015AZR1	POJ1905	20	ND	1	10/16/00	10/19/00	
				89.1 %				
<i>Surrogate: 4-BFB (FID) (70-130%)</i>								
The reporting limit for this sample was adjusted by a factor of 0.939 to account for the applicable preparation factor.								
Sample ID: PJJ0236-07 (GD-22(0-30) - Soil)								
Volatile Fuel Hydrocarbons	ADHS 8015AZR1	POJ1905	20	ND	1	10/16/00	10/19/00	
				79.3 %				
<i>Surrogate: 4-BFB (FID) (70-130%)</i>								
The reporting limit for this sample was adjusted by a factor of 0.926 to account for the applicable preparation factor.								



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 Tempe, AZ 85282 Report Number: PJJ0236
 Attention: Terry Turner
 Sampled: 10/16/00
 Received: 10/16/00

VOLATILE FUEL HYDROCARBONS (ADHS 8015AZR1)

Analyte	Method	Batch	Reporting Limit mg/kg	Sample Result mg/kg	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: PJJ0236-08 (#10(0-30) - Soil)								
Volatiles Fuel Hydrocarbons	ADHS 8015AZR1	P0J1905	20	ND	1	10/16/00	10/19/00	
<i>Surrogate: 4-BFB (FID) (70-130%)</i>				80.2 %				

The reporting limit for this sample was adjusted by a factor of 0.943 to account for the applicable preparation factor.

DEL MAR ANALYTICAL, PHOENIX (AZ0426)

Beth Price
Project Manager

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 Attention: Terry Turner

Client Project ID: COP Rio Salado Phase II 731.03

Sampled: 10/16/00
 Received: 10/16/00

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EXTRACTABLE FUEL HYDROCARBONS (ADHS 8015AZR1)

Analyte	Method	Batch	Reporting Limit mg/kg	Sample Result mg/kg	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: PJJ0236-02 (#9(0-30) - Soil)								
DRO (C10-C22)	ADHS 8015AZR1	P0J1805	30	ND	1	10/18/00	10/18/00	
ORO (C22-C32)	ADHS 8015AZR1	P0J1805	100	ND	1	10/18/00	10/18/00	
Total (C10-C32)	ADHS 8015AZR1	P0J1805	130	ND	1	10/18/00	10/18/00	
<i>Surrogate: n-Docosane (70-130%)</i>				78.7 %				
Sample ID: PJJ0236-03 (#6(0-30) - Soil)								
DRO (C10-C22)	ADHS 8015AZR1	P0J1805	30	ND	1	10/18/00	10/18/00	
ORO (C22-C32)	ADHS 8015AZR1	P0J1805	100	ND	1	10/18/00	10/18/00	
Total (C10-C32)	ADHS 8015AZR1	P0J1805	130	ND	1	10/18/00	10/18/00	
<i>Surrogate: n-Docosane (70-130%)</i>				81.7 %				
Sample ID: PJJ0236-04 (#1(0-30) - Soil)								
DRO (C10-C22)	ADHS 8015AZR1	P0J1805	30	ND	1	10/18/00	10/18/00	
ORO (C22-C32)	ADHS 8015AZR1	P0J1805	100	ND	1	10/18/00	10/18/00	
Total (C10-C32)	ADHS 8015AZR1	P0J1805	130	ND	1	10/18/00	10/18/00	
<i>Surrogate: n-Docosane (70-130%)</i>				81.4 %				
Sample ID: PJJ0236-05 (#5(0-30) - Soil)								
DRO (C10-C22)	ADHS 8015AZR1	P0J1805	30	ND	1	10/18/00	10/18/00	
ORO (C22-C32)	ADHS 8015AZR1	P0J1805	100	ND	1	10/18/00	10/18/00	
Total (C10-C32)	ADHS 8015AZR1	P0J1805	130	ND	1	10/18/00	10/18/00	
<i>Surrogate: n-Docosane (70-130%)</i>				79.0 %				
Sample ID: PJJ0236-06 (#3(0-30) - Soil)								
DRO (C10-C22)	ADHS 8015AZR1	P0J1805	30	ND	1	10/18/00	10/18/00	
ORO (C22-C32)	ADHS 8015AZR1	P0J1805	100	ND	1	10/18/00	10/18/00	
Total (C10-C32)	ADHS 8015AZR1	P0J1805	130	ND	1	10/18/00	10/18/00	
<i>Surrogate: n-Docosane (70-130%)</i>				77.4 %				

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EXTRACTABLE FUEL HYDROCARBONS (ADHS 8015AZR1)

Analyte	Method	Batch	Reporting Limit mg/kg	Sample Result mg/kg	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: PJJ0236-07 (GD-22(0-30) - Soil)								
DRO (C10-C22)	ADHS 8015AZR1	POJ1805	30	ND	1	10/18/00	10/18/00	
ORO (C22-C32)	ADHS 8015AZR1	POJ1805	100	ND	1	10/18/00	10/18/00	
Total (C10-C32)	ADHS 8015AZR1	POJ1805	130	ND	1	10/18/00	10/18/00	
<i>Surrogate: n-Docosane (70-130%)</i>				77.8 %				
Sample ID: PJJ0236-08 (#10(0-30) - Soil)								
DRO (C10-C22)	ADHS 8015AZR1	POJ1805	30	ND	1	10/18/00	10/18/00	
ORO (C22-C32)	ADHS 8015AZR1	POJ1805	100	ND	1	10/18/00	10/18/00	
Total (C10-C32)	ADHS 8015AZR1	POJ1805	130	ND	1	10/18/00	10/18/00	
<i>Surrogate: n-Docosane (70-130%)</i>				77.5 %				

DEL MAR ANALYTICAL, PHOENIX (AZ0426)

Beth Price
 Project Manager

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Client Project ID: COP Rio Salado Phase II 731.03
 Report Number: PJJ0236

Sampled: 10/16/00
 Received: 10/16/00
 Issued: 10/25/00

CASE NARRATIVE

LABORATORY NUMBER	SAMPLE DESCRIPTION	SAMPLE MATRIX
PJJ0236-01	TB-101600	Soil
PJJ0236-02	#9(0-30)	Soil (96.20% dry wt.)
PJJ0236-03	#6(0-30)	Soil (93.50% dry wt.)
PJJ0236-04	#1(0-30)	Soil (94.80% dry wt.)
PJJ0236-05	#5(0-30)	Soil (93.90% dry wt.)
PJJ0236-06	#3(0-30)	Soil (93.90% dry wt.)
PJJ0236-07	GD-22(0-30)	Soil (94.50% dry wt.)
PJJ0236-08	#10(0-30)	Soil (89.00% dry wt.)

SAMPLE RECEIPT: Samples were received intact, on ice, and with chain of custody documentation.

HOLDING TIMES: Holding times were met.

PRESERVATION: Samples requiring preservation were verified prior to sample analysis.

QA/QC CRITERIA: All analyses met method criteria.

OBSERVATIONS: No significant observations were made.

SUBCONTRACTED: No analyses were subcontracted to an outside laboratory.

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 Beth Price
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TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (ADHS METHOD 418.1 AZ)

Analyte	Method	Batch	Reporting Limit mg/kg	Sample Result mg/kg	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: PJJ0236-02 (#9(0-30) - Soil)								
Total Recoverable Hydrocarbons	ADHS 418.1 AZ	P0J2004	20	42	1	10/20/00	10/20/00	
Sample ID: PJJ0236-03 (#6(0-30) - Soil)								
Total Recoverable Hydrocarbons	ADHS 418.1 AZ	P0J2004	20	ND	1	10/20/00	10/20/00	
Sample ID: PJJ0236-04 (#1(0-30) - Soil)								
Total Recoverable Hydrocarbons	ADHS 418.1 AZ	P0J2004	20	ND	1	10/20/00	10/20/00	
Sample ID: PJJ0236-05 (#5(0-30) - Soil)								
Total Recoverable Hydrocarbons	ADHS 418.1 AZ	P0J2004	20	ND	1	10/20/00	10/20/00	
Sample ID: PJJ0236-06 (#3(0-30) - Soil)								
Total Recoverable Hydrocarbons	ADHS 418.1 AZ	P0J2004	20	ND	1	10/20/00	10/20/00	
Sample ID: PJJ0236-07 (GD-22(0-30) - Soil)								
Total Recoverable Hydrocarbons	ADHS 418.1 AZ	P0J2004	20	24	1	10/20/00	10/20/00	
Sample ID: PJJ0236-08 (#10(0-30) - Soil)								
Total Recoverable Hydrocarbons	ADHS 418.1 AZ	P0J2004	20	ND	1	10/20/00	10/20/00	

Beth Price
Project Manager

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APPENDIX B

LABORATORY ANALYTICAL REPORTS FOR SOIL BORING SAMPLES

ATTACHMENT C

add Tab C
for this
app C



January 11, 2001
 Phoenix Rio Salado, FCD 1999-C-062
 Exploratory Trenching

Gentlemen,

Positioned equipment 0700-0900 and commenced exploratory trenching 0900 Thursday, January 11, 2001 with 1 Cat. 330L tracked excavator. Dug three trenches, easternmost reach of Phase Two, near I-10, STA's 259+50 450' LT, 260+00 CL, 260+50 450' RT. Relocated to area between Phase One and 7th St. Bridge and excavated twelve pits on 100 ft. stations. Moved equipment to Habitat Demonstration area, completed five pits per designation COP personnel. Completed excavation at 1645 Thursday, January 11, 2001. Work observed by John P. Rodriguez, FCDMC.

Eastern End Ph. II, near I-10

STA 259+50 LT	0'-14'	Cobbles/Soil/Sand
STA 260 CL.....	0'-13'	Cobbles/Sand/Moisture, water starts after 12'
STA 260+50 RT	0'	Surface rubble, very sparse
	0' -12'	Cobbles/Soil

Between Ph. I and 7th St. Bridge

1	0'-12'	Cobbles/Sand
2	0'- 8'	Large Cobbles/Sand
	8'- 9'	Cobbles, hard packed
3	0'- 2'	Cobbles/Sand
	2'- 5'	Cobbles/Sand/Broken Concrete
	5'-12'	Cobbles/Sand
4	0'-12'	Cobbles/Sand
5	0'- 5'	Cobbles/Broken Concrete
	5'-10'	Cobbles/Sand
6	0'- 5'	Cobbles/Broken Concrete
	5'-10'	Cobbles/Sand
7	0'-11'	Cobbles/Sand

8	.....	0' - 7' >7'	Cobbles/Sand Sandy/Clay past 8'
9	.....	0'- 6' 6'-14'	Surface Conc. Rubble, Cobbles/Sand/Broken Conc. Cobbles/Sand, One Snow Ski, Sears/Roebuck circa 1970
10	.....	0'- 2' 2'- 13'	Cobbles/Broken Concrete Cobbles/Sand
11	.....	0' 0'-12'	Concentrated Surface Rubble, Concrete Cobbles/Sand
12	.....	0' 0'- 6' 8' 6'-12'	Concentrated Surface Rubble, Concrete Cobbles/Sand/Broken Concrete Exposed a thin layer of Clay Bricks at approx. 8' Cobbles/Sand

APPENDIX “E”

**REPORT ON ADDITIONAL PHASE II
ENVIRONMENTAL TESTING**

APPENDIX “F”

SPECIFICATIONS FOR WASTE STOCKPILE SEGREGATION

SPECIFICATIONS FOR WASTE STOCKPILE SEGREGATION

RIO SALADO – PHOENIX REACH LOW FLOW CHANNEL PROJECT – PHASE 2

SECTION 1 - INTRODUCTION

Unclassified waste materials were encountered in Phase 1 of the Low Flow Channel Project. The waste materials were located in the bottom of the Salt River and consisted of inert debris, tires, construction debris and small amounts of municipal solid waste intermixed with soil, gravel and cobbles.

Should similar unclassified materials be encountered in this Phase 2 of the project, the Contractor at the direction of the Engineer, shall stockpile such material in accordance with Special Provisions Section 350. This material will then be processed by segregating waste materials from soil and other materials that can remain on site as fill material. This specification will be used for that purpose.

SECTION 2 - DEFINITION OF RESPONSIBILITIES

The Contractor shall, with the approval of the Engineer, utilize one of the three stockpile areas identified in SGC Subsection 107.5.4 for the stockpiling and segregation of unclassified materials.

The Contractor will be responsible for managing and processing all materials placed within the designated waste stockpile area. This includes, but is not limited to, the following:

- Maintaining (and if necessary, modifying) perimeter drainage control ditches and berms around the waste processing and stockpile areas as directed by the FCDMC;
- Processing the waste materials as specified herein;
- Preparing areas for processed material stockpiles, and creating and maintaining stockpiles of processed materials;
- Transportation and disposal of tires, construction debris, and inert materials (and possibly metallic debris); and
- Restoration of the waste processing and stockpile areas so that no waste materials remain on or beneath the ground surface.

A City of Phoenix Environmental Consultant will perform periodic monitoring and sampling of the processed materials to evaluate the potential presence of regulated materials.

SECTION 3 – MATERIALS AND MEASUREMENT

Section 3.1 – Material Categories

The types of materials that may be generated by the waste segregation process are summarized below:

- Category 1. **Tires.**
- Category 2. **Metallic debris** such as loose rebar, wire, cable, pipes, etc.
- Category 3. Material retained on a 6-inch screen or larger screen. This material will be considered **6-inch plus inert material**, and may include concrete, asphaltic pavement, brick, and reinforcing steel contained within concrete, and rocks greater than 6 inches in largest dimension, but will not include special waste, hazardous waste, glass, detached metal, vegetative debris, wood, lumber, or other non-inert debris.
- Category 4. Material passing a 6-inch screen and retained on a 3-inch screen. This material will be considered **non-inert construction debris**, and may include cobbles; fragments of brick and concrete; glass, some soil; and non-inert debris such as wood, lumber, plastic and vegetative debris. This category may also include larger pieces of non-inert materials such as wood, carpet, furniture, or other materials associated with demolition or renovation of buildings. This category does not include metal and special or hazardous waste.
- Category 5. Material passing a 3-inch screen and retained on a 1-inch screen. This material will be considered **1 to 3-inch inert material**, and may include gravel; fragments of brick and concrete; some soil; and very minor amounts of non-inert debris such as wood, plastic and small metal debris.
- Category 6. Material passing a 1-inch screen. This material will be considered **reclaimed soil**, and may include soil, fine gravel, and sand.
- Category 7. Other **unspecified materials** and waste from stockpile processing.

Section 3.2 – Measurement of Quantities

Measurement of quantities to be processed per this specification and for payment in accordance with Special Provisions Section 350, Bid Items 350-19 and 350-20 shall be based on specific survey quantities of waste material stockpiles prior to processing or screening. Once processing or screening has commenced on a waste stockpile, no additional materials may be added to that stockpile.

SECTION 4 - SCOPE OF WORK

Section 4.1 - Mobilization

Contractor shall propose to the Engineer the location of each stockpile, and the extent of site preparation for the stockpiles and processing areas. These items shall be approved in writing by the Engineer prior to commencement of work by the Contractor. The Contractor shall also propose one or more methods to clearly show the Consultant where reclaimed soil has been added to the soil stockpile(s) each week.

Section 4.2 - Waste Segregation

Section 4.2.1 - General

During processing of materials, the Contractor shall utilize visual observation to identify potential wind-blown litter, and such litter will be managed to minimize its spread. The Contractor shall also be responsible for dust control measures in all areas utilized by the Contractor. At a minimum, dust control measures shall consist of water trucks to mitigate dust from vehicle traffic and processing equipment.

Section 4.2.2 - First Segregation Phase

The objective of the First Segregation Phase is to perform a visual screening of stockpiled materials, and to remove and reasonably segregate large waste objects (inert debris, tires, vegetative debris, wood, lumber, metal, and other waste materials, etc.) from the stockpiled materials. This process will include spreading of the stockpiled materials or processing them through an 8-inch Grizzly; visual identification of waste objects to be removed; removal and segregation of waste objects by hand or using an excavator bucket, clamshell, grapppler, or other similar device.

As applicable, materials recovered by this phase shall be segregated into Categories 1 (tires), 2 (metallic debris), 3 (inert material), 4 (non-inert construction debris), and 7 (unspecified) as described above, and stockpiled as specified in Section 4.3 below. All remaining material will be subjected to the Second Segregation Phase described below.

Section 4.2.3 - Second Segregation Phase

Stockpiled material remaining after the first phase of segregation will be processed by mechanical screening. Screen sizes will consist of the following:

- 6 inches (Grizzly or equivalent equipment)
- 3 inches (vibratory screen or equivalent equipment)
- 1 inch (vibratory screen or equivalent equipment)

Materials retained on the first screen (6 inches and larger) are anticipated to include boulders, concrete, metal, tires, logs, and other large-diameter waste objects. Material retained on this screen level will be segregated by visual observation and hand or mechanical methods into Categories 1 (tires), 2 (metallic debris), 3 (inert material), 4 (non-inert construction debris), and 7 (unspecified), as applicable, and stockpiled as specified.

Materials retained on the second screen (3 inches to 6 inches) are anticipated to include cobbles, bricks, and lesser amounts of wood, metal, and other non-inert materials. Any materials not considered construction debris shall be removed from this process stream by the Contractor. Material retained on this screen level will be stockpiled and managed as Category 4 (non-inert construction debris).

Materials retained on the third screen (1 inch to 3 inches) are anticipated to include gravel, fragments of brick and concrete, some soil, and very minor amounts of non-inert materials. Material retained on this screen will be stockpiled and managed as Category 5 (1 to 3-inch inert debris). If the material retained on the second screen does not contain a significant amount of non-inert material as determined by the Engineer, it will be retained for use as landscaping or fill material on the Rio Salado Project site. Otherwise, it may be disposed of as non-inert construction debris.

Material that passes all screen levels (1-inch minus) will consist of reclaimed soil that can be beneficially used within the requirements of the construction of the Rio Salado Project. This material will be stockpiled and managed as Category 6 (reclaimed soil). The contractor shall provide access to the Consultant so that this material can be periodically sampled.

Manual labor will likely be used to visually screen and remove metallic or other debris from the screen conveyor during screening operations. All materials removed in this manner shall be stockpiled and managed as the appropriate material category.

Section 4.2.4 - Presence of Waste Other Than Solid Waste

If at any time during the segregation and processing of materials from the stockpile area, the Contractor has reasonable suspicion that they have encountered any type of waste other than solid waste (Category 7, which could include special or hazardous waste, asbestos, medical waste, petroleum contaminated soil, etc.) they shall notify the Engineer immediately.

The Consultant will provide sampling and characterization required for proper handling and disposal of such material. After stockpiling of any such material, the Contractor will not be held responsible for its handling or disposal, but they shall provide access to third parties who may be retained to handle and dispose of the materials.

Section 4.2.5 - Reclaimed Soil Sampling

The reclaimed soil that passes the final (one inch) screen will be stockpiled for future use on the Rio Salado Project site. This reclaimed soil will be sampled by the City of Phoenix environmental consultant to verify that it does not contain potential contamination at a level detrimental to public health or the environment, and is suitable for re-use. The Contractor shall provide access to the Consultant to perform periodic soil sampling. It is anticipated that the reclaimed soil will be sampled once every 5,000 cubic yards. As stated in Section 4.1, the Contractor shall develop a procedure to clearly indicate to the Consultant where soil has been added to the stockpile(s) since the previous sampling event.

Section 4.3 - Material Management and Disposal

Section 4.3.1 - Stockpile and Processing Area Selection and Preparation

During the mobilization phase of the project, the Contractor and Engineer shall mutually agree on the location and configuration of processing areas and stockpiles for each type of material. The Contractor shall use stakes to outline each stockpile area and the Contractor shall be responsible for maintaining the stockpiles within the specified areas. If material is to be stockpiled in the processing area after removal of waste materials, the Contractor shall ensure that no waste material is present beneath the stockpile by first grading and processing soils in the area to a depth of at least one foot below the depth at which native soils are encountered. The existing processing area may be expanded or altered only with the written approval of the Engineer.

Section 4.3.2 - Stockpiling and Management of Materials

Stockpiling and disposal requirements for each Material Category are described below.

Section 4.3.2.1 - Material Category 6 Reclaimed Soil

It is anticipated that this material will remain on the site for future use. Stockpiles for this Material Category shall remain within the bermed processing area or other locations established under Section 4.3.1.

Section 4.3.2.2 - Material Category 1 Tires

This material shall be removed from the site and disposed of by the Contractor at an authorized facility. Stockpiles for this Material Category shall remain within the bermed processing area unless otherwise specified in writing by the Engineer. If necessary, up to 40 cubic yards may be temporarily stockpiled outside the bermed area, but anything over

this amount must be removed from the site or moved to specified locations within the bermed area if this amount is exceeded.

Section 4.3.2.3 - Material Category 2 Metallic Debris

This material shall be removed from the site and disposed of or recycled by the Contractor at an authorized facility. Stockpiles for this Material Category shall remain within the bermed processing area unless otherwise specified in writing by the Engineer. If necessary, up to 40 cubic yards may be temporarily stockpiled outside the bermed area, but anything over this amount must be removed from the site or moved to specified locations within the bermed area if this amount is exceeded.

Section 4.3.2.4 - Material Category 3 6-Inch Plus Inert Material

This material shall be removed from the site and disposed of by the Contractor at an authorized facility. Stockpiles for this Material Category shall remain within the bermed processing area unless otherwise specified in writing by the Engineer. If necessary, up to 2000 cubic yards may be temporarily stockpiled outside the bermed area, but anything over this amount must be removed from the site or moved to specified locations within the bermed area if this amount is exceeded.

Section 4.3.2.5 - Material Category 4 Non-Inert Construction Debris

This material shall be removed from the site and disposed of by the Contractor at an authorized facility. Stockpiles for this Material Category shall remain within the bermed processing area unless otherwise specified in writing by the Engineer. If necessary, up to 2000 cubic yards may be temporarily stockpiled outside the bermed area, but anything over this amount must be removed from the site or moved to specified locations within the bermed area if this amount is exceeded.

Section 4.3.2.6 - Material Category 5 1 to 3 Inch Inert Material

It is anticipated that this material will remain on the site for future use. However, the Contractor shall not use it for fill or place it in an undesignated stockpile area until so authorized by the Engineer. Stockpiles for this Material Category shall remain within the bermed processing area or locations specifically identified by the Engineer. If necessary, up to 2000 cubic yards may be temporarily stockpiled outside the bermed area, but anything over this amount must be moved to a location identified for this stockpile (or to a location within the bermed area) if this amount is exceeded.

Section 4.3.2.7 - Material Category 6 Reclaimed Soil

It is anticipated that this material will remain on the site for future use. However, the Contractor shall not use it for fill or place it in an undesignated stockpile area until so authorized by the Engineer. Stockpiles for this Material Category shall remain within the bermed processing area or locations specifically identified by the Engineer.

Section 4.3.2.8 - Material Category 7 Unspecified Materials

These materials will be characterized by the Consultant to determine handling and, if necessary, disposal requirements. Depending on the nature of the materials, they will either be removed from the site for disposal by the Contractor utilizing Section 350 bid items or by the City of Phoenix depending on the characterization results per Subsection 107.5.4 and Section 350. Stockpiles for this Material Category shall remain within the bermed processing area. Temporary or permanent stockpiling or handling of this material outside the bermed processing area will not be permitted unless authorized in writing by the Engineer.

Section 4.3.3 – Disposal of Processed Materials

Processed materials categories 1, 2, 3, and 4 shall be disposed of using the appropriate Special Provisions Section 350 bid item. Material categories 5 and 6 shall remain on site for use by others. Material category 7 shall be disposed of as directed by the Engineer and the Consultant.

Disposal of materials categories 1, 2, 3 and 4 shall be:

Category 1 – Tires – Use Bid Items 350-7 through 350-9.

Category 2 – Metallic Debris – Shall be recycled and disposed of by the Contractor at no cost to this segregation process.

Category 3 – 6-Inch Plus Inert Material – Use Bid Items 350-1 through 350-3.

Category 4 – Non-Inert Construction Debris – Use Bid Items 350-4 through 350-6.

Section 4.3.4 - Maintenance and Restoration of Processing and Stockpiling Areas

At the end of each day, the Contractor shall regrade the processing area, perimeter berms, and drainage ditches as necessary to ensure that stormwater runoff or flows in the adjacent stormwater outfall will not contact the material or waste stockpiles, and that potential runoff from the waste stockpile will not escape the bermed area. Stormwater protection structures (drainage ditches, berms, or a combination) shall be a minimum of two feet high or deep. Any and all stormwater outfall channels that are located close to the processing and stockpile areas shall be kept free of obstructions to allow unimpeded flow to the main Salt River channel.

At the completion of the project, the processing and stockpile areas shall be free of all waste materials (Material Categories 1, 2, 3, 4, and 7). The Contractor shall ensure that no waste material is present in these areas by grading and processing soils in the area to a depth of at least one foot below the depth at which native soils are encountered. Verification that the areas are free of waste materials shall be made by the Engineer. Category 5 and 6 materials shall remain on site for use by others.

Section 4.4 - Project Documentation

The Contractor shall provide to Engineer a written weekly status report including the following:

- Brief narrative of activities,
- Description of any unusual situations,
- The estimated amount of processed material (weekly and cumulative)
- Estimated amounts of each material category (weekly and cumulative)
- Disposal documentation such as truck load counts, disposal facility weight and gate tickets, etc.

SECTION 5 - COMPLIANCE WITH SPECIFICATIONS

Upon receipt of written notification by Engineer that these specifications are not being met, the Contractor shall immediately take action to remedy the deficiency. Failure to adequately respond to such notification within 48 hours may result in reduction of payment.