Alluvium Drill Cuttings Logging Form Comments - Nye County Nuclear Waste Repository Project Office

Date Logged	Sample Number	Depth Interval (feet bgs) From	Depth Interval (feet bgs) To	Comments
6/25/2003	29P-0-2.5	0.00	2.50	Hole is spudded without a collar. Therefore, material is blown through the annular space and formation density cannot be measured. Also, fines are lost due to air winnowing at cyclone. Slightly moist due to incipient moisture at near surface. Any angularity of gravels due to drill bit. Gravels are fine to coarse (probably cobbles). Caliche rinds on gravels. Gravels are 95% densely welded clasts from 0 to 5 ft, very hard, multi-colored.
6/25/2003	29P-2.5-5.0	2.50	5.00	Slightly moist due to incipient moisture at near surface. Any angularity of gravels due to drill bit. Gravels are fine to coarse (probably cobbles). Caliche rinds on gravels.
6/25/2003	29P-5.0-7.5	5.00	7.50	Nonwelded clasts display greater rounding than welded clasts
6/25/2003	29P-7.5-10.0	7.50	10.00	Bouldery - drill bit chattering and kicking off track (2-1/2 degree deviation @ 60 ft)
6/25/2003	29P-10.0-12.5	10.00	12.50	Lots of gravel at 10 ft. Chips are angular and probably boulder chips.
6/25/2003	29P-12.5-15.0	12.50	15.00	
6/25/2003	29P-15.0-17.5	15.00	17.50	Trace of vesicular basalt in intervals 15 to 17.5 ft and 25 to 27.5 ft. Sample volume ~ 3 gals. Good representative sample. Lifting is efficient.
6/25/2003	29P-17.5-20.0	17.50	20.00	Coarse gravel component increasing.
6/25/2003	29P-20.0-22.5	20.00	22.50	
6/25/2003	29P-22.5-25.0	22.50	25.00	Small sample volume. Total sample going to lab. None to SMF.
6/25/2003	29P-25.0-27.5	25.00	27.50	
6/25/2003	29P-27.5-30.0	27.50	30.00	A few clasts of calcite present in gravel component.
6/25/2003	29P-30.0-32.5	30.00	32.50	Difficulty cleaning out.
6/25/2003	29P-32.5-35.0	32.50	35.00	Calcite filling on healed fractures in a few gravel clasts. Increase in basaltic gravel clasts - black and vesicular
6/25/2003	29P-35.0-37.5	35.00	37.50	
6/25/2003	29P-37.5-40.0	37.50	40.00	

Alluvium Drill Cuttings Logging Form Comments - Nye County Nuclear Waste Repository Project Office

Date Logged	Sample Number	Depth Interval (feet bgs) From	Depth Interval (feet bgs) To	Comments
6/25/2003	29P-40.0-42.5	40.00	42.50	
6/25/2003	29P-42.5-45.0	42.50	45.00	Nonwelded gravel component roughly equal to welded component.
6/25/2003	29P-45.0-47.5	45.00	47.50	
6/25/2003	29P-47.5- 50.0	47.50	50.00	Silt component increases. Angularity of gravel clasts increase slightly.
6/25/2003	29P-50.0-52.5	50.00	52.50	
6/25/2003	29P-52.5-55.0	52.50	55.00	
6/25/2003	29P-55.0-57.5	55.00	57.50	Minor (<1%) vesicular basalt clasts from 55 to 60 ft. Predominantly (90%) densely welded gravel clasts; 10% nonwelded clasts.
6/25/2003	29P-57.5-60.0	57.50	60.00	
6/25/2003	29P-60.0-62.5	60.00	62.50	
6/26/2003	29P-62.5-65.0	62.50	65.00	A few basaltic clasts from 62.5 to 80 ft (<5%)
6/26/2003	29P-65.0-67.5	65.00	67.50	
6/26/2003	29P-67.5-70.0	67.50	70.00	
6/26/2003	29P-70.0-72.5	70.00	72.50	Rare opaline fragments.
6/26/2003	29P-72.5-75.0	72.50	75.00	
6/26/2003	29P-75.0-77.5	75.00	77.50	
6/26/2003	29P-77.5-80.0	77.50	80.00	Cleanout material weight from 57.7 - 80 ft = 192.80 kg. Some material lost in the cleanout interval 57.7 - 80 ft due to difficulty with unstable hole.

Alluvium Drill Cuttings Logging Form Comments - Nye County Nuclear Waste Repository Project Office

Date Logged	Sample Number	Depth Interval (feet bgs) From	Depth Interval (feet bgs) To	Comments
6/26/2003	29P-80.0-82.5	80.00	82.50	Drilling very slowly in an effort to minimize borehole deviation.
6/26/2003	29P-82.5-85.0	82.50	85.00	Color change: becoming much darker.
6/26/2003	29P-85.0-87.5	85.00	87.50	
6/26/2003	29P-87.5-90.0	87.50	90.00	Cemented grains present. We may therefore see a high bias on gravel weights determinations.
6/26/2003	29P-90.0-92.5	90.00	92.50	Cement sand coatings on gravels.
6/26/2003	29P-92.5-95.0	92.50	95.00	
6/26/2003	29P-95.0-97.5	95.00	97.50	
6/26/2003	29P-97.5-100	97.50	100.00	Cleanout material weight from 80 to 100 ft = 48.95 kg.
6/27/2003	29P-100.00-102.5	100.00	102.50	Small sample; core interval was over-drilled with larger diameter air rotary bit. Samples are slightly moist containing 1-3% moisture from 100 to 105 ft. Samples are nearly monolithic intervals 100 to 102.5 ft and 110 to 112.5 ft. Suspect gravel measurement. Interval 100.0 - 102.5 overdrills (reams) drive core interval 100.00-102.27--see Alluvium Core Logging Form.
6/27/2003	29P-102.5-105.0	102.50	105.00	Slightly more hetero-lithic with a predominance of moderate brown densely welded clasts
6/27/2003	29P-105.0-107.5	105.00	107.50	Plasticity is logged as low, but it is approaching moderate. Sample is drier than above (samples are slightly moist containing 1-3% moisture from 100-105 ft). Gravel scale not working from 105 to 112.5 ft (maybe sample is too large). Gravel % estimate is visual.
6/27/2003	29P-107.5-110.0	107.50	110.00	A few vesicular basalt clasts present.
6/27/2003	29P-110.0-112.5	110.00	112.50	
6/27/2003	29P-112.5-115.0	112.50	115.00	
6/27/2003	29P-115.0-117.5	115.00	117.50	Hole is unstable. Condition hole before advancing. This seems to coincide with the reduction in fines content at 115 ft as well as increased angularity of gravel clasts. This might be a bouldery zone.
6/27/2003	29P-117.5-120.0	117.50	120.00	Some material was lost from the cleanout sample as evidenced when we blow dried the hole at 120 ft and had some annular return of material. Cleanout material weight from 100 to 120 ft = 193.25 kg.

Alluvium Drill Cuttings Logging Form Comments - Nye County Nuclear Waste Repository Project Office

Date Logged	Sample Number	Depth Interval (feet bgs) From	Depth Interval (feet bgs) To	Comments
6/27/2003	29P-120.0-122.5	120.00	122.50	
6/27/2003	29P-122.5-125.0	122.50	125.00	Sand grains cemented together.
6/27/2003	29P-125.0-127.5	125.00	127.50	
6/27/2003	29P-127.5-130.0	127.50	130.00	
6/27/2003	29P-130.0-132.5	130.00	132.50	Grain coatings become prevalent.
6/27/2003	29P-132.5-135.0	132.50	135.00	
6/27/2003	29P-135.0-137.5	135.00	137.50	Grain coatings prevalent from 135 to 170 ft.
6/27/2003	29P-137.5- 140.0	137.50	140.00	Cleanout material from 120 to 140 ft = 71.75 kg. Some material was lost during cleanout sampling due to annular blow by.
6/27/2003	29P-140.0-142.5	140.00	142.50	Cemented sand grains from 140 to 147.5 ft and 160 to 162.5 ft.
6/27/2003	29P-142.5-145.0	142.50	145.00	
6/27/2003	29P-145.0-147.5	145.00	147.50	
6/27/2003	29P-147.5-150.0	147.50	150.00	
6/27/2003	29P-150.0-152.5	150.00	152.50	
6/27/2003	29P-152.5-155.0	152.50	155.00	
6/27/2003	29P-155.0-157.5	155.00	157.50	
6/27/2003	29P-157.5-160.0	157.50	160.00	Condition hole with mud to stabilize 20 ft above planned core interval. Cleanout material weight from 140 to 160 ft = 114.25 kg. Some material was lost during cleanout sampling due to annular blow by.

Alluvium Drill Cuttings Logging Form Comments - Nye County Nuclear Waste Repository Project Office

Date Logged	Sample Number	Depth Interval (feet bgs) From	Depth Interval (feet bgs) To	Comments
6/27/2003	29P-160.0-162.5	160.00	162.50	
6/27/2003	29P-162.5-165.0	162.50	165.00	
6/27/2003	29P-165.0-167.5	165.00	167.50	
6/27/2003	29P-167.5-170.0	167.50	170.00	
6/27/2003	29P-170.0-172.5	170.00	172.50	
6/27/2003	29P-172.5-175.0	172.50	175.00	
6/27/2003	29P-175.0-177.5	175.00	177.50	
6/27/2003	29P-177.5-180.0	177.50	180.00	Cleanout material weight from 160 to 180 ft = 146.70 kg.
6/28/2003	29P-180.0-182.5	180.00	182.50	Core interval was over-drilled upon re-entering hole with face-return air hammer (RC) assembly. Drill with center return RC air hammer 180 to 203.3 ft. Overdrilled core run #2 interval (180 to 181.13 ft) contains fill from up hole that was generated upon re-entry with hammer bit. Heavy grain coatings, as well as observance of cementation in core barrel #2. Interval 180.0 - 182.5 overdrills (reams) drive core interval 180.00 - 181.13--see Alluvium Core Logging Form.
6/28/2003	29P-182.5-185.0	182.50	185.00	Gravel size increased from 182.5 to 190 ft due to larger annular space as the hole hogs out. Samples are slightly moist (1-2%). Core barrel samples support this also.
6/28/2003	29P-185.0-187.5	185.00	187.50	
6/28/2003	29P-187.5-190.0	187.50	190.00	
6/28/2003	29P-190.0-192.5	190.00	192.50	
6/28/2003	29P-192.5-195.0	192.50	195.00	Potential exists for hammer oil contamination at 2.5 to 5 ft samples (at joint break). Small sample return. Total went to NWRPO Lab. None to SMF. Sample is probably contaminated with fill. No contamination observed.
6/28/2003	29P-195.0-197.5	195.00	197.50	Vesicular basalt clast present
6/28/2003	29P-197.5-200.0	197.50	200.00	Cleanout material weight from 180 to 200 ft = 74.55 kg.

Alluvium Drill Cuttings Logging Form Comments - Nye County Nuclear Waste Repository Project Office

Date Logged	Sample Number	Depth Interval (feet bgs) From	Depth Interval (feet bgs) To	Comments
6/28/2003	29P-200.0-202.5	200.00	202.50	
6/28/2003	29P-202.5-205.0	202.50	205.00	Fill is plugging hammer bit. Trip bit and return to air rotary methods. Therefore, drilling method was air hammer from 180 to 203.3 ft; air rotary from 203.3 ft.
6/28/2003	29P-205.0-207.5	205.00	207.50	
6/28/2003	29P-207.5-210.0	207.50	210.00	
6/28/2003	29P-210.0-212.5	210.00	212.50	
6/28/2003	29P-212.5-215.0	212.50	215.00	
6/28/2003	29P-215.0-217.5	215.00	217.50	
6/28/2003	29P-217.5-220.0	217.50	220.00	Cleanout material weight from 200 to 220 ft = 129.25 kg.
6/28/2003	29P-220.0-222.5	220.00	222.50	Slightly moist (1-2%). Cementation is logged as none because there is less grain coating than up hole and no cemented sand.
6/28/2003	29P-222.5-225.0	222.50	225.00	
6/28/2003	29P-225.0-227.5	225.00	227.50	
6/28/2003	29P-227.5-230.0	227.50	230.00	
6/28/2003	29P-230.0-232.5	230.00	232.50	
6/28/2003	29P-232.5-235.0	232.50	235.00	
6/28/2003	29P-235.0-237.5	235.00	237.50	
6/28/2003	29P-237.5-240.0	237.50	240.00	Cleanout material weight from 220 to 240 ft = 143.40 kg.

Alluvium Drill Cuttings Logging Form Comments - Nye County Nuclear Waste Repository Project Office

Date Logged	Sample Number	Depth Interval (feet bgs) From	Depth Interval (feet bgs) To	Comments
6/28/2003	29P-240.0-242.5	240.00	242.50	
6/28/2003	29P-242.5-245.0	242.50	245.00	Hole is caving. Condition with mud. Material is granular and loose.
6/28/2003	29P-245.0-247.5	245.00	247.50	At 247.5 ft - moisture present from conditioning at 245 ft, also a small sample. At 250 ft good sample, less moisture.
6/28/2003	29P-247.5-250.0	247.50	250.00	Heavy grain coatings and cemented sand grains = moderate cementation.
6/28/2003	29P-250.0-252.5	250.00	252.50	
6/28/2003	29P-252.5-255.0	252.50	255.00	
6/28/2003	29P-255.0-257.5	255.00	257.50	
6/28/2003	29P-257.5-260.0	257.50	260.00	Cleanout material weight from interval 240 to 260 ft = 10.90 kg.
6/28/2003	29P-260.0-262.5	260.00	262.50	
6/28/2003	29P-262.5-265.0	262.50	265.00	
6/28/2003	29P-265.0-267.5	265.00	267.50	
6/28/2003	29P-267.5-270.0	267.50	270.00	
6/28/2003	29P-270.0-272.5	270.00	272.50	
6/28/2003	29P-272.5-275.0	272.50	275.00	
6/28/2003	29P-275.0-277.5	275.00	277.50	Small subsample; suspect gravel percentage.
6/28/2003	29P-277.5-280.0	277.50	280.00	Very slight moisture (1%) or less. Cleanout material weight from interval 260 to 280 ft = 222.05 kg.

Alluvium Drill Cuttings Logging Form Comments - Nye County Nuclear Waste Repository Project Office

Date Logged	Sample Number	Depth Interval (feet bgs) From	Depth Interval (feet bgs) To	Comments
6/29/2003	29P-280.0-282.5	280.00	282.50	From 280 to 292.5 ft gravel clasts are up to 1.5 inches across long axis of clast. Begin air-hammer cycle at 280 to 303.2 ft. Interval 280.0 - 282.5 overdrills (reams) drive core interval 279.98 - 282.11--see Alluvium Core Logging Form.
6/29/2003	29P-282.5-285.0	282.50	285.00	
6/29/2003	29P-285.0-287.5	285.00	287.50	
6/29/2003	29P-287.5-290.0	287.50	290.00	
6/29/2003	29P-290.0-292.5	290.00	292.50	
6/29/2003	29P-292.5-295.0	292.50	295.00	Clay balls in sample. Sample from 292.5 to 302.5 ft is very clayey and poorly graded. Also contains greater moisture. Reduction in maximum gravel clast size to 3/4" and smaller percentage due to plugging. Distinct formation change: More orange (5YR 5/6), less and smaller gravel.
6/29/2003	29P-295.0-297.5	295.00	297.50	Lost some sample from 295 to 302.5 ft due to bit plugging and only partial returns up center tube.
6/29/2003	29P-297.5-300.0	297.50	300.00	
6/29/2003	29P-300.0-302.5	300.00	302.50	
6/29/2003	29P-302.5-305.0	302.50	305.00	Switch back to air-rotary drilling method. Air-hammer wasn't lifting cuttings efficiently. Cleanout material weight from 280 to 303.2 = 184.70 kg.
6/29/2003	29P-305.0-307.5	305.00	307.50	Windy conditions today (6/29/03). There is considerable loss of fines due to winnowing at cyclone.
6/29/2003	29P-307.5-310.0	307.50	310.00	Grain coatings effervesce strongly with 10% HCL acid from 307.5 to 320 ft.
6/29/2003	29P-310.0-312.5	310.00	312.50	
6/29/2003	29P-312.5-315.0	312.50	315.00	Moderate cementation from 312.5 to 320 ft based on hard and thick (2mm) grain coatings of cemented sand. Gravel clasts display marked lithologic homogeneity from 312.5 to 320 ft. Cemented coatings on gravels are well sorted and comprised of quartz. Gravel lithology is very phenocryst poor, contains no quartz, and is 10YR 4/2. Looks like Tiva. Matrix sand component is lithologically the same as rock clasts from 312.5 to 320 ft.
6/29/2003	29P-315.0-317.5	315.00	317.50	
6/29/2003	29P-317.5-320.0	317.50	320.00	First appearance of quartzite in gravel clast lithology. Large clay balls in drill cuttings. Component logged as fines and sand are possibly products of drill bit pulverization of rock.