Location <u>Americalle-Labadic</u> Date <u>Holighog</u> Designed ( Cligant Daita & Tenas Project / Client Leitz 1 Jens WEATHER: WARM 65°F MOSTLY SUNNY MILD. WIND FROM E'SE @ 10-15 MPH 420 CF Doughtonziker. He stated the off plug is missing tion the drill rig. They are going to leave the site to go buy a new oil plug at an autoparts STOR. SEE PAGE 62 122 - Finisheddrilling, sand a growting P-9. 55- Setupon P-93. Observe Mille Carlson, Paul Leitz & Jeff Fouse onsite. 228- Maris Enterprises arrive at P-9. Doug, Dave " Ryan Hunzi Ker Ryan Northantt and Bill Dubois 235 - Begindilling on P-93. 320- Mike Carlsonottsite. 331 - John Einer i Kenny Kintzone Ht. Took pictures 335- John & Kenny offsite. Nell Construction Notes: P-93 "Sch 40 pvc 10-slot, set base @ 35' 1/40 P. Sand to 21.75 use 250 10 1/70 S. Sand to 20.5' use 50 11 16 bent. Slurry to GS, use 32 g (Calc. Vol. = 52 q) D:= 5.5" D= 10" DW= 69a GMUIS Dou

Date 10/20/09 Location AmerenUE - Labadie Project / Client Reitz & Jens WEATHER: WARM, 75°F, AALTLY SUNNY MILD, WIND FROM SOUTH & 15-25 MOH 1500 - Finished drilling, sand & growthey P-93. 1510-Setus on P-95 while Max's washes HSAS and refives the weater tank. 1517 - Dave Hunziker offsite. 1537- Begindvillingon P-95 1640- Hammerblow rod adapter broke at 34.5 on P-95 No spare adapter to obtain last 12" of SPT. Well Construction Notes: P-95 2" Sch. 40 Prc 10-Slot set base@ 34.9" 20/40 P. Sand to 21.6 use 250 16 30/70 S. Sand to ZO.3 use 60 Bent. Slurry to GS. use 28 16 (Cak. Vol. = 52 g) 0;=10.5" 0;=14.5" PW=604 1740- Scott King offsite, Geo Squit pump is not working for him to develop wells 1745 - Finished drilling, sand & growthy P-95 1815 - Max's Enterprises, Scott King and I offsite. 1821- CT John Einer about departure. () Muts Lou

Location Amerenue-Labadie Date 10/21/09 Project / Client <u>Reitz à Jens</u> LOEATHER: WARM 550F, PARTLY CLOUDY, CALM, 1645 - Arrive onsite for DSI Fieldwork. Max's Enterprises onsite: Doug & Ryan Hunziker, Bill Dubois and Ryan Northcutt. 700 - Max's changes tire on support trailer. 715 - Conduct tailgate safety meeting. 125- Shaun Shanahan, Charak Onsite and Stated he would like to see their product for the rock fill on the tarmaccess road. Informed him that I win inform our client. 135- Seff Fouse onsite at turn access road W/Pace Construction. They are filling In the low areas w/ Fabric & rock on the 10ad. Informed Jeff about Charah wanting to see their product @ \$4/ton 745-Setup on P-97. 300- Beginde Ming on P-97. 718 - CFM.Ke Carlson. Stated he is ansite for the weekly safety meeting. 140 - Finished duilling, sand of growting P-97. 45. Setup on A-99. 153-Begindrilling on P-99. 05 - Chi's Dienettier MONE on site. 21- SPThammelsupport/guide broke on Omry Don

Date 10/21/09 67 Location America UE-Labadic Project / Client Revitz 1 Jers

Well Construction Notes: P-97\*348' 2" Sch 40 Pue 10-Slot set base 8 -35+ 29/40 P. Sond to 21.5' use 250 16 30/70 S. Sand to 20, use 50 16 Bent. Slurry to GS, use 53 9 (Calc. Vol. = 51 g) D; = 8" D; = 11.5" PW= 66g Well raised O. S' while treminy sand/sensoring HSA 1121-CONT. - duillyig. 1134 - Maris win use manual hammer by using winch until piece can be repaired 1136 - Dave Hunziker onsite. 1145- Dore Hunziker offsite to get the broken quide for the sor hammer cend have + repaired. 1216 - Mille Carlson ons: 70 @ P-99. 1315- ChrisVinetter Offste. 1350 - Finished drilling, sand and growthing 1299. 1420-Mike Carlson offsite. 1425- Setup on A-71. 1444 - Chris Vienetheronsite 1448 Begudrilling on P-71. Gruzz Don

Location Amelen UE-Lubadie Date 10/21/09 Project / Client Reitz & Jen WEATHER: WARM 70°F OVERCAST, 10-15MPH WENDFROM SOUTH, MILD 1ell Construction Notes: P-99 #34.1" Sch 40 PVC 10-Slot set base 0 35 g 10 P. Sand to 20.6' use 75 205. Sand to 19.1, use 50 ent. Slurry to GS, use 38 g Cale. Vol. = 49 g) 0:= 18.5 0= 16" W= 60g Icil reised O. 9' during HSK removal trying 3 Flush hearing sands from #SAS. Natural : Iter pack to 23.5 bgs. 143- Dave Hunzike, onsite w/ repaired = AT Hammer guidy 50- Doug & Vove Hunziker / eare to go complete surface completions and add growt. Gave Dave a table to record amount of growt added and we'ls completed. 154- Fhished drilling, sand in growting P- 71. 00- Chris Vierenther officite 08- Leave P-71 and mob. to const. trailer. Growt PZ Comments Completed the illoylog P-67 Ha | 12g Completed The northog P-69

Location Ameren UE - Labedie Date 10/21/09 Project/Client Reitz & Jens

WELL Construction Notes: P-71 2" Sih 40 PVC 10-Slot, set base @ 34.9 2940 P. Sand to 21.7' use 250 30/205. Sund to 20.1', use 50 14 Bent Slurry to GS, size 52 - q) D;=15" 0= 18.5" (Calc. Vol. = 51 PW- 489 1745 Maris inished uploading support trucks and fixing SPT hanner. 1802 - maks Enfergilses and I alforthe 1806 - CT John Einerabout clepeture

Location AmerenUE-Labodic \_ Date 10/22/09 Project / Client Keitz & Jens WEATHER: WARM 55°F OVERCAST, HUNTO CALM, HEAM RATH IN FORECAST BY 0830' 1052 - Aurile onsite to continue OSI field. Wok. Max's Enterplices ons Ac. Doug & Ryan Hunziker, Bill Oubois, and Ryca Northeute Dave Hunziker onsite 711 - Conduct tailacte satety meeting. 713 - Due to the extreme like lihood of rah and thunderstorms white the act 2 hours, the plun is to perform Surface completions and add grout to existing piezometers. 757 Begin growting and completions after mixing growt. PZ Grout Comments 1757 pq 30g GROWT Only 810 P-19 8a' Completed, needs lock 325 P-71 GROWT Casing, J-plug 120 P-65 331 0g Completed needs lock 338 P-93 Od Casing, J-Plug 8g P-95 342 Casing, J-Plug 8ă P-97 Casing, J-Plug 346 P-99 350 Casing, 5-Plug Rants

Location AmerenUE - Labadie Date 10/22/09 Project / Client Keitz & Jens

0900 - Kyle Kocher and Jason Pruct are onsite w/ Reitz & Jens, and Terre Dr.M is OnsAre drilling on C-37 0925- Light to moderate ran is talling, but no lightning. We are going to try drilling on 4-120. Chris Vierether MONE onsite. 0437 CT Mike Carlson Intorned him the Jain has let up a little and we are apingto trydilling Also intoined Kim that Reitz & Jens is Oasite doulling w/ Terra Drill 1007- Begindiilling on P-120. 1123 - Chils Vienther Onsite at \$ 120 1154-ChrisVienether office te Well Construction Notes: P-120 4"Sel 40 Prc Zo-Slot set base @ 34.9 10/20 P. Send to 21.3' use 375 16 30/10 S. Sand to 19.7' use 75 1h 75 Bent Slurry to GS, use D:= 13" D== 17" (Calc. Vol. = 68 a) PW= 54g ()mms

Location Americal E-Laboradic Date 10/22/09 Location Date Project / Client <u>Reitz 4 Jens</u> Project / Client \_\_\_\_ WEATHER: COOL, 60°F, RAIN, WIND FROM EAST AT 10-15MPH 305 - Finisheddilling, sand & growting P-120 348 - Due to rain drilling activities were Stopped. Max's Enterprises Finished Unloading support truck. 350 - Maxis Enterprises offsite and Demobilizing back to Ft. Scott WS. 350 - Offsite for the day. 70 - CT John E.mer. Informed him that drilling activities have ceased for the week due to rain.

Location Americal E-Labodic Date 10/22/09 Project / Client Reits 4 Jens WEATHER: COOL 60°F RAIN, WIND FROM 05 - Finished dilling, sand & growting P-120 18- Que to rain drilling activities were Stopped. Max's Enterprises tinkshed unloading support timek. 50- Maris Enterprises offsite and demobilizing back to Ft. Scott KS. 50 - Offsite for the day 0 - CT John E. mer. Interned him that drilling activities have ceased for the week due to tain. 1 11

Date 10/26/09 Location America UE-Labadie Project/Client Reitz Tens WEATHER: COOL 559 OVERCAST LIGHT RAIN CAM 0920 - Arn'se onsite for Ost fieldurade Sunte King onsite. Max's Enterprises onsite. Doug & Ryan thenrike. B. 11 Dulyois Observed Terry Duin Mud Rotery Vig Dasite 0925 Asked Bill Dubbis of he completed his 10-hour OSHA training the stated he did but does not have the certificate w/him. 1000 - CT Dare Hunzler Intormed him to Fax OSHA certificate for Bill Cubols to Mike Carlson 1010-Setul on P-61 1030 - Conduct failente sately meeting. 1035 Begin dr: 11ing on A-61 Well Construction Notes: A-61 4" Sch 40 PVC 20-Slot set base @ 34.7 use 350 10/20 A. Sand to 21.2 16 30405. Sond to 20' 75 16 use 68 Bent. Sluring to GS. use 00 g D,= 10" D= 14.54 ( Cale. Vol. = 69 **q**)  $\beta W = 50_q$ 17 MUTS/

Date 10/14 10/2109 Date 10/20/09 Location Ameren UE - Labadie Location Amerente - Labadic Project / Client Leitz & Jens Project / Client Reitz Jens 1519 - CONT. - R.O.W. He stated yes 343 - Finished drilling sand & growting P-61. The wet ground conditions are requiring but that we must sample these the drift in to pull the support truck since we have not received appoint trom Keitz & Jens to log the holes down the furn access road and to From the cuttings. Intorned Mike the piczometer locations. 15 - Setup on P-122. Mais back to equipment that we will attempt putting away From P-122 and try setting up on storage area to fill water fants, switch trailers, decon HSAs and load 2" P-87 1615 Begindrilling on P-87. well materials. 15 - Orilloig and support truck unable to 1655 Scottking onsite stated his new make it to P-122 because the support GeoSydit pump stopped workly. Seld truck transmission is overheating from he is offsite for the day. assisting the drilling during pulling. TA- CT MM Carlson to ask if we could Well Construction Notes: P-87 2 Sch 40 PVC 10-Slot, set base @ 35 get the bull dozer from PACE Const. 20/40 P. Sand to 21.4' use 310 30/70 S. Sond to 19.6' use 50 to pull the support truck to the 16 pierometer locations. He sald whave 46 Bent Sluing to GS use 42 9 opproval to request PACE to pull the  $(C_{a}|_{c}, V_{0}|_{z} = 50g_{g}) O_{z} = 3^{u}OF = 9^{u}$  $PW = 50g_{g}$ rig/truck it we are getting stuck but only if they are onsite. Informed MKE that the buildozer is onsite, but I an unaware if PACE personell are onstre. 1828 - Finished drilling sand & grouting 19-87. I asked Mike it we can set up on 1858 Unload trucks and offsite. P-87 and P-14D from the Davis Rd. Grants Dou () mines / lou

Date 10/27/09 Location America UE-Labadie Project / Client Keitz & Jens WEATHER: COOL, 45°F, OVERCAST, RAINING 215 - Maris Enterprises Support truck has Hut tive on front left. They begt to all the tire with their portable Complessol. 245- Follow Max's to tile repair shop. 22- Arrive onsite w/ Max's Enterprises: Ryun Hunzikes and Dubois, B.M. Doug Hunziker getting tire fixed on Support Frack in St. Clair. 135- Ryan Hunziker spoke we Doug Huszike about support truck and the service repair station indicated the wheel bearings on the tront need replaced due to the "shaking" of the wheels when on the lift. This will require the truck to be in the repair shop most of the day. 155 - Doug Hunziker called and indicated that upon turther inspection of the track it will not require repair of the wheel bearings, Only Hightening of the wheel lock nut. 134 - Setup on P-140 w/ diilling pulling the support trailer. 336 - Conduct tailgate Safety meeting

Date 10/27/09 Location Ameren UE-Labadie Project / Client Keitz & Jens

0900-Doug Hunziker onsite w/ supert fuce. 0908 - Begindrilling on P-140. Well Construction Notes: P-140 2" sch 40 PUC 10- \$10+ set base @ 34.7" 740 P. Sand to 21.25 use 240 36 30/10 S. Sand to 20.1, use 50 16 Bent. Slurry to GS use 28 (Cak. Vol. = 51 g) D:= 9.5" D= 13.5" D(12- 44 PW= 449 1146 Finisheddrilling Sand & grouting P-140 1202 - Finished pulling out drifting + trate W. Greden GMC Hut is being pulled by support truck from Davis Rd. 1212 - CT Mille Carlson Informed him the rain is causing the tield conditions to be too wet to demand that we arc leaving the site 1232 CT Kenny Kinte, Ameren Sa foty, to intom him we are leaving the site for the day. 1240 - Mak's Enterprises and I offsite. O MUIS Lou

1.44

Location Amerencie-Labadie Date 10/28/09 Project / Client Reitz & Jens WEATHER: COOL, 50°F, OUERCAST, DRIZZLE, 1058 - Arrive Onsite For DSI Fieldwork. Mars Enterprises onsite: Doug & Ryan Hunziker, Bill Dubois. 715 - Finished recon. of potential drilling locations. The fields are saturated with areas of standing warter. P-187 has standing water but is located off Davis Rol and appears to be the best option. 750-Setup on P-187. Walt for Maxis to arrive at location w/ dralling. BIS. Diillig would not start. Ignition wire began smoking. Max's realized ignition and then ump started drill rig. 338- Re-schupon P-187. Observe Terra Bill and Reite & Jens onsite, Kyle Kocher and Jason Haett. 309 - Begin drilling on P-187. Conduct tailaste satety meeting. 41- Finisfed drilling, Sand & growting P-187. 30- Observe Mike Carlson 4. Chris Viewether onsite. Frank Phillipsonshe 300- Backfrom taking Ryan Hunzikes to haladie to buy lunch for the clew. Smorts Don

Date 10/28/09 Location Ameren UE -Labadic Project / Client Keitz & Jens WEATHER: COOL 60°F OUERCAST, 5-10 MAH WEND FROM SOUTH Well Construction Notes: P-187 2" Sch. 40 PVC 10-Slot set base @ 35.1 20/40 P. Sund to 218, use 300 16 3% 5. Sand to 20.7' 50 16 use Bent. Slurry to GS, use 32 Bent. Sluring to 65 use 32 g (Calc. Vol. = 53 g) D;= 3" D;= 75" PW= 60g 1315-Setup on A-79 Mike Certson stated to continuosly sample to 10 fect and then HSA down to 35-tect without splitspoon samples. 1339 - Mais now to lo catton by using dilling to pull support trailer. Very muddy and Slow pulling. 1350-Begindrilling on P-79. ~ 1400 - Bluke Smotherman, Chois Vienether & Larry Pirce onsite. All w/ MONR 1440 - MDN2 leaves P-79. 1513 - Enished drilling, send & growting P-79. 1543-Setup on P- \$581. 1550-Begindiillingon P-8381. Unizo Dou

Location AmerenUE-Labadic Date 10/28/09 Location America UE-Labadie Date 10/29/09 Project / Client Leitz & Jens Project/Client Reltz 4 Jens WEATHER: COOL, 50°F, OUERCAST, WIND FROM the NE at 10-15MPH Well Completion Notes: P-79 0652 Andre onsite for DSI Fieldwak "Sch. 40 Prc 10-Slot set base@ 35" Mike Calson Buster. Maris Enterprises 9/40 P. Sand to 21.6', use 265 onsite: Doug & Ryan Hunziker, lb , use 50 %70 S. Sand to 20.25 B: 11 Qubois 16 Bent. Slurry to GS, use 42 1/2 0719 - Conduct tailagte sately meeting. (Cale. Vol. = 52 a) Die 7" OF= 13" 0815 - Setup on P-106. Connect +raile PW= 5kg to GMC Breder Fruck. Or M rice PE 106 location. 5+3- WEIL Construction Notes P-BI "Sch 40 PUC 20-Slot set base @ 34.8" 120 P. Sand to 21.25' use 360 16 9/105. Sand to 20' use 50 16 SHELBY TUBE-P-106 1-3 Bent. Slurry to GS, use 63 g Well Construction Notes: P-106 (Cale. Vot. = 69 g) D:= 13" D== 22" 2" Sch 40 PVC 10-Slot set base @ 35 PW= 53g 20/ 40 P. Sand to 21.7' use 260 1828 - Finished dr. Wing, sund & growting P-BL. 908 - Finished unloading trucks and offsite.  $(Calc. Vol. = 51 - q) D_{i} = 4' D_{f} = 9.5''$ PW=50 Muts Jour 1010 - Finished dilling, sand & growting P-106. Rained out rence Site @ 11:20 U MARES (

Location Ameren UE-Labedie Date 11/05/09 Project / Client Reitz & Jens WEATHER: COOL, 50°F, CLEARSKIES, MILD 305- Arrive onsite for DSI fieldur ork. Max's Enterprises onsite performing wenhend completions: Doug Hunziker, B: 11 Onbois & Ryan Northcutt. Scott King oncite. Doug started the fields are still very wat and causing the support fruck and rig to become stuck, which is slowing progress. He Il commended We begin dr. Ning and allow the Fields a couple of days to dry and then perturn wellhead completions. 20 - Attempt setting up on P-146; howers, we condenot make it to the hole location. Drainwiter tank and attempt being pulled out to farm access road. 52 - Finided filling up w/ water and setup on P-108, 05 - Conduct tailgate safety meeting. 27- Begin drilling on P-108. 08- Chrisviewether ansite. "55- Spoke w/ Larry" Boot Pierce via Chris Vienether's cell phone and he stated that we must continonal y sample to total depth theretore, requiring splitspoons Sim are Done

Location America UE-Labadic Date 11/03/09 83 Project / Client WEATHER: WARM, 60°F CLEADSIES CALM, MILD

1235- CONT. - every 18 mehrs. I Then mistructed the drik crew to stop drilling notil we can get this resolved. 1238- CT M. Ke Carlson Lett message tur him to return my call. 1300 - CT Gredell Central office to Speak w/ M. Ve Calson. Mace save to stop drilling until turther notice. 1310 - Chris Vierrether ottsitetor lunch. 1345 - Support trailer has flut tire. Remore the from trailer to have repaded. 1410 - Chris Vierether culled to say he was backonsite. Intumed has that we were done dr. 11ing until further notice. 1444 - Back to P. 108 cel second support trailer to begin missing dooret for well head completions 1505 Beginadding grout, 5-plugs and lock to uncompleted wells 1535 - Spoke w/Lairy "Bout" Pierce via Chiss Vierrethers cell phone and he stated to follow work plan as previously followed/as we have been doing

Location Amerin UE-Labadie Date 11/03/09 Project / Client Reitzd Jens

Growt Comments PZ P-9 Og Completed P-106 05 49 Add lock 5-plug and growt 1.93 Completed 30 P.95 Чg Completed P.97 54 Completed 01 5g Completed P-99 10 Og Completed, walked to P2 P-104 022

Location Amerin UE-Labadic Date 11/03/09 Project / Client Reitz & Jens

1535-CONT. - but that we must sample every plezometer via continuosly sampling until non-cohesine material is encountered, then op lit-span sample at 5' intervals. He stated the CAT drilling crew with bore next to the 3 siccometers that were not sumpled via split spoons 1539 - CF Mike Curson. Verified and Contismed Larry Picne - comments ducumented above. 1045- Finished well completions. Unload thall a trailed take trash to dumissted. 1715-0 Fisite for day and u/ Maxis to Union to get the repared for support traiter. mas Dan

Location	Ameren	UE-Lab	adie	Date //	104/09
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10	15 M IS	Dis K	Jan No	ith cut	
027-	Setup O	r F- 108	3 to Co.	nt. dr.	ling.
050-	Conduct	-tailgat	esafety	meeti	g
P70-	Finished	jump s	tarting	drill rid	Max's 17chose
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Location Ameren UE-Labradie Date 11/04/09 Project / Client <u>Leitz & Jens</u> WEATHER: COOL, 60°F, CLEARSLIES, 15-20 MPH GUSTING WINS FROMEAST, MILO 0920 - Go to equipment storage area to get supplies, 2nd trailer, and water For next 2 wells. 0925- Mike Chrison onsity. 1008-Setup on A. 110. 1015 - Begindrilling on A-110. Well Construction Notes: A-110 2" Sch 40 PVC 10- Slot sct base @ 35.2" 20/40 P. Sand to 21.75, use 260 16 30/70 S. Sand to 20.25' use 50 - 16 Bent. Sluing to 65, use 25 g (Calc. Vol. = 52 g) Di= 13" DE= 16.5" PW= 38a 1225 Venicpipe unscrewed inside 4543 during the addition of send. 1245 Mars able to reconnect tremie pipe and start the addition of sand 1332-Finisheddr: Iling, sand i growting P-110 1355-Begin drilling on P-112 1524 - Chis Vieliether Onsite at Parz. 1600-Mille Callson onsite at P-112 1650 mike Carlson leaves A-112

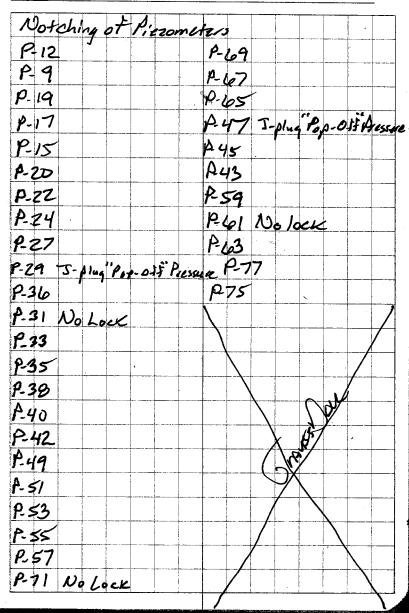
Location America UE-Labordie Date 11/04/09 Project / Client Pritz & Juns

Dell Construction Notes: P-112 Sch. 40 AVC 1D-Slot Set base @ 35.3' 10 P. Send to 22.4, use 250 gr 16. 705. Sard to 20' use 50 16 N. Slurry to BS, use 18 g Cede. Vol. = 51 p) D:= 17" D= 19.5 10: 31g 710 - During the addition of secondary sand sand would not fullout of the HSAS before natura sands intil trated filter pack, Mercroit, the secondary Sand height is 2.4 feet. 17 - Chris Vienithe leaves P-112, 27- Finished duilling, sand & granting P-112. 310 - Frished unloading tradler and quiding drilling back to equipment storage orea. Offsite. MUE

Location America UE-Labadic Date 11/05/09 Project/Client <u>Reitz & Jens</u> WEATHER: COOL, 35°F FOGGY, CALM, MILD 0605- Arrive onstre for OSI Fickhook MAL Carlson onsite, Maris Enterprises onsite . Dave, Doug ? Ry cin Hunziker, Bill Outoois, and Ryon Northcutt. 0627 - Conduct tailgate safety moeting. 0710 - CME 750 Dristrig will not start Remove starter and sugar to Leave Site w/ Kyen Humikes to Washington to purchase new starter, buy part for support Fruck, 0715 - Offsite to Washington. 0845 - Bull From Washington State will not be available until 1:30 pm today at O'Reilys Autora H3 in Weshington. Truck bricke dust Flange will not be available for pickup until 10 00 her on 11/04/09 at Ioid in Weshirster. 0445 - Finished preparing supplies and trade to do well completions. 0958 - Ryan Hunziker and I begin was ! completions. 6 mars Dou

Location America UE-Lubadie Date 1105/09 Project / Client Reitz & Jens WEATHER: WARM, 60°F, CLEAR SKIES, CALM, MELD Grout PZ Connerts Og Repair: hole in pad. P-118 00 P-106 09 Completed Sq Completed 24 P-108 P-110 × 64 Add j-plug 38 P-112+ 7g P-79\* 7g P-81 8g Add ; - plug 48 57 Add j-plug Completed Thompsteed 24 P-61 89 29 Add Pro, Cong., Conc., J-Plag P-70 69 00 Compad, No Lock P-79\* 09 25 Campleted, NoLock 45 P-110 × Oa Completed, Nolock P-112+ 0g 52 Completed No Lock 10 - Finished with weilhead completions. Ryan Hunziker and I offsite to Washington to pick up the starter for the drill 25 - Back From Washington. States at O'Reilys did not have correct mounting position. Return to site w/old starter. 57 - Begin notching wells for surveyers 15 - Meeting cul Paul Reitz, Jo Ann Thee, Chilis Cook, & Mike Carlson about minimizing

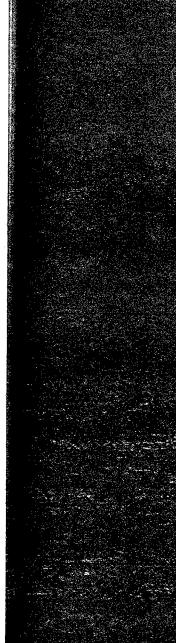
Location AmerenUE - Labudie Date 11/05/09 Project / Client <u>RLitz & Jens</u>



Location Ameren UE-Lobadie \_\_\_\_ Date 11.06/09 Location Ameren UE - Lubadie Date 11/06/09 Project / Client Reitz & Jens Project / Client Reitz & Jens WEATHER: 65°F WARM MOSTLY SUNDY, 10-15 MDH WEND FROM SOUTH, MILD Notching of Aiezometers - Cont. From 11/05/09 Wen Construction Notes: A-142 P-79 Add Lock 2" Sch HO AVC 10-SIST, Schbase at 35.1" P-81 20/410 P. Sund to 22.1 use 300 16 P-87 30/50 S. Sand to 20.1' use 50 Pad Collapsed P-99 Bent Slurry to GS, use 21 P-97 (Cale. Vol. = 51 g) D: 7" D= 10" P.95 PW= 63q P.93 1825 - Finished unloading traiter suggelia 1120 - Dritt rig, CME 750, Still ino perable. and assist w/ repair of support Assist Lynn Hunziker with mixing freek Support fruck operating. grout and attempting to unhook Mike Curlison May's Enterprises Frailer From BMC; how ever, ground and I affecte. is too soft and trailer hitch is too low From weight. Begin assisting 1335 - Cannot repair Clutch. Moresparts needed. Walk to P-142 location to observe JTO. NAWA drilling 1452- Finished drilling, sand & growting P-142. 1549- CME 750 operating, Begin drilling on P-128. 1739- Finished diiling w/ 8.25" 145As to 35' forday. GAUSS Don

Location America 4E-Labadic Date 11/07/09 Project / Client Reitz Sens WEATHER: WARM, GOOF CLEAR SKIES, MILD Olle15 - Arrive Onsite tur OSI Fieldwork Mile Carlson; Max's Enterprises Onsite: Dave, Dorg & Ryon Han Ziller, Bill Dubois, à Ryan Northcutt 0630- Conduct tailgate sofety meeting. 0640 - Ryun Hanziker and I setup on P-128. Begh installing rebuilt starter. 0705- Resume drilling on P. 128. Well Construction Notes: P-128 4" Sch. 40 PVC 20-Slot, set base @ 34.7" 0/20 P. Soud to 21.3, use 400 10/50 S. Sand to 19.5, use 75 16 Bent, Slurry to GS, use 60 g (Calc. Vil. = 68 g) D:= X2" D= 6" PW=72 0830- Mike Carlson offsite to JC Office. Ground too soft for B-53 to drill. 0847 - Finished drilling, sand & growting P-128. SHELBY TUBE SAMPLE + P-128 0.7-2.7' 3 South of Boschole 15° Rec Gmuss On-

Location America UE-Lalgadie Date 11/07/09 9, Project / Client Reitz 4 Jens Grout X ΡZ Comments A.142 0415 12a P-88 0924 P-73 100 0927 0941- May's Enterprises and I Areisland unhooking trailers and unloading supplies. Offs. 70.



Location Amerca UK-Labadie Data 11/09/09 Location Americalle-Labadie Data 11/04/09 Project / Chient Reite & Jens Project/ Client Leitzh Jens WEATHER: WARM (05 OF DUERCAST, MILD, CALM 1110 - Arive onsite for DSI Fieldwork, Mike 1720-Frished de May For duy on A-83 to 15' 1745-Maris Enterprises and Mic Curlson and I at 5:te Carlson and Max's Enterprises Oliverdy Onsite. GMC truck, Gredell, wheelk caring begun grinding on way to site early the morning. Redward to Jefferson City to drop alt truck for repairs and brought Strong / Vehicle to site 1130 - Setup on P. 156 Begin duilling. Well Construction Notes: P-156 2" Sch 40 PUC 10. Slot set base at 34.8' 29/40 P. Sand to 21.5", use 250 Hb 30/10 S. Sand to 20.3", use 50 Hb Bent. Slurry to GS, use 49 (Calc. Vol. = 52 g) 0;= 8.5" D\_== 15.5" PW: 44g OV 1415 - Max's portable generator pull cord broke. Dismuntle and repair. 1517 - Finisheddiilling, scand à growting P-156. 1606 - Max's (Dave & Bill) back From filling neuter, getting materials & decon. of HSAS. 1621- Setup on P-83 634- Begin duilling on P-83-Grants Dou

Lucation America 4E-Labedie Date 11/10/89 Project / Client Restz & Jers WEATHER: COOL 50°F FOGGY, HUMID, MUSTLY CLEUDY 610- Arrive onsite For DSI Fieldwoork, Mike Culson and Maxis Enterprises; Dave, Dough Ryan Hunziker; Bill Dubois; and Ruan Northcutt Onsite 620 - Conduct tail gate Safety meeting. 034 - Return to P-83 to resume di 11:10 154- Resume drilling on P-83. 810- Sand and grave inside 145As and sand Catch could not be opened to setwell Pull Deat HSAS, plug bit, and reamout hole to 35' Nell Construction Notes: P-83 Sel. 40 PVC 10-910+ set base at 34.8' 40 P. Sand to 21.5 250 use 4 50 S. Sand to 20' 50 16 . Use ent. Sluing to BS, use 32 -9 (Calc. Vol.: 51 0;=9.5 0==14" <u>q</u>) W: 30g 837- Blake Smotherman MONE Onsite 940 - Finished drilling, sarel & growting P-83. 949- Blake Smotherman leaves A- 83 location 05- Maisbackto equisment storage grea

immin Ameren UE-Labadie 11/10/09 Project/Client Keitz & Jens LUEATHER: COOL 55°F CLOUDY WIDD FROM NORTH 10-15 MOL 10 24 - Complete photographs of below: PHOTO LOG South, ruts made by combine on Form access Road east of P-1107 - on 11/00/09 2) Same as previous 3) NORTH ruts made by combine on fam access roudeast of A 1157. 4) South ruts made by conably on form access road southeast of P-167. 5) South, wethere crossing on toundad road (6) NOBETHUREST, ducks in use-Hand. 1036-Setus on P-85 1050 - Maris arrives of P-85 after filling uniter tank, decon. of 4545, and ball of 10.25" 45A5/ piezometer muterials 1108-Blake Smotherman arrides at P-85 1109 - Begin diilling on P-85 1245- Blake asked to take photographs of my dilling log. Informed him that he is welcome to He is also taking photographs of soil samples 1433 Resume dishing w/ 10.25" Jus 15 75 75 35

Location Ameren UE-Labadie Date N/10/04 Project / Client Feitz 4 Jens 433-CONT: afters Maxis cut wood phags For the ItsAE. Mso, had to retrieve auge publics and retriever From Cont 750 dr.11 1/2 Pell Construction Notes: P-85 Sch. HD AVE 10-Slot set base at 34" 40 P. Sand to 20.5" , use 350 Us 505. Sand to 18.7 50 use 16 ent. Sluin to BS, use 49 Cule, Vol. = (25 a) D; = 10" 0= 17" W= 504 547-Blake Smotherman offsite Forday. 601 - Growthose plugged. Cheorout plug and begin growting 028-Fihished deilling, sand 1 growting P-85. 145 - Unload supplies and materials. Maris, Scott King, Mille Carlson and I offsite 3 Mood Dow

antion Americalie-Labadie Date 11/11/69 Huject / Client Reited Jes WEATHER: COOL, 45°F CLEAR SITES MILLS, 0615- Arrive onside for OSI fieldwork. Mike Carlson, Scottking and Max's Enterprises ( Dave, Dong Ryan Hunziller; Bill Ouloois & Brian Northeuty) onsite. 0635 Dave Hunziker & Bill Dubois offerte to Ft. Scott, KS Bill's and to had a series stroke and authork is grimm. Old 10 - Conduct tuilgate safety meeting 0650 - Take Osing Henrikes to Motile 8-53 119 at P.85 location to move to next location P-124 0705- Putt B-53 on P-124 location and learc on standby until fail drill crew refuns 0715- Scrup on P-136 and resume dr. Ring ar/ 10.25 HSA 0751- Leave A- 136 to get field staking Supplies. OBILO Begin Field Staking by walking to ocations. 0951 - Finished Field staking at P-160. Setup on P-124 Mille Cuilson leaves to meet wil Kenny Kin to for safety meeting

Location Ameren UE-Labadie Date 11/11/09	Location Amerallie-Labedie Date 11/11/0
Project/Olient Reitz & Jens	Project/Client <u>Reitz &amp; Jens</u>
	WEATHER: WAILM, 650F CLEAR SKIES 5-1 MOIL WEND FROM NORTH, MILD
Piezometers Field Staked	
P-191 Fallow, ground very soft	1406-Setup on P-126
P-193 Fallow ground toft	1418 Begindrilling on P-126.
P.181 Fallow, ground soft	1620 - Ourny the installation of the 4" A
P.179 Fallow ground very soft	prezometer for P-126 fine suces
P-150 CornStubble, ground Very Soft	infiltrated Its to and would not an
P.152 ComStubble ground soft. C-151	the well piczometer to be instal
under standing water	at 351
P-164 Coinstubble, ground soft.	
P-162 Corn stubble, ground soft. C-163	Well Construction Notes: P-126
192 COM, Standle, CIDERA SOLA, C-105	4" Sch 40 PVC 10-Slot, Set buse at =
Plinder standing water & Fallow/crops.	20/10 P. Sand to 20.3, use 440 16
P 160 Corn Stubble, ground soft	30/50 3. Sand to 19 , use 50 16
	Bent Slury to BS, use 45 g
1046-Begindrillingon P-124.	(Cake, Vol. = 66 g) 0:= 7" 07=
119a12 Acacha 12, 182 have D 1211	PW= 42 g
Well Construction Wotes: P-124	
2" Sch. 40 AVC 10-Slot set base at 35.3'	1715 - Tinbulcol clinding, sand & growting P. Le
29/40 P. Sand to 22' use 250 16 39/50 S. Sand to 20.1' use 50 16	1745- Ottsirc along wit Mike Carlson Se
	King & Max's Enterprises
WIT. STURY TO \$3, 450	
	Junit Daw
PW= 48g	
1352-Finished drilling, Sand & grouting A 124.	

Location America UE-Labadie 11/12/09 Location Ameren UE-Labudie Dation 11/12/09 10 Project/ Client Reitz & Jens Paulander Colores Reitz & Jens WEATHER: COLD. 35°F. CLEAR SKIES, CALM, FROST OEATHER WALM LOOPE MOSTLY SUNNY, 5MPH WIND EROM SOUTHEAST Olo10- Arrive Onsite For DSI Fieldwork. Well Construction Dotes: P-114 Mike Carlson and Max's Enterprises 4" Sch HO PUC 10-Slot Set Base at 34.8 2940 A. Sand to 21.6, use 450 16 (Dough Lyan Hunzilles; Ryan Northcutt) 3950 S. Sand to 20.1, use 75 Onsite, 0630- Conduct tailgate safety meeting. Bent Sturry to GS, use 53 0650 - Setup on P-114 while Max's fuels (Cak, Voi = 70 0:= 10.5" 0=14" -9) PLO - 780 CME 750 and mobilizes to P-114 0745- Max's sets up on P-114. Power washer West Frolen and 45AS could not be Well Construction Notes: A- 152 2" Sch 40 AVC 10. Slot set baseat 34.8" decontaningeted until somer washer 20/40 P. Sand to 21.5' un Haned. us e 225 0757- Begin drilling on P.114. 30/50 5. Sund to 19.5' 50 use 0930 - White convertible Sebring? w/ tan top Bent. Slurry to GS, use 45 Observing our dilling activities from Davis (Calc. Vol. = 50 0,=14" D==17 .g) Pcc= 48g Load. 0945- Dave Hunziker onsite. He is going to Setup on P-138 w/ Mubile B- 53 rig. 1610 - Finishedde illing sand of growthing P-152 1209 - Finished drilling, sand & growthy P- 114. 1630 - CME 750 required to pull Support 1310 - Use CME 750 to pull KOG offort truck from P-152 Then mobilize to of location near B-153 P-13B and publ support fruck and 1330- Setup on P-152 1335- Begin di Iling on P-152 Mulile B-53 to Davis Rd Chris Vienether onsite. Stated he hasken ons te shee 1100 hours. MATS NOU 1645 Chris Vienether offsite. ALL OFFSITE 1710 SAMS DOLL.

Location Ameren UE-Labedie Data #/13/09 Project/Client Restz & Jens WEATHER: COLO, 40°F, MOSTLY CLOUDY, CALM, 0620 - Arrive onsite for OSI field work. Mike Carlson and Max's Enterprises Dave Doug & Byan Hunziker; Ryan Northautt) Onside 0650- Conduct tailgate satisfy meeting 0735-Setup on A-165. 0748. Beginds: 11ing on A-165. PW=400 Well Construction Dotes: P-1105 75 4" Sch 40 PVC 20-Slot, set base out 37.9' use 400 46 19/20 P. Sand to 21.25 30/50 S. Sund to 50 19.8' use 33 g Beat. Slurry to GS, use D:= 6.5'D== 10" (Cake. Vol. = 69 g) PW= 60g 1106 - Finished drilling sand & growting P-165. 1110 -PZ Growt Add Comments P-128 129 1130- Marsbeginsdecon. of ItsAs 1220- Setup On P-15B. 1230- Beginduilling on P-158 Inn's Door

Longion America UE - Labadie Data 11/13/09 Project / Client Reitz & Jeas WEATHER: LODOF WARM MOLTEY SUNNY, SMAH WITH FROM SOUTH, MILD Well Construction Notes: P-158 2 Sch 40 AVC 10-5/04, set base at 34.9 2940 P. Sund to 21.4' 30/50 S. Sund to 20.25' use 250 16 50 16 use Bent. Slurry to GS, use 38 (Calc. Vol. = 52 2) 0:=11.5"0= 14 1450 - Finished drilling, Sand & grouting P-158. 1552 - Begm Field staking. Walk to locations. \* Pierometers Field Staked the P.185 Cornstuble, ground 50#++++++ P-173 Cornstubble ground soft, in hous P-183 Corn Stubble, ground very soft / wet P-195 Unharvested Corn, 6" of weater P-197 Cornstrubble, ground 30ft, wet areas surrounding location P-115 Cornstubble, ground soft /wet 1700 - Finished Field staking. 1725 - Mike Carlson, Marss Etterprises and I offsite Gmus Oper

Location Americalie - Labodie Deta 11/14/09 Date 11/14/09 111 Location Ameren UE - Labadic Freject/Olient Reitz & Jens Project/ Olient Rest & Jens WEATHER: COOL, MONTLY CLOUDY, 450F CALM. MELD 0612 - Arrive onstre for DS.T. Fieldwork. 1105- Mobile B-53 became Stuck trying to Mike Carlson and Maris Enterprises pull out the OME - 750. Use persone ( ( Dure Doug & Ryan Hunziker, Ryan 1001theret ) onsite. truck to pull out Support truck # 2 1115- Mike Carlson offs Re" 0632 Conduct tailgate safety meeting. 1120- Take Lyon Hunziller down to Normers 0706 Setup on P-150. CME 750 unable hervesting beens and gel them to to pull support truck to the staked pull drive rigs out. They said they location. Move location 40' to the would; there to, we drove a funnia west to get his fraction + I mile away. 0720 - Begin drilling on P-150. 1140 - Favmer w/ treator onsare and begins pulling out drill llas. 1229-Begin well completions PZ Growt Comment Well Construction Notes: P- 150 2" Sch 40 PUC 10- 3/0+ Set base at 35.1' Comments 20/10 P. Sand to ZZ' use 275 39/50 S. Sand to ZO' use 50 1230-P-120 Og Og Completed, NO LOCK 1235 P-122 14 Completed No Lock Bent Slumy to GS, use 60 g (Calc. Vol.= 51 g) D:= 11" D= 15" 10g Add temp casing, 100 lock 1257 P-134 4g 3g 1302 P-146 Completed, Notoce PW= 36g. 1312 P-158 Completed, NO LOCK 1000 - Finished dilling, sand & growting A-150. 1027 - 4se CME 750 to part support Finer 42 1357 - Flisted unloading trucks and securing site Maris Enterprises and z out of field, unsuccessiful. offitz. 1100- Combine harvesting beans from the Sw part of the Newman property.

Location Lite - Amuen LIE-Laber Date 11/20/09 Project / Client Lik Jeas

316-CONT: are too wet for the dining to Schup on any location. P-199 locution access points are carendy soft & wet. Explained to him that Mais is trying to complete wells but water is infiltrating borcholes/pads. Informed MKL that Scott is developing P-88 currently, and I will give hom a can in a couple of hours w/status. 330- Go to Labe de Market For burch 343 - Back from Laberdie Market. 350- Doug and Eyen Northurtt Go to Cantiment storage area to decon. HSAS Jun last week and prepare the Mobile B-53 rig for trans port back to Ft. Scott. 512 - CT Mike Carlson Informed him Majos i's Finished winterizing equipmentand Icady to depart to Ft. Scott. Mais performed 2 out of 12 completions (P-156 of P-114) - Lowerer, the other piezoneters were too wet to complete. Maxsadded temp. Casings to the other 10. 1535 Maxis, Scottking & I offsite, Grouts Dou

Location Ameren UE - Labadie Date <u>11/20/09</u><sup>11</sup> Project / Client Reitz & Juns WEATHER: COOL, 50°F CLEAR SKIFS, 5-10MALL WEND FROM THE SUD, 1055 - Arnu onsite for DET fieldook. 1100 - Scottking onsite 0 1005 pluning mobilization to the site Dare Hunziker Called and indication the Support truck un dr. 71 even bake down in Lebanon, mo and will likely not be here until tomorrow 1009- AT Mike Curison to intorne hive of dr.M crew arrival time. He stated to go to the site and check site conditions 1120 - Kecon Site Speake w/ Jagon Procest WRiJ. Jason is field staking today and indicated they was be drilling sometane that werk. 1155 Finished loading samples in Ka's truck and prepare to develop weeks 1205- Setup on A-120 to developsus/ 2019. 1240 - Fil: shed w/P-120. 1244 - Setup on P-126, to develop 1320- F.h. Sheel w/ P-126 1323- Setup on P-114 to develop 1356- Finished w/ P-114 1406-Setup on P-85 to derelop. 1439. Finished up P-85

Location America UE - Labedie Date 11/30/09 Location America UE - Labadie Date 12/01/09 Project / Client Reitz i Jens Project / Client Reitz & Jens WEATHER: COLD 30°F, CLEAR SKIES, SMAR WING 450 - Setup on P-1360 to develop 0625- Arrive onsite for DSI Fieldurge. 523 - Finished w/ P-136 Maris Enterprises (Durg & Ryan 531- Schupon P.165 to develop Hunz Ver, Ryon North cutt) ansile 608- Finished w/P-165. 0700 - Conduct toilgate safety meeting 155 - Frished unloading supplies and security Maris Finished unloading west site attle Scottperformed papernok construction materials from support For development records trailer 700. Scottking and I offsite. 0750 - Setup on P-201 after filling water tank Fueling CME-750, and transport to location DB10 - Beg / drilling on A-201 Well Construction Notes: P-201 2" Sch 40 AVC 10 Slot set base at 35 20/40 P. Sand to 21.3 use 225 1b 3950 S. Sand to 20' 15 259.9 Bent Stury to GS D:=7" D==10.5 (Calc. Vo) = 51 9) PW= 389 1100 - Finisted dr. Iling, sand i growting P-201 1108 - Offsite to Labodie Market to take Rym Hunzike, toget land. 1130- Back onsite, Setup on P-199 Graves Dou

Location Ameren UE-Labadie Date 12/01/09 Project / Client <u>Reitz & Jess</u> WEATHER: COOL 55°F MOSTLY SUNNY, 15-20 MIH WIND FROM SUD 55-Beghdrilling on P-199 Dell Construction Notes: P-199 Sch 4D AVC 10-Slot set base at 34.9' 10 P. Sand to 21.6 use 450 50 S. Send to 19.8 90 弘 49 ent. Slurry to GS. use Cale. Vol. = 69 g) N = 10" D== 17" W-569 47 - Finished drilling, Sanda growting A-199 00 - Check locutions For ground conditions. P-169 4 P-171 maybe able to be accessed in the morning it no rain. 28- Mais prepares Ra 5 man Club Car to begin well completions as Scott King is prite using other Club Car. 00- Finished scowting access conditions to P-164. The ground between Davis Rd. 4 P-164 is a drainage low and soft. Scouted arcess from B-153 to P-164; Lower ground stillsoft. The best access point to the Diezuncters P-1100 A-173, P-183 A-185, P-195 P-175 may be off of Davis Rol directly SMANIS Don

Location Ameren UE-Labadie Date 12/01/69 Tues Project/Client Litz Jens 1600-CONT: South of P-187, 1630 - Scouted A- 17 and it should report likely be accessed from C-1108 to the north since the first 100 feet from the form access road is extremely Solt 1639 - Scouted P-191. Able to dille to the lucation w/ Bredell 1/2 ton GMC but ground is very soft. Well's Completed by Eyan Hunziker & Ryan Detactor P-124 - Completed P-126 - Completed P-134 - Completed 38 -Needs growt Completed P-148 -Under standty water -150 -Needs Growt P.152 -Completed 1-177 -P-136 - Completed P-165- Completed P122 - Patched concrete paddue to collapse. 1755- Unload supplies. All offsite Graves Dow

Location Ameren UE-Labudie Date 12/02/04 Project/Client Re: tze Jens WEATHER: COLD, 35 %, OUERCAST, CALM 1025 - Arrive onsite for OSI Fieldwork. Max's Enterprises (Doug & Ryan Hunziker, Ryan Northcutt) Onsite. 735-Setup on P-1109. Pull support truck with come-750 rig to loca tion. 138- Conduct tailgate safety meeting. 145- Begindrilling on P-169. 910 - Finished sampling A- 169 and begin reaming hole wil 10.25" HSAS. Observed Plat till on Gredell GMC TINK. Front left. Begin changing thre. 114 - Finished changing tire. We had much difficulty due to the jack and track sinking in the soft soil Well Construction Notes: P-169 "Sel HD PYC 10-Slot set base at 35" use 400 40 P. Sand to 21.5" 505 Send to 19.5' 90 . USC 46 pent. Slurry to GS, use 39 Calc. Vol. = 68 g) Di= 5" D= 10.5" 20 = 60g 144- Finished drilling, sa -d, i growting A-169.

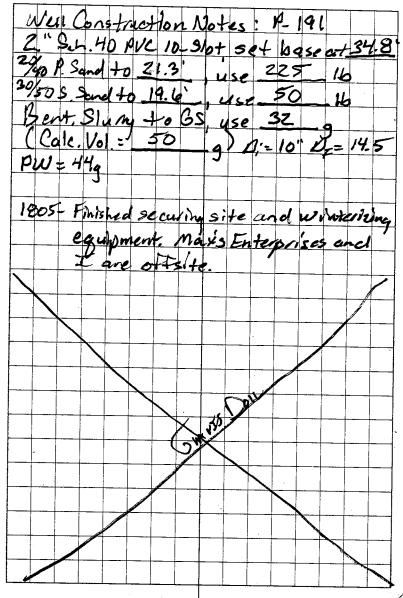
Location Amelle 4E - Lebadie Date 12/02/09 Project/Client Reitz 9 Jens WEATHER. COLD, 40°F ODER CAST, 10-20 MAN LA ENDS FROM THENDETH 1155 Setup on P-171 1205 - Begin drilling on A- 171 Well Construction Notes: P-171 2" 9ch. 40 MVC 10-510+ set base at 35 20/40 P. Sand to 21.6 uce 275 16 30/ 30 9. Sout to 20' 50 use 14 Bent Sturing to GS use 46 a) D:= 10,5'D== 17" (Cak. Vol. = 51  $PW = 40_{g}$ 1422 - Finished drilling, sand & growting P-176. 1445 - Parkdrill rig on tamaccess road new PILA. Due to the Flat the reading repair, we are going to leave the site to make it to St. Clark no by 4:30pm to day to have the the repaired and placed back on the truck. Take Kym Hunziker to Labadie maket to get tund. 1500 - Back onsite and its beginning to race. Max's preparing supplies and equipment tor tomorrow. 1538- Maris Enterplises offsite. Omvis Dou

Location Ameren UE-Labadie Date 12/02/04 Project / Client Reitz & Jens WEATHER: COLO 40°F RAINING, 10-20MAH WIND FROM NORTH 555 - Finished securing site. Scott King and I offsite. Head to St. Clark to have BMC Truck tive Fixed/mounted. 700 - Finished getting the Front left tire repaired and mounted. I had the Space tive installed on the manuhed and the repaired/plugged the made into the spare. A 3/4" hole w/rock observed on mer wall of thre. Dor

Location <u>Ameren UE-Labadie</u> Date <u>12/03/09</u> Die 1-125 Project / Client Reitz & Jens WEATHER: COLD, 30° F, OVERCAST, CALM 0631-Arriveonsite For DSI Fieldusk 0635 Maris Enterprises onsite ( Doug & Ryan Hunziker Ryan Northcutt) 0700- Recon the field conditions w/ Ryan Hunziky due to yesterday's afternos Vala (snow mix It aspears ~ 1/1" of precipitation fell. P- 179 ggs. to be an ssible so we win atten setting up at that location. 0725 - Concluct tailgate satety meeting 0741- Max's begins airing CME- 750 the and support thailer thes 0824- Setup on P-179. 0832 Begin der Iling de A-179. Well Construction Notes: A- 179 2" Sal 40 AVC 10 - 5/02 Set base at 34.9 20/40 P. Sond +0\*20.7' 250 use 30/ 50 S. Sand +0 19.3 50 use 6 Bert Slurg to BS. use 32 0;=150 (Calc. Vol. = 49 -6" 6)  $PW=4T_{q}$ P. Sand would not Fall out of HSAs 2 raise 1701

26 Location America UE-Labadie Date 12/03/09 Thurs Project/Client Reitz & Jens WEATHER: COLD 35°F, 10-15 MPH WIND FROM 1104 - Finisheddri King, sand & growthing P-179. 1126-Setup on P-181 1131 - Begin drilling on P-181. 1229- PUL tiemic head broke during finshing of HSAS at 35 Auril 10 Fret of ASAs to retrieve tremic liser pipe then redril to 35 Well Construction Notes: P-179, 181 2" Sch. 40 PVC 10-slot set base of 34.7" - 0/40 P. Sand to 21.5 , use 225 16 20/50 S Sand to 20 , use 50 Bent, Slung to GS, yse 28 a (Cale. Vol = 51 a) D:= 6" D= 10" PW= HHq SHELBY TUBE P-181 1-3' 12" Rec. 1414 - Finisheddrilling, sand grouting A-181. 1445- Setupor P-191 1500- Begindrilling on P-191, 1707- Finished drilling, sand & growting P-191 735- Scott King offsite. GmuIS Don

Location Ameren UE - Labadie Date <u>12/03/09</u><sup>127</sup> Thurs. Project / Client Reitz & Jens



Location America UE-Labadie Date 12/04/09 Fri. Project / Client Reitz & Jens WEATHER: COLD, 20°F, CLEARSKIES, CALM 2625 - Airlue Onsite for DSI fieldwork, Maxis Enterprises onsAL (Doug " Ryan Hunziker, Ryan Northeutt). 2640 - Conduct tailgate safety meeting. 1734 - Setup on P-193. 1804 Begindrilling on P-193. Well Construction Notes: P-193 4"Sch 40 PVC-20-Slot set base at 34.9" 20 P. Sand to 21.4', use 490 15 950 5- Sand to 19.4', use 100 16 Bent. Slawy to GS, use 49 9 (Cale. Vol. = <u>67</u> g) 0;= 2" 0;= 9" OU= 530 Use 20 - Slot screen per Mike Callson. 1129 - Finished drilling, and & growthy P-193. 1157 - Ryan Hunziker and I loak site to go purchase a board for plugs in the 10.25" HSAS Nersest hardware Store W/ lumber was in Paci Dic, MO, Buy tunch in Laboradie 1300 - Back prosite. 1317 - Setup on P-164. GALSOUR

Location Ameren UE-Lubadie Date <u>12/04/09</u> Project/Client Reitz & Jens WEATHER: COLD. 30°F MOSTLYSUDNY 10MPH WY NO FROM WEST 1332 - Beg ndrilling on P-164. Well Construction Notes: P-164 4" Ich 40 AVE ZO- Lot set base at 34.8 10/20 P. Sand to 21.3' use 375 16 30/50 S. Sand to 19.3, use 100 16 Bent. Slum to BS, use 42 9 ( Cale. Uo! = 67 - g) 0:= 7.5 '0= 15.5  $Pw = 50_{a}$ 1618 Finished dvilling, sand & growting P-164 1736 - Finished setting up de Il rig son P- 197 location unloading supplies and securing site. Maxis and I offsite 1050

30 Location America UE-Lubade Date 12/05/09 Project / Client Reitz & Jens WEATHER: COLD, ZOOF, CLEAR SKJES, CALM >620 Arrive onsite for DSI Fieldwork. Max's Enterprises ( Doing : Ryan Hunziker, Ryan North cutt )onsite 2706-Setup on 19-197. >710 - Conduct tailgate safety meeting. 1724 - CME 750 diff: custing starting, but did with the aid of a jump start, generator assist and starter fluid. "742 - Begindrilling on P-197 Well Construction Notes: A 197 "Sch40 PVC 20-Slot, set base @ 34.7' 20 P. Sand to 21.2' use 375 16 1/50 S. Sand to 19.3' use 100 16 3ent. 9 luny to GS, use <u>42</u> g (Cale, Vol. = <u>67</u> g) D:=9.5" D:= 15.5" JW= 52g 000 - Scout remainly locations of PZ. An were accessed by vehicle. P-162 should be moved 75' to the south across wetland P-195 should be moved 100° North out of low, and P-173 may meed to be moved eastor west. GARS Dur

Location AmerenuE-Labedie Date 12/05/09 131 Project / Client Reiten Jens 1108 - Finished drilling, sand & growting P-197. 12-12 - Finished unlocking supplies, Maris loads & trailer and prepares the B-53 rig to travel back to Fr. Scott, and officite. The bock to SC Office

Location America UE - Labadic Date 12/09/09 Wed. Project / Client Reitz & Jens WEATHER: COLD 25°F DUERCAST VERY WINDY, 30 - 45 MIGH WIND CUSTS FROM 736 - Arrive onsite to continue OSI fieldwork. Max's Enterprisesonsite (Doug Hunziky, Bill Dubois, Ryan Northcutt). 740 - Doug indicated the generator put Cord broke and they must reputrit in order to decon? tremic weter. BILD- Doug Hunzkerand I offsite to Washington, Mo to get new generales. 723 - Doug & I return Wigenerator. Kyan i B.71 prepared supplies, transcuster, etc. while we were away 928- Scott King onsite. 340- Conduct tailgate safety meeting. 100- CME 750 dimin not starting due to cold. Connect generator to Oil warmplug. Also direct Contractor blower heater tourids Engine block. 134 - Rig started. 136- Scott Kny back from trying to develop wells. He stated the pumphoses are Treezing. >40- CT Mile Carlson, Interned him Scott cannot develops the well solve to the Filling Conditions. Mike Stated

Date <u>12/09/09</u><sup>133</sup> Wed. Location AmerenUE-Labadie Project/Client Leitz & Jens 1040-CONT: to send Scott Lome Also informed Mile that drin 11g sust started but we are still planning on setting up on P-162. 1120 - Or Mily 154 part become shick fundite to pull to P-12. Ground is still soft Hrom yesterdy's rain, but not yet frozen. 1141 - Unhook rig from support truck and Sull Support truck frailer back to Vauis Rol. Support trailer now has a Hut Hil. 1210 - Park drilling off of Davis Rol. Orne Support truck up that the on truck le buck to construct un staging area. Dump water tank to lighter the load on the trailer 1230- CT MIKe Calsen, Intomed him adaptot attempt to access P-162 w/out success and that trailed was that, and that are are going to unload nuted scenare for and take it to get repaired. He stated to leaves te to the day & ty again tomorrivel 1309- Leave site For day. May's Enterprises offsthe. Gives Dou

and the second secon

Location America UIE-Labadic Date 12/10/09 Project / Client Leitz & Jens WEATHER: COLD, 10°F, CLEAR SKIES, SMPH WIND 615 - Arrive onside for OSI Fieldwork May's Enterprises onsite ( Doug Hunziker, Bill Untois Ryan Northcutt) 025- Max's begins installing new the onto Frailer '240 - Conduct tailgate saturdy meeting. ,55- Setup and dr. Il rig in the Field near P. 187 and plug into oil "warming" plug and direct heuter/bluer towards Englie block. 142 - Come 750 diviling started 153 - Setup on P-162 Move location n 75 Feet south of wetland to place on higher elevation out of topographic low that holds water. 825- Begin dvilling on P-122. Nell Construction Notes: P-162 'Sch 40 PUC 10-Slot, set base at 34.6 50 S. Sand to 19.5' use 425 15 ent. Surry to GS, use D& 56 Calc. Vol. = 68 g) D:= 5" DE= 13" W= 699 JMUES DON

Location <u>Ameren UE-mbadie</u> Date <u>12/10/04</u><sup>135</sup> Project / Client Reiter Jens WEATHER: COLD, 25 OF CLEARSKIES, 10-15 MPH WIND FROM WEST 1418 - Finished sand in dr. Wing and growthy P-162. mich HAFicilly with threats Freezing on dr. M string, bolts tor 145765 and treme pipes, Diso tremic pipe become disconnected and fell hoto 145As which regulared refrieval. The generater ien and at gas which required refueling and the growthad to be mixed. Growthose became Clagged during the mixing of growt that required disconnecting and Freehy clas. The plutch on the rig also had to be blad 1435 Setup on P- 110D. 1455-Beghan 16 agon P-160. 1053 - Finished dinkling to 25' on A-140 For the day. 1725 Finished unloading supplies. Maxis and I offerte Divers

Location Americane Labadie Date 12/11/09
Location <u>Amelenue-Labadie</u> Date <u>12/11/09</u> Project/Client <u>Reitz &amp; Jens</u> Fill.
WEATHER: COLD, 15°F, PARTLY CLOUDY CALM
015-Andre onsite for OST Fieldwork
Maxis Enterprises onsite ( Doug
Hunziker Bill Onbois Ryan Northcutt)
700 - Conduct tailgat a satety meeting.
Setup on P-160
728- Resume dilling on P-160.
Vell Construction Notes: P-400
"Sch 4D PVC 10 -Stor set base at 35'
40 P. Sand to 21.5, use 275 16
505. Sund to 20 use 40 16
Sent. Shurry to GS use 28
3ent: Shurry to GS use 28 g (Calc. Vol. = 51 g) Dre 3" Dre 7" W= 500
W= Sog
J
348- EmisLeddilling sand à growthy P-160.
10-Setup on P-183
25- Begindrilling or 12183
14. Finished drilling, sand & growthy P- 183
15- Finished getting lunch and Lillie water Land
15- Finished getting lunch and filling water tank
- on support trailer, Setup on P-195. Nove the staked location ~ 50 north to Stay
aut at to again this low that helds where i
145-Beah di Illas on P-195
out of topographic low that holds water 445-Begin di, 111ng on P-195. Onies Docu

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Location Amerenue - Labordie Date 12/14/09 Mon. Project / Client Reitz & Jens WENTHER: COOL 55°F MOSTLY CLOUDY BREED TEMP. DEOPPING TO 35°F BF 1400 HOURS 123 - Arrive onsite for DSI fieldwork Mile Calson à Frank Avilips slrendy onsite performing againter tests. 40 - Maxis Enterprises onsite ( Doug Hunziker, Bin Onbois & Ryan Northcoutt) 05 - Max's begins growting wells at budgets using the Child Car for + ransportation, and decon. of the HSAS Good Comments PZ P-199 10g None P-201 54 11 15 145- Max's stated the ground is too soft For them to grant any more wells. Therefore, they begin drilling weep holes A the protective casing. Also, empty growt-tank to remove pieces of ice that are clogging the 30 - Maxis Enterprises officie for day. 05- Mike Carlson, Frank Phillips and I are offsite 2 mg me Con

Location <u>Amelentie Labodic</u> Date <u>12/15/09</u><sup>139</sup> Project Officer Reitz & Jens Project / Client Reitz & Jens WEATHER: COLD 20°F PARTLY CLOUDY 5-10MAH WING FROM THE NOILTH 0623- Arrive onsite for DSI Fieldwork Mike Carbon & Maxis Entersizes ( Doug Hunziker Bill Dubois, & Rom Northeutpons, te. 0700- Conduct tail gate satety meeting. 0828 - Atter fueling ing starting ry and pulling support truck + trater we are set on P-175. Moved the stalled location 18' south due to a topographic low with standing unterat the location. 0854-Beginarilling on P-175. Well Construction Notes: P-175. 2"Sch. 40 PVC 10-Stot set base at 35 20/40 P. Sand to 20.34 use 250 16 3950 S. Sand to 19.3 use 40 11 Bent. Sturry to GS, use 32 9 (Calc Vol = 49.9) 0:=12" 0=165 PW > 56g \* Heaving sends intiting HSA- during the tremic of the fifter pack. SHELBY TUBT P-175 1-3 GMNIS DOLL 26 Rec.

Location America UE-Labadic Date 12/15/09 Doited Ton Location America UE-Labadie \_\_\_\_ Date <u>12/K0/09</u> Project / Client Leitz & Jens Project / Client Reitz i Jens WEATHER COLD, 15°F, CLEAR SKIES, CALM 140 - Finished dilling, sand & growting P-175 0635- Arrive onsite for DSI Fieldwork 38- Setup on P-185. Use Gredell Truck Maxis Enterprises (Doug Horziker, GNC to load hand water. Pick up Bill Oubois, & Ryan Northcatt Tunch in Labadie white getting water onsite 58- Begindrilling on P-185. 0700 - Max's Enterprises prepares to mix a contand grant wells. Jell Construction Notes: P-185 0710 - Frank Phillips onsite. We plepare to develop / a quite test wells Sch 40 Puc 10-Slot set base at 35.1 40 P. Sand to 21.75, use 275 16 505. Sand to 20.6', use 40 16 Aguifer Testing ent. Slumy to GS, use 35 g PZ Timer Timer Dep the Comments Peath Calc Vol. = 33 q) Di= 11." D== 21" 1-199 0924 6.98 5.85 0929 We 50g P-193 1037 1042 6.87 H. 88 P-169 1116 1121 8.22 Sulter 24 otD-Mike Carlson & Frank Phillips attaite. F197 1319 12.09 1324 9.92 734-FMIshed dritting sand a groupting P-185. P.12 1407 1412 1045 8.96" 330- Finish pulling support tinck/ trailer out 11.95 " P-164 1451 12.39 456 of field and move drill vig to Farm access road. Max's Enterprises 1400 - Frank Phillips affsite. and I offsite 20012 Day

and the second 
2 Location	America	UE-Lab	adie_	_ Date <u>12</u>	/16/09 wed
Project /	Client <u>Re</u> THER: CO	172 4 30 02,40°	CLEARS		mpHFRom
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1-150	59				
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143 Location Ameren UE-Labadic Date 2/n/09 Project / Client Reitz & Jens Thus WEATHER: COLD, 25%, PARTLY CLOUDY CRUM PM: COOL 550 F. MOSTI Y SUNNY S-10 WIND SW XXSF AVINE ONSITE FOR D'ST Avelduson K. Maris Enters rises ( Doug Hunzke, BIN Dubo's, ? Ryan Morthcutt onsite 0705- Maxis begins wer campletions and I beg in wen development Wells Completed 150 P-160 P-162, P-164, P-169 173 P-175 P-179 A-181 P-185, P-191, P-193 P-195 Bent Chips Adde 199 P-201 197 P-\* 12/22/09-TAD-P-138 1P 152 Completed \* Wells Developed P-171 P-179, P-181, P-191, P-201 1630 - Max: Enterprises stated the CVioht on the RAJ MAN Rental Club Car Broke. 1710 - Secure site Max's Enterprises 17 an

Location Americalie-Labadie Date 12/21/09 Mon. Project/Client Leite Jens WEATHER: COLD, 30°F OUERCAST HUMIN SMPH WIND FROM NW. 1-2" Show ON GEBUND 1803 Arrive Onsite for AST field work. Frank Phillips onsite. B36 - Scottking onsite. 1900 - Frank Scott and I begin collecting writer levels 230- Completed round of water levels from 100 piezometers 300 ChrisCook W/ Ri Jonste. Stated they are going to try drilling to day. Gave Chris H- boxes of soil Samples & Z. Shelby tubes. 305 Frank Phillips off site. 325- Scottking & I begin developing wells. Well's Oeveloped P-138 P-152 P-183, P-185, P-195 1755 - Finis Lun loading equipment and securing site. Scort and I offsite muss Dour

Date 12/22/09 145 Location Ameleake Labadic Project / Client Keitz & Jens WEATHER: COLD 30°F, OUERCAST, FOGGE 0655 - Avride onsite to continue DET Fieldwork. Terra Din CATCrew onsite, Then stated their other drilling even to the temporen borings will not be onlite until tomorrow. 0724 - Beain developing wells. 0813 - Olase we Scott King onsite. Wells Neveloped P-150 P-148 P-160 P-173 P-175 1145- Ihished developing weeks. 1415 Scott-Anished developing P-177. I cleaned out the construction Figiler and loaded all of our Equipment into truck 1445- Scott King and I cht site

# **Appendix 4**

Piezometer Boring Logs and Temporary Boring Descriptions

Detailed Site Investigation Proposed Utility Waste Disposal Area Ameren Labadie Power Plant

Prepared by: GREDELL Engineering Resources, Inc.

Symbol	KEY TO Description	Symbol	LS Description
_	symbols		protective casing
	Silt		set in concrete
<u>सस्य</u> उद्ययन	Verm Tine		bentonite slurry
	Very Fine to Fine Sand		silica sand, blank PVC
	Coarse to Very Coarse Sand		slotted pipe w/ sand
	Medium Sand		endcap on pipe packed in sand
	Clay		
	Silty Clay		
	"Gley" Facies (Except for 100% Sand)		
	Large Gravel (Pebbles and Cobbles)		
000 000 0000	Small Gravel (Granules)		
<u>Aisc. S</u>	ymbols		
_\	Boring continues		
¥_ Ţ	Water table during drilling		
Soil Sa	mplers		
	Bulk/Grab sample		
	Standard penetration test		
$\triangleleft$	Bulk sample taken from 6 in. auger		
<u>Monitor</u>	Well Details		
Ī	capped riser with locking cover		

Ameren Missouri Labadie Power Plant **Proposed Utility Waste Disposal Area Detailed Site Investigation** CLIENT: Reitz & Jens, Inc.

#### BORING LOG **P-9**

**LOCATION:** Heisel-NW, N of LBR, W of farm access Rd.

GRAVEL

Ö

G.S. ELEVATION: 469.90' T.O.C. ELEVATION: 473.26' **NORTHING:** 996108.40 EASTING: 726981.78 LITHOLOGY RECOVERY WELL CONSTRUCTION DIAGRAM CLAY g SAMPLE TYPE SM GRAVEL ОЕРТН (FEET) WATER TABL DESCRIPTION VC SAND ELEVATION VF SAND FACIES I.D. **M SAND** SAND SAND GRAPHIC PERCENT SILTY CLAY SILT  $\mathbf{O}$ -1 470 0 0.0-1.1 ft; Sandy Silt, brown, 10YR 4/3, damp, FB loose. 1.1-2.0 ft; Silty Sand, dark brown, 10YR 3/3, 100 damp, soft, mottles (10YR 4/6). 2.0-2.4 ft; Fine Sand, with very fine sand, brown, 10YR 4/3, damp, loose. - 465 5 2.4-5.0 ft; Clayey Silt, trace very fine sand below 3.1 ft, dark brown and brown, 10YR 3/3 and 4/3, slightly plastic, damp, soft. FP/ 60 5.0-7.0 ft; Poor recovery, probable Clayey Silt Lev slough. 7.0-15.5 ft; Fine Sand grading to Silty Sand, - 460  $\overline{\Delta}$ 10 thin beds, dark brown, 10YR 3/3; dark grayish 100 brown, 10YR 4/2, and herringbone laminated at 7.9 ft; mottles (10YR 4/6), trace clay and wet below 10.0 ft. - 455 15 67 15.5-31.3 ft; Fine Sand, with very fine sand, brown, 10YR 4/3, wet, soft, trace coarse sand (<1%) at 20.2 ft. 450 20 100 - 445 25 100

11/8/2010 Printed: Date

NOTES:	S. King (Gredell) onsite developing piezometers.	I
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STRATIFICATION LINES ARE

APPROXIMATE LITHOLOGIC BOUNDARIE ONLY, ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.	S WATER LEVELS.	AFTER DRILLING: DATE:
SAMFLES.	PIEZOMETER:	INSTALLED AT +/- 3
NOTES: S. King (Gredell) onsite	VERTICAL DATUM:	NAVD 88
developing piezometers.	HORIZONTAL DATUM:	NAD 83
	WEATHER: Cool, 50°F, Par	rtly Cloudy, Mild, Calm.

WATER LEVELS:

Figure P-9 Sheet 1 of 2

DURING DRILLING

FEET

FEET

\_ FEET .8

10

**BORING LOG P-9** 

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

#### LOCATION: Heisel-NW, N of LBR, W of farm access Rd. G.S. ELEVATION: 469.90' T.O.C. ELEVATION: 473.26'

 G.S. ELEVATION:
 469.90'
 T.O.C. ELEVATION:
 473.2

 NORTHING:
 996108.40
 EASTING:
 726981.78

				r.		RҮ	· · · · ·					_ITI	HO	LO	GY			
<b>DEPTH (FEET)</b>	ELEVATION	WELL CONSTRUCTION DIAGRAM	WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND		1	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
30   35	- - 440 - - - - 435					94	31.3-36.1 ft; Coarse Sand, with medium sand and fine sand, dark grayish brown 10YR 4/2, wet, soft to loose. 36.1-36.5 ft; Medium to Coarse Sand, dark	C										
40	- - - 430 - -						gray 10YR 4/1, trace fine gravel, 15 mm clasts, subrounded quartz and feldspars, (fine sand slough probable in top of 35.0 ft S.S.). BORING TERMINATED IN MEDIUM TO COARSE SAND @36.5 FT											
- 45 - -	- 425  																	
50 - - -	- - 420 -	:																
55 -	- 415																	
DRILLING CO.: Max's Enterprises, Inc. DRILLER: Ryan Hunziker LOGGED BY: T. Doll DATE DRILLED: 10/20/09 START TIME: 8:02AM			nc.			STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY, ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES. PIEZOM NOTES: S. King (Gredell) onsite VERTICAL D/	ETER:	AF DA INS	TER TE: STAL	DRII		3: _			FEE FEE	:Т.		
END TIM	E:	11:22AM 10.25"					developing piezometers. HORIZONTAL D/ WEATHER: Cool,	ATUM:	NAD	83	Mild	l, Cal	m.					

## **BORING LOG P-12**

Ameren Missouri Labadie Power Plant LOCATION: Heisel-NW, N of LBR, E of farm access Rd. **Proposed Utility Waste Disposal Area** G.S. ELEVATION: 468.95' T.O.C. ELEVATION: 472.14' **Detailed Site Investigation** CLIENT: Reitz & Jens, Inc. PERCENT RECOVERY WELL CONSTRUCTION DIAGRAM **SRAPHIC LOG** SAMPLE TYPE DEPTH (FEET) **WATER TABL** DESCRIPTION ELEVATION 470 0 

**NORTHING: 996215.71 EASTING:** 728171.12 LITHOLOGY CLAY SM GRAVEL -G GRAVEL /C SAND VF SAND FACIES I.D. **M SAND** SAND SAND SILTY CLAY SILT Ó 0.0-0.8 ft; Clayey Silt grading to silt. FB 0.8-1.3 ft; Clay, very dark gray, 10YR 3/1, highly plastic, firm, damp, trace roots, mottles 100 ----(10YR 4/6). 1.3-3.5 ft; Clayey Silt, dark grayish brown, 465 10YR 4/2, with clay laminae, damp, plastic. 5 3.5-4.8 ft; Clayey Silty Sand, yellowish brown, grading moist. 4.8-5.9 ft; Silty Clay, brown, plastic, damp. 53 5.9-6.7 ft; Clay, dark brown, plastic. 6.7-10.0 ft; Silt grading to Clay grading to Very 460 Fine Sand, interlaminated, light brown. 10 d. 10.0-33.3 ft; Fine Sand grading to Medium FP/ Sand, dark gray to brown, 10YR 4/1 to 4/3, Lev (Gley) 1 3/N in 25 ft S.S., wet below 15 ft, 20 some clay below 20 ft, (clay slough probable in 30.0 ft S.S.). 455 15 72 450 20 67 CO/ BS 445 25 33 STRATIFICATION LINES ARE WATER LEVELS: DRILLING CO .: Max's Enterprises, Inc. DURING DRILLING FEET 15 APPROXIMATE LITHOLOGIC BOUNDARIES AFTER DRILLING: FEET DRILLER: Dave Hunziker ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN DATE: LOGGED BY: M. Carlson SAMPLES. PIEZOMETER: INSTALLED AT +/- 33.8 FEET DATE DRILLED: 09/16/09 NOTES: Chris Vierrether, MDNR, VERTICAL DATUM: NAVD 88 START TIME: 1:40PM onsite observing drilling HORIZONTAL DATUM: NAD 83 END TIME: 4:15PM activities. WEATHER: Clear, 70s°F, Dry.

11/8/2010 Printed: Date

BOREHOLE DIA .:

8.25"

## **BORING LOG P-12**

NORTHING: 996215.71

Ameren Missouri Labadie Power Plant **Proposed Utility Waste Disposal Area Detailed Site Investigation** CLIENT: Reitz & Jens, Inc.

## LOCATION: Heisel-NW, N of LBR, E of farm access Rd.

G.S. ELEVATION: 468.95' T.O.C. ELEVATION: 472.14'

**EASTING:** 728171.12

LITHOLOGY PERCENT RECOVERY WELL CONSTRUCTION DIAGRAM CLAY SM GRAVEL SAMPLE TYPE -G GRAVEL **GRAPHIC LOG** ОЕРТН (FEET) **WATER TABL** DESCRIPTION VC SAND VF SAND ELEVATION FACIES I.D. M SAND F SAND SAND SILTY CLAY SILT ö FP/ 10.0-32.5 ft; Fine Sand grading to Medium Sand, dark gray to brown, 10YR 4/1 to 4/3, Lev 440 (Gley) 1 3/N in 25 ft S.S., wet below 15 ft, some clay below 20 ft, (clay slough probable in 30 30.0 ft S.S.). 61 32.5-36.5 ft; Medium to Coarse Sand, gray, С 10YR 5/1, wet, medium consistency. 435 35 100 BORING TERMINATED IN MEDIUM TO COARSE SAND @36.5 FT 430 40 425 45 - 420 50 415 55 STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES WATER LEVELS: DURING DRILLING 15 FEET DRILLING CO .: Max's Enterprises, Inc. AFTER DRILLING: FEET ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN DRILLER: Dave Hunziker DATE: LOGGED BY: M. Carlson SAMPLES. DATE DRILLED: 09/16/09 NOTES: Chris Vierrether, MDNR. START TIME: VERTICAL DATUM: NAVD 88 1:40PM onsite observing drilling HORIZONTAL DATUM: NAD 83 END TIME: 4:15PM activities. WEATHER: Clear, 70s°F, Dry.

BOREHOLE DIA .:

8.25"

#### Ameren Missouri Labadie Power Plant **Proposed Utility Waste Disposal Area Detailed Site Investigation**

## **BORING LOG P-15**

LOCATION: Heisel-NW, W of farm access Rd. G.S. ELEVATION: 469.35' T.O.C. ELEVATION: 472.40' CLIENT: Reitz & Jens, Inc. NORTHING: 995802.44 EASTING: 727271.36 LITHOLOGY RECOVERY CONSTRUCTION DIAGRAM CLAY SM GRAVEL -G GRAVEL SAMPLE TYPE **GRAPHIC LOG** DEPTH (FEET) WATER TABL DESCRIPTION VC SAND VF SAND ELEVATION FACIES I.D. SAND SAND M SAND PERCENT SILTY CLAY WELL SILT 0 470 0 0.0-1.5 ft; Fine Sand, light brown. FB . . . . 1.5-1.8 ft; Very Fine Sand grading to silt, 100 Ξ \laminated. 1.8-3.4 ft; Clayey Silt, thinly bedded, olive 465 gray. 5 3.4-4.2 ft; Clay, dark brown, plastic, firm. 4.2-5.0 ft; Silty Clay, medium brown. 5.0-10.0 ft; Silt, Clay, and Very Fine Sand, 18 interlaminated. 460 10 10.0-13.3 ft; Silt and Very Fine Sand, FP/ 100 interlaminated, with clay laminae. Lev 13.3-28.3 ft; Fine Sand grading to Silty Sand 455 grading to Medium Sand; fine sand bed to 18.3 15 ft, clay seams; silty sand bed to 23.3 ft, clay 44 laminae; medium sand bed below 25.0 ft, clay balls; olive gray. 450 20 44 445 25 61 STRATIFICATION LINES ARE WATER LEVELS: DURING DRILLING 10.5 DRILLING CO .: Max's Enterprises, Inc. FEET APPROXIMATE LITHOLOGIC BOUNDARIES AFTER DRILLING: FEET DRILLER: Dave Hunziker ONLY: ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN DATE: LOGGED BY: M. Carlson SAMPLES. PIEZOMETER: INSTALLED AT +/- 35.0 FEET DATE DRILLED: 09/16/09 NOTES: Chris Vierrether, MDNR, VERTICAL DATUM: NAVD 88 START TIME: 4:40PM onsite observing drilling HORIZONTAL DATUM: NAD 83

activities.

END TIME:

BOREHOLE DIA .:

8:50AM 9/17

8.25"

WEATHER: Clear, 70s°F, Dry.

## BORING LOG P-15

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Printed: 11/8/2010

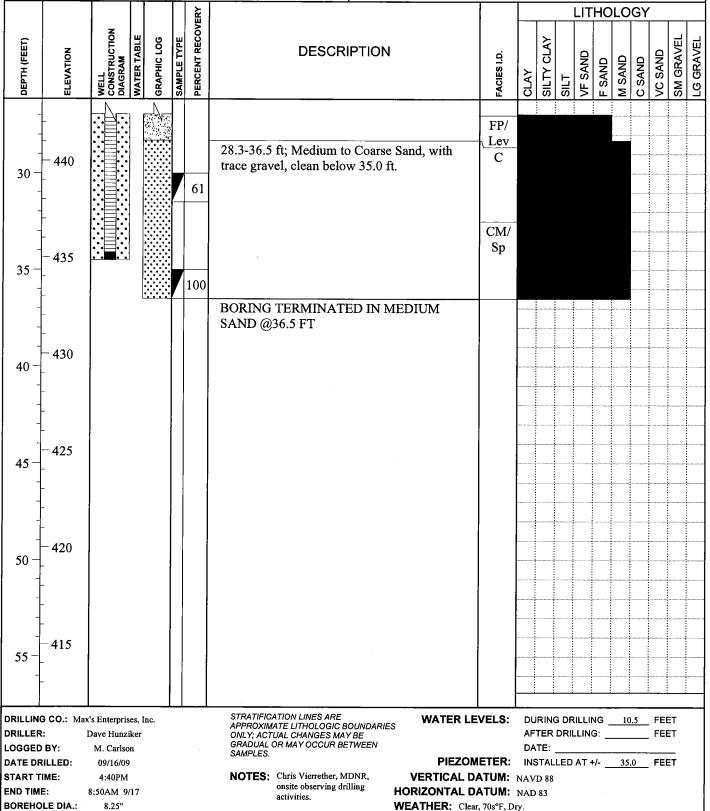
Date

LOCATION: Heisel-NW, W of farm access Rd.

G.S. ELEVATION: 469.35' T.O.C. ELEVATION: 472.40'

NORTHING: 995802.44

EASTING: 727271.36



## **BORING LOG P-17**

**Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation** CLIENT: Reitz & Jens, Inc.

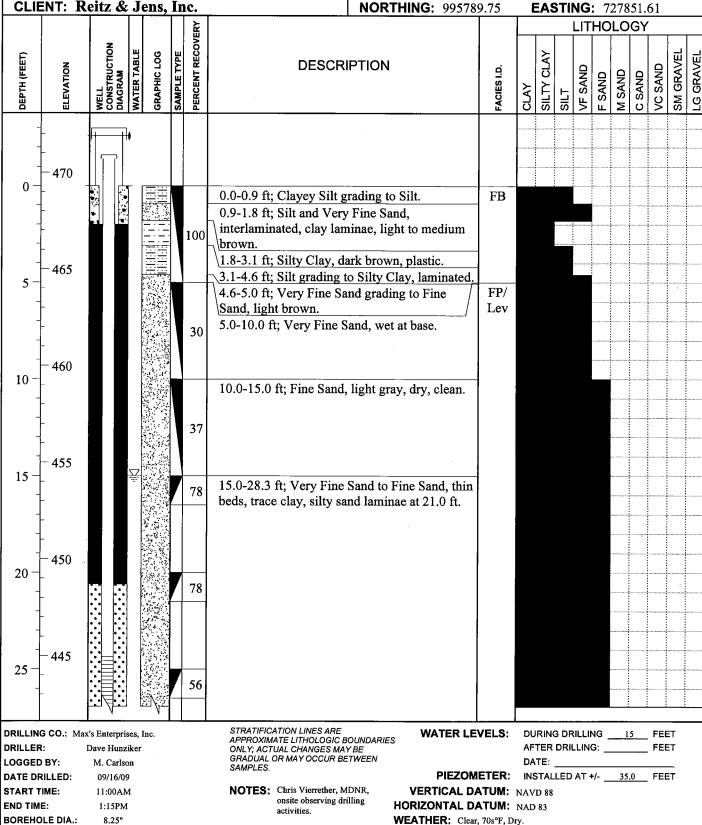
11/8/2010

Printed:

Date

8.25"

**LOCATION:** Heisel-NE- E of farm access Rd, N of LBR G.S. ELEVATION: 469.30' T.O.C. ELEVATION: 472.19'



WEATHER: Clear, 70s°F, Dry.

## BORING LOG P-17

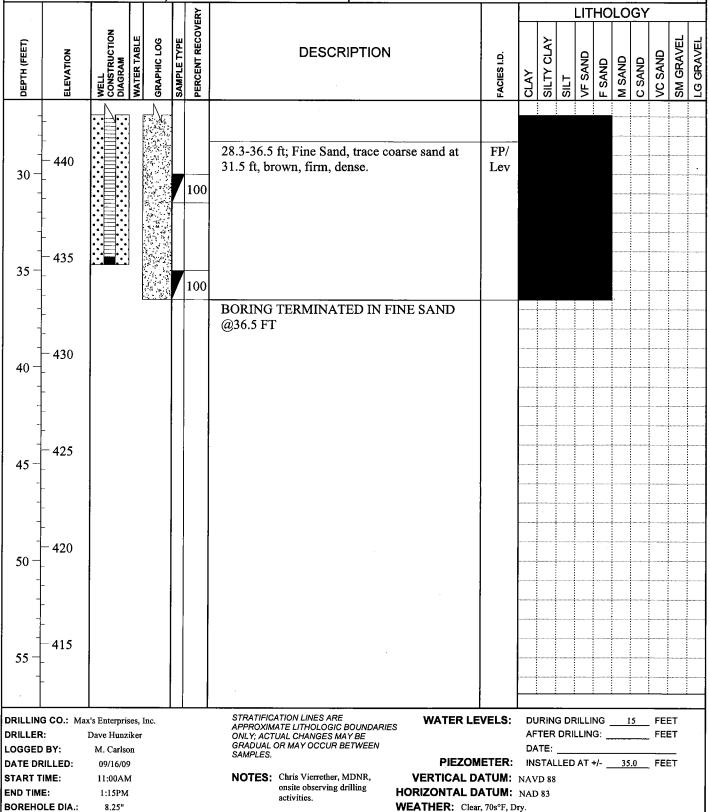
Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Printed: 11/8/2010

Date

LOCATION: Heisel-NE- E of farm access Rd, N of LBR G.S. ELEVATION: 469.30' T.O.C. ELEVATION: 472.19'

**NORTHING:** 995789.75 **EASTING:** 727851.61



## **BORING LOG P-19**

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Printed: 11/8/2010

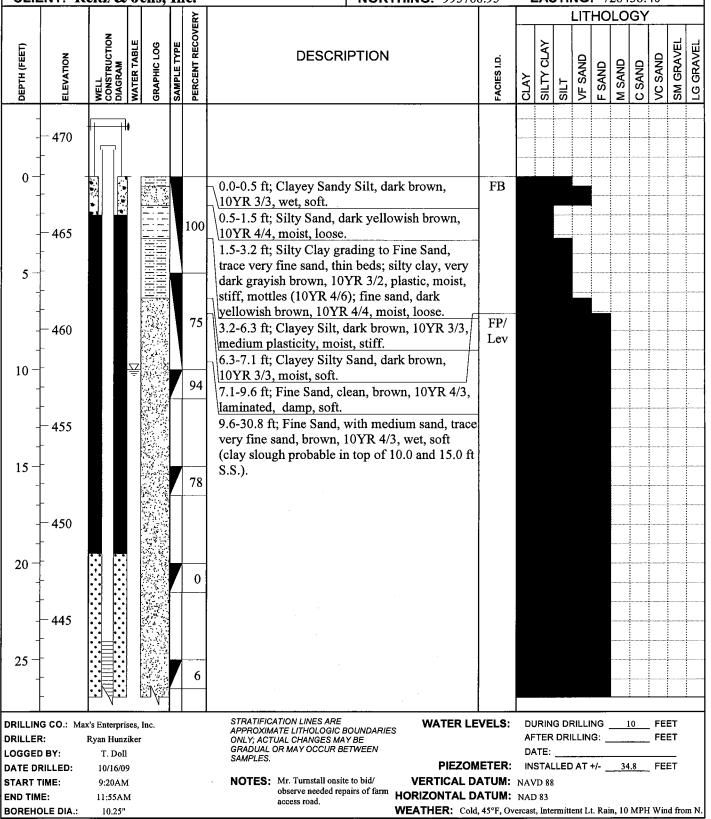
Date

LOCATION: Heisel-NE, N of LBR, E of farm access Rd.

G.S. ELEVATION: 467.90' T.O.C. ELEVATION: 470.84'

NORTHING: 995768.95

5 **EASTING:** 728438.40



## **BORING LOG P-19**

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

LOCATION: Heisel-NE, N of LBR, E of farm access Rd.

G.S. ELEVATION: 467.90' T.O.C. ELEVATION: 470.84'

**NORTHING:** 995768.95 **EASTING:** 728438.40

					T T	<u> </u>	Northino: 33370								<u> </u>			$\neg$
						Ϋ́.			L .			LIT	HO		GY			
DEPTH (FEET)	ELEVATION	WELL CONSTRUCTION DIAGRAM	WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
				_\_														
30 -	440  -					72	9.6-30.8 ft; Fine Sand, with medium sand, trace very fine sand, brown, 10YR 4/3, wet, soft (clay slough probable in top of 10.0 and 15.0 ft S.S.).	FP/ Lev					-					
	-  435 -					12	30.8-36.5 ft; Medium to Coarse Sand grading to Gravelly Sand, dark gray, 10YR 4/1, 25 mm subrounded clasts, loose, wet.	С										
	-				7	100												
40 -	- 430 		,				BORING TERMINATED IN GRAVELLY SAND @36.5 FT											
	- - - 425 -																	
45	- - - 420																	
50 -																		
55 -	- 415																	
				<b>T</b>			STRATIFICATION LINES ARE											
DRILLING CO.: Max's Enterprises, Inc. DRILLER: Ryan Hunziker LOGGED BY: T. Doll DATE DRILLED: 10/16/09 START TIME: 9:20AM END TIME: 11:55AM							APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES. PIEZOM NOTES: Mr. Turnstall onsite to bid/ observe needed repairs of farm access road. VERTICAL D/ HORIZONTAL D/	ETER: ATUM: ATUM:	AF DA INS NAV NAD	TER TE: STAL D 88 9 83	DRII	LIN AT 1	NG _ G: +/	34.	.8	FEE	=T  =T	
BOREHO	LE DIA.:	10.25"					WEATHER: Cold,	45°F, Ov	ercast	, Inte	rmitte	nt Lt	. Rain	ı, 10 l	MPH	Wind	d fror	a N.

## **BORING LOG P-20**

Ameren Missouri Labadie Power Plant **Proposed Utility Waste Disposal Area** 

LOCATION: Heisel-NW, N of LBR, W of farm access Rd.

G.S. ELEVATION: 469.35' T.O.C. ELEVATION: 472.28' **Detailed Site Investigation** CLIENT: Reitz & Jens, Inc. NORTHING: 995510.59 EASTING: 726856.24 LITHOLOGY /ERY CONSTRUCTION DIAGRAM PERCENT RECOV CLAY SM GRAVEL GRAVEL SAMPLE TYPE GRAPHIC LOG DEPTH (FEET) WATER TABL DESCRIPTION VC SAND ELEVATION VF SAND FACIES I.D. M SAND F SAND C SAND SILTY CLAY SILT WELL Ö 470 0 0.0-1.0 ft; Silt grading to Clayey Silt.  $\mathbf{FB}$ 1.0-2.0 ft; Very Fine Sand grading to Fine \Sand, light brown, dry. 57 2.0-5.0 ft; Clayey Silt with Very Fine Sand. 465 5 5.0-10.0 ft; Very Fine Sand grading to Silt grading to Clay, very thinly bedded, ripple laminations. 18 460 10 10.0-13.3 ft; Silty Clay, interlaminated with silt 100 and clay thin beds, moist. 13.3-18.3 ft; Silty Clay grading to Very Fine 455 Sand, grading to Fine Sand at 16.2 ft, wet.  $\nabla$ 15 FP/ 56 Lev 18.3-28.3 ft; Clayey Silt grading to Very Fine 450 and Fine Sand, (No sample recovery from 25.0-20 26.5 ft). 67 445 25 0 STRATIFICATION LINES ARE DURING DRILLING DRILLING CO.: Max's Enterprises, Inc. WATER LEVELS: 15 FEET APPROXIMATE LITHOLOGIC BOUNDARIES AFTER DRILLING: FEET DRILLER: Dave Hunziker ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN . DATE:

Printed: 11/8/2010 LOGGED BY: M. Carlson SAMPLES. DATE DRILLED: 09/17/09 NOTES: Chris Vierrether, MDNR, VERTICAL DATUM: NAVD 88 START TIME: 9:30AM onsite observing drilling Date HORIZONTAL DATUM: NAD 83 END TIME: 11:30AM activities. BOREHOLE DIA .: WEATHER: Not recorded. 8.25"

## **BORING LOG P-20**

**Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area** 

Date Printed: 11/8/2010

## LOCATION: Heisel-NW, N of LBR, W of farm access Rd.

G.S. ELEVATION: 469.35' T.O.C. ELEVATION: 472.28' **Detailed Site Investigation** CLIENT: Reitz & Jens, Inc. NORTHING: 995510.59 **EASTING:** 726856.24 LITHOLOGY RECOVERY WELL CONSTRUCTION DIAGRAM CLAY SAMPLE TYPE g SM GRAVEL -G GRAVEL DEPTH (FEET) **NATER TABL** DESCRIPTION ELEVATION VC SAND VF SAND FACIES I.D. M SAND GRAPHIC PERCENT F SAND C SAND SILTY CLAY SILT 18.3-28.3 ft; Clayey Silt grading to Very Fine FP/ and Fine Sand, (No sample recovery from 25.0-Lev 26.5 ft). 440 30 100 33.3-36.5 ft; Very Fine Sand grading to Fine FP/ 435 Sand, grading to Coarse Sand at 36.2 ft. Lev 35 ..... С 100 • • BORING TERMINATED IN COARSE SAND @36.5 FT 430 40 425 45 420 50 415 55

## Ameren Missouri Labadie Power Plant **Proposed Utility Waste Disposal Area** Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

## **BORING LOG P-22**

LOCATION: Heisel-NW, N of LBR, W of farm access Rd. G.S. ELEVATION: 468.40' T.O.C. ELEVATION: 471.27'

**NORTHING:** 995503.03

EAS	TING:	727579.54

CLIENT: Reitz & Jens, I	nc.	<b>NORTHING:</b> 99550	3.03		<u>:AS</u>	IIN	G:	12	1515	9.54		
	ERY					L	TH	OL	OG	Y	· · · · ·	
DEPTH (FEET) ELEVATION CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG	SAMPLE 1YPE PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	СГАҮ	SILTY CLAY	SILT				VC SAND	SM GRAVEL	LG GRAVEL
- 465	100	0.0-1.3 ft; Silty Sand, brown, 10YR 4/3, moist, soft, stiff below 1.9 ft. 1.3-2.5 ft; Clayey Sandy Silt, very dark grayish brown, 10YR 3/2, moist, stiff.	FB									
5-		2.5-3.0 ft; Fine Sand, with very fine sand, brown, 10YR 4/3, moist, soft. 3.0-5.0 ft; Sandy Silty Clay, dark brown, 10YR 3/3, slightly plastic, stiff.										
- 460 10	65	5.0-6.0 ft; Clayey Sandy Silt grading to Silty Sand, thin beds, dark brown, 10YR 3/3, moist, soft. 6.0-7.9 ft; Silty Clay, very dark grayish brown,	FP/ Lev									
	65	10YR 3/2, plastic, stiff, moist, mottles (10YR 4/6). 7.9-13.2 ft; Silty Sand and Fine Sand, thin beds, grayish brown and brown, 10YR 5/2 and										
	100	<ul> <li>4/3, wet below 10.0 ft, laminated below 10.8 ff, stiff below 13.0 ft.</li> <li>13.2-28.3 ft; Sandy Silt, alternating thin beds of Clayey Silt and Fine Sand, very dark gray</li> </ul>	CO/ BS									
		(Gley) 1 3/N to 20.7 ft, wet, soft, laminated from 13.2-13.3 ft and 15.3-16.5 ft, dark gray, 10YR 4/1, below 20.7 ft, trace coarse sand below 25.8 ft, (clayey silt and fine sand slough										
	89	probable in top of 20.0-30.0 ft S.S.).	FP/ Lev									
	61											
DRILLING CO.: Max's Enterprises, Inc. DRILLER: Ryan Hunziker LOGGED BY: T. Doll	<b>I</b>	STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY, ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.		AF DA	JRING TER D TE: _	DRILL	ING:			FE	ET	
DATE DRILLED:         10/07/09           START TIME:         8:15AM           END TIME:         11:42AM           BOREHOLE DIA.:         10.25"		NOTES: Chris Vierrether (MDNR), M. Carlson & S. King (Gredell) onsite observing drilling activities. MO Gas onsite. PIEZOM VERTICAL D/ HORIZONTAL D/ WEATHER: Cold,	ATUM: ATUM:	NAV NAC	83		T +/-		35.0	_ FE	ET	

Figure P-22 Sheet 1 of 2

BORING LOG P-22

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Printed: 11/8/2010

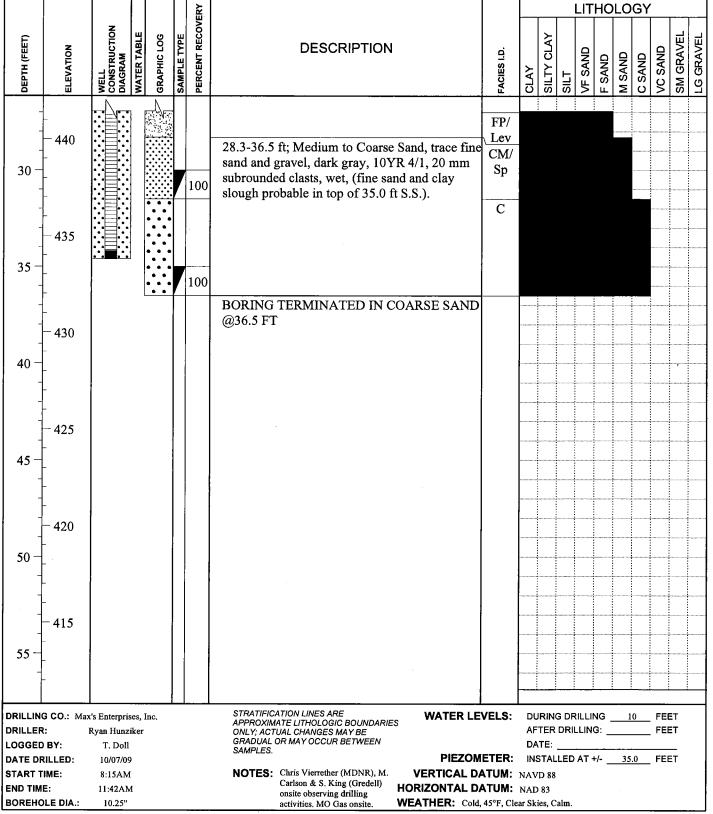
Date

#### LOCATION: Heisel-NW, N of LBR, W of farm access Rd. G.S. ELEVATION: 468.40' T.O.C. ELEVATION: 471.27'

**ELEVATION:**  $468.40^{\circ}$  **1.O.C. ELEVATION:** 471.27

NORTHING: 995503.03

**EASTING:** 727579.54



## BORING LOG P-24

Ameren Missouri Labadie Power Plant LOCATION: Heisel-Northeast. East of farm access Rd. **Proposed Utility Waste Disposal Area** G.S. ELEVATION: 468.50' T.O.C. ELEVATION: 471.44' **Detailed Site Investigation** CLIENT: Reitz & Jens, Inc. NORTHING: 995476.21 EASTING: 728133.29 LITHOLOGY RECOVERY WELL CONSTRUCTION DIAGRAM CLAY WATER TABLE SAMPLE TYPE SM GRAVEI GRAVEL **GRAPHIC LOG** ОЕРТН (FEET) DESCRIPTION VC SAND VF SAND ELEVATION FACIES I.D. **M SAND** SAND SAND PERCENT SILTY CLAY SILT õ Ó 470 0 0-1.3 ft; Silt and Clayey Silt, wind blown. FB 1.3-2.3 ft; Clay, pale yellowish brown, 10YR 6/ 100 <u>2, plastic.</u> 2.3-3.1 ft; Silt and Clayey Silt, light brown, 465 non-cohesive, dry. 5 3.1-4.2 ft; As above, laminated, moist. 4.2-7.0 ft; Silt and Clay, highly interlaminated to cross-laminated, pale yellowish orange, FP/ 27 10YR 8/6, base poorly defined due to lack of recovery. Lev 460 7.0-15.0 ft; Very Fine to Fine Sand, grayish orange, 10YR 7/4, poor recovery, saturated 10 below 13 ft. 17 455 . 15 15.0-31.0 ft; Fine Sand, gravish orange, 10YR 100 7/4, laminated, well sorted, trace clay (slough), grading to medium sand. 450 20 61 445 25 39 STRATIFICATION LINES ARE WATER LEVELS: DRILLING CO.: Max's Enterprises. Inc. DURING DRILLING FEET 13 APPROXIMATE LITHOLOGIC BOUNDARIES AFTER DRILLING: \_ FEET DRILLER: Dave Hunziker ONLY: ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN LOGGED BY: DATE: M. Carlson SAMPLES. PIÉZOMETER: INSTALLED AT +/- 35.0 FEET DATE DRILLED: 09/16/09 NOTES: Chris Vierrether, MDNR, VERTICAL DATUM: NAVD 88 START TIME: 7:25AM onsite observing drilling HORIZONTAL DATUM: NAD 83 END TIME: 10:20AM activities. BOREHOLE DIA .: 8.25" WEATHER: Clear, 70s°F, Dry.

Date Printed: 11/8/2010

## **BORING LOG P-24**

Ameren Missouri Labadie Power Plant **Proposed Utility Waste Disposal Area Detailed Site Investigation** 

## LOCATION: Heisel-Northeast. East of farm access Rd.

G.S. ELEVATION: 468.50' T.O.C. ELEVATION: 471.44'

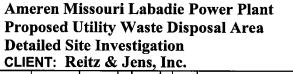
CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

**NORTHING:** 995476.21 EASTING: 728133.29 

						Ξ.								L		L	<u>.      </u>			<u> </u>	<u> </u>	<u> </u>	_
DEPTH (FEET)	ELEVATION	WELL CONSTRUCTION DIAGRAM	WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY		DE	SCRIF	PTION			FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
30 -	- 440 		والمراقع المراجع المراجع المراجع				15.0-31.0 7/4, lamin grading to	ated, w	ell sorte	ed, trace			FP/ Lev										
35 -	- - - 435 -					44	31.0-36.5 orange, 10 very coars	)YR 7/4	, well s	orted, sp			FP/ Lev										
40 -	- - - 430 - -					100	BORING VERY CO					го											
45	- 425 - - -																						
50 -	- 420																						
55 -	- 415																						
DRILLEI LOGGEI	RILLING CO.: Max's Enterprises, Inc. RILLER: Dave Hunziker DGGED BY: M. Carlson			APPROXIM ONLY; ACT	ATION LINE IATE LITHO UAL CHAN OR MAY OO	LOGIC BO	BE	1			AF DA	TER	DRIL	LINC	G:			FEE	ET				
DATE DI START 1 END TIM BOREHO	TIME:	09/16/09 7:25AM 10:20AM 8.25"					NOTES:	Chris Vier onsite obs activities.	erving drill	ling	_		ATUM: ATUM:	NAV NAE		LED	AT 1	+/	35.	.0	FEE	:T	

## BORING LOG P-27



11/8/20

Printed:

Date

LOCATION: Heisel-NW, W of farm access Rd

G.S. ELEVATION: 469.07' T.O.C. ELEVATION: 471.99'

NORTHING: 995206.06

EASTING: 727247.55

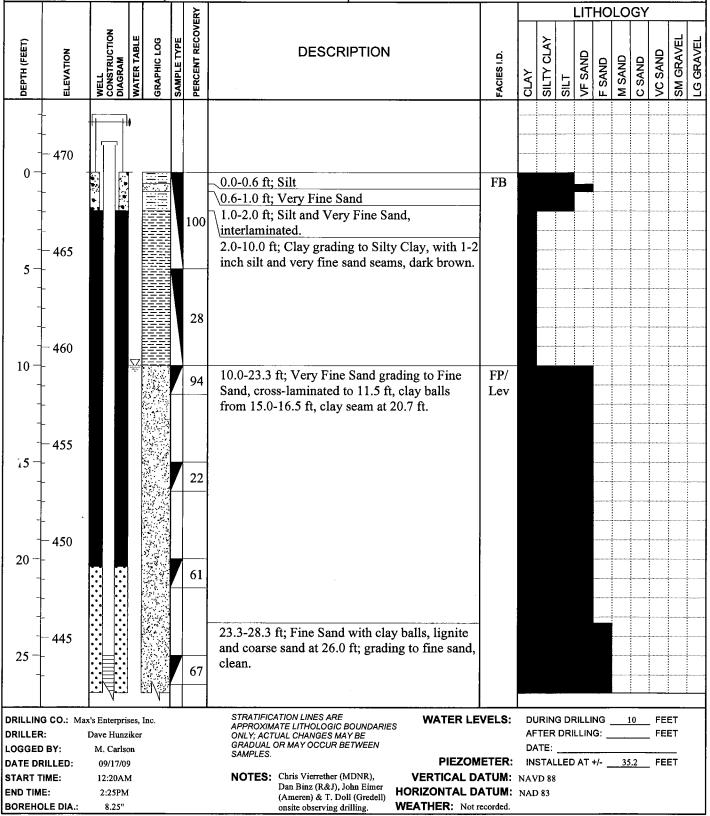


Figure P-27 Sheet 1 of 2

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

## BORING LOG P-27

LOCATION: Heisel-NW, W of farm access Rd

G.S. ELEVATION: 469.07' T.O.C. ELEVATION: 471.99'

NORTHING: 995206.06

EASTING: 727247.55

						RY							HO	LO	GΥ			
<b>ДЕРТН (FEET)</b>	ELEVATION	WELL CONSTRUCTION DIAGRAM	WATER TABLE	<b>GRAPHIC LOG</b>	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND	M SAND		VC SAND	SM GRAVEL	LG GRAVEL
30	- 440 					100	28.3-36.5 ft; Fine Sand, clean, grayish green at base.	FP/ Lev										
40	- 					100	BORING TERMINATED IN FINE SAND @36.5 FT											· · · · · · · · · · · · · · · · · · ·
45 -	- <b>425</b> -	Ę		5														
50	- 420  -																	
55	- 415 																	
DRILLER LOGGED DATE DR START T END TIM	DRILLING CO.: Max's Enterprises, Inc. DRILLER: Dave Hunziker LOGGED BY: M. Carlson DATE DRILLED: 09/17/09 START TIME: 12:20AM END TIME: 2:25PM BOREHOLE DIA.: 8.25"		ю.			STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES. NOTES: Chris Vierrether (MDNR), Dan Binz (R&J), John Eimer (Ameren) & T. Doll (Gredell) onsite observing drilling. WEATHER: Not r	ETER: ATUM: ATUM:	AF DA INS NAV	TER TE: STAL D 88	G DR DRIL	LING	):			FEE	Т —		

#### Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/17/2010

## BORING LOG P-29

LOCATION: Heisel-NW- N of LBR, W of farm access Rd.

G.S. ELEVATION: 467.73' T.O.C. ELEVATION: 470.83'

NORTHING: 005188.03 FASTING: 727844.60

CLIENT: ]	Reitz &	Jens	<u>, Ir</u>	ıc.	NORTHING: 99518	8.03		EAS	STI	NG:	: 7:	278	<u>44.</u>	59		
				ERY						LIT	но	LO	GY			
DEPTH (FEET) ELEVATION	WELL CONSTRUCTION DIAGRAM	WATER TABLE GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
470																
			يالالالال	100	0.0-1.3 ft; Clayey Silt grading to Silt, medium brown grading to light brown, cross-laminated below 0.9 ft.	FB										
- 465				100	1.3-3.6 ft; Clay, olive gray, plastic.											
					3.6-5.9 ft; Silty Clay, olive gray.											
5-																
		¥			5.9-10.2 ft; Silt and Clay, alternating thin beds, laminated, wet at 6.9 ft.											
460				45	Autoritation, wet at 0.7 It.											
					10.2-13.0 ft; Clay, very dark gray, (Gley), iron	CO/										
					concretions.	BS										
455				52	13.0-15.0 ft; Very Fine Sand grading to Silt	FP/										
					grading to Clay, thin beds, medium brown.	Lev										
15 -			7	22												
			$\mathbb{H}$													
- 450																
		а. 														
20 -				61		· ·										
			Н	01	20.6-28.3 ft; Fine Sand grading to Medium and Coarse Sand, clay seam at 26.5 ft.											
445					Could Sund, only bound at 2015 It.											
		1. 1. 1. 1. 1. 1. 1. 1.														
25-																
			Ľ	67												
		Y	1		STRATIFICATION LINES ARE WATER LE											$\neg$
DRILLING CO.: M DRILLER:	ax's Enterprise Dave Hunzik				APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE	VELS:	AF	TER	g dr Dril	LIN(	G: _					
LOGGED BY: DATE DRILLED:	M. Carlson 09/15/09	1			GRADUAL OR MAY OCCUR BETWEEN SAMPLES. PIEZOM		DA IN:	TE:	LED	АТ -	+/-	35	2	FEE	— Т	
START TIME:	10:56AM				NOTES: T. Doll (Gredell) onsite VERTICAL DA	ATUM:	NAV	D 88			' _	55				
END TIME: BOREHOLE DIA.:	2:15PM 8.25"				observing drilling activities. HORIZONTAL D/ WEATHER: Clear			83								
	8.23				WEATHER: Clear	, /vs r, D	1У.									

## BORING LOG P-29

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/17/2010

LOCATION: Heisel-NW- N of LBR, W of farm access Rd.

G.S. ELEVATION: 467.73' T.O.C. ELEVATION: 470.83'

**NORTHING:** 995188.03 **EASTING:** 727844.69

					RY					l	_ITI	HOI	LO	GY			
DEPTH (FEET)	ELEVATION	WELL CONSTRUCTION DIAGRAM	WATER TABLE GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
	- <b>44</b> 0					28.3-36.5 ft; Medium to Coarse Sand, trace	CM/										
30	-				100	clay at contact, trace gravel, gray, 10YR 5/1 clasts.	Sp										
35 -	- 435 - -				100												
-	-				100							-					
-	- <b>4</b> 30					BORING TERMINATED IN MEDIUM TO COARSE SAND @36.5 FT											
40 -						SHELBY TUBE SAMPLE COLLECTED AT 2.0-4.0 FT DEPTH AT COMPLETION OF DRILLING.											
-	- 425																
45	-						-										
-	- 420																
50 -																	
	- 415 																
55 -																	
-	_														:		
DRILLING DRILLER LOGGED		's Enterprise Dave Hunzik M. Carlson	er			STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.	VELS:	AF DA	TER	DRII		3:		.9	FEE	т_	
DATE DRILLED:         09/15/09           START TIME:         10:56AM           END TIME:         2:15PM           BOREHOLE DIA.:         8.25"						NOTES: T. Doll (Gredell) onsite VERTICAL D observing drilling activities. HORIZONTAL D WEATHER: Clea	ATUM: ATUM:	NAV NAC	D 88		AT +	/	35.	.2	FEE	т	

Ameren Missouri Labadie Power Plant **Proposed Utility Waste Disposal Area Detailed Site Investigation** CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

## **BORING LOG P-31**

**NORTHING:** 994921.76

LOCATION: Heisel-Northeast. East of farm access Rd.

G.S. ELEVATION: 467.67' T.O.C. ELEVATION: 470.22'

EASTING: 726950.89 LITHOLOGY PERCENT RECOVERY WELL CONSTRUCTION DIAGRAM CLAY **GRAPHIC LOG** SAMPLE TYPE SM GRAVEL DEPTH (FEET) -G GRAVEL WATER TABL DESCRIPTION ELEVATION VF SAND VC SAND FACIES I.D. **M SAND** SAND SAND SILTY CLAY SILT O 470 0 0-0.9 ft; Clayey Silt, dark brown. FB 0.9-1.4 ft; Silt and Very Fine Sand, light brown, laminated. 100 465 1.4-4.4 ft; Clay, light olive gray, 5Y 6/1, scattered very thin beds of silt, plastic, firm. 4.4-9.2 ft; Silty Clay, light olive gray, 5Y 6/1, 5 plastic, moist. 100 460 Sec. 1 9.2-12.0 ft; Very Fine Sand, Silt and Clay, FP/ 10 highly interlaminated, pale yellowish brown, Lev 10YR 6/2. 12.0-21.0 ft; Fine Sand, gravish orange, 10YR 100 455 7/4, well sorted, carbonaceous fragments at 14.3 ft, saturated, sharp lower contact. 15 67 450 20 89 21.0-32.5 ft; Silty Sand, distinct very dark gray CO/ (Gley) 1 3/N, scattered plastic clay layers up to BS 445 0.5 ft thick, interbedded with fine sand noted above (fine sand slough probable in top S.S.). 25 100 STRATIFICATION LINES ARE DRILLING CO .: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING FEET 12 APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE DRILLER: AFTER DRILLING: \_ \_ FEET Ryan Hunziker GRADUAL OR MAY OCCUR BETWEEN LOGGED BY: M. Carlson DATE: \_ SAMPLES. PIEZOMETER: INSTALLED AT +/- 34.5 FEET DATE DRILLED: 10/12/09 START TIME: NOTES: T. Doll (Gredell) onsite to VERTICAL DATUM: NAVD 88 12:00AM relieve M. Carlson. S. King END TIME: 3:10PM HORIZONTAL DATUM: NAD 83 (Gredell) onsite developing BOREHOLE DIA .: 10.25" WEATHER: Cool, 50°F, Overcast, Mild, 5 MPH Wind from E. piezometers.

Figure P-31 Sheet 1 of 2

# Ameren Missouri Labadie Power Plant

Printed: 11/8/2010

Date

## **BORING LOG P-31**

**Proposed Utility Waste Disposal Area Detailed Site Investigation** CLIENT: Reitz & Jens, Inc. **NORTHING: 994921.76** 

## LOCATION: Heisel-Northeast. East of farm access Rd.

G.S. ELEVATION: 467.67' T.O.C. ELEVATION: 470.22'

EASTING: 726950.89

PERCENT RECOVERY LITHOLOGY WELL CONSTRUCTION DIAGRAM WATER TABLE CLAY **GRAPHIC LOG** SAMPLE TYPE DEPTH (FEET) SM GRAVEL -G GRAVEL DESCRIPTION ELEVATION VC SAND FACIES I.D. VF SAND **M SAND** SAND SAND SILTY CLAY SILT ö 21.0-32.5 ft; Silty Sand, distinct very dark gray CO/ 440 (Gley) 1 3/N, scattered plastic clay layers up to BS 0.5 ft thick, interbedded with fine sand noted above (fine sand slough probable in top S.S.). 30 100 435 32.5-36.5 ft; Medium to Coarse Sand, grayish CM/ orange, 10YR 7/4, trace gravel, (fine sand Sp slough in top S.S.). 35 100 BORING TERMINATED IN MEDIUM 430 SAND @36.5 FT 40 425 45 420 50 415 55 STRATIFICATION LINES ARE DRILLING CO.: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING 12 FEET APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE DRILLER: Ryan Hunziker AFTER DRILLING: \_ FEET GRADUAL OR MAY OCCUR BETWEEN LOGGED BY: M. Carlson DATE: SAMPLES DATE DRILLED: 10/12/09 START TIME: NOTES: T. Doll (Gredell) onsite to VERTICAL DATUM: NAVD 88 12:00AM relieve M. Carlson, S. King END TIME: HORIZONTAL DATUM: NAD 83 3:10PM (Gredell) onsite developing BOREHOLE DIA .: 10.25" WEATHER: Cool, 50°F, Overcast, Mild, 5 MPH Wind from E. piezometers.

Ameren Missouri Labadie Power Plant **Proposed Utility Waste Disposal Area Detailed Site Investigation** CLIENT: Reitz & Jens, Inc.

## **BORING LOG P-33**

**LOCATION:** Heisel-Northeast. East of farm access Rd.

G.S. ELEVATION: 468.44' T.O.C. ELEVATION: 471.18'

Date Printed: 11/8/2010

NORTHING: 99491

10.34	EASTING:	727559.71

			Jens	2		NONTHING, 39431	1	<u> </u>					415	_			
					RY					L		HO	LO	GY			
DEPTH (FEET)	ELEVATION	WELL CONSTRUCTION DIAGRAM	WAIEK IABLE GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	СLAY	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
	470																
						0-1.4 ft; Clayey Silt, light brown.	FB			-							
	465				100	1.4-2.3 ft; Silt, light olive gray, 5Y 6/1, <u>laminated, sparse clay lamina, friable.</u> 2.3-6.8 ft; Clay to Silty Clay, very thin to thin											
	102					bedded, light olive gray, 5Y 6/1, scattered silt											
5 -						lamina, contorted beds-scour contact at 6.0 ft,											
						lower contact scoured, erosional.											
					100	6.8-8.2 ft; Clay, laminated, olive gray, 5Y 4/1,											
	460	Ē	ZE		100	_ trace silt, plastic.	-										
						8.2-11.6 ft; Silt and Clay, highly interlaminated, pale yellowish brown, 10YR 6/											
10						2, saturated.											
						-											
					50	11.6-26.0 ft; Fine Sand, grayish orange, 10YR 7/4, trace clay and silt, sharp lower contact.	FP/ Lev										
	455			34 12		774, trace chay and sht, sharp lower contact.											
15 -			/: 														
					94												
			1														
	450					x.											
20 -			1997 - 1997 1997 - 1997														
					56												
I -[.	445			, ,													
	+4-5			3. - S.													
25 -																	
				Ľ	39	26.0-30.0 ft; Coarse Sand, grayish orange,	C										
-		•• 7••	<u>لما</u>			2010 2010 IV, Course Sund, Eraylon Orange,											
	O.: Max	's Enterprise	es, Inc.			STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES WATER LE	EVELS:	DL	RING	G DR	ILLI	NG	8	.2	•		
DRILLER:		Doug Hunzik				ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN			TER		LIN	G: _			, FEI	ΞT	
LOGGED B		M. Carlson 09/14/09	1			SAMPLES. PIEZON	IETER:		STAL		AT ·	+/	34	.8	FEI	ET	
START TIM		9:42AM				NOTES: Chris Vierrether, MDNR, VERTICAL D						-					
END TIME:		3:50PM				onsite observing drilling activities.											
BOREHOLE	DIA.:	8.25"				WEATHER: Clea	r, sunny, 7	us"F,	Dry,								

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

## BORING LOG P-33

LOCATION: Heisel-Northeast. East of farm access Rd. G.S. ELEVATION: 468.44' T.O.C. ELEVATION: 471.18'

**NORTHING:** 994910.34 **EASTING:** 727559.71

	<u>NT: R</u>	eitz & Jens	s <u>, I</u> r	<u>ıc.</u>	NORTHING: 99491	10.34	<u> </u>	STI	NG	: 72	<u>275</u>	<u>59.'</u>	71		
									LIT	ΉO	LO	GΥ			
DEPTH (FEET)	ELEVATION	WELL CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
	_				10YR 7/4, common lignite fragments.										
30 -	- 440 -														
30 -	 -			72	30.0-36.5 ft; Medium to Coarse Sand, grayish orange, 10YR 7/4, gravelly with 2-10 mm clasts (granules-small pebbles), (fine sand	C									
	- 435 -				slough in last S.S.).										
35 -	-		7	44											
	-				BORING TERMINATED IN MEDIUM SAND @36.5 FT										
	- <b>43</b> 0														
40 -	-														
	- 425														
45 -	-														
	-														
	- 420														
50 -	-														
	- 														
	- 415 -														
55 -	_														
	G CO 1 M	's Enterprises, Inc.			STRATIFICATION LINES ARE WATER L				: 		ـــــــــــــــــــــــــــــــــــــ	.2	FF	i	
DRILLER	t: :	.: Max's Enterprises, Inc.       STRATIFICATION LINES ARE       WATER LEVELS:       DURING DRILLING         Doug Hunziker       ONLY; ACTUAL CHANGES MAY BE       AFTER DRILLING:         M. Carlson       GRADUAL OR MAY OCCUR BETWEEN       DATE:			FE										
DATE DR START T	IME:	09/14/09 9:42AM 3:50PM			PIEZO NOTES: Chris Vierrether, MDNR, VERTICAL I onsite observing drilling HORIZONTAL I		NAVD 8		DAT	+/	34	.8	FE	T	
BOREHO		8.25"			activities. WEATHER: Cle			<i>'</i> .							

#### Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

## BORING LOG P-35

LOCATION: Heisel-NE-E of farm access Rd, N of LBR

G.S. ELEVATION: 467.61' T.O.C. ELEVATION: 470.61'

NORTHING: 994886.38 EAST

.38	EA	ST	ΓIN	G:	72812	5.58

CLIENT: P	leitz & Jens,	inc.	NORTHING: 99488	6.38	E	:AS		G:	128	125	.38						
		ERY					LITHOLOGY										
DEPTH (FEET) ELEVATION	WELL CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG	SAMPLE TYPE PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL				
_																	
0			0.0-1.3 ft; Silt and Clayey Silt, thin beds, light	FB													
465		100	gray. 1.3-3.2 ft; Clay, plastic, olive gray.														
			3.2-4.3 ft; Silty Clay and Clay, olive gray.														
5 -			4.3-4.8 ft; Silt, light gray 4.8-6.2 ft; Clay, olive gray, plastic, firm.	1													
			6.2-10.2 ft; Silt and Clay, alternating thin beds,	-													
- 460		47	wet below 8.5 ft.														
	¥																
10 -																	
			10.2-15.0 ft; Clayey Silt, wet.														
									_		_						
455		30							_								
							-										
15 -			15.0-18.3 ft; Fine Sand, with clay laminae,	FP/				:									
-		50	olive gray, clean.	Lev													
450																	
			18.3-28.3 ft; Fine Sand grading to Medium-														
20 -			Coarse Sand, with clay laminae.														
		67															
445		33.31															
											-						
25 -				C													
		100															
		1						_									
DRILLING CO.: M	ax's Enterprises, Inc. Doug Hunziker	APPROXIMATE LITHOLOGIC BOUNDARIES															
LOGGED BY:	M. Carlson		GRADUAL OR MAY OCCUR BETWEEN SAMPLES		D	TE:											
DATE DRILLED:	9/15/09		NOTES: T. Doll (Gredell) onsite VERTICAL D					AT +/		33.0	_ FE	ET					
START TIME: END TIME:	4:20PM 9/14 10:25AM		observing drilling activities.														
BOREHOLE DIA .:	8.25"		WEATHER: Clea	r, Sunny, 7	70s°F,	Dry.											

#### Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

## BORING LOG P-35

LOCATION: Heisel-NE-E of farm access Rd, N of LBR

G.S. ELEVATION: 467.61' T.O.C. ELEVATION: 470.61'

NORTHING: 994886.38 EASTING: 728125.58

				ERY					LI	TH	<u>OLC</u>	<u>iGY</u>	, ,			
DEPTH (FEET)	ELEVATION	WELL CONSTRUCTION DIAGRAM	WATER TABLE GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	SILT VE SAND		M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
-	- 440															
30-			000 000 000	7 2 0		28.3-33.3 ft; Medium-Coarse Sand grading to Very Coarse-Gravelly Sand, medium gray.	C									
-	-    - 		8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8		83											
-	- 435		00 ç6			33.3-36.5 ft; Medium-Coarse Sand	С									
35					44							÷				
-	430		•			BORING TERMINATED IN COARSE SANI @36.5 FT										
40 -																
-	- 425															
-	-												-			
45 -																
-	420															
50																
-	- 415					· · · ·										
- 55 -	-															
-																
DRILLER		Doug Hunzi	iker	1		STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN	EVELS:	Af		DRILL	ING:					
LOGGEI DATE DI START 1 END TIM BOREHO	RILLED: FIME:	M. Carlso 9/15/09 4:20PM 9/ 10:25AM 8.25"	/14			SAMPLES.	DATUM:	IN NAV NAI	D 83				3.0	_ FEI	ET	

## **BORING LOG P-36**

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

LOCATION: Heisel-NE-E of farm access Rd, N of LBR

G.S. ELEVATION: 468.20' T.O.C. ELEVATION: 471.23'

NORTHING: 995058.28 EASTING: 728509.44

CLIENT: Reitz & Jens						IC.	NORTHING: 99505	8.28	LITHOLOGY											
						RY		1				LIT	HO	LO	GY					
DEPTH (FEET)	ELEVATION	WELL CONSTRUCTION DIAGRAM	WATER TABLE	<b>GRAPHIC LOG</b>	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES 1.D.	сгау	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL		
	- <b>47</b> 0 												4							
			-				0.0-1.0 ft; Clayey Silt, dark grayish brown, \10YR 4/2, firm, dry.	FB												
	_		-			100	1.0-1.6 ft; Clay, dark brown, plastic, firm.				•••									
	- 465		Ī			100	\1.6-2.6 ft; Silty Clay, dark brown.													
5-	-						2.6-6.6 ft; Silt and Clayey Silt, laminated, yellowish brown.													
	_				١															
	-	-	¥				6.6-10.0 ft; grading to Clay and Silt, laminated	-			:			ļ						
						40	wet.				ļ									
	- 460																			
	_																			
10-	_						10.0-32.5 ft; Very Fine Sand grading to Fine	FP/												
	_						Sand, thin beds, trace clay, wet.	Lev							<u> </u>					
	_					10														
	- 455																			
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25 -																				
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I		· · ·		1			STRATIFICATION LINES ARE WATER I		<u> </u>											
DRILLIN	GCO.: Ma	x's Enterpris Dave Hunzi					APPROXIMATE LITHOLOGIC BOUNDARIES	EVELO:			NG DI R DR									
LOGGED		M. Carlso					GRADUAL OR MAY OCCUR BETWEEN													
DATE DE		9/15/09				PIEZOMETER: INSTALLED AT +/						FE	ΕŤ							
START T		3:11AM					NOTES: T. Doll (Gredell) onsite VERTICAL D observing drilling activities.				8									
END TIM		5:00PM									or ⊓	-								
BOREHO	JLE DIA.:	8.25"					WEATHER: Clo	udy, spott	у кан	u, 708	с <b>г</b> , D	ıy.								

#### Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Printed: 11/8/2010

Date

## **BORING LOG P-36**

LOCATION: Heisel-NE-E of farm access Rd, N of LBR G.S. ELEVATION: 468.20' T.O.C. ELEVATION: 471.23'

**EASTING:** 728509.44 NORTHING: 995058.28 LITHOLOGY PERCENT RECOVERY CONSTRUCTION DIAGRAM CLAY SAMPLE TYPE SM GRAVEI g -G GRAVEL **DEPTH** (FEET) WATER TABL VC SAND DESCRIPTION VF SAND ELEVATION **M SAND** C SAND FACIES I.D. F SAND GRAPHIC SILTY CLAY SILT WELL ÷){;-10.0-32.5 ft; Very Fine Sand grading to Fine FP/ 440 Sand, thin beds, trace clay, wet. Lev 30 39 32.5-36.5 ft; Fine Sand grading to Medium CO/ 435 Sand, greenish gray clayey sand at base. BS 35 72 BORING TERMINATED IN CLAYEY SAND @36.5 FT 430 40 425 45 420 50 415 55 STRATIFICATION LINES ARE WATER LEVELS: DURING DRILLING \_\_\_\_\_\_ FEET DRILLING CO .: Max's Enterprises, Inc. APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN \_\_ FEET AFTER DRILLING: DRILLER: Dave Hunziker DATE: LOGGED BY: M. Carlson SAMPLES. PIEZOMETER: INSTALLED AT +/- \_\_\_\_35.3\_\_\_ FEET DATE DRILLED: 9/15/09 NOTES: T. Doll (Gredell) onsite VERTICAL DATUM: NAVD 88 START TIME: 3:11AM observing drilling activities. HORIZONTAL DATUM: NAD 83 END TIME: 5:00PM BOREHOLE DIA.: WEATHER: Cloudy, Spotty Rain, 70s°F, Dry. 8.25"

## BORING LOG P-38

NORTHING: 994618.74

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

## LOCATION: Heisel-West-S. in ROW of Labadie Bottom Rd

G.S. ELEVATION: 467.15' T.O.C. ELEVATION: 470.11'

**EASTING:** 727238.62

LITHOLOGY RECOVERY WELL CONSTRUCTION DIAGRAM **NATER TABLE** CLAY SM GRAVEL SAMPLE TYPE G GRAVEL **SRAPHIC LOG** DEPTH (FEET) DESCRIPTION VC SAND VF SAND ELEVATION FACIES I.D. **M SAND** SAND PERCENT SAND SILTY CLAY SILT ö 470 i la 0 0-0.5 ft; Silt, dark grayish brown, 10YR 4/2, FB wet, soft. 0.5-1.0 ft; Very fine sand, brown, 10YR 4/3, 465 100 dry, soft. . 1.0-4.1 ft; Clay, very dark grayish brown, 10YR 3/2, moist, plastic, very firm, mottles 5 (10YR 4/6). 4.1-5.0 ft; Clayey Silt, dark gravish brown, 10YR 4/2, moist, soft. 460 100 5.0-6.3 ft; Poor recovery, probable Clay slough. 6.3-9.1 ft; Clay and Sandy Silt, alternating thin beds, dark grayish brown, 10YR 4/2; clay beds 10 highly plastic, very firm, mottles 10YR 4/6; sandy silt beds moist, soft. 9.1-12.5 ft; Fine Sand, brown, 10YR 4/3, 455 90 ripple laminated grading to laminated, wood CO/ fragments below 12 ft, iron oxide staining BS (10YR 5/6), moist grading to wet, very soft. 15 12.5-28.3 ft; Fine Sand, very dark gray (Gley) 1 100 3/N, trace very fine sand, grading to medium sand below 25.6 ft, saturated, non-cohesive 450 (fine sand and clay slough probable in top of S.S.). 20 61 445 25 89 STRATIFICATION LINES ARE DRILLING CO.: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING FEET 10 APPROXIMATE LITHOLOGIC BOUNDARIES AFTER DRILLING: FEET DRILLER: Doug Hunziker ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN DATE: LOGGED BY: T. Doll SAMPLES. PIEZOMETER: INSTALLED AT +/-FEET DATE DRILLED: 34.6 9/22/09 NOTES: Chris Vierrether (MDNR) and VERTICAL DATUM: NAVD 88 START TIME: 7:35AM John Eimer & Rich Hill HORIZONTAL DATUM: NAD 83 END TIME: 10:35AM (Ameren) onsite observing BOREHOLE DIA.: WEATHER: Warm, 65°F, Mostly Cloudy, Humid, Calm, Rained Last Evening. 8.25" drilling activities.

Proposed Utility Waste Disposal Area

## **BORING LOG P-38** Ameren Missouri Labadie Power Plant

LOCATION: Heisel-West-S. in ROW of Labadie Bottom Rd

G.S. ELEVATION: 467.15' T.O.C. ELEVATION: 470.11'

Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

**NORTHING:** 994618 74 **FASTING:** 727238 62

CLIENT: Reitz & Jens, Inc. NORTHING: 994618.74 EASTING: 727238.62																
				RY					LITH	IOL	.00	GΥ				
DEPTH (FEET)	ELEVATION	WELL CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	SILT					VC SAND	SM GRAVEL	LG GRAVEL
	4.40															
	- 440															
					28.3-36.5 ft; Medium Sand grading to Coarse	CO/										
30 -	_				Sand, very dark to dark gray (Gley) 1 3/N and	BS										
	_		7	100	4/N, (fine sand noted at total depth based on cuttings sample collected from auger bit).											
-	- 435		H		cuttings sample conceled from auger off).											
_	_															
35	_	• •														
	_		7	100												
-	- 430	<u> </u>	T		BORING TERMINATED IN FINE SAND											
-	-				@36.5 ft											
-	-															
40 -	-											_				
	_															
_	- 425															
-	-															
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45 -	-														_	
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DRILLING		t's Enterprises, Inc.			STRATIFICATION LINES ARE WATER LE	VELS:				LING				FEE FEE		
LOGGED		Doug Hunziker T. Doll			ONLY, ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.										_	
DATE DR		9/22/09			PIEZON				LED	AT +/		34.0	6	FEE	т	
START T		7:35AM 10:35AM			NOTES: Chris Vierrether (MDNR) and VERTICAL D John Eimer & Rich Hill (Amerna) ansitic charging											
BOREHO		8.25"			(Ameren) onsite observing drilling activities. WEATHER: Warn				ly, H	umid,	Calm	, Rai	ned I	.ast E	venin	g.
			_													_

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Printed: 11/8/2010

Date

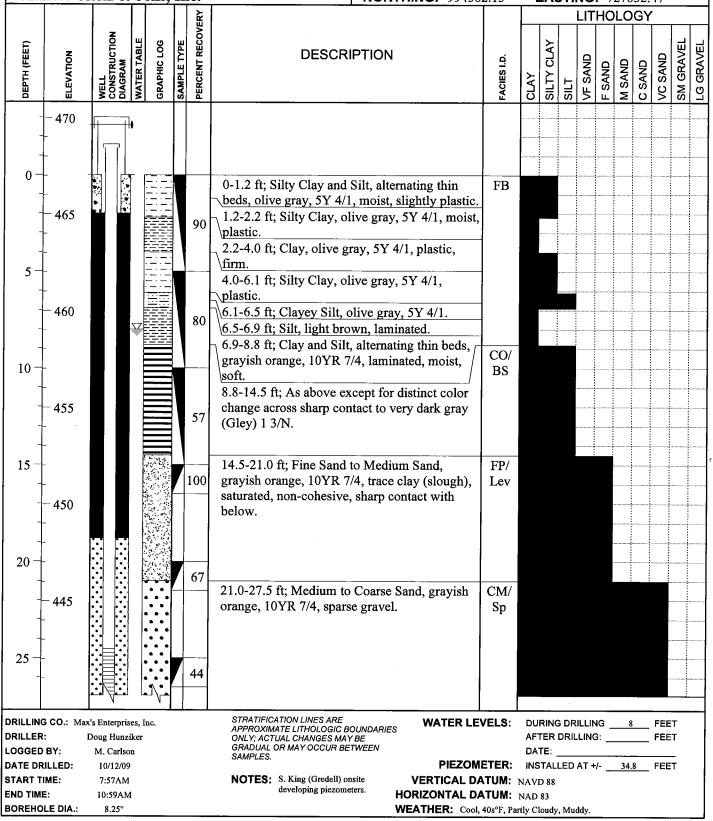
## BORING LOG P-40

LOCATION: Heisel-South. Edge of LBR

G.S. ELEVATION: 467.05' T.O.C. ELEVATION: 469.93'

NORTHING: 994582.15 EASTING

EAS	TING:	727832.47	



Ameren Missouri Labadie Power Plant **Proposed Utility Waste Disposal Area Detailed Site Investigation** CLIENT: Reitz & Jens, Inc.

# **BORING LOG P-40**

LOCATION: Heisel-South. Edge of LBR

G.S. ELEVATION: 467.05' T.O.C. ELEVATION: 469.93'

Date Printed: 11/8/2010

**NORTHING:** 994582.15 **EASTING:** 727832.47

				ERY		1			L	<u>.IT</u> F	IOLC	<u>)GY</u>	, 		
DEPTH (FEET)	ELEVATION	WELL WELL CONSTRUCTION DIAGRAM WATER TABLE	GRAPHIC LOG SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
-	440		$\Lambda$												
30				28	27.5-32.0 ft; Fine to Medium Sand, grayish orange, 10YR 7/4, trace gravel and coarse sand.	CM/ Sp									
35 -	- 435				32.0-36.5 ft; Coarse to Very Coarse Sand, grayish orange, 10YR 7/4, gravelly.	C									
	-		<b>/</b>	100											[
- - 40 -	- 430 - -				BORING TERMINATED IN VERY COARSE SAND @36.5 FT										•
-	- 425														
45 - -	-														
-	- <b>42</b> 0														
50	- 														
55 -	-														
DRILLIN DRILLEF LOGGEE DATE DF	R: 1 ) BY:	's Enterprises, Inc Doug Hunziker M. Carlson 10/12/09	<b> </b>	<u> </u>	STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY: ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES. PIEZOM		AF DA	TER I TE: _	DRILI		G : 3		FEE	т —	
START T END TIM BOREHO	IME: E:	7:57AM 10:59AM 8.25"			NOTES: S. King (Gredell) onsite developing piezometers. VERTICAL DA HORIZONTAL DA WEATHER: Cool,	ATUM: ATUM:	NAV NAD	D 88 83							

#### Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Printed: 11/8/2010

# BORING LOG P-42

NORTHING: 994538.42

LOCATION: Heisel-West-S of LBR, W of farm access Rd. G.S. ELEVATION: 467.74' T.O.C. ELEVATION: 470.60'

LEVATION: 467.74 1.0.C. ELEVATION: 470.60

**EASTING:** 728420.83

LITHOLOGY /ERY RECOV CONSTRUCTION CLAY SAMPLE TYPE SM GRAVEL GRAVEL ОЕРТН (FEET) **SRAPHIC LOG** VATER TABL DESCRIPTION /C SAND ELEVATION VF SAND FACIES I.D. SAND F SAND **M SAND** DIAGRAM PERCENT SILTY CLAY SILT WELL õ ö 470 0 0.0-0.5 ft; Clayey Silt, dark brown, 10YR 3/3, FB 2 \wet, soft. 0.5-1.5 ft; Silty Sand, dark gravish brown, 80 465 10YR 4/2, moist, soft. 1.5-3.0 ft; Silty Clay, very dark gravish brown, 10YR 3/2, plastic, stiff. 5 3.0-7.1 ft; Silty Clay and Clayey Silt, thin beds, dark gravish brown to brown, 10YR 4/2 and 4/ 3, slightly plastic, wet below 5.9 ft, soft, (clay 65 FP/ 460 slough probable in top of 5.0 ft C.S.Lev 7.1-7.8 ft; Silty Sand, dark grayish brown, 10YR 4/2, laminated, wet, soft. 10 7.8-11.3 ft; Fine Sand grading to with very fine sand, gravish brown, 10YR 5/2, laminated above 10.0 ft, dry to 8.3 ft; wet below 8.3 ft, 40 455 loose to soft. 11.3-15.0 ft; grading to Fine Sand, with medium sand. 15 15.0-20.2 ft; Fine Sand, with very fine sand, 72 brown, 10YR 4/3, wet, soft. 450 20 20.2-36.5 ft; Medium to Coarse Sand, with fine С 61 sand, alternating thin beds, dark yellowish brown and brown, 10YR 4/4 and 4/3, wet, soft 445 to loose, interbedded layers of fine sand, subrounded quartz and feldspar clasts, becoming dark gray, 10YR 4/1, below 35.6 ft. 25 100 STRATIFICATION LINES ARE WATER LEVELS: DRILLING CO .: Max's Enterprises. Inc. DURING DRILLING 10 FEET APPROXIMATE LITHOLOGIC BOUNDARIES DRILLER: AFTER DRILLING: FEET Ryan Hunziker ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN LOGGED BY: DATE: T. Doll SAMPLES PIEZOMETER: INSTALLED AT +/-DATE DRILLED: FEET 34.8 10/06/09 NOTES: Chris Vierrether, MDNR, VERTICAL DATUM: NAVD 88 START TIME: 12:58AM onsite observing drilling HORIZONTAL DATUM: NAD 83 END TIME: 5:09PM activities. BOREHOLE DIA .: 10.25" WEATHER: Warm, 70°F, Overcast, 25 MPH Gusting Wind from SW, Humid.

Figure P-42 Sheet 1 of 2

# BORING LOG P-42

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

**LOCATION:** Heisel-West-S of LBR, W of farm access Rd.

G.S. ELEVATION: 467.74' T.O.C. ELEVATION: 470.60'

NORTHING: 994538.42 EA

E	ASTII	NG:	728420.83	

	<u>kenz &amp; Jens,</u>	<u> mc.</u>	<b>NORTHING:</b> 994538	.42		511	NG.	. //	2042	.0.8	)	
		RV					LIT	HO	LOC	ΞY		
DEPTH (FEET) ELEVATION	WELL CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG	SAMPLE TYPE PERCENT RECOVERY	DESCRIPTION	FACIES I.D.		SILT	VF SAND	F SAND	M SAND	C SAND	SM GRAVEL	LG GRAVEL
30 - - - - - - 435		61	20.2-36.5 ft; Medium to Coarse Sand, with fine sand, alternating thin beds, dark yellowish brown and brown, 10YR 4/4 and 4/3, wet, soft to loose, interbedded layers of fine sand, subrounded quartz and feldspar clasts, becoming dark gray, 10YR 4/1, below 35.6 ft.	C								
35 -		56										
			BORING TERMINATED IN MEDIUM									
			SAND @36.5 FT									
40												
425												
45 -												
43												
420												
50												
55 -												
												<u> </u>
DRILLING CO.: M DRILLER: LOGGED BY:	fax's Enterprises, Inc. Ryan Hunziker T. Doll		STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.		DURI AFTE DATE	R DRII	LLIN	G:		F	EET EET	
DATE DRILLED: START TIME: END TIME:	10/06/09 12:58AM 5:09PM		PIEZOME NOTES: Chris Vierrether, MDNR, onsite observing drilling activities. HORIZONTAL DA	TUM: TUM:	NAD 83	8					EET	
BOREHOLE DIA.	10.25"		WEATHER: Warm,	70°F, Ov	vercast, 2	5 MPH	I Gus	ting V	/ind fi	rom S'	V, Hur	nid,

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

# BORING LOG P-43

LOCATION: Heisel-West-S of LBR, W of farm access Rd G.S. ELEVATION: 466.07' T.O.C. ELEVATION: 469.20'

**NORTHING: 994333.02** EASTING: 726945.21 LITHOLOGY PERCENT RECOVERY WELL CONSTRUCTION DIAGRAM CLAY SM GRAVEL SAMPLE TYPE **GRAPHIC LOG** -G GRAVEL **JEPTH (FEET)** WATER TABL DESCRIPTION VC SAND ELEVATION VF SAND FACIES I.D. C SAND F SAND M SAND SILTY CLAY SILT 0 0.0-1.0 ft; Silt, brown.  $\mathbf{FB}$ 465 1.0-1.3 ft; Very Fine Sand, dry, light brown. 1.3-5.0 ft; Silty Clay grading to Clayey Silt, 53 with clay seams, dark brown. 5 5.0-7.0 ft; Clayey Silt and Clay, thin beds. 460 7.0-10.0 ft; Very Fine Sand. FP/ 45 Lev 10 10.0-13.3 ft; Silt, brown grading to (Gley), wet. CO/ 72 455  $\mathbf{BS}$ 13.3-28.3 ft; Sandy Clay grading to Fine and Medium Sand, (Gley); with clay balls and clay 15 seams below 20.0 ft, medium brown. 44 450 20 100 445 25 100 440 STRATIFICATION LINES ARE DRILLING CO.: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING 11.5 FEET APPROXIMATE LITHOLOGIC BOUNDARIES DRILLER: AFTER DRILLING: FEET Dave Hunziker ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN DATE: LOGGED BY: M. Carlson SAMPLES. DATE DRILLED: 9/17/09 NOTES: Chris Vierrether (MDNR) and VERTICAL DATUM: NAVD 88 START TIME: 3:05PM Dan Binz (R&J) onsite HORIZONTAL DATUM: NAD 83 END TIME: 5:20PM observing drilling activities. BOREHOLE DIA .: WEATHER: Not recorded. 8.25"

Date Printed: 11/8/2010

#### Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

# BORING LOG P-43

LOCATION: Heisel-West-S of LBR, W of farm access Rd G.S. ELEVATION: 466.07' T.O.C. ELEVATION: 469.20'

CLIENT: Reitz & Jens, Inc. NORTHING: 994333.02 EASTING: 726945.21 LITHOLOGY PERCENT RECOVERY CONSTRUCTION CLAY SAMPLE TYPE **GRAPHIC LOG** SM GRAVEI **.G GRAVEL JEPTH** (FEET) WATER TABL DESCRIPTION VF SAND ELEVATION VC SAND FACIES I.D. **M SAND** C SAND SAND DIAGRAM SILTY CLAY SILT WELL ш 28.3-36.5 ft; Medium Sand grading to Coarse CO/ Sand, some gravel, (Gley-colored fine sand at BS 30 total depth based on cuttings sample collected 89 435 from auger bit). 35 100 430 BORING TERMINATED IN FINE SAND @36.5 FT 40 425 45 420 50 415 55 410 STRATIFICATION LINES ARE DRILLING CO.: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING 11.5 FEET APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE AFTER DRILLING: FEET DRILLER: Dave Hunziker GRADUAL OR MAY OCCUR BETWEEN DATE: LOGGED BY: M. Carlson SAMPLES. PIEZOMETER: INSTALLED AT +/- 34.8 FEET DATE DRILLED: 9/17/09 NOTES: Chris Vierrether (MDNR) and VERTICAL DATUM: NAVD 88 START TIME: 3:05PM Dan Binz (R&J) onsite HORIZONTAL DATUM: NAD 83 END TIME: 5:20PM observing drilling activities.

BOREHOLE DIA .:

8.25"

WEATHER: Not recorded.

#### **GREDELL BORING LOG P-45 ENGINEERING RESOURCES, INC.** Ameren Missouri Labadie Power Plant LOCATION: Heisel-West-S and adj to LBR **Proposed Utility Waste Disposal Area** G.S. ELEVATION: 467.12' T.O.C. ELEVATION: 470.07' **Detailed Site Investigation** CLIENT: Reitz & Jens, Inc. NORTHING: 994324.97 EASTING: 727532.26 LITHOLOGY RECOVERY WELL CONSTRUCTION DIAGRAM CLAY SAMPLE TYPE SM GRAVEL .G GRAVEL GRAPHIC LOG ОЕРТН (FEET) WATER TABI DESCRIPTION VF SAND VC SAND ELEVATION **M SAND** FACIES I.D. C SAND SAND PERCENT SILTY CLAY SILT 470 0 0.0-1.2 ft; Silt grading to Very Fine Sand, FB • cross-laminated, light brown. 465 1.2-10.0 ft; Clay, Silty Clay, and Clayey Silt, 100 alternating thin beds, dark brown, wet at 9.0 ft. 5 • • 460 88 $\overline{\Delta}$ -10 10.0-18.3 ft; Silty Sand, medium brown, FP/ 78 laminated, wet, (clay slough noted in top of Lev 15.0 ft S.S.). 455 15 61 450 18.3-33.3 ft; Silty Sand grading to Fine Sand at 21.0 ft, gray; Gley-colored from 21.0-24.0 ft; 20 clay seam at 30.0 ft, medium brown. CO/ 67 BS 445 FP/ 25 Lev 78 STRATIFICATION LINES ARE DRILLING CO.: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING 9 FEET APPROXIMATE LITHOLOGIC BOUNDARIES DRILLER: ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN AFTER DRILLING: FEET Doug Hunziker LOGGED BY: M. Carlson DATE: SAMPLES. PIEZOMETER: INSTALLED AT +/- 34.8 DATE DRILLED: 9/18/09 FEET NOTES: JoAnn Thee (Ameren) and T. VERTICAL DATUM: NAVD 88 START TIME: 7:35AM Doll (Gredell) onsite HORIZONTAL DATUM: NAD 83 END TIME: 10:10AM observing drilling activities. WEATHER: Clear, 70s°F, Dry. BOREHOLE DIA .: 8.25"

Printed: 11/17/2010

Date

# BORING LOG P-45

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/17/2010

#### **LOCATION:** Heisel-West-S and adj to LBR

G.S. ELEVATION: 467.12' T.O.C. ELEVATION: 470.07'

**NORTHING:** 994324.97 **EASTING:** 727532.26

					RY				_		LIT	но	LO	GY			
DEPTH (FEET)	ELEVATION	WELL CONSTRUCTION DIAGRAM	WATER TABLE GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	сгау	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
30 -	- 440 - - - 425				100	18.3-33.3 ft; Silty Sand grading to Fine Sand at 21.0 ft, gray; Gley-colored from 21.0-24.0 ft; clay seam at 30.0 ft, medium brown.	FP/ Lev										
35-	- 435 - -			7	100	33.3-36.5 ft; Fine to Medium Sand, grading to Fine Sand and Clay at 36.0 ft, alternating thin beds; coarse to very coarse sand at base.	C	-									
- - 40 -	- 430 - - - - - 425					BORING TERMINATED IN COARSE SAND @36.5 FT SHELBY TUBE SAMPLE COLLECTED AT 3.0-5.0 FT DEPTH AT COMPLETION OF DRILLING.						· · · · · · · · · · · · · · · · · · ·					
45	- - - - <b>42</b> 0																
50	- - - 415						2										•
55	-																
DRILLIN DRILLEF LOGGEE		x's Enterpris Doug Hunz M. Carlso	iker			STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.		AF D/	TER	DRI	LLIN	G: _	<u> </u>		FE	T	
DATE DE START 1 END TIM BOREHO	IME:	9/18/09 7:35AM 10:10AN 8.25"	I			PIEZOM NOTES: JoAnn Thee (Ameren) and T. Doll (Gredell) onsite observing drilling activities. WEATHER: Clear	ATUM: ATUM:	NAV NAI	VD 88		) AT ·	+/	34	.8	FE	ET	

#### **GREDELL BORING LOG P-47 ENGINEERING RESOURCES, INC. Ameren Missouri Labadie Power Plant** LOCATION: Heisel-West-W of farm access Rd, S of LBR **Proposed Utility Waste Disposal Area** G.S. ELEVATION: 467.10' T.O.C. ELEVATION: 469.86' **Detailed Site Investigation** CLIENT: Reitz & Jens, Inc. NORTHING: 994320.66 EASTING: 728124.52 LITHOLOGY PERCENT RECOVERY WELL CONSTRUCTION DIAGRAM CLAY SM GRAVEL -G GRAVEL WATER TABLE g SAMPLE TYPE **DEPTH (FEET)** DESCRIPTION VC SAND ELEVATION VF SAND FACIES I.D. F SAND **M SAND** C SAND GRAPHIC SILTY CLAY SILT 470 0 FB 0.0-1.3 ft; Silt, light brown. • 1.3-2.2 ft; Silty Clay, olive gray. 465 100 2.2-4.2 ft; Clay, dark brown, lean, stiff. 4.2-5.0 ft; Sandy Silt, light brown. 5 5.0-7.2 ft; Clay grading to Silty Clay, dark brown. 460 53 7.2-10.0 ft; Very Fine Sand, light brown, dry. FP/ Lev 10 10.0-21.0 ft; Silty Sand, Sandy Silt, and Very 61 Fine Sand, alternating thin beds; clay seams to 11.5 ft; gray, sharp lower contact. 455 15 56 450 20 72 21.0-28.3 ft; Fine Sand to Coarse Sand, trace 445 gravel, alternating thin beds, sharp contact with above. 25 61 STRATIFICATION LINES ARE WATER LEVELS: DURING DRILLING 6.5 FEET DRILLING CO .: Max's Enterprises, Inc. APPROXIMATE LITHOLOGIC BOUNDARIES AFTER DRILLING: FEET DRILLER: Doug Hunziker ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN DATE: LOGGED BY: M, Carlson SAMPLES. PIEZOMETER: INSTALLED AT +/- 34.9 FEET DATE DRILLED: 9/18/09 VERTICAL DATUM: NAVD 88 NOTES: Dan Binz (R&J) and T. Doll START TIME: 10:30AM (Gredell) onsite observing HORIZONTAL DATUM: NAD 83 END TIME: 1:15PM drilling activities. BOREHOLE DIA .: WEATHER: Clear, 70s°F, Dry. 8.25"

# BORING LOG P-47

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

LOCATION: Heisel-West-W of farm access Rd, S of LBR G.S. ELEVATION: 467.10' T.O.C. ELEVATION: 469.86'

NORTHING: 994320.66 EASTING: 728124.52 LITHOLOGY PERCENT RECOVERY WELL CONSTRUCTION DIAGRAM CLAY SM GRAVEL SAMPLE TYPE **GRAPHIC LOG** -G GRAVEL DEPTH (FEET) **WATER TAB** DESCRIPTION VC SAND ELEVATION VF SAND FACIES I.D. M SAND F SAND C SAND SILTY CLAY SILT 440 ٦VF ŝą, 28.3-36.5 ft; Coarse Sand, gravelly С • . ٠ 30 67 435 35 39 . BORING TERMINATED IN COARSE SAND 430 @36.5 FT . 40 425 45 420 50 415 55 STRATIFICATION LINES ARE DRILLING CO .: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING \_\_\_\_\_\_ FEET APPROXIMATE LITHOLOGIC BOUNDARIES DRILLER: AFTER DRILLING: FEET Doug Hunziker ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN LOGGED BY: DATE: M, Carlson SAMPLES. DATE DRILLED: PIEZOMETER: INSTALLED AT +/- 34.9 FEET 9/18/09 NOTES: Dan Binz (R&J) and T. Doll START TIME: VERTICAL DATUM: NAVD 88 10:30AM (Gredell) onsite observing END TIME: HORIZONTAL DATUM: NAD 83 1:15PM drilling activities.

BOREHOLE DIA .:

8.25"

WEATHER: Clear, 70s°F, Dry.

### BORING LOG P-49

**NORTHING: 994499.84** 

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

LOCATION: Heisel-NW-Adj. to LBR and farm access Rd. G.S. ELEVATION: 467,58' T.O.C. ELEVATION: 470,56'

LLEVATION. 407.38 1.0.0. ELEVATION: 470.30

EASTING: 728938.97

LITHOLOGY RECOVERY WELL CONSTRUCTION DIAGRAM GRAVEL CLAY SAMPLE TYPE GRAVEL **GRAPHIC LOG JEPTH (FEET) NATER TABL** DESCRIPTION VC SAND ELEVATION VF SAND FACIES I.D. M SAND SAND PERCENT F SAND SILTY CLAY SILT SN Ō 470 0 0.0-0.5 ft; Clayey Silt, dark brown, 10YR 3/3, FB wet, soft. 0.5-1.5 ft; Clayey Silt, very dark grayish 100465 brown, 10YR 3/2, moist, stiff 1.5-6.3 ft; Silty Sand, Clayey Sandy Silt, and Clayey Silt, alternating thin beds, dark grayish 5 brown, 10YR 4/2, moist, loose grading to soft, herringbone cross-bedding and brown (10YR FP/ 4/3) below 3.8 ft, clayey silt below 5.9 ft. 50 460 Lev 6.3-8.8 ft; Fine Sand, trace very fine sand, dark yellowish brown, 10YR 4/4, herringbone cross-CO/ bedding, interbedded silt layers 1 mm thick and 10 BS dark grayish brown (10YR 4/2) below 6.9 ft. 100 8.8-15.3 ft; Silty Clay, dark to very dark gray, (Gley) 1 4/N to 3/N, iron concretions to 10.8 ft, 455 plastic, firm, trace very fine sand from 10.8 to 11.5 ft, soft below 10.8 ft, (clay slough probable in top of 15.0 ft S.S.). 15 100 15.3-23.3 ft; Fine Sand, trace very fine sand, FP/ dark grayish brown, 10YR 4/2, wet, soft, (clay Lev slough probable in top of 20.0 ft S.S.). 450 20 83 445 23.3-28.3 ft; Fine Sand, trace medium to coarse sand and gravel, brown, 10YR 4/2, wet, loose. 25 28 STRATIFICATION LINES ARE DRILLING CO.: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING 10 FEET APPROXIMATE LITHOLOGIC BOUNDARIES DRILLER: AFTER DRILLING: FEET Ryan Hunziker ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN LOGGED BY: DATE: T. Doll SAMPLES PIEZOMETER: INSTALLED AT +/-DATE DRILLED: 35.0 FEET 10/14/09 NOTES: M. Carlson (Gredell), John VERTICAL DATUM: NAVD 88 START TIME: 3:08PM Eimer (Ameren) and Jeff HORIZONTAL DATUM: NAD 83 END TIME: 5:08PM Fouse (R&J) onsite observing BOREHOLE DIA .: WEATHER: Cold, 45°F, Overcast, Intermittent Lt. Rain, 10-15 MPH NE Wind. 8.25" drilling activities. S. King,

Ameren Missouri Labadie Power Plant **Proposed Utility Waste Disposal Area Detailed Site Investigation** CLIENT: Reitz & Jens, Inc.

Printed: 11/8/2010

Date

BOREHOLE DIA .:

8.25"

### **BORING LOG P-49**

LOCATION: Heisel-NW-Adj. to LBR and farm access Rd. G.S. ELEVATION: 467.58' T.O.C. ELEVATION: 470.56'

NORTHING: 994499.84 **EASTING:** 728938.97 LITHOLOGY PERCENT RECOVERY WELL CONSTRUCTION DIAGRAM WATER TABLE CLAY SAMPLE TYPE SM GRAVEL **GRAPHIC LOG** -G GRAVEL **DEPTH** (FEET) DESCRIPTION ELEVATION VF SAND VC SAND FACIES I.D. M SAND C SAND F SAND SILTY CLAY SILT FP/ 440 Lev 28.3-36.5 ft; Coarse Sand, with medium sand, С trace gravel, subrounded 12 mm clasts, very 30 dark gray (Gley) 1 3/N below 35.6 ft. 50 435 35 61 BORING TERMINATED IN FINE SAND 430 @36.5 FT 40 425 45 420 50 415 55 STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES DRILLING CO.: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING 10 FEET DRILLER: AFTER DRILLING: FEET ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN Ryan Hunziker LOGGED BY: DATE: T. Doll SAMPLES. PIEZOMETER: INSTALLED AT +/- 35.0 FEET DATE DRILLED: 10/14/09 NOTES: M. Carlson (Gredell), John VERTICAL DATUM: NAVD 88 START TIME: 3:08PM Eimer (Ameren) and Jeff HORIZONTAL DATUM: NAD 83 END TIME: . 5:08PM Fouse (R&J) onsite observing

drilling activities. S. King.

WEATHER: Cold, 45°F, Overcast, Intermittent Lt. Rain, 10-15 MPH NE Wind.

### BORING LOG P-51

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

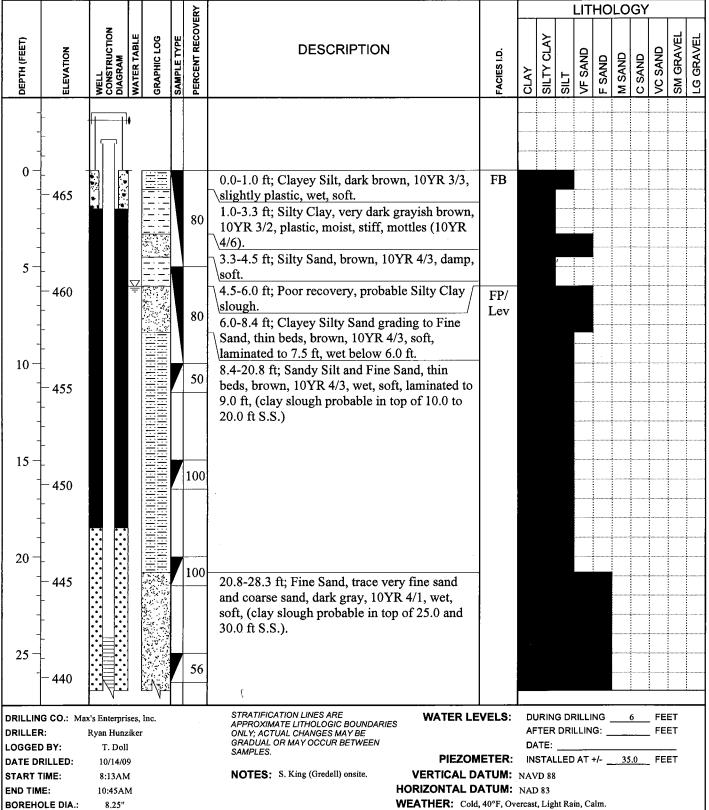
11/8/2010

Date

LOCATION: Newman-N-Adj. to LBR near AUELBE-004

G.S. ELEVATION: 466.25' T.O.C. ELEVATION: 469.06'

NORTHING: 994463.37 EASTING: 729490.00



#### Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Printed: 11/8/2010

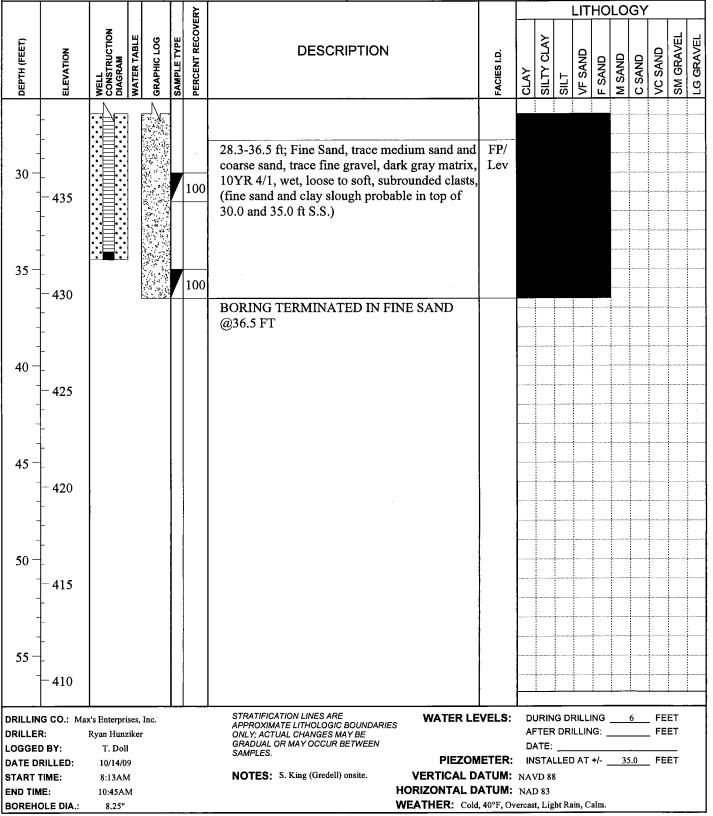
Date

# BORING LOG P-51

LOCATION: Newman-N-Adj. to LBR near AUELBE-004

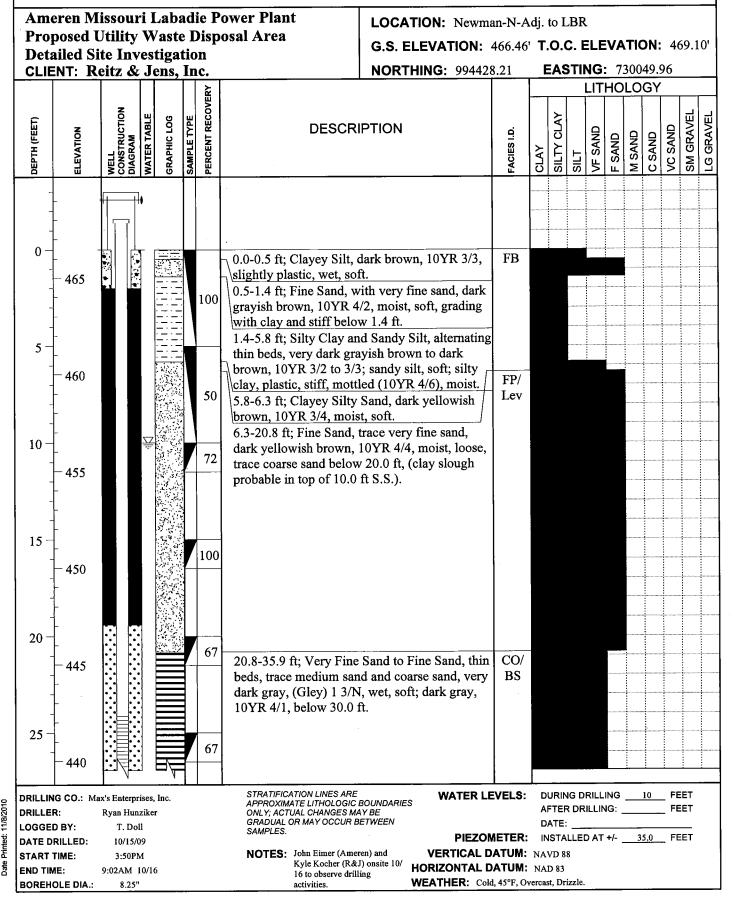
G.S. ELEVATION: 466.25' T.O.C. ELEVATION: 469.06'

**NORTHING:** 994463.37 **EASTING:** 729490.00



...

### BORING LOG P-53



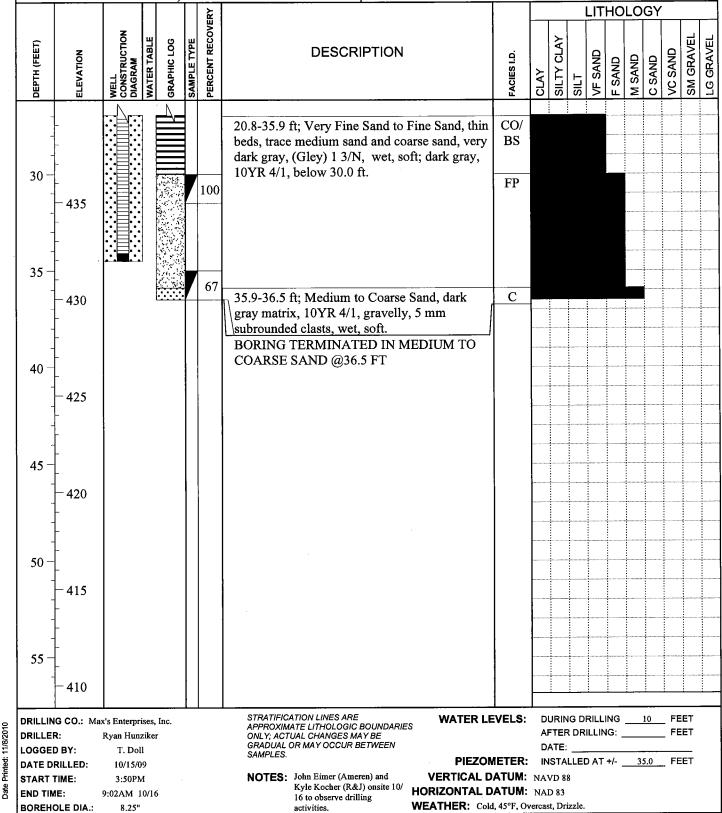
#### **Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation** CLIENT: Reitz & Jens, Inc.

# **BORING LOG P-53**

LOCATION: Newman-N-Adj. to LBR

G.S. ELEVATION: 466.46' T.O.C. ELEVATION: 469.10'

#### EASTING: 730049.96 NORTHING: 994428.21



#### Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Printed: 11/8/2010

Date

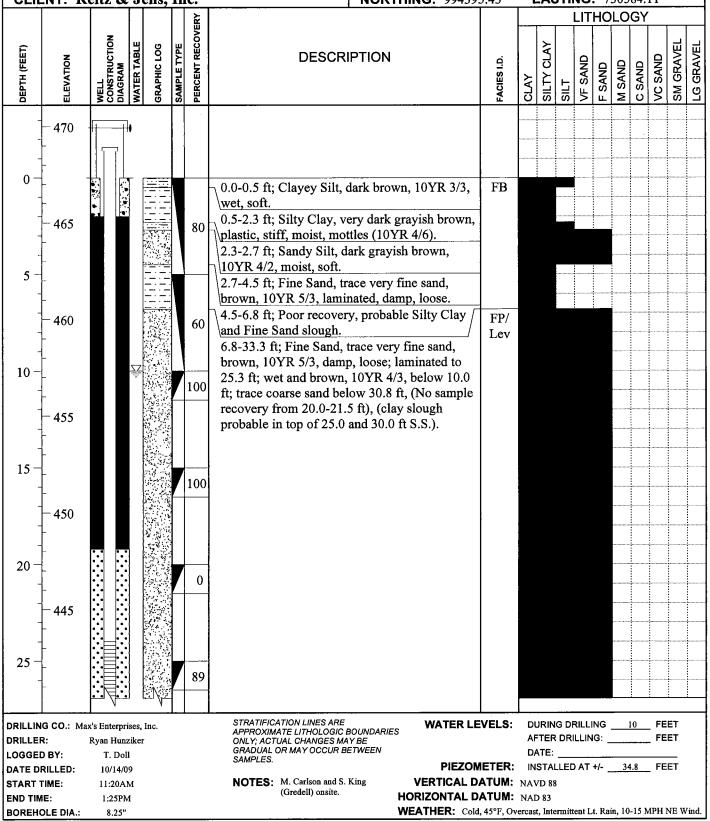
### BORING LOG P-55

LOCATION: Newman-N-Adj. to LBR

G.S. ELEVATION: 467.33' T.O.C. ELEVATION: 470.02'

NORTHING: 994395.43 EASTII

**EASTING:** 730584.11



Date Printed: 11/8/2010

# BORING LOG P-55

							ower Plant	LOCATION: Newm	an-N-A	dj. 1	to L	BR						
	posed U ailed Si	•				-	osal Area	G.S. ELEVATION:	467.33	' <b>T</b> .	0.0	C. E	ELEV/	ATIO	ON:	4	70.0	2'
	Ineu SI							NORTHING: 99439	5.43	E	EAS	TI	<b>IG:</b> 7	305	84.	11		
						ERY		· · · · · · · · · · · · · · · · · · ·						)LO	GY			
DEPTH (FEET)	ELEVATION	WELL CONSTRUCTION DIAGRAM	WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCR		FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND F SAND	M SAND	C SAND	VC SAND.	SM GRAVEL	LG GRAVEL
30	440   435					61	6.8-33.3 ft; Fine Sand, brown, 10YR 5/3, dam 25.3 ft; wet and brown, ft; trace coarse sand bel recovery from 20.0-21. probable in top of 25.0	p, loose; laminated to 10YR 4/3, below 10.0 low 30.8 ft, (No sample 5 ft), (clay slough and 30.0 ft S.S.).	FP/ Lev									
35	- 			000000000000000000000000000000000000000		100	2 wet soft (gravelly s	grayish brown, 10YR 4/ and noted at total depth le collected from auger	CM/ Sp C									
40	- - - - 425						SAND @36.5 FT											
45	- - - 420																	
50	- - - - 415																	
55 -	-																	
DRILLIN DRILLEI LOGGEI DATE D	OBY:	x's Enterpri Ryan Hunz T. Doll 10/14/0	riker l				STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC I ONLY; ACTUAL CHANGES MA GRADUAL OR MAY OCCUR B SAMPLES.	NY BE ETWEEN	EVELS:	AF DA	TER TE:	DRI	RILLING LLING:			_ FE	ET	
START	TIME:	10/14/0 11:20A 1:25PM 8.25"	М				NOTES: M. Carlson and S. (Gredell) onsite.		ATUM: ATUM:	NAV NAI	/D 88 D 83	3				_		/ind.

#### GREDELL **BORING LOG P-57 ENGINEERING RESOURCES, INC.** Ameren Missouri Labadie Power Plant LOCATION: Newman-NE-Adj. to LBR **Proposed Utility Waste Disposal Area** G.S. ELEVATION: 465.99' T.O.C. ELEVATION: 468.87' **Detailed Site Investigation** CLIENT: Reitz & Jens, Inc. NORTHING: 994356.77 EASTING: 731212.53 LITHOLOGY RECOVERY CONSTRUCTION CLAY SAMPLE TYPE **GRAPHIC LOG** SM GRAVEI GRAVEL EPTH (FEET) WATER TABI DESCRIPTION /C SAND VF SAND ELEVATION FACIES I.D. M SAND F SAND PERCENT C SAND SILTY CLAY WELL SILT Q 0 0.0-0.5 ft; Clayey Silt, dark brown, 10YR 3/3, FB • 465 ÷ wet, soft. 0.5-2.0 ft; Silty Clay, very dark grayish brown, 80 10YR 3/2, plastic, moist, stiff, mottles (10YR 4/6). 2.0-2.4 ft; Sandy Silt, dark grayish brown, 5 10YR 4/2, moist, soft. 460 2.4-4.5 ft; Fine Sand, trace very fine sand, brown, 10YR 4/3, damp, loose. FP/ 60 4.5-6.5 ft; Poor recovery, probable Silty Clay Lev slough. 6.5-15.9 ft; Fine Sand, trace very fine sand, 10 brown, 10YR 4/3, damp, loose; clay interbeds 89 455 < 1 inch thick to 7.1 ft; wet below 10.0 ft, (sand and clay slough probable in top of 10.0 and 15.0 ft S.S.). 15 61 450 15.9-21.1 ft; Fine to Coarse Sand, trace very CM/ fine sand, alternating thin beds, dark gray, Sp 10YR 4/1, wet, soft; dark yellowish brown, 10YR 4/6, below 20.6 ft. 20 94 445 21.1-36.5 ft; Medium to Coarse Sand, with С very fine sand and gravel, alternating thin beds, dark gray to dark grayish brown, 10YR 4/1 to 4/2, wet, loose, 20 mm quartz and feldspar subrounded clasts, sporadic clay balls. 25 94 440 STRATIFICATION LINES ARE DRILLING CO.: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING 10 FEET APPROXIMATE LITHOLOGIC BOUNDARIES DRILLER: AFTER DRILLING: FEET Ryan Hunziker ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN LOGGED BY: T. Doll DATE: SAMPLES. PIEZOMETER: INSTALLED AT +/- 34.8 FEET DATE DRILLED: 10/15/09 START TIME: NOTES: S. King (Gredell) onsite. VERTICAL DATUM: NAVD 88 11:25AM HORIZONTAL DATUM: NAD 83 END TIME: 2:51PM

Ē Date BOREHOLE DIA .:

10.25"

WEATHER: Cold, 45°F, Overcast, Drizzle.

#### Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

# BORING LOG P-57

LOCATION: Newman-NE-Adj. to LBR

G.S. ELEVATION: 465.99' T.O.C. ELEVATION: 468.87'

**NORTHING:** 994356.77 **EASTING:** 731212.53

ULILI	<u> </u>	eitz & Jens,	111	<u>.</u>	NORTHING: 994350	5.77				10.	- 15	121	2.5.	<u> </u>	
				≿					L	_ITH	HOL	_00	ЭΥ		l
DEPTH (FEET)	ELEVATION	WELL CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND SM GRAVEL	LG GRAVEL
		N N		_			_			<u> </u>					
30	- 435			100	21.1-36.5 ft; Medium to Coarse Sand, with very fine sand and gravel, alternating thin beds, dark gray to dark grayish brown, 10YR 4/1 to 4/2, wet, loose, 20 mm quartz and feldspar subrounded clasts, sporadic clay balls.	С									
	430		7   1	100											
					BORING TERMINATED IN GRAVELLY SAND @36.5 FT										
40	- 425				SHELBY TUBE SAMPLE COLLECTED AT 1.0-3.0 FT DEPTH AT COMPLETION OF DRILLING.										
45 +															
	420														
50	415														
	-														
55 -	410														
	110														
01007/21/11 DRILLER: LOGGED	1	s's Enterprises, Inc. Ryan Hunziker T. Doll	<u>I</u>		STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY, ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.	VELS:	AF DA	TER	DRIL		∋:			FEET FEET	
DRILLING DRILLER: DRILLER: LOGGED DATE DRI DATE DRI START TH END TIME BOREHOL	VE: :	10/15/09 11:25AM 2:51PM 10.25"			NOTES: S. King (Gredell) onsite. VERTICAL D/ HORIZONTAL D/ WEATHER: Cold	ATUM: ATUM:	NAV NAE	7D 88 0 83		AT +	·/	34.8	<u>8</u>	FEET	

#### Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

### BORING LOG P-59

LOCATION: Heisel-West-S. of LBR & W. of farm Rd G.S. ELEVATION: 465.36' T.O.C. ELEVATION: 467.94'

**EASTING:** 727225.40 NORTHING: 994039.34 LITHOLOGY PERCENT RECOVERY WELL CONSTRUCTION DIAGRAM CLAY SM GRAVEL SAMPLE TYPE g .G GRAVEL DEPTH (FEET) WATER TABL DESCRIPTION ELEVATION VF SAND VC SAND ACIES I.D. **M SAND** SAND SAND GRAPHIC SILTY CLAY SILT ö 0 465 0-0.3 ft; Silt, dark gravish brown, 10YR 4/2, FB dry, soft. 0.3-0.6 ft; Very Fine Sand, brown, 10YR 4/3, 100 dry, soft. 0.6-4.1 ft; Clay, very dark grayish brown, 10YR 3/2, moist, highly plastic, firm, mottles 5 460 10YR 4/6. 4.1-5.0 ft; Clayey Silt, dark gray, 10YR 4/1, moist, soft. 100 5.0-5.9 ft; Poor recovery, probable Clay slough. 5.9-10.0 ft; Fine Sand, Silty Clay, Sandy Silt, Clay and Clayey Silty Sand, alternating thin 10 beds, very dark gray and dark grayish brown, 455 FP/ 10YR 3/1 and 4/2, moist; clay beds highly Lev plastic, firm; sandy silt and clayey silty sand 50 beds soft. 10.0-18.3 ft; Fine Sand, trace very fine sand, dark grayish brown and dark gray, 10YR 4/2 15 and 4/1, wet, soft, laminated and iron staining 450 100 to 12.5 ft. 18.3-20.6 ft; Silty Clayey Sand, dark grayish brown, 10YR 4/2, wet, very soft. 20 445 94 20.6-25.3 ft; Fine Sand, very dark gray, (Gley) CO/ 1 3/N, wet, soft. BS 25 440 67 25.3-30.3 ft; Silty Very Fine to Fine Sand and CO/ Medium to Coarse Sand, trace gravel, BS STRATIFICATION LINES ARE WATER LEVELS: DRILLING CO .: Max's Enterprises, Inc. DURING DRILLING 8.4 FEET APPROXIMATE LITHOLOGIC BOUNDARIES AFTER DRILLING: FEET DRILLER: Doug Hunziker ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN DATE: LOGGED BY: T. Doll SAMPLES. PIEZOMETER: INSTALLED AT +/- 35.3 FEET DATE DRILLED: 9/21/09 VERTICAL DATUM: NAVD 88 START TIME: NOTES: Chris Vierrether, MDNR, 3:00PM onsite observing drilling HORIZONTAL DATUM: NAD 83 END TIME: 5:27PM activities. BOREHOLE DIA .: WEATHER: Warn, 80°F, Mostly Sunny, Humid, 5 MPH Wind from E. 8.25"

# BORING LOG P-59

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

LOCATION: Heisel-West-S. of LBR & W. of farm Rd

G.S. ELEVATION: 465.36' T.O.C. ELEVATION: 467.94'

**NORTHING:** 994039.34 **EASTING:** 727225.40

CLIE	INT: K	eitz & J	ens,	IU	c.		NORTHING	: 994039	7.34		:A3		NG:	14	<u>. 12</u> .	23.4	HU		
					ERY									10	<u>_0</u>	GΥ	,		
DEPTH (FEET)	ELEVATION	WELL CONSTRUCTION DIAGRAM WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCR	PTION		FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
30 -	- - - 435					alternating thin beds, da mottles yellowish brow		1 4/N,	CO/ BS										
	- 435 - -			7	56	30.3-36.2 ft; Coarse Sar and gravel, trace fine sa gray, 10YR 4/1, wet, so (fine sand noted at total sample collected from a	nd, thin beds, d ft grading to loo depth based on	ark ose,	C										
35 -	- 430		•••	7	50	····													
			<u> </u>	$\vdash$		<u>∧36.2-36.5 ft; Fine Sand</u>			FP/										
40	- - 425 - - -					BORING TERMINAT	ED IN FINE SA	ND	Lev										
45	- 420 - -																		
50 -	- 415 - -																		
55 -	- 410 																		
DRILLIN	<b>t:</b>	s's Enterprises, Doug Hunzike T. Doll				STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC E ONLY; ACTUAL CHANGES MA GRADUAL OR MAY OCCUR BE SAMDLES	OUNDARIES Y BE	ATER LE	VELS:	AF		DRIL	LING	_					
DATE DE START T END TIM	RILLED: TIME:	9/21/09 3:00PM 5:27PM 8.25"		_		SAMPLES. NOTES: Chris Vierrether, M onsite observing dr activities.	illing HORIZ	PIEZOM RTICAL DA ONTAL DA HER: Warn	ATUM: ATUM:	NAV NAD	D 88 83		AT + mid, 5				FEE		

#### Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation

Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

# BORING LOG P-61

LOCATION: Heisel-West-S. of LBR & W. of farm Rd

G.S. ELEVATION: 465.92' T.O.C. ELEVATION: 468.87'

NORTHING: 994020.22

EASTING:	727813.31
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CLIENI: Reitz & Jei	18, 11	ic.	<b>NORTHING:</b> 99402	0.22		211	NG.	• 7.	2/0	10.2	) [		
		RY					LIT	HO	LO	GΥ			
DEPTH (FEET) ELEVATION WELL CONSTRUCTION DIAGRAM WATER TABLE	GRAPHIC LOG SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY SII TY CI AV	SILT SL	VF SAND	F SAND	M SAND	C SAND	VC SAND		LG GRAVEL
			0.0-0.9 ft; Clayey Silt, dark brown, 10YR 3/3,	FB									
465		100	slightly plastic, roots, moist grading to wet, soft. 0.9-1.2 ft; Silty Sand, brown, 10YR 4/3, moist,										
5			loose. 1.2-2.3 ft; Silty Clay, very dark grayish brown,										
			10YR 3/2, plastic, very stiff, mottles (10YR 4/ 6), sandy silt thin bed at 2.2 ft. 2.3-6.4 ft; Silty Clay, very dark grayish brown,										
		100	10YR 3/2, plastic, moist, very stiff, mottles (10YR 4/6), very fine sand thin bed below 6.3 ft.										
		85	6.4-7.0 ft; Silty Clay, very dark grayish brown, 10YR 3/2, plastic, moist, very stiff. 7.0-8.1 ft; Clayey Silt, brown, 10YR 4/3, wet,	CO/ BS									
- - 15-			soft. 8.1-8.6 ft; Silty Clay, dark grayish brown, 10YR 4/2, plastic, moist, soft, mottles (10YR 3/ 2).										
450  		94	8.6-10.5 ft; Sandy Clayey Silt, dark grayish brown, 10YR 4/2, laminated, wet, soft; grading with clay below 10.3 ft. 10.5-11.1 ft; Silty Sand, Clayey Silt, and Sandy										
		100	Clayey Silt, alternating thin beds, wet, soft; silty sand, brown, 10YR 4/3; clayey silt and sandy clayey silt, dark gray, 10YR 4/1. 11.1-21.3 ft; Silty Clay, Silty Sand, Clayey Silt,										
			Sandy Clayey Silt, Sandy Silt and Fine Sand, alternating thin beds, dark gray, (Gley) 1 4/N, wet, soft; laminated fine organic debris to 20.5	CM/ Sp									·····
	/ \-	100	ft; fine sand below 20.5 ft, (clay slough probable in top of 15.0 and 20.0 ft S.S.). 21.3-28.3 ft, Medium Sand grading to Coarse										
DRILLING CO.: Max's Enterprises, Inc DRILLER: Ryan Hunziker LOGGED BY: T. Doll			STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMULES	VELS:		NG DF R DRI		-			FEE		
DATE DRILLED:         10/26/09           START TIME:         10:35AM           END TIME:         1:43PM			SAMPLES. PIEZON NOTES: S. King (Gredell) onsite. VERTICAL D. HORIZONTAL D.	ATUM:	NAVD		AT -	+/	34	.7	FEE	T	
BOREHOLE DIA.: 10.25"			WEATHER: Cool				in, Ca	alm.					

Printed:

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# BORING LOG P-61

**Ameren Missouri Labadie Power Plant** LOCATION: Heisel-West-S. of LBR & W. of farm Rd **Proposed Utility Waste Disposal Area** G.S. ELEVATION: 465.92' T.O.C. ELEVATION: 468.87' **Detailed Site Investigation** CLIENT: Reitz & Jens, Inc. **NORTHING: 994020.22** EASTING: 727813.31 LITHOLOGY PERCENT RECOVERY WELL CONSTRUCTION DIAGRAM CLAY **GRAPHIC LOG** SAMPLE TYPE SM GRAVEL DEPTH (FEET) -G GRAVEL WATER TABI DESCRIPTION VF SAND ELEVATION VC SAND FACIES I.D. **M SAND** C SAND F SAND SILTY CLAY SILT Sand, with fine sand, trace very fine sand, thin beds, dark gray matrix, 10YR 4/1, 30 mm black С coalified wood matter (clay slough probable in \25.0 ft S.S.). 30 28.3-36.5 ft; Medium to Coarse Sand, trace fine 89 435 sand, and fine to coarse gravel, dark gray matrix, 10YR 4/1, clay ball (plastic), (fine sand slough probable in top of 30.0 and 35.0 ft S.S.). . . 35 CM/ 100 430 Sp BORING TERMINATED IN MEDIUM SAND @36.5 FT 40 425 45 420 50 415 55 410 STRATIFICATION LINES ARE WATER LEVELS: 6 FEET DRILLING CO .: Max's Enterprises, Inc. DURING DRILLING APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE AFTER DRILLING: FEET DRILLER: Ryan Hunziker GRADUAL OR MAY OCCUR BETWEEN SAMPLES. DATE: LOGGED BY: T. Doll DATE DRILLED: 10/26/09 VERTICAL DATUM: NAVD 88 START TIME: NOTES: S. King (Gredell) onsite. 10:35AM HORIZONTAL DATUM: NAD 83 END TIME: 1:43PM WEATHER: Cool, 55°F, Overcast, Light Rain, Calm. BOREHOLE DIA.: 10.25"

#### Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

# BORING LOG P-63

LOCATION: Heisel-West-S. of LBR & W. of farm Rd

G.S. ELEVATION: 466.20' T.O.C. ELEVATION: 469.10'

NORTHING: 994004 98 FASTIN

**EASTING:** 728407.71

CLIENT: Rei	itz & Jens,	Inc.		<b>NORTHING: 99400</b>	<u>4.98</u>	<u> </u>	AST	ING	: 7	<u>284</u>	<u>07.</u>	71		
		ERY						LIT	НО	LO	GΥ			
DEPTH (FEET) ELEVATION	WELL CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG	SAMPLE TYPE PERCENT RECOVERY	DESCRIP	TION	FACIES I.D.	CLAY	SILTY CLAY	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
	,  '*													
						H								
			0.0-1.1 ft; Sandy Clayey	Silt, dark brown,	FB									
			10YR 3/3, moist, soft. 1.1-4.1 ft; Very Fine Sand	d, gravish brown.										
		100	10YR 5/2, damp, loose.	, , , , , , , , , , , , , , , , , , ,										
			$\uparrow$ 4.1-4.5 ft; Silty Clay, ver	y dark gravish brown.										
5-			10YR 3/2, plastic, firm, n	noist.										
			4.5-5.0 ft; Silt, dark grayi	sh brown, 10YR 4/2,										
	$\mathbf{v}$	57	5.0-6.4 ft; Poor recovery,	probable Silty Clay	FP/									
			slough. 6.4-11.8 ft; Sandy Silt, C	ay and Clayey Silty	Lev									
10 -			Sand, alternating thin bed	s, very dark grayish										
455			brown to brown, 10YR $3/2$ wet; clay beds highly plas											
		57	and clayey silty sand bed		CO/ BS									
			staining below 10.0 ft. 11.8-16.0 ft; Fine Sand, v	ery dark gray (Gley)	20									
15			1 3/N, wet, soft, (clay, fin	e sand and silt slough										
- 450		67	probable in top of 15.0 ft 16.0-18.3 ft; Very Fine S											
			(Gley) 1 3/N, wet, soft.	anu, very uark gray,										
			18.3-25.8 ft; Medium to 0		CO/									
20-			gray, (Gley) 1 3/N, wet, s sand and silt slough noted		BS/C									
- 445		78	S.S.).	. III top 01 15.0 It										
25 -														]
		100	25.8-36.5 ft; Coarse Sand	with gravel	С								_	
				,	Ŭ									
DRILLING CO.: Max's	•		STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOU		VELS:				-					
DRILLER: Do LOGGED BY:	ug Hunziker T. Doll		ONLY; ACTUAL CHANGES MAY E GRADUAL OR MAY OCCUR BETV SAMPLES.			DAT	'ER DR 'E:						_	
DATE DRILLED:	9/21/09		NOTES: John Eimer (Ameren)	onsite VERTICAL D		INS	TALLEI			34	.9	FEE	т	
	11:31AM 2:22PM		observing drilling acti											
BOREHOLE DIA.:	8.25"			WEATHER: Warn	a, 70°F, H	eavy F	og, Caln	a, Hun	nid.					

### BORING LOG P-63

Ameren Missouri Labadie Power Plant LOCATION: Heisel-West-S. of LBR & W. of farm Rd **Proposed Utility Waste Disposal Area** G.S. ELEVATION: 466.20' T.O.C. ELEVATION: 469.10' **Detailed Site Investigation** CLIENT: Reitz & Jens, Inc. NORTHING: 994004.98 EASTING: 728407.71 LITHOLOGY PERCENT RECOVERY WELL CONSTRUCTION DIAGRAM CLAY SAMPLE TYPE **GRAPHIC LOG** ОЕРТН (FEET) SM GRAVEI .G GRAVEL WATER TABL DESCRIPTION ELEVATION VF SAND VC SAND FACIES I.D. **M SAND** C SAND F SAND SILTY CLAY SILT alternating thin beds, dark gray to dark grayish С brown, 10YR 4/1 and 4/2, wet, soft. 30 89 435 35 67 . . - 430 BORING TERMINATED IN COARSE SAND @36.5 FT 40 425 45 420 50 415 55 410 STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES DRILLING CO.: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING 8 FEET AFTER DRILLING: DRILLER: ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN FEET Doug Hunziker LOGGED BY: DATE: T. Doll SAMPLES. PIEZOMETER: INSTALLED AT +/- 34.9 FEET DATE DRILLED: 9/21/09 NOTES: John Eimer (Ameren) onsite START TIME: 11:31AM VERTICAL DATUM: NAVD 88 observing drilling activities. END TIME: 2:22PM HORIZONTAL DATUM: NAD 83 BOREHOLE DIA .: 8.25" WEATHER: Warm, 70°F, Heavy Fog, Calm, Humid.

# RCES, INC. BORING LOG P-65

NORTHING: 993990.81

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Printed: 11/8/2010

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### LOCATION: Newman-West-S. of LBR & E. of farm Rd

G.S. ELEVATION: 468.06' T.O.C. ELEVATION: 471.31'

**EASTING:** 729165.61

LITHOLOGY RECOVERY CONSTRUCTION CLAY SAMPLE TYPE SM GRAVEL **GRAPHIC LOG** GRAVEL DEPTH (FEET) WATER TABL DESCRIPTION VC SAND ELEVATION FACIES I.D. **VF SAND** SAND **M SAND** SAND PERCENT DIAGRAM SILTY CLAY WELL SILT Ō Ö -10 470 0 0.0-0.7 ft; Sandy Clayey Silt, very dark grayish FB brown, 10YR 3/2, moist, soft. 0.7-2.0 ft; Clayey Silt, very dark grayish 90 brown, moist, soft, mottles (10YR 4/6). 465 2.0-3.0 ft; Silty Sand, brown, 10YR 4/3, moist, loose. 5 3.0-5.6 ft; Clayey Sandy Silt, dark grayish brown, 10YR 4/2, laminated, wet, soft, mottles (10YR 4/6). 40 5.6-8.5 ft; Very Fine Sand, Clavey Silt, Clavey 460 Sandy Silt, alternating thin beds; very fine sand to 5.8 ft, brown, 10YR 4/3, moist, loose; clayey 10 silt below 5.8 ft, very dark gravish brown, 10YR 3/2, non-plastic, moist, soft; clayey sandy silt below 6.0 ft, dark yellowish brown, 65 10YR 4/2, laminated, moist, soft, mottles 455 (10YR 4/6). 8.5-12.5 ft; Silty Clay, dark gray, 10YR 4/1, 15 plastic, laminated, iron concretions with 94 prominent staining (10YR 4/6), moist, soft. FP/ 12.5-15.6 ft; Clayey Sandy Silt, brown and Lev dark gray, 10YR 4/3 and 4/1, laminated, 450 mottles (10YR 4/6), wet. 15.6-25.6 ft; Fine Sand, trace very fine sand, dark grayish brown, 10YR 4/2, wet, soft, (clay 20 44 slough probable in top of 15.0 and 20.0 ft S.S.). 445 25 78 25.6-36.5 ft; Coarse Sand to Gravelly Sand, С STRATIFICATION LINES ARE WATER LEVELS: DRILLING CO .: Max's Enterprises, Inc. DURING DRILLING FEET 12.5 APPROXIMATE LITHOLOGIC BOUNDARIES AFTER DRILLING: DRILLER: FEET Rvan Hunziker ONLY: ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN LOGGED BY: DATE: T. Doll SAMPLES PIEZOMETER: INSTALLED AT +/- 34.9 FEET DATE DRILLED: 10/13/09 NOTES: S. King (Gredell) onsite VERTICAL DATUM: NAVD 88 START TIME: 8:43AM developing piezometers. END TIME: HORIZONTAL DATUM: NAD 83 11:25AM BOREHOLE DIA .: 8.25" WEATHER: Cold, 45°F, Overcast, Breezy.

# BORING LOG P-65

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

### LOCATION: Newman-West-S. of LBR & E. of farm Rd

G.S. ELEVATION: 468.06' T.O.C. ELEVATION: 471.31'

NORTHING: 993990.81

.81 **EASTING:** 729<u>165.61</u>

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						RY						LITI	HO	LO	GΥ			
<b>DEPTH (FEET)</b>	ELEVATION	WELL CONSTRUCTION DIAGRAM	WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND			VC SAND	SM GRAVEL	LG GRAVEL
		Ν		Ν	Π													٦
30 -	- 440 		ç			39	with medium sand, trace fine sand, alternating thin beds, dark gray, 10YR 4/1, subrounded quartz and feldspar clasts, coalified wood fragments below 30.3 ft, wet, loose.	C						·	·	·		
35	- 435 				97													
-	L .		c	çççç	7	6												
	- 430 		L	_~~			BORING TERMINATED IN COARSE SAND @36.5 FT											
40 -	-																	
-	-																	
	- 425 -																	
45 -	-																	
	-																	
	- 420																	
50 -	-																	
	-																	
	- 415																	
55 -	-					·												
	-																	
DRILLING DRILLER LOGGED		's Enterpris Ryan Hunzi T. Doll		nc.			STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.		AF DA	TER TE:	DRII		3:			FEE	т —	
DATE DE START T END TIM	'IME: E:	10/13/09 8:43AM 11:25AM					PIEZOMI NOTES: S. King (Gredell) onsite VERTICAL DA developing piezometers. HORIZONTAL DA	TUM:	NAV NAD	D 88 83		AT +	-/	34.	9	FEE	T	
BOREHO	DLE DIA.:	8.25"					WEATHER: Cold,	45°F, Ov	ercast	, Bree	ezy.							

# BORING LOG P-67

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

### LOCATION: Newman-West-S. of LBR & E. of farm Rd

G.S. ELEVATION: 465.52' T.O.C. ELEVATION: 468.28'

NORTHING: 993985.65 E

EASTING: 729758.28

CLIENT: I	<u>ceitz &amp; Jens,</u>	<u>inc.</u>	NORTHING: 99398	5.65	E	ASTI	NG		297:	58.2	28	_	
		<u>}</u>					LIT	HO	LO	GY			
DEPTH (FEET) ELEVATION	WELL CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG	SAMPLE TYPE PERCENT RECOVERY	DESCRIPTION	FACIES I.D.		SILTY CLAY SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
_			· · · · ·										
0-465			0.0-0.5 ft; Clayey Silt, dark brown, 10YR 3/3, moist, soft.	FB									
5-460		95	0.5-0.8 ft; Silty Sand, dark yellowish brown, 10YR 4/4, moist, loose. 0.8-2.3 ft; Clayey Silt, very dark grayish brown, 10YR 3/2, slightly plastic, firm, moist, mottles (10YR 4/6).										
		50	<ul> <li>2.3-3.6 ft; Silty Clay, very dark grayish brown,</li> <li>10YR 3/2, plastic, firm, moist.</li> <li>3.6-3.8 ft; Silty Sand, dark yellowish brown,</li> <li>10YR 4/4, moist, loose.</li> <li>3.8-5.0 ft; Silty Clay, very dark grayish brown,</li> </ul>	FP/ Lev									
		95	10YR 3/2, plastic, moist, stiff, mottles (10YR 4/6). 5.0-6.8 ft; Poor recovery, probable Silty Clay slough. 6.8-7.3 ft; Silty Clayey Sand, dark gray to dark	CO/									
		94	grayish brown, 10YR 4/1 and 4/2, moist, soft 7.3-12.3 ft; Fine Sand, with very fine sand, brown, 10YR 4/3, iron staining (10YR 4/6), wet, soft. 12.3-13.1 ft; Clayey Silt, Silty Clay and Fine	BS FP/ Lev									
		100	Sand, alternating thin beds; dark gray, 10YR 4/ 1, wet, soft; silty clay bed, plastic; fine sand below 12.8 ft, brown, 10YR 4/3, loose. 13.1-15.7 ft; Silty Clay and Very Fine Sand, thin beds, (Gley) 1 4/N; silty clay to 13.3 ft, plastic, firm; very fine sand below 13.3 ft, laminated, wet, soft.										
		100	15.7-25.6 ft; Fine Sand, with very fine sand, dark gray, 10YR 4/1, wet, soft, (clay slough probable in top of 15.0 though 25.0 ft S.S.). 25.6-36.5 ft; Medium Sand, with fine and	CM/									
DRILLING CO.: M DRILLER: LOGGED BY:	Ryan Hunziker T. Doll		STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY, ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.		AFT DAT	ING DA ER DRI E:	LLING	3:		_	FEE	T -	
DATE DRILLED: START TIME: END TIME: BOREHOLE DIA.:	10/13/09 12:20PM 2:57PM 8.25"		PIEZOM NOTES: S. King (Gredell) onsite developing piezometers. WEATHER: Cold,	ATUM: ATUM:	NAVD NAD 8	3			35.	0	FEE	T'	

### **BORING LOG P-67**

**Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation** CLIENT: Reitz & Jens, Inc.

11/8/2010

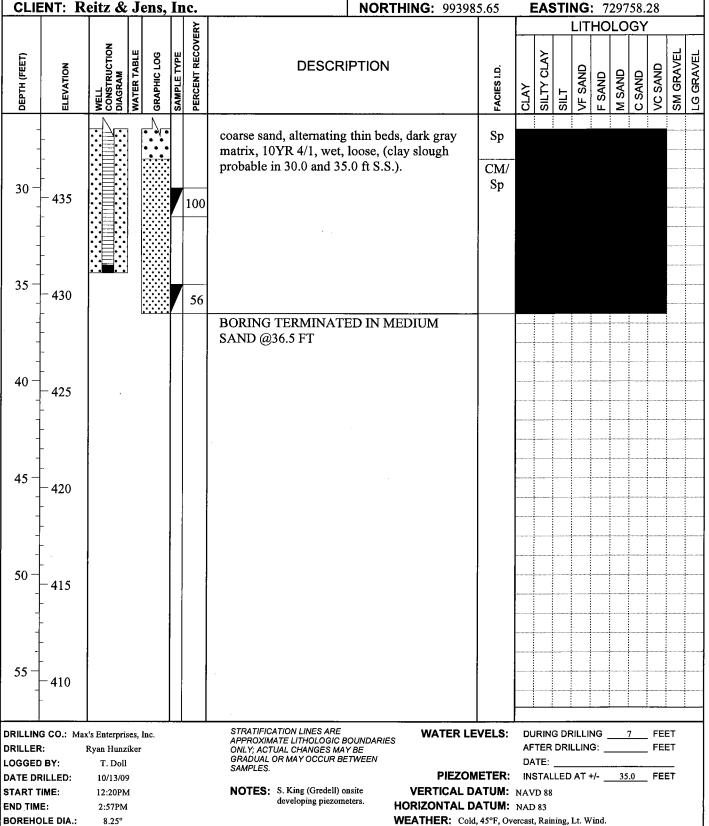
Printed:

Date

# LOCATION: Newman-West-S. of LBR & E. of farm Rd

G.S. ELEVATION: 465.52' T.O.C. ELEVATION: 468.28'

**NORTHING:** 993985.65

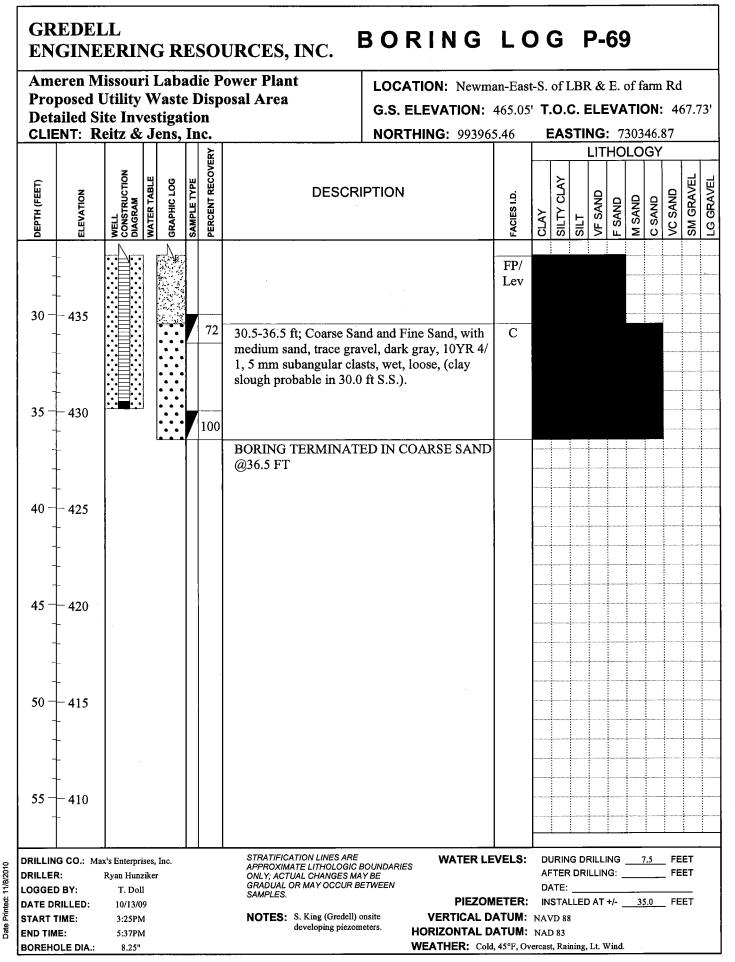


Printed:

Date

### **BORING LOG P-69**

**Ameren Missouri Labadie Power Plant** LOCATION: Newman-East-S. of LBR & E. of farm Rd **Proposed Utility Waste Disposal Area** G.S. ELEVATION: 465.05' T.O.C. ELEVATION: 467.73' **Detailed Site Investigation** CLIENT: Reitz & Jens, Inc. **NORTHING:** 993965.46 **EASTING:** 730346.87 LITHOLOGY RECOVERY CONSTRUCTION DIAGRAM CLAY SAMPLE TYPE SM GRAVEL **GRAPHIC LOG** GRAVEL **JEPTH (FEET)** WATER TABL DESCRIPTION ELEVATION VC SAND FACIES I.D. VF SAND M SAND SAND SAND PERCENT SILTY CLAY WELL SILT Õ 0 -465 0.0-0.5 ft; Clayey Silt, dark brown, 10YR 3/3, FB slightly plastic, wet, soft. 0.5-1.8 ft; Silty Clay, very dark gravish brown, 100 10YR 3/2, plastic, stiff, moist, mottles (10YR 4/6). 1.8-2.2 ft; Clayey Silt, dark gray, 10YR 4/1, 5 460 slightly plastic, stiff, moist, mottles (10YR 4/ 6). 2.2-4.5 ft; Silty Clay, very dark grayish brown, 70 10YR 3/2, plastic, stiff, moist, mottles (10YR FP/ 4/6). Lev 4.5-5.0 ft; Clayey Silt, brown, 10YR 4/3, 10 -- 455 laminated, wet, soft. 100 5.0-7.5 ft; Poor recovery, probable Silty Clay slough. 7.5-30.5 ft; Fine Sand, trace very fine sand and medium sand, dark grayish brown, 10YR 4/2, wet, loose to soft; iron staining to 15.0 ft; dark 15 - 450 gray, 10YR 4/1, below 20.3 ft, (clay slough 78 probable in 10.0 and 25.0 ft S.S.). 20 - 445 100 25 440 100 STRATIFICATION LINES ARE DRILLING CO.: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING 7.5 FEET APPROXIMATE LITHOLOGIC BOUNDARIES AFTER DRILLING: \_ DRILLER: FEET Rvan Hunziker ONLY: ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN LOGGED BY: DATE: T. Doll SAMPLES. DATE DRILLED: PIEZOMETER: INSTALLED AT +/- \_\_\_\_\_\_\_\_ FEET 10/13/09 NOTES: S. King (Gredell) onsite START TIME: VERTICAL DATUM: NAVD 88 3:25PM developing piezometers. HORIZONTAL DATUM: NAD 83 END TIME: 5:37PM BOREHOLE DIA .: 8.25" WEATHER: Cold, 45°F, Overcast, Raining, Lt. Wind.



#### Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

### BORING LOG P-71

LOCATION: Newman-East-S. of LBR & E. of farm Rd

G.S. ELEVATION: 467.42' T.Q.C. ELEVATION: 470.70'

**NORTHING:** 993948.36 **EASTING:** 730927.90

Image: Second state of the second s	SM GRAVEL
0       -470         -465       0.0-0.5 ft; Clayey Silt, very dark grayish brown, 10YR 3/2, slightly plastic, moist, soft.         5       -465         5	SM GRAVEL LG GRAVEL
470         0         465         80         0.0-0.5 ft; Clayey Silt, very dark grayish brown, 10YR 3/2, slightly plastic, moist, soft.         0.5-1.8 ft; Silty Clay, very dark grayish brown, 10YR 3/2, plastic, very stiff, moist, mottles         10YR 4/6).         1.8-2.0 ft; Sandy Clayey Silt, dark brown, 10YR 3/3, moist, soft.         2.0-2.6 ft; Silty Clay, very dark grayish brown, EP/	
0       0.0-0.5 ft; Clayey Silt, very dark grayish brown, 10YR 3/2, slightly plastic, moist, soft.       FB         465       80       0.5-1.8 ft; Silty Clay, very dark grayish brown, 10YR 3/2, plastic, very stiff, moist, mottles (10YR 4/6).       FB         5       1.8-2.0 ft; Sandy Clayey Silt, dark brown, 10YR 3/3, moist, soft.       1.8-2.0 ft; Silty Clay, very dark grayish brown, 10YR 3/3, moist, soft.       ED/	
465         5         5	
5 - 80 10YR 3/2, plastic, very stiff, moist, mottles (10YR 4/6). 1.8-2.0 ft; Sandy Clayey Silt, dark brown, 10YR 3/3, moist, soft. 2.0-2.6 ft; Silty Clay, very dark grayish brown,	
5 10YR 3/3, moist, soft. 2.0-2.6 ft; Silty Clay, very dark grayish brown, ED/	
460 35 <u>10YR 3/2, plastic, very stiff, moist.</u> 2.6-4.5 ft; Very Fine Sand, trace fine sand, Lev	
brown, 10YR 4/3, laminated, damp, loose. 4.5-6.2 ft; Poor recovery, probable Silty Clay	
Biologi. 83 Stough. 6.2-10.3 ft; Fine Sand, trace very fine sand, brown 10YR 4/3 laminated damp loose	
-455       -455         10.3-16.0 ft; Silty Clay, Clayey Silt and Sandy         Silt, alternating thin beds; silty clay to 10.6 ft,         dark gray to dark grayish brown, 10YR 4/1 and	
15 - 4/2, slightly plastic, soft, wet; sandy silt below $10.6$ ft, alternating beds <1 inch thick of dark $10.6$ ft.	
450 debris below 10.6 ft; silty clay below 15.0 ft,	
20 - dark gray, 10YR 4/1, laminated, plastic, moist, soft; sandy silt below 15.2 ft, brown, 10YR 4/3, laminated, wet, soft.	
-445 16.0-36.5 ft; Sandy Silt and Fine Sand, with very fine sand, thin beds, very dark gray,	
(Gley) 1 3/N, laminated to 21.3 ft, wet, soft, black plant debris at 26.4 ft, (clay slough probable in top of 25.0 ft S. S.).	
LOCCED BY: T. DAIL GRADUAL OR MAY OCCUR BETWEEN DATE:	EET EET
DATE DRILLED:     10/21/09       START TIME:     2:48PM       NOTES:     Chris Vierrether, MDNR, onsite observing drilling	EET
END TIME:       4:54PM       onsite observing drilling activities.       HORIZONTAL DATUM: NAD 83         BOREHOLE DIA.:       8.25"       WEATHER: Warm, 70°F, Overcast, 10-15 MPH Wind from S., Mike	d

# **BORING LOG P-71**

Ameren Missouri Labadie Power Plant **Proposed Utility Waste Disposal Area** Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

### LOCATION: Newman-East-S. of LBR & E. of farm Rd

G.S. ELEVATION: 467.42' T.O.C. ELEVATION: 470.70'

Date Printed: 11/8/2010

**NORTHING:** 993948.36 **EASTING:** 730927.90

CLIE	:NT: K	eitz & J	ens,	In	.C.	N	<b>ORTHING:</b> 99394	8.30		AS		IG:		_		_		
					RΥ				ļ,	,	ļ	<u> T </u>	HO	LO	GY			
DEPTH (FEET)	ELEVATION	WELL CONSTRUCTION DIAGRAM WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTI	ON	FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
_								<u> </u>										
30	- 440 - - - - - - - - - - - - - - - - - -				50	16.0-36.5 ft; Sandy Silt and very fine sand, thin beds, ve (Gley) 1 3/N, laminated to 2 black plant debris at 26.4 ft probable in top of 25.0 ft S.	ery dark gray, 21.3 ft, wet, soft, , (clay slough	CO/ BS										
35 -	-				100								-					
-	-				100													
-	- 430					BORING TERMINATED @36.5 FT	IN FINE SAND											
_	_					0												
40 -																		
-	-																	
-	425									-								
-	-																	
45 -																		
-	-																	
-	- 420																	
-																		
-	-																	
50 -	1																	
	-																	
-	- 415																	
-	-																	
55	-																	*
	1																	
DRILLIN DRILLE LOGGE	R:	J x's Enterprises, Ryan Hunzike T. Doll				STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUN ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWE		EVELS:	AF	TER	DRI		G: _			FEI FEI		
	RILLED: TIME:	10/21/09 2:48PM 4:54PM				SAMPLES. NOTES: Chris Vierrether, MDNR onsite observing drilling activities.	UERTICAL D	ATUM:	NAV NAD	D 88 83						FE	T	
BOREH	OLE DIA.:	8.25"					WEATHER: Was	m, 70°F, O	vercas	st, 10	-15 N	1PH '	wind	trom	ı S., N	/IIId.		

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

# BORING LOG P-73

LOCATION: Bean Field-West Margin Project Area

G.S. ELEVATION: 467.06' T.O.C. ELEVATION: 469.94'

NORTHING: 993742.59

	kenz & Jens, In	IC.	NORTHING: 99374	2.39		<u>=AS</u>		16:	1.	269	24.0	50			
		ERY					L	ITI.	ю	LO	GY				
DEPTH (FEET) ELEVATION	WELL CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL	
- 470											_				
465			0-1.6 ft; Clayey Silt, light olive gray, 5Y 6/1, soft, plastic. 1.6-2.2 ft; Silt, light brown, non-cohesive, dry.	FB											
		85	2.2-3.5 ft; Clay, olive gray, 5Y 4/1, plastic, $firm$ .												
5			3.5-4.4 ft; Silty Clay and Silt, light olive gray, 5Y 6/1, soft, wet. 4.4-6.3 ft; Very Fine Sand, grayish orange,	-				ĺ							
		86	10YR 7/4, silty, indistinct bedding, saturated. 6.3-6.6 ft; Silty Clay, olive gray, 5Y 4/1,	FP/ Lev											
10		78	plastic. 6.6-31.2 ft; Fine Sand, grayish orange, 10YR 7/ 4, scattered clay streaks (slough) and silt, sharp												
- 455		/8	lower contact.												
		100													
20		100													
445															
		100													
	ax's Enterprises Inc		STRATIFICATION LINES ARE WATER L		יוח	IRING	יפח					FEE	т	$\neg$	
DRILLING CO.: Max's Enterprises, Inc. DRILLER: Doug Hunziker			APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN			ELS: DURING DRILLING <u>4</u> FE AFTER DRILLING: <u></u> FE DATE:									
LOGGED BY: M. Carlson DATE DRILLED: 11/06/09			SAMPLES. PIEZON		INS	STAL	LED					FEE	T		
START TIME: END TIME: BOREHOLE DIA.:	7:54AM 2:04PM 10.25"		Smotherman (MDNR) onsite observing drilling activities. T. HORIZONTAL D	ATUM:	NAD	83									
DORENOLE DIA.:	10.25"		Doll (Gredell) onsite. WEATHER: Sunn	y, 308°F, I	л. W1	na.									

#### Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

# BORING LOG P-73

LOCATION: Bean Field-West Margin Project Area

G.S. ELEVATION: 467.06' T.O.C. ELEVATION: 469.94'

NORTHING: 993742.59 EASTING: 726924.60

	enz & Jens, II			2.57	1		110.								
		<b>₽</b>			LITHOLOGY										
DEPTH (FEET) ELEVATION	WELL WELL CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY SII TY CI AY	SILT	VF SAND	F SAND	M SAND	C SAND VC SAND	SM GRAVEL	LG GRAVEL			
		100	6.6-31.2 ft; Fine Sand, grayish orange, 10YR 7/ 4, scattered clay streaks (slough) and silt, sharp lower contact.	FP/ Lev											
- 435		100	31.2-36.5 ft; Medium to Coarse Sand, grayish orange, 10YR 7/4, common granules and black carbonaceous fragments, (very coarse sand noted at total depth based on cuttings sample collected from auger bit) (fine sand slough in top S.S.).	С											
+ 430 + 40			BORING TERMINATED IN VERY COARSE SAND @ 36.5 FT												
				2 9											
DRILLING CO.: Ma	x's Enterprises, Inc. Doug Hunziker		STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE	VELS:	DURII						ET				
LOGGED BY: DATE DRILLED: START TIME: END TIME: BOREHOLE DIA.:	M. Carlson 11/06/09 7:54AM 2:04PM 10.25"	Infloom     GRADUAL OR MAY OCCUR BETWEEN SAMPLES.     PIEZOMETER       6/09     SAMPLES.     PIEZOMETER       AM     NOTES:     Chris Vierrether and Blake     VERTICAL DATUN       PM     observing drilling activities. T.     HORIZONTAL DATUN							DATE:						

#### Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

### BORING LOG P-75

LOCATION: Heisel-Bean Field-West Margin Project Area G.S. ELEVATION: 466.12' T.O.C. ELEVATION: 468.75'

-G GRAVEL

EASTING: 727511.13 CLIENT: Reitz & Jens, Inc. NORTHING: 993730.50 LITHOLOGY PERCENT RECOVERY WELL CONSTRUCTION DIAGRAM CLAY SM GRAVEL **NATER TABLE** SAMPLE TYPE **SRAPHIC LOG** DEPTH (FEET) DESCRIPTION VC SAND EVATION. VF SAND **M SAND** FACIES I.D. C SAND F SAND SILTY CLAY SILT H 0 0.0-0.6 ft; Silt, very dark grayish brown, 10YR FB • 465 3/2, damp, soft. 0.6-1.0 ft; Silty Sand, dark grayish brown, 100 10YR 4/2, soft, damp. 1.0-6.0 ft; Clay, very dark grayish brown, 10YR 3/2, highly plastic, very firm, moist, 5 mottles (10YR 4/6). 460 6.0-9.1 ft; Silty Sand, Silty Clay, Sandy Silt and Clay, alternating thin beds, dark gray to 100 dark yellowish brown, 10YR 4/1 to 4/4, damp grading to moist, wet below 6.9 ft; clay below FP/ 8.8 ft, highly plastic, firm, mottled (10YR 4/6). 10 9.1-28.3 ft; Fine Sand, dark gravish brown, Lev 455 10YR 4/2, wet, soft, wood fragments at 11.7 and 25.7 ft; very dark gray, (Gley) 1 3/N, 45 below 15.3 ft, (clay slough probable in top of 15.0-30.0 S.S.). 15 CO/ 56 450 BS 20 78 445 25 78 440 STRATIFICATION LINES ARE DURING DRILLING 7.3 FEET DRILLING CO .: Max's Enterprises, Inc. WATER LEVELS: APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE AFTER DRILLING: FEET DRILLER: Doug Hunziker GRADUAL OR MAY OCCUR BETWEEN DATE: LOGGED BY: T. Doll SAMPLES. PIEZOMETER: INSTALLED AT +/- 34.8 FEET DATE DRILLED: 09/28/09 NOTES: VERTICAL DATUM: NAVD 88 START TIME: 7:50AM END TIME: HORIZONTAL DATUM: NAD 83 10:35AM

BOREHOLE DIA .:

8.25"

WEATHER: Cool, 55°F, Overcast, Light Rain, Calm.

#### Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Printed: 11/8/2010

Date

## BORING LOG P-75

NORTHING: 993730.50

LOCATION: Heisel-Bean Field-West Margin Project Area

G.S. ELEVATION: 466.12' T.O.C. ELEVATION: 468.75'

**EASTING:** 727511.13

LITHOLOGY PERCENT RECOVERY CONSTRUCTION DIAGRAM CLAY SAMPLE TYPE **GRAPHIC LOG** SM GRAVEL GRAVEL DEPTH (FEET) WATER TABI DESCRIPTION VC SAND ELEVATION VF SAND M SAND FACIES I.D. C SAND F SAND SILTY CLAY SILT WELL Ö 28.3-32.5 ft; Fine to Medium Sand, very dark CO/ gray, (Gley) 1 3/N, wet, soft, (clay slough BS 30 probable in top of 35.0 ft S.S.). 56 435 32.5-36.5 ft; Coarse Sand, with medium sand, С trace fine sand and gravel, dark gray, 10YR 4/ 1, subrounded clasts, wet, soft. 35 100 - 430 BORING TERMINATED IN COARSE SAND @36.5 FT 40 425 45 420 50 415 55 410 STRATIFICATION LINES ARE DRILLING CO.: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING \_\_\_\_\_\_\_ FEET APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN DRILLER: Doug Hunziker AFTER DRILLING: FEET LOGGED BY: T. Doll DATE: SAMPLES. PIEZOMETER: INSTALLED AT +/- 34.8 FEET DATE DRILLED: 09/28/09 VERTICAL DATUM: NAVD 88 START TIME: NOTES: 7:50AM HORIZONTAL DATUM: NAD 83 END TIME: 10:35AM BOREHOLE DIA .: WEATHER: Cool, 55°F, Overcast, Light Rain, Calm. 8.25"

#### Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Printed: 11/8/2010

Date

## BORING LOG P-77

NORTHING: 993714.81

LOCATION: Heisel-West-S of LBR, W of farm access Rd. G.S. ELEVATION: 465.41' T.O.C. ELEVATION: 468.05'

**S. ELEVATION:** 465.41' **I.O.C. ELEVATION:** 468.05'

EASTING: 728102.38

LITHOLOGY ΕR RECOV *IRUCTION* CLAY SAMPLE TYPE SM GRAVEL G GRAVEL **GRAPHIC LOG** DEPTH (FEET) WATER TABL DESCRIPTION ELEVATION VF SAND VC SAND FACIES I.D. M SAND C SAND CONSTRUC DIAGRAM SAND PERCENT SILTY CLAY SILT WELL Н 0 465 1. AN 11 0.0-1.0 ft; Clayey Silt, very dark gravish FB \brown, 10YR 3/2, moist, soft. 1.0-1.9 ft; Silty Sand, dark gravish brown, 50 10YR 4/2, moist, soft. 1.9-3.8 ft; Silty Clay, very dark gravish brown, 10YR 3/2, plastic, very firm, mottles (10YR 4/ 5 460 (6). 3.8-5.9 ft; Poor recovery, probable Silty Clay slough. 100 5.9-10.5 ft; Clayey Silt, Silty Clay, Sandy Silt  $\overline{\Sigma}$ and Fine Sand, alternating thin beds, dark grayish brown, 10YR 4/2, wet, soft; silty clay 10 at 6.8 ft, dark brown, 10YR 3/3, plastic, firm, 455 CO/ moist; sandy silt, iron staining and mottles BS (10YR 4/6) below 7.7 ft, laminated below 8.3 72 Ift. FP/ 10.5-12.3 ft; Clayey Silt, Silty Clay and Fine Lev Sand, alternating thin beds, very dark gray, 15 (Gley) 1 3/N, laminated, wet, soft, plant 450 67 material below 11.3 ft. 12.3-20.3 ft; Fine Sand, trace very fine sand, dark gray, 10YR 4/1, wet, soft, laminated to 13.6 ft; thin clay interbeds from 15.0-15.5 ft, dark grayish brown, 10YR 4/2. 20 445 20.3-31.2 ft; Fine Sand grading to Medium CM/ 83 Sand grading to Coarse Sand, thin beds, trace Sp gravel below 20.7 ft, dark gray and gray, 10YR 4/1 and 5/1, wet, alternating soft and loose consistency; subrounded clasts; clayey silty sand below 31.1 ft. 25 440 100 STRATIFICATION LINES ARE DRILLING CO .: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING \_\_\_\_\_\_ FEET APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE AFTER DRILLING: DRILLER: Doug Hunziker FEET GRADUAL OR MAY OCCUR BETWEEN DATE: LOGGED BY: T. Doll SAMPLES. PIEZOMETER: INSTALLED AT +/- 35.0 FEET DATE DRILLED: 09/28/09 NOTES: Chris Vierrether, MDNR, VERTICAL DATUM: NAVD 88 START TIME: 11:10AM onsite observing drilling END TIME: HORIZONTAL DATUM: NAD 83 1:45PM activities. WEATHER: Warm, 60°F, Clear Skies, Mild, 30 MPH Gusting Wind. BOREHOLE DIA .: 8.25"

# BORING LOG P-77

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

LOCATION: Heisel-West-S of LBR, W of farm access Rd.

G.S. ELEVATION: 465.41' T.O.C. ELEVATION: 468.05'

NORTHING: 993714.81 EASTING: 728102.38

				Π	RY	····						HO	LO	GΥ			
<b>DEPTH (FEET)</b>	ELEVATION	WELL CONSTRUCTION DIAGRAM WATER TARI F	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
30 -	- - - 435 -				100	\sand below 31.1 ft. 31.2-36.5 ft; Gravelly Sand, with fine to coarse	CM/ Sp										
35-	- - - 430		6 00 00 00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		100	sand, alternating thin beds, dark gray, 10YR 4/ 1, wet, soft grading to loose, black angular coalified wood fragments to 31.3 ft.											
- - 40 -	- - 425 					BORING TERMINATED IN COARSE SAND @36.5 FT											
- 45 — -	- - - 420 -																
- 50 — -	- - - 415 -																
55 — -	- - - 410 -																
DRILLIN DRILLEF LOGGEI	र:	l c's Enterprises Doug Hunzik T. Doll			<u>.</u>	STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.		AF D/	TER ATE:		LLIN	G: _			_ FEI _ FEI		
DATE DI START 1 END TIM	RILLED: FIME:	09/28/09 11:10AM 1:45PM 8.25"				NOTES: Chris Vierrether, MDNR, onsite observing drilling activities. WDNR, WEATHER: War	ATUM: ATUM:	NAV NAI	VD 88 D 83	8	) AT ·					ET	

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Printed: 11/8/2010

Date

### **BORING LOG P-79**

LOCATION: Heisel-West-S of LBR, Adj. farm access Rd. G.S. ELEVATION: 467.01' T.O.C. ELEVATION: 469.84'

**EASTING:** 728850.48 NORTHING: 993695.02 LITHOLOGY RECOVERY WELL CONSTRUCTION DIAGRAM <u>CLAY</u> Ľ SAMPLE TYPE SM GRAVEI .G GRAVEL **JEPTH** (FEET) WATER TABL DESCRIPTION ELEVATION VF SAND VC SAND ACIES I.D. C SAND SAND M SAND GRAPHIC PERCENT SILTY CLAY SILT 470 0 0.0-0.9 ft, Clayey Silt, dark brown, 10YR 3/3, FB wet, soft, roots, trace very fine sand below 0.5 465 \ft. 100 0.9-2.7 ft; Silty Clay, very dark grayish brown, 10YR 3/2, plastic, very stiff, moist, mottles (10YR 4/6). 5 2.7-3.9 ft; Clavey Silt and Silty Clay, thin beds, dark yellowish brown to dark brown, 10YR 3/4 to 3/3, moist; silty clay bed, plastic, very stiff. 460 FP/  $\nabla$ 80 3.9-5.5 ft, Clayey Sandy Silt, dark grayish Lev brown, 10YR 4/2, laminated, wet, soft. 5.5-6.8 ft, Silty Clay, dark brown, 10YR 3/2, 10 plastic, very stiff, moist. 100 6.8-7.4 ft; Clayey Silt, dark brown, 10YR 3/3, laminated, moist, soft. 455 7.4-12.5 ft; Sandy Silt, dark grayish brown, 10YR 4/2, herringbone laminae, wet, soft. 12.5-28.3 ft; Sandy Silt, dark brown, 10YR 3/3, 15 wet. 100 450 20 100 445 25 100 STRATIFICATION LINES ARE DRILLING CO.: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING 7.5 FEET APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE AFTER DRILLING: FEET DRILLER: Ryan Hunziker GRADUAL OR MAY OCCUR BETWEEN DATE: LOGGED BY: T. Doll SAMPLES. PIEZOMETER: INSTALLED AT +/- 35.0 FEET DATE DRILLED: 10/28/09 NOTES: Chris Vierrether, Blake VERTICAL DATUM: NAVD 88 START TIME: 1.50PM Smotherman, & Larry Pierce END TIME: HORIZONTAL DATUM: NAD 83 3:13PM (MDNR) onsite observing BOREHOLE DIA .: WEATHER: Cool, 60°F, Overcast, 5-10 MPH Wind from S. 10.25" drilling activities.

Ameren Missouri Labadie Power Plant

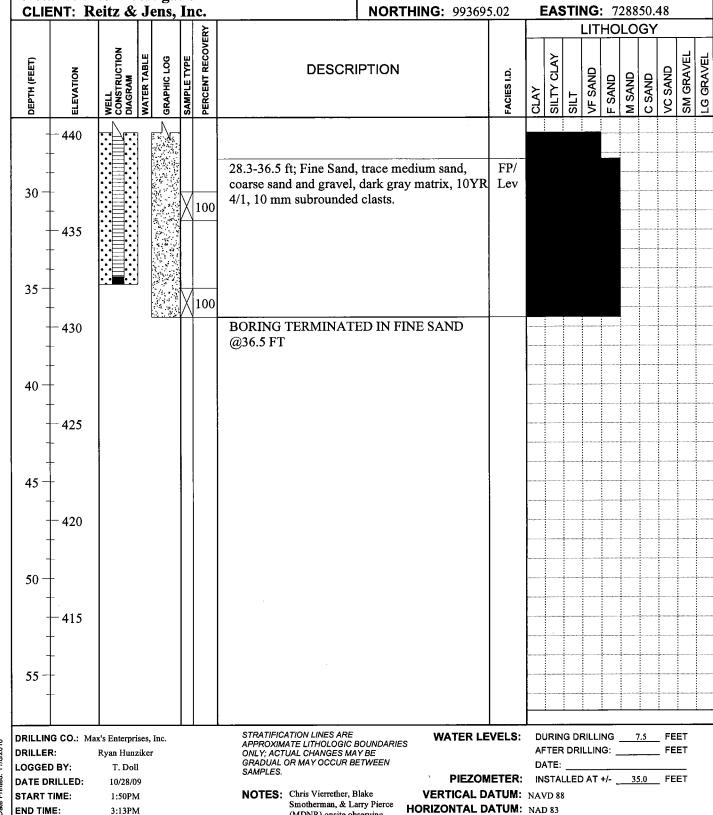
**Proposed Utility Waste Disposal Area** 

## **BORING LOG P-79**

LOCATION: Heisel-West-S of LBR, Adj. farm access Rd.

G.S. ELEVATION: 467.01' T.O.C. ELEVATION: 469.84'

**Detailed Site Investigation** 



(MDNR) onsite observing

drilling activities.

11/8/2010 Printed: Date

BOREHOLE DIA .:

10.25"

WEATHER: Cool, 60°F, Overcast, 5-10 MPH Wind from S.

#### Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

### BORING LOG P-81

LOCATION: Newman-NE-Central-S of LBR

G.S. ELEVATION: 467.64' T.O.C. ELEVATION: 470.31'

NORTHING: 993679.30 EA

	0	EASTING:	729444.97
--	---	----------	-----------

- 465	DESCRIPTION 0.0-0.9 ft, Clayey Silt, dark brown, 10YR 3/3,	FACIES I.D.	CLAY	SILTY CLAY		F SAND		C SAND	C SAND		GRAVEL
		FACIES I.D.	CLAY		SILT VF SAND	F SAND	M SAND	C SAND	C SAND	A GRAVEL	ZAVEL
0	0.0.0.0 ft Clayer Silt doet brown 10VD 2/2					1	: :		>	ଡ	LG G
0 - 465 90	0.0.0.0 ft Clavey Silt deek brown 10VD 2/2										
- 465 90		FB									
	wet, soft, roots, with very fine sand below 0.8 ft, moist. 0.9-2.1 ft; Silty Clay, dark brown, 10YR 3/2, plastic, very stiff, moist, mottles (10YR 4/6).										
5 -	2.1-2.9 ft; Silty Sand, brown, 10YR 4/3, moist, soft. 2.9-4.8 ft; Sandy Silt, Sandy Clayey Silt, and										
- 460 45	Silty Clay, alternating thin beds, moist; sandy silt, brown to dark yellowish brown, 10YR 4/3 and 4/4; sandy clayey silt and silty clay, dark										
	$\pi$ $\mu$	FP/ Lev									
	sandy silty clay, plastic, stiff, moist; silty clayey sand, laminated, wet. 8.7-13.1 ft; Silty Sand, dark brown, 10YR 3/3, wet, soft. 13.1-13.9 ft; Clayey Silt, Silty Sand and Silty										
	Clay, alternating thin beds, wet; clayey silt, dark gray, 10YR 4/1, slightly plastic, soft, laminated, sharp contact with below; silty sand, dark yellowish brown, 10YR 4/6, iron concretions, wet, stiff; silty clay below 13.7 ft, dark gray, (Gley) 1 4/N, plastic, moist, soft.								-		
	13.9-18.3 ft; Very Fine Sand, trace fine sand, dark yellowish brown, 10YR 4/4, iron staining, wet, loose. 18.3-28.3 ft; Very Fine Sand to Fine Sand,										
DRILLING CO.: Max's Enterprises, Inc. DRILLER: Ryan Hunziker LOGGED BY: T. Doll	STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY, ACTUAL CHANGES MAY BE GRADUAL OF MAY OCCUR BETWEEN SAMULES	ELS:	AF.	TER [	DRILI DRILLI	NG: _			FEE FEE		
DATE DRILLED:         10/28/09           START TIME:         3:50PM           END TIME:         6:28PM           BOREHOLE DIA.:         10.25"	SAMPLES. PIEZOME NOTES: M. Carlson and F. Phillps (Gredell) onsite performing pilot aquifer test. VERTICAL DAT HORIZONTAL DAT WEATHER: Cool, 60	TUM: 1 TUM: 1	NAV NAD	D 88 83	ED AT	+/-	_34	.8	FEE	ΞT	

## BORING LOG P-81

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

**LOCATION:** Newman-NE-Central-S of LBR

G.S. ELEVATION: 467.64' T.O.C. ELEVATION: 470.31'

**NORTHING:** 993679.30 **EASTING:** 729444.97

				RY					1	LITI	HO	LO	<u>GY</u>			
DEPTH (FEET)	ELEVATION	WELL CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
30	- 440 - - - - 435		X	100	trace coarse sand, alternating thin beds, dark grayish brown and dark gray, 10YR 4/2 and 4/ <u>1, wet.</u> 28.3-36.5 ft; Medium Sand, with fine sand and coarse sand, dark gray, 10YR 4/1, wet.	С										
35			X	100	BORING TERMINATED IN MEDIUM											
40	- 430 - - -				SAND @36.5 FT											
45	- 425 - -															
50	- 420  -			-												
55 -	- 415  															
DRILLIN DRILLEF LOGGEI DATE DI	R: ) BY:	r's Enterprises, Inc. Ryan Hunziker T. Doll 10/28/09			STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES. PIEZOM		AF DA	TER		LLIN	G: _			FEE	ET 	
START 1 END TIM	IME:	3:50PM 6:28PM 10.25"			NOTES: M. Carlson and F. Phillps (Gredell) onsite performing pilot aquifer test. VERTICAL D/ HORIZONTAL D/ WEATHER: Cool,	ATUM:	NAV NAI	/D 88 D 83								:

### **BORING LOG P-83**

Ameren Missouri Labadie Power Plant **Proposed Utility Waste Disposal Area Detailed Site Investigation** CLIENT: Reitz & Jens, Inc.

LOCATION: Newman-N-Central-S of LBR, W of David Rd

G.S. ELEVATION: 464.74' T.O.C. ELEVATION: 467.55'

**NORTHING:** 993664.23 **EASTING:** 730089.18

	Nenz & Jens,	Inc.	NORTHING: 99366	4.23	EAS	ING:	/30	009.	10	
		RY				LITH	IOLO	DGY	/	
DEPTH (FEET) ELEVATION	WELL CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG	SAMPLE TYPE PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY SILTY CLAY	SILT VF SAND	F SAND M SAND	C SAND	VC SAND	SM GRAVEL LG GRAVEL
-										
0465			, 0.0-0.7 ft; Clayey Silt, very dark grayish brown	FD						
		100	and dark brown, 10YR 3/2 and 3/3, slightly plastic, soft, moist, roots.	FB						
5 - 460			0.7-1.8 ft; Sandy Clayey Silt, dark brown, 10YR 3/3, slightly plastic, stiff, moist. 1.8-4.3 ft; Silty Clay, very dark grayish brown,							
		90	10YR 3/2, plastic, very stiff, moist, mottles (10YR 4/6); dark grayish brown, 10YR 4/2, below 3.4 ft.							
			4.3-15.8 ft; Sandy Clayey Silt, Silty Clay and Very Fine Sand, alternating thin beds, dark gray and dark grayish brown, 10YR 4/1 and 4/							
		42	2, moist to 5.7 ft; sandy clayey silt beds, laminated; silty clay beds generally mottled (10YR 4/6); iron staining and iron concretions in sandy clayey silt and silty clay beds from 6.8	FP/ Lev						
		89	to 8.5 ft and again below 9.3 ft; silty clay beds, plastic; very fine sand beds below 8.5 ft, brown, 10YR 4/3, (clay slough probable in top		:					
		09	of 15.0 ft S.S.). 15.8-25.7 ft; Very Fine Sand and Fine Sand, alternating thin beds, dark gray to brown, 10YR 4/1 to 4/3, wet, trace coarse sand below 21.2 ft,							
		100	soft grading to loose consistency.							
25 - 440		61	25.7-36.5 ft; Medium to Coarse Sand, with	CM/						
										_ <u>:</u>
DRILLING CO.: M DRILLER: LOGGED BY:	ax's Enterprises, Inc. Dave Hunziker T. Doll		STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY, ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.	VELS:		B DRILLIN DRILLING				
DATE DRILLED: START TIME: END TIME:	11/10/09 4:34PM 11/9 9:40AM		NOTES: Blake Smotherman, MDNR, VERTICAL D/ onsite observing drilling activities. HORIZONTAL D/	ATUM:	NAVD 88	LED AT +/	3	4.8	FEE	г
BOREHOLE DIA .:	8.25"		WEATHER: Cool,	50°F, Fog	ggy, Mostly	Cloudy, H	ımid.			

Printed: 11/8/2010

Date

## BORING LOG P-83

**Ameren Missouri Labadie Power Plant** LOCATION: Newman-N-Central-S of LBR, W of David Rd **Proposed Utility Waste Disposal Area** G.S. ELEVATION: 464.74' T.O.C. ELEVATION: 467.55' **Detailed Site Investigation** CLIENT: Reitz & Jens, Inc. EASTING: 730089.18 **NORTHING:** 993664.23 LITHOLOGY PERCENT RECOVERY CONSTRUCTION CLAY g SAMPLE TYPE SM GRAVEI -G GRAVEL DEPTH (FEET) DESCRIPTION VF SAND VC SAND ELEVATION M SAND FACIES I.D. SAND C SAND GRAPHIC DIAGRAM VATER 1 SILTY CLAY SILT WELL ш very fine to fine sand, alternating thin beds, Sp trace clay, dark grayish brown and dark gray, С 10YR 4/2 and 4/1, 5-20 mm subrounded clasts, medium sand from 30.6 to 30.8 ft is dark gray, 435 30 (Gley) 1 4/N, (fine sand noted at total depth 44 based on cuttings sample collected from auger bit). 430 35 FP/ 61 Lev BORING TERMINATED IN FINE SAND @36.5 FT 425 40 420 45 415 50 410 55 STRATIFICATION LINES ARE DRILLING CO .: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING 5.6 FEET APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN AFTER DRILLING: \_ DRILLER: Dave Hunziker FEET LOGGED BY: T. Doll DATE: SAMPLES. PIEZOMETER: INSTALLED AT +/- 34.8 FEET DATE DRILLED: 11/10/09 NOTES: Blake Smotherman, MDNR, START TIME: VERTICAL DATUM: NAVD 88 4:34PM 11/9 onsite observing drilling HORIZONTAL DATUM: NAD 83 END TIME: 9:40AM activities. WEATHER: Cool, 50°F, Foggy, Mostly Cloudy, Humid. BOREHOLE DIA .: 8.25"

#### Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Printed: 11/8/2010

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### **BORING LOG P-85**

LOCATION: Newman-N-Central-S of LBR, W of David Rd G.S. ELEVATION: 464.41' T.O.C. ELEVATION: 466.75'

NORTHING: 993647.31 EASTING: 730619.20 LITHOLOGY PERCENT RECOVERY WELL CONSTRUCTION DIAGRAM CLAY SAMPLE TYPE ß **G GRAVEL** SM GRAVEI ОЕРТН (FEET) WATER TABL DESCRIPTION ELEVATION **VF SAND** VC SAND ACIES I.D. **M SAND** C SAND SAND GRAPHIC SILTY CLAY SILT ц 465 0 0.0-0.8 ft, Clayey Silt grading to Silty Clay, FB very dark grayish brown, 10YR 3/2, moist, soft, roots, slightly plastic below 0.5 ft. 65 0.8-4.2 ft; Silty Clay, very dark grayish brown, 10YR 3/2, plastic, stiff, mottles (10YR 4/6), 460 becoming highly plastic and very stiff below 5 1.8 ft; silt bed from 2.3-2.4 ft, brown, 10YR 4/ 3, moist, soft. FP/ 4.2-5.8 ft; Poor recovery, probable Silty Clay Lev 50 and Sandy Clayey Silt. 5.8-28.3 ft; Silty Sand grading to Fine Sand, thin beds, dark yellowish brown and brown, 455 10 10YR 4/4 and 4/3, wet, soft; laminated black 100 coalified wood matter and fine muscovite mica flakes from 6.9-7.5 ft; becoming dark gravish brown, 10YR 4/2 below 20.0 ft, (clay slough probable in top of 10.0-20.0 ft S.S.). 450 15 100 445 20 100 440 25 100 STRATIFICATION LINES ARE DRILLING CO .: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING \_\_\_\_\_\_\_ FEET APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE AFTER DRILLING: DRILLER: Dave Hunziker FEET GRADUAL OR MAY OCCUR BETWEEN DATE: LOGGED BY: T. Doll SAMPLES. PIEZOMETER: INSTALLED AT +/- 34.0 FEET DATE DRILLED: 11/10/09 START TIME: NOTES: Blake Smotherman, MDNR, VERTICAL DATUM: NAVD 88 11:09AM onsite observing drilling HORIZONTAL DATUM: NAD 83 END TIME: 4:28PM activities. **BOREHOLE DIA.:** WEATHER: Cool, 55°F, Cloudy, 10-15 MPH Wind from N. 10.25"

### BORING LOG P-85

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

### LOCATION: Newman-N-Central-S of LBR, W of David Rd

G.S. ELEVATION: 464.41' T.O.C. ELEVATION: 466.75'

NORTHING: 993647.31 EASTING: 730619.20

					RΥ	· · · · · · · · · · · · · · · · · · ·					ITI	HO	LO	GΥ			
<b>DEPTH (FEET)</b>	ELEVATION	WELL CONSTRUCTION DIAGRAM	WATER TABLE GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
30	- 435			7	61	28.3-36.5 ft; Medium Sand grading to Sandy Gravel, thin beds, trace gravel, dark gray matrix, 10YR 4/1, wet, 10-15 mm subrounded clasts to 30.9 ft, 5-30 mm subangular clasts below 35.3 ft, (fine sand and clay slough probable in top of 30.0 and 35.0 ft S.S.).	C										
40	- 					BORING TERMINATED IN SANDY GRAVEL SAND @36.5 FT											
- 45 — -	- 					·											
50	- 415 																
55	- <b>4</b> 10 - -																
DRILLER LOGGEI DATE DI START 1 END TIM	D BY: RILLED: FIME:	s's Enterpris Dave Hunz T. Doll 11/10/09 11:09AN 4:28PM 10.25"	iker 9 1			STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY, ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES. NOTES: Blake Smotherman, MDNR, onsite observing drilling activities. WATER LE WEZOM VERTICAL DA HORIZONTAL DA WEATHER: Cool	ETER: ATUM: ATUM:	AF DA IN NAV NAI	83	DRII	AT +	G:	34.	.0	FEE	T	

#### Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

### **BORING LOG P-87**

LOCATION: Newman-East-S of LBR, Adj to Davis Rd

G.S. ELEVATION: 466.69' T.O.C. ELEVATION: 469.64'

NORTHING: 993693.54 EASTING: 7

93.54	EASTING:	731420.88

CLIENT: R	leitz & Jens, In	IC.	NORTHING: 99369	3.54		<u>=AS</u>	TIN	G:	731	120.	88		
		ERY	7				L	TH	OLC	)GY			
DEPTH (FEET) ELEVATION	WELL WELL CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	SILT		M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
-													
				ED									
465 		75	0.0-0.8 ft; Clayey Silt, dark brown, 10YR 3/3, slightly plastic, soft, moist to wet, roots. 0.8-3.2 ft; Silty Clay, very dark grayish brown, 10YR 3/2, plastic, very stiff, moist, mottles (10YR 4/6).	FB									
5 - 460		75	<ul> <li>3.2-4.4 ft; Silty Sand, dark yellowish brown, <u>10YR 4/4, moist, loose.</u></li> <li>4.4-6.7 ft; Poor recovery, probable Silty Clay slough.</li> <li>6.7-13.3 ft; Sandy Silt, Clayey Sandy Silt, Sandy Silty Clay, Fine Sand and Very Fine</li> </ul>										
		70	Sand, alternating thin beds, wet; sandy silt and silty sand beds, brown to dark grayish brown, 10YR 3/4, 4/2, 4/3; sandy silty clay beds, dark gray, 10YR 4/1, plastic, soft; sandy silt and clayey sandy silt beds, laminated; very fine sand bed laminated below 12.0 ft; iron staining in clayey sandy silt bed from 11.1-11.7 ft.	CO/									
		100	13.3-20.6 ft; Sandy Silt grading to Clayey Sandy Silt, thin beds, dark gray, (Gley) 1 4/N, wet, soft; laminated to 16.5 ft; slightly plastic below 20.5 ft, (clay slough probable in top of 20.0 ft S.S.).	BS									
20 - 445		67	20.6-36.5 ft; Medium Sand, with fine and coarse sand; alternating thin beds, dark gray, 10YR 4/1, wet, loose to soft, trace gravel, 5 mm subrounded clasts to 21.0 ft; 20 mm	CM/ Sp									
25 - 440		56	subrounded clasts below 36.1 ft, (fine sand noted at total depth based on cuttings sample collected from auger bit).										
DRILLING CO.: Ma DRILLER: LOGGED BY: DATE DRILLED:	ax's Enterprises, Inc. Ryan Hunziker T. Doll 10/26/09		STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY, ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES. PIEZON	ETER:	Af D/ IN	TER TE: STAL	G DRII DRILI LED A	.ING:			FEE	ET	
START TIME: END TIME: BOREHOLE DIA.:	4:15PM 6:28PM 8.25"		NOTES: S. King (Gredell) onsite developing piezometers. VERTICAL D HORIZONTAL D WEATHER: Cool	ATUM:	NAI	D 83		alm.					

## BORING LOG P-87

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

### LOCATION: Newman-East-S of LBR, Adj to Davis Rd

G.S. ELEVATION: 466.69' T.O.C. ELEVATION: 469.64'

NORTHING: 993693.54 EASTING

j:	993693.54	EAST	ING:	731420.88	

	11		- 1139 ·	***		<b>NOKTHING.</b> 99309	·J.J <del>.</del>	·/*					144		.0		
					₽					_ L	ITI.	HO	LO	GΥ			
DEPTH (FEET)	ELEVATION	WELL CONSTRUCTION DIAGRAM WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.			SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
30	435				67	20.6-36.5 ft; Medium Sand, with fine and coarse sand; alternating thin beds, dark gray, 10YR 4/1, wet, loose to soft, trace gravel, 5 mm subrounded clasts to 21.0 ft; 20 mm subrounded clasts below 36.1 ft, (fine sand noted at total depth based on cuttings sample collected from auger bit).	CM/ Sp										
			1	71	83		FP/										
	430 425 420 415 410					BORING TERMINATED IN FINE SAND @36.5 FT	Lev										
DRILLING C DRILLER: LOGGED BY DATE DRILL START TIME END TIME:	ו -ED: ב:	Ryan Hunzike T. Doll 10/26/09 4:15PM 6:28PM				NOTES: S. King (Gredell) onsite developing piezometers. VERTICAL D HORIZONTAL D	METER: ATUM: ATUM:	NAD 83	R C :: ALL 88 3	.ED A	LINC	3: 			FE	ET	
START TIME	≣:	4:15PM				developmin a mission atoms	ATUM:	NAD 83	3	ain, C	Calm						-

#### Ameren Missouri Labadie Power Plant **Proposed Utility Waste Disposal Area Detailed Site Investigation** CLIENT: Reitz & Jens, Inc.

Printed: 11/8/20

Date

BOREHOLE DIA .:

8.25"

### **BORING LOG P-88**

LOCATION: Bean Field-West Margin Project Area G.S. ELEVATION: 466.25' T.O.C. ELEVATION: 469.13'

**EASTING:** 727072.92 **NORTHING:** 993401.94 LITHOLOGY RECOVERY CONSTRUCTION DIAGRAM CLAY SAMPLE TYPE SM GRAVEL ĝ LG GRAVEL DEPTH (FEET) WATER TABI DESCRIPTION VF SAND VC SAND ELEVATION FACIES I.D. SAND **M SAND** C SAND GRAPHIC PERCENT SILTY CLAY WELL SILT Ц -4 0 0-2.5 ft; Silty Clay, light olive gray, 5Y 6/1 to FB . olive gray, 5Y 4/1, soft, slightly plastic. 465 67 2.5-5.0 ft; Silt and Very Fine Sand, alternating thin beds, yellowish gray, 5Y 8/1. 5 5.0-6.5 ft; Very Fine Sand, grayish orange, FP/ 00 460 10YR 7/4, saturated. Lev 6.5-12.5 ft; Very Fine to Fine Sand, grayish 61 orange, 10YR 7/4, scattered 2-inch clay seams (slough). 10 100 455 12.5-31.2 ft; Fine Sand, gravish orange, 10YR 7/4, clean, well sorted, sharp lower contact. 15 100 450 20 100 445 25 100 440 STRATIFICATION LINES ARE DRILLING CO .: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING 5 FEET APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE AFTER DRILLING: FEET DRILLER: Dave Hunziker GRADUAL OR MAY OCCUR BETWEEN DATE: LOGGED BY: M. Carlson SAMPLES. PIEZOMETER: INSTALLED AT +/- 34.8 FEET DATE DRILLED: 11/06/09 START TIME: NOTES: Paul Reitz, Jason Pruett, Chris VERTICAL DATUM: NAVD 88 3:00PM Cook (R&J), T.Doll (Gredell) HORIZONTAL DATUM: NAD 83 END TIME: and JoAnn Thee (Ameren) WEATHER: Warm, 60°F, Clear Skies, Calm.

onsite.

11/8/2010

Printed:

Date

### BORING LOG P-88

**Ameren Missouri Labadie Power Plant** LOCATION: Bean Field-West Margin Project Area **Proposed Utility Waste Disposal Area** G.S. ELEVATION: 466.25' T.O.C. ELEVATION: 469.13' **Detailed Site Investigation** EASTING: 727072.92 CLIENT: Reitz & Jens, Inc. NORTHING: 993401.94 LITHOLOGY RECOVERY CONSTRUCTION CLAY SM GRAVEL SAMPLE TYPE -G GRAVEL **GRAPHIC LOG** DEPTH (FEET) WATER TABL DESCRIPTION VC SAND ELEVATION VF SAND FACIES I.D. **M SAND** F SAND C SAND PERCENT DIAGRAN SILTY CLAY SILT WELL 12.5-31.2 ft; Fine Sand, grayish orange, 10YR FP/ 7/4, clean, well sorted, sharp lower contact. Lev 30 -89 435 31.2-36.5 ft; Medium to Coarse Sand, pale С yellowish orange, 10YR 6/2, gravelly (fine sand slough in top of S.S.). 35 67 430 BORING TERMINATED IN MEDIUM TO COARSE SAND @36.5 FT 40 425 45 420 50 -415 55 410 STRATIFICATION LINES ARE WATER LEVELS: DURING DRILLING \_\_\_\_\_5 FEET DRILLING CO .: Max's Enterprises, Inc. APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN AFTER DRILLING: \_ FEET DRILLER: Dave Hunziker DATE: LOGGED BY: M. Carlson SAMPLES. PIEZOMETER: INSTALLED AT +/- 34.8 FEET DATE DRILLED: 11/06/09 NOTES: Paul Reitz, Jason Pruett, Chris VERTICAL DATUM: NAVD 88 START TIME: 3:00PM Cook (R&J), T.Doll (Gredell) HORIZONTAL DATUM: NAD 83 END TIME: and JoAnn Thee (Ameren) WEATHER: Warm, 60°F, Clear Skies, Calm. BOREHOLE DIA .: 8.25" onsite.

### Ameren Missouri Labadie Power Plant **Proposed Utility Waste Disposal Area Detailed Site Investigation**

## BORING LOG P-90

**LOCATION:** Heisel-West, W of farm access Rd, S of LBR

G.S. ELEVATION: 465.38' T.O.C. ELEVATION: 468.10'

CLIENT: Reitz & Jens, Inc. EASTING: 727804.04 **NORTHING: 993427.80** LITHOLOGY PERCENT RECOVERY WELL CONSTRUCTION DIAGRAM CLAY SAMPLE TYPE SM GRAVEL GRAPHIC LOG **JEPTH (FEET)** -G GRAVEL WATER TABL DESCRIPTION VC SAND ELEVATION VF SAND ACIES I.D. M SAND C SAND SAND SILTY ( CLAY SILT 0 465 0.0-0.5 ft; Clayey Silt, dark brown, 10YR 3/3, FB damp, soft. 0.5-1.3 ft; Fine Sand and Silty Sand, thin beds, 100 dark grayish brown, 10YR 4/2, damp, soft. 1.3-5.0 ft; Clay, very dark gravish brown, 10YR 3/2, highly plastic, very firm, moist, 5 460 mottles (10YR 4/6), interbeds of silt <1 inch thick. 5.0-10.0 ft; Silty Clay and Clayey Silt, dark 100 brown and dark grayish brown, 10YR 3/3 and 4/2, soft; moist to 7.3 ft; wet below 8.0 ft; silty clay, plastic; firm to very firm below 6.6 ft. 10 -455 10-13.5 ft; Medium Sand, trace fine sand and CO/ clay, dark yellowish brown, 10YR 3/6, wet, BS soft; clay, very dark gray, (Gley) 1 3/N, plastic, 40 moist grading to wet. 13.5-31.3 ft; Very Fine to Fine Sand, thin beds, FP/ dark gray, 10YR 4/1, wet, soft, (fine sand and Lev 15 450 clay slough probable in top of 15.0-30.0 ft 100 S.S.). 20 445 100 25 440 100 STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES DRILLING CO.: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING 8 FEET AFTER DRILLING: DRILLER: Doug Hunziker ONLY; ACTUAL CHANGES MAY BE FEET GRADUAL OR MAY OCCUR BETWEEN

T. Doll

09/28/09

2:20PM

5:00PM

8.25"

SAMPLES.

NOTES: Chris Vierrether, MDNR,

activities.

onsite observing drilling

PIEZOMETER: INSTALLED AT +/- 35.0 FEET

DATE:

WEATHER: Warm, 60°F, Clear Skies, Mild, 30 MPH Gusting Wind.

VERTICAL DATUM: NAVD 88

HORIZONTAL DATUM: NAD 83

Ameren Missouri Labadie Power Plant

**Proposed Utility Waste Disposal Area** 

### BORING LOG P-90

LOCATION: Heisel-West, W of farm access Rd, S of LBR

G.S. ELEVATION: 465.38' T.O.C. ELEVATION: 468.10'

Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

**NORTHING:** 993427.80 **EASTING:** 727804.04

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		z		OVER				-1							,	_
DEPTH (FEET)	ELEVATION	WELL CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	сгау	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
																,,
	- - - 435			100	13.5-31.3 ft; Very Fine to Fine Sand, thin beds, dark gray, 10YR 4/1, wet, soft, (fine sand and clay slough probable in top of 15.0-30.0 ft S.S.).	FP/ Lev										
35 -	- - - 430		•		31.3-36.5 ft; Medium to Coarse Sand, thin beds, with fine sand, trace very fine sand and gravel, dark gray, 10YR 4/1, subrounded clasts, wet; loose to 35.0 ft; firm below 35.0 ft, (fine sand and clay slough probable in top of 30.0 ft	CM/ Sp	-									
	-		<u>:</u> /	100	·											
-	-				BORING TERMINATED IN MEDIUM SAND @36.5 FT											
-					C											
40	- 425															
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45 -	- 420															
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50 -	- 415															
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55 -																
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DRILLIN DRILLEF LOGGED	<b>R:</b>	s's Enterprises, Inc. Doug Hunziker T. Doll			STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY, ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES. 		AF DA	TER	DRI	LLIN	NG _ G: _			FE	ΞT 	
DATE DE START T END TIM BOREHO	IME:	09/28/09 2:20PM 5:00PM 8.25"			NOTES: Chris Vierrether, MDNR, onsite observing drilling activities. PIEZON HORIZONTAL D WEATHER: Warr	ATUM: ATUM:	NAV NAI	'D 88 0 83	1		+/				ΞT	:

11/8/2010

Printed:

Date

### BORING LOG P-93

**Ameren Missouri Labadie Power Plant** LOCATION: Newman-West, E of farm access Rd **Proposed Utility Waste Disposal Area** G.S. ELEVATION: 465.91' T.O.C. ELEVATION: 468.82' **Detailed Site Investigation** CLIENT: Reitz & Jens, Inc. NORTHING: 993388.35 EASTING: 729062.32 LITHOLOGY PERCENT RECOVERY CONSTRUCTION CLAY SM GRAVEL -G GRAVEL SAMPLE TYPE WATER TABLE ОЕРТН (FEET) **GRAPHIC LOG** DESCRIPTION VF SAND VC SAND ELEVATION ACIES I.D. SAND **M SAND** C SAND DIAGRAM SILTY CLAY SILT WELL -11 0 0.0-0.9 ft; Clavey Silt, dark brown, 10YR 3/3, FB 465 moist, soft; silty sand below 0.8 ft, brown, 10YR 4/3, damp, loose. 100 0.9-6.8 ft; Silty Clay, very dark grayish brown, 10YR 3/2, plastic, stiff, moist, mottles (10YR 4/6); very stiff below 3.9 ft; dark brown, 10YR 5 3/3, stiff below 6.1 ft. 460 6.8-8.0 ft; Clayey Silt grading to Silty Clay; 100 dark gravish brown, 10YR 4/2, wet grading to moist; silty clay, highly plastic. 8.0-16.3 ft; Silty Sand and Fine Sand, thin 10 beds, dark grayish brown and dark gray, 10YR FP/ 89 455 4/2 and 4/1, wet, soft, mottles (10YR 4/6) to Lev 8.8 ft; laminated to 11.3 ft; laminations from 10.3-11.3 ft are very dark gray (10YR 3/1), (fine sand and clay slough probable in top of 10.0 and 15.0 ft S.S.). 15 94 450 16.3-23.3 ft, Fine Sand and Coarse Sand, CM/ alternating thin beds, dark gray, 10YR 4/1, wet, Sp soft, (clay slough probable in top of 25.0 ft S.S.). 20 61 445 23.3-36.5 ft; Coarse Sand, with fine and С medium sand, thin beds, trace gravel, dark 25 gray, 10YR 4/1, 10-15 mm rounded to 94 440 subrounded clasts, wet, soft grading to loose, STRATIFICATION LINES ARE DRILLING CO .: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING 10 FEET APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE AFTER DRILLING: FEET DRILLER: Rvan Hunziker GRADUAL OR MAY OCCUR BETWEEN DATE: LOGGED BY: T. Doll SAMPLES. PIEZOMETER: INSTALLED AT +/- 35.0 FEET DATE DRILLED: 10/20/09 NOTES: M. Carlson (Gredell), John VERTICAL DATUM: NAVD 88 START TIME: 12-35PM Eimer and Kenny Kintz HORIZONTAL DATUM: NAD 83 END TIME: 3:00PM (Ameren) onsite observing WEATHER: Warm, 65°F, Mostly Sunny, Mild, 10-15 MPH Wind from E-SE. BOREHOLE DIA .: 8.25" drilling activities.

## BORING LOG P-93

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

#### LOCATION: Newman-West, E of farm access Rd

G.S. ELEVATION: 465.91' T.O.C. ELEVATION: 468.82'

NORTHING: 993388.35 EASTING: 729062.32

CLIENT	<u>Reit</u>	<u>z &amp;</u> J	ens,	In	IC.		NORTHING: 99338	8.35	E	AS	_	IG:				2		
				Π	ERY				$\square$		Ļ	<u>.IT</u>	IOL	.00	Υ.			
DEPTH (FEET)	ELEVATION	CONSTRUCTION DIAGRAM WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRI	PTION	FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
_				Ī		\ (fine cond and alow alow	rachin top of 25.0 ft []											
30 43	5				100	(fine sand and clay slou S.S.). 23.3-36.5 ft; Coarse San medium sand, thin beds gray, 10YR 4/1, 10-15 n subrounded clasts, wet, (fine sand and clay slou S.S.).	nd, with fine and , trace gravel, dark nm rounded to soft grading to loose,	С										
35					61													
						BORING TERMINATI @36.5 FT	ED IN COARSE SAND											
40 42	25																	
45-																		
	20																	
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55 -																		
41						STRATIFICATION LINES ARE	WATER LE			DINI			16			FEE		
DRILLING CO DRILLER: LOGGED BY: DATE DRILLE	Ryan 	n Hunziko T. Doll 0/20/09	-			APPROXIMATE LITHOLOGIC E ONLY; ACTUAL CHANGES MA GRADUAL OR MAY OCCUR BU SAMPLES.	IOUNDARIES Y BE ETWEEN PIEZON	IETER:	AF DA INS	TER TE: STAL			3:				т -	
START TIME: END TIME: BOREHOLE D	3	2:35PM 3:00PM 8.25"				NOTES: M. Carlson (Grede Eimer and Kenny I (Ameren) onsite of drilling activities.	Cintz HORIZONTAL D	ATUM:	NAD	83		ild, 10	-15 N	лрн '	Wind	from	E-SE	

11/8/2010

Printed:

Date

### **BORING LOG P-95**

Ameren Missouri Labadie Power Plant LOCATION: Newman-Central, E of farm access Rd **Proposed Utility Waste Disposal Area** G.S. ELEVATION: 467.22' T.O.C. ELEVATION: 469.92' **Detailed Site Investigation** EASTING: 729725.06 CLIENT: Reitz & Jens, Inc. NORTHING: 993368.45 LITHOLOGY RECOVERY CONSTRUCTION DIAGRAM CLAY SM GRAVEI **GRAPHIC LOG** SAMPLE TYPE -G GRAVEL EPTH (FEET) WATER TABI DESCRIPTION VC SAND VF SAND ELEVATION ACIES I.D. C SAND SAND **M SAND** PERCENT SILTY CLAY SILT WELL HL. 470 0 0.0-0.8 ft; Clayey Silt, dark brown, 10YR 3/3, FB non-plastic, soft, moist, trace clay below 0.6 ft. 0.8-1.9 ft; Silty Clay, very dark grayish brown, 465 80 10YR 3/2, plastic, stiff, moist, mottles (10YR 4/6). 1.9-10.7 ft; Silty Sand, Clayey Silty Sand, and 5 Silty Clay, alternating thin beds, dark grayish brown to brown, 10YR 4/3 and 4/2, wet; silty sand bed from 3.5-4.0 ft, laminated; silty clay 460 70 bed, plastic, dark brown, 10YR 3/3; silty sand below 10.0 ft, iron staining (10YR 4/6). 10 10.7-20.0 ft; Sandy Silt, Silty Clay, and Very CO/ Fine Sand, alternating thin beds, very dark BS 455 80 gray, (Gley) 1 3/N, wet, soft; silty clay bed from 11.4-12.7 ft, black mottles (Gley 1 2.5/N); (fine sand and clay slough probable in top of 15 15.0 S.S.). 89 450 20 20.0-30.8 ft; Fine sand, with medium sand, 89 trace coarse sand, very dark gray, (Gley) 1 3/N; with coarse sand below 23.3 ft, (clay slough 445 probable in top of 25.0 ft S.S.) 25 89 STRATIFICATION LINES ARE WATER LEVELS: DURING DRILLING \_\_\_\_8 \_\_\_ FEET DRILLING CO .: Max's Enterprises, Inc. APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN DRILLER: AFTER DRILLING: FEET Ryan Hunziker LOGGED BY: DATE: T. Doll SAMPLES. PIEZOMETER: INSTALLED AT +/- 34.9 FEET DATE DRILLED: 10/20/09 NOTES: S. King (Gredell) onsite VERTICAL DATUM: NAVD 88 START TIME: 3:37PM developing piezometers. HORIZONTAL DATUM: NAD 83 END TIME: 5:45PM WEATHER: Warm, 75°F, Partly Sunny, Mild, 15-25 MPH Wind from S. BOREHOLE DIA .: 8.25"

11/8/2010

Printed:

Date

## BORING LOG P-95

Ameren Missouri Labadie Power Plant LOCATION: Newman-Central, E of farm access Rd **Proposed Utility Waste Disposal Area** G.S. ELEVATION: 467.22' T.O.C. ELEVATION: 469.92' **Detailed Site Investigation** CLIENT: Reitz & Jens, Inc. NORTHING: 993368.45 EASTING: 729725.06 LITHOLOGY PERCENT RECOVERY CONSTRUCTION DIAGRAM CLAY SM GRAVEL .G GRAVEL SAMPLE TYPE **WATER TABLE GRAPHIC LOG** ОЕРТН (FEET) DESCRIPTION VC SAND VF SAND ELEVATION **M SAND** FACIES 1.D. F SAND C SAND SILTY CLAY SILT WELL 440 CO/ 20.0-30.8 ft; Fine sand, with medium sand, 89 BS trace coarse sand, very dark gray, (Gley) 1 3/N; with coarse sand below 23.3 ft, (clay slough probable in top of 25.0 ft S.S.) 30 78 30.8-36.5 ft; Medium Sand to Coarse Sand, С alternating thin beds, trace very fine sand and - 435 gravel, dark gray, 10YR 4/1, wet, loose, 10 mm subrounded clasts. 35 33 BORING TERMINATED IN COARSE SAND 430 @36.5 FT 40 425 45 420 50 415 55 STRATIFICATION LINES ARE WATER LEVELS: DURING DRILLING 8 FEET DRILLING CO .: Max's Enterprises, Inc. APPROXIMATE LITHOLOGIC BOUNDARIES AFTER DRILLING: FEET DRILLER: Ryan Hunziker ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN DATE: LOGGED BY: T. Doll SAMPLES. PIEZOMETER: INSTALLED AT +/- 34.9 FEET DATE DRILLED: 10/20/09 NOTES: S. King (Gredell) onsite START TIME: 3:37PM VERTICAL DATUM: NAVD 88 developing piezometers. HORIZONTAL DATUM: NAD 83 END TIME: 5:45PM WEATHER: Warm, 75°F, Partly Sunny, Mild, 15-25 MPH Wind from S. BOREHOLE DIA .: 8.25"

11/8/20

Printed:

Date

### BORING LOG P-97

**Ameren Missouri Labadie Power Plant** LOCATION: Newman-Central, E of farm access Rd **Proposed Utility Waste Disposal Area** G.S. ELEVATION: 467.05' T.O.C. ELEVATION: 469.67' **Detailed Site Investigation** CLIENT: Reitz & Jens, Inc. NORTHING: 993349.44 EASTING: 730302.43 LITHOLOGY RECOVERY *IRUCTION* CLAY SM GRAVE GRAVEL ß SAMPLE TYPE ОЕРТН (FEET) WATER TABI DESCRIPTION VF SAND VC SAND ELEVATION ACIES I.D. SAND M SAND C SAND DIAGRAM GRAPHIC PERCENT SILTY CLAY CONST SILT WELL õ 470 0 0.0-0.9 ft; Clayey Silt, dark brown, 10YR 3/3, FB \non-plastic, moist, soft. •] 465 0.9-1.8 ft; Silty Clay, very dark grayish brown, 100 10YR 3/2, slightly plastic, stiff, moist, mottles (10YR 4 6). 1.8-3.7 ft; Silty Sand, brown, 10YR 4/3, moist, 5 soft; silty sand below 3.0 ft, wet, mottles (10YR 4/6). 3.7-4.5 ft; Silty Clay, dark brown, 10YR 3/3, 460 55 moist, stiff, mottles (10YR 4/6). 4.5-10.3 ft; Silty Sand and Clayey Silt, thin beds; silty sand, dark yellowish brown and 10 brown, 10YR 4/4 and 4/3, loose grading to CO/ stiff, moist; laminated, mottles (10YR 4/6) and BS wet below 7.1 ft; clayey silt, dark brown, 10YR 455 75 3/3, slightly plastic, moist, soft. 10.3-15.9 ft; Silty Clay and Silty Sand, thin beds, very dark gray, (Gley) 1 3/N, moist, soft; 15 silty clay to 11.4 ft, highly plastic, moist, iron 72 concretions (10YR 4/6); silty clay to 11.9 ft, FP/ plant detritus, coalified wood; silty sand to 13.8 450 Lev ft, laminations of fibrous plant detritus; silty sand to 15.0 ft; wet below 11.9 ft; (clay slough probable in top of 15.0 ft S.S.). 15.9-30.5 ft; Fine to Coarse Sand, alternating 20 thin beds, dark gray, 10YR 4/1, wet, alternating 72 loose and soft beds, (clay slough probable in 445 top of 20.0 ft S.S.). 25 61 STRATIFICATION LINES ARE WATER LEVELS: DURING DRILLING \_\_\_\_\_ FEET DRILLING CO .: Max's Enterprises, Inc. APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN FEET AFTER DRILLING: DRILLER: Ryan Hunziker DATE: LOGGED BY: T Doll SAMPLES. PIEZOMETER: INSTALLED AT +/- 34.8 FEET DATE DRILLED: 10/21/09 NOTES: Chris Vierrether, MDNR, VERTICAL DATUM: NAVD 88 START TIME: 7:45AM onsite observing drilling HORIZONTAL DATUM: NAD 83 END TIME: 10:40AM activities. WEATHER: Warm, 55°F, Partly Cloudy, Mild, Calm. BOREHOLE DIA .: 8.25"

#### Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

## BORING LOG P-97

LOCATION: Newman-Central, E of farm access Rd

G.S. ELEVATION: 467.05' T.O.C. ELEVATION: 469.67'

**NORTHING:** 993349.44 **EASTING:** 730302.43

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						RY					1	LITI	HO	LO	GY			1
DEPTH (FEET)	ELEVATION	WELL CONSTRUCTION DIAGRAM	WATER TABLE	<b>GRAPHIC LOG</b>	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
		Ν		Ν	Π													
30 -	~ 440						15.9-30.5 ft; Fine to Coarse Sand, alternating thin beds, dark gray, 10YR 4/1, wet, alternating loose and soft beds, (clay slough probable in top of 20.0 ft S.S.).	FP/ Lev	-									
35-	- 435					56	30.5-36.5 ft; Coarse Sand, with medium sand, trace fine sand and gravel, dark gray, 10YR 4/ 1, wet, soft, 5 mm subrounded clasts, (clay slough probable in top of 35.0 ft S.S.).	C										
				••••		61												
	- 430		L				BORING TERMINATED IN COARSE SAND @36.5 FT											
40-+																		
	- 425				;													
45 -																		
	- 420																	
50							·											
	- 415	-																
55 -																		
																		_
DRILLING DRILLER: LOGGED	: 1	's Enterpris Ryan Hunzi T. Doll	iker	inc.			STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN	VELS:	AF		DRIL		-		1	FEE		
DATE DRI START TII END TIME	ILLED: ME:	10/21/09 7:45AM 10:40AM	<b>)</b> [				SAMPLES. PIEZON NOTES: Chris Vierrether, MDNR, onsite observing drilling activities. HORIZONTAL D	ATUM:	INS NAV	STAL D 88		AT +	+/	34	.8	FEE	T	
BOREHOL	LE DIA.:	8.25"					WEATHER: War	n, 55°F, P	artly C	loud	y, Mi	ld, Ca	alm.					

### **Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area** Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

### **BORING LOG P-99**

LOCATION: Newman-East, Adj to Davis Rd

G.S. ELEVATION: 464.38' T.O.C. ELEVATION: 467.21'

**NORTHING:** 993336.45 **EASTING:** 730887.27

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DEPTH (FEET)	ELEVATION	WELL CONSTRUCTION DIAGRAM WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	СLAY		SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
	- 465 - 465 - 460 455 455 455 450 				75 40 72 100 100	<ul> <li>0.0-0.7 ft; Clayey Silt, dark brown, 10YR 3/3, moist, soft.</li> <li>0.7-2.3 ft; Silty Clay, very dark grayish brown, 10YR 3/2, plastic, very firm, moist, mottles (10YR 4/6).</li> <li>2.3-2.8 ft; Clayey Silt, dark yellowish brown, 10YR 3/4, slightly plastic, moist, soft.</li> <li>2.8-3.9 ft; Silty Clay, very dark grayish brown, 10YR 3/2, plastic, very stiff, moist.</li> <li>3.9-6.1 ft; Poor recovery, Silty Clay slough probable.</li> <li>6.1-13.3 ft; Clayey Silt grading to Fine Sand; clayey silt to 6.2 ft, dark grayish brown, 10YR 4/2, slightly plastic, laminated, moist, soft; fine sand, dark yellowish brown, 10YR 4/4, wet, loose, (clay slough probable in top of 10.0 ft S.S.).</li> <li>13.3-18.3 ft, Fine Sand, with very fine sand, trace medium sand and coarse sand, dark gray, 10YR 4/1, wet, soft, trace clay ball.</li> <li>18.3-23.3 ft; Fine Sand and Clayey Sand, alternating thin beds, trace medium sand, alternating thin beds, trace clay balls.</li> <li>23.3-36.5 ft; Coarse Sand, with fine sand and gravel, trace medium sand, alternating thin beds, trace clay balls.</li> </ul>	FB FP/ Lev										
DRILLING DRILLER LOGGED	₹:	k's Enterprises, Ryan Hunziker T. Doll				STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY: ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES	VELS:	AF	RING FER [ TE: _	DRIL	LINC	):					
DATE DR START T END TIM BOREHO	RILLED: 'IME: E:	10/21/09 10:53AM 1:50PM 8.25"				SAMPLES. PIEZON NOTES: Chris Vierrether (MDNR) and M. Carlson (Gredell) onsite observing drilling activities. WEATHER: Warn	ATUM: ATUM:	NAV. NAD	83						FEI	ET	

#### Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

## BORING LOG P-99

LOCATION: Newman-East, Adj to Davis Rd

G.S. ELEVATION: 464.38' T.O.C. ELEVATION: 467.21'

**NORTHING:** 993336.45 **EASTING:** 730887.27

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						Ϋ́						LIT	HO		<u>GY</u>			
ОЕРТН (FEET)	ELEVATION	WELL CONSTRUCTION DIAGRAM	WATER TABLE	<b>GRAPHIC LOG</b>	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
30 -	- 435				/	100	slough probable in top of 25.0 ft S.S.). 23.3-36.5 ft; Coarse Sand, with fine sand and gravel, trace medium sand, alternating thin beds, dark gray, 10YR 4/1, wet, loose, 10-20 mm subangular clasts, (fine sand and clay slough probable in top of 25.0 ft S.S.).	С										
35 -	- 430					100									        			
40	- - - 425 -						BORING TERMINATED IN COARSE SAND @36.5 FT											
45	- - - 420 -																	
50 -	- 415																	
	- 410 																	
DRILLEF LOGGED DATE DF START T	D BY: RILLED: FIME:	Ryan Hunzik T. Doll 10/21/09 10:53AM	-		<u> </u>	1	STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY, ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES. NOTES: Chris Vierrether (MDNR) and M. Carlson (Gredell) onsite	ETER: ATUM:	AF DA INS NAVI	TER TE: STAL D 88	DRIL	ILLING	):			FEE FEE FEE	т —	
END TIM	IE: DLE DIA.:	1:50PM 8.25"					M. Carison (Gredell) onsite observing drilling activities. WEATHER: Warr				ld, 10	)-15 N	1PH	Wind	from	. <b>S</b> .		

## BORING LOG P-102

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

LOCATION: Heisel-West, S of LBR, W of farm access Rd

**G.S. ELEVATION:** 464.29' **T.O.C. ELEVATION:** 467.27'

NORTHING: 993140.49

**EASTING:** 727503.68

	. 1			<b>,</b>			NORTHING: 99314	0.49		:A3		<u>10</u> .	1.	213	03.0	00		
						RΥ					L	-ITI	HO	LO	GΥ			
DEPTH (FEET)	ELEVATION	WELL CONSTRUCTION DIAGRAM	WATER TABLE	<b>GRAPHIC LOG</b>	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
-		· · ·			Π													
	65 -		•				0.0-1.6 ft; Clayey Silt, dark brown, 10YR 3/3,	FB										
5 - 40	50					90	moist, soft; silt below 1.5 ft, dark grayish brown, 10YR 4/2, moist, soft. 1.6-4.8 ft; Clay and Silty Clay, thin beds, very dark grayish brown, 10YR 3/2, plastic, firm, moist; mottles (10YR 4/6) below 2.5 ft; interbeds of silt from 2.5-4.0 ft; clay bed, 4.0-											
	55		Ţ,			100	5.0 ft, dark brown, 10YR 3/3, highly plastic. 4.8-7.2 ft; Poor recovery, probable Clay slough. 7.2-9.0 ft; Very Fine Sand and Silty Clay, thin beds, dark grayish brown, 10YR 4/2, wet, soft, clay interbeds <1 inch thick, silty clay below	CO/										
						60	8.3 ft, plastic. 9.0-10.0 ft; Silty Clay, very dark gray, (Gley) 3/N, highly plastic, wet, soft. 10.0-13.3 ft; Fine Sand, trace very fine sand, dark yellowish brown, 10YR 4/4, wet, soft.	BS FP/ Lev CO/										
	50					67	13.3-18.3 ft; Silty Clay, very dark gray, (Gley) 1 3/N, highly plastic, soft, wet, (clay slough probable in top of 15.0 and 20.0 ft S.S.).	BS										
	15		1			72	18.3-28.3 ft; Fine to Medium Sand, thin beds, trace coarse sand below 25.3 ft, dark gray, 10YR 4/1, wet, soft, (clay slough probable in top of 25.0 ft S.S.).	CM/ Sp										
	ю		1000 A.C. 1000 C.M. 100															
			•	_\ <u>\</u>		44												
DRILLING CO DRILLER: LOGGED BY: DATE DRILLE	Đ:	Ryan Hunzi T. Doll 09/29/09	iker	nc.			STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES. PIEZOM	ETER:	AFT DAT	ER ( TE: _ TALL	EDRI		):			FEE	т -	
START TIME: END TIME: BOREHOLE D		5:15PM 9/ 9:45AM 8.25"			-		NOTES: Chris Vierrether, MDNR, onsite observing drilling activities. VERTICAL D/ HORIZONTAL D/ WEATHER: Cool,	ATUM:	NAD	83	ild, Bı	reezy	·.					

#### Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

# BORING LOG P-102

LOCATION: Heisel-West, S of LBR, W of farm access Rd

G.S. ELEVATION: 464.29' T.O.C. ELEVATION: 467.27'

**NORTHING:** 993140.49 **EASTING:** 727503.68

												_			
				¥					L	.ITH	łOL	.OG	iΥ		
DEPTH (FEET)	ELEVATION	WELL CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY					C SAND VC SAND	SM GRAVEL	LG GRAVEL
30	435		7	61	28.3-36.5 ft; Medium Sand, trace gravel, dark gray, 10YR 4/1, clasts subrounded, (fine sand and clay slough probable in 35.0 ft S.S.).	CM/ Sp	-								
35 -	430		/	100											
	425				BORING TERMINATED IN MEDIUM SAND @36.5 FT										
45 -	420														
50	415				· · · · · · · · · · · · · · · · · · ·										
55 -	410														
DRILLING C		's Enterprises, Inc. Ryan Hunziker			STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY, ACTUAL CHANGES MAY BE	EVELS:						8		EET EET	
LOGGED B DATE DRIL START TIM END TIME:	Y: LED:	T. Doll 09/29/09 5:15PM 9/28 9:45AM			GRADUAL OR MAY OCCUR BETWEEN SAMPLES		DA INS NAV	TE: STAL D 88				34.7		ET	

#### Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

## BORING LOG P-104

LOCATION: Heisel-West, S of LBR, W of farm access Rd

G.S. ELEVATION: 465.00' T.O.C. ELEVATION: 467.78'

NORTHING: 993125.75 EASTING: 728085.40

CLIENT: R	leitz & Jens, Inc.	NORTHING: 99312	5.75	E	<u>A5</u>	 <b>3:</b> 7					
	IKY I					тнс	<u>LO</u>	GY			
DEPTH (FEET)	WELL WELL CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG SAMPLE TYPE SAMPLE TYPE	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
							-				
0 465		0.0-1.0 ft; Clayey Silt, dark brown, 10YR 3/3, \plastic, stiff, moist.	FB								
	95	1.0-3.5 ft; Clay, very dark grayish brown, 10YR 3/2, plastic, stiff, moist.									
5-460		3.5-4.9 ft; Silty Clay, dark grayish brown, 10YR 4/2, low plasticity, soft, moist, mottles		- -							
		(10YR 4/6). 4.9-8.2 ft; Poor recovery, probable Silty Clay slough.									
+	28	8.2-11.3 ft; Silty Sand, dark grayish brown,									
10-455		10YR 4/2, wet, soft, mottles (10YR 4/6).		ī							
	55	11.3-11.8 ft, Silty Clay, dark gray, 10YR 4/1, plastic, soft, wet. 11.8-13.9 ft; Silty Sand, dark gray, 10YR 4/1, laminations of black coalified wood matter,	FP/ Lev	-							
	67	wet, soft. 13.9-33.3 ft; Fine Sand, dark gray, 10YR 4/1, wet, soft; with very fine sand below 25.3 ft, (fine sand and clay slough probable at top of 20.0-30.0 ft S.S.).									
	78										
25 - 440											
	67										
DRILLING CO.: M DRILLER: LOGGED BY:	ax's Enterprises, Inc. Dave Hunziker T. Doll	STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY, ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.	VELS:	AF DA	TER I	LING ING:			FE		
DATE DRILLED: START TIME: END TIME: BOREHOLE DIA.:	10/05/09 5:00PM 9/30 9:35AM 10/5 10.25"	NOTES: Chris Vierrether (MDNR) and M. Carlson (Gredell) onsite observing drilling activities. WEATHER: Warr	ATUM: ATUM:	NAV NAI	/D 88 D 83	(T +/- I, 5 MP			-		-

## BORING LOG P-104

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

LOCATION: Heisel-West, S of LBR, W of farm access Rd

G.S. ELEVATION: 465.00' T.O.C. ELEVATION: 467.78'

NORTHING: 993125.75 EASTING: 728085.40

			Nor((1))(C: 5)512.				ITHO		GV		
DN FEET)	RUCTION M TABLE C LOG C LOG	PERCENT RECOVERY	DESCRIPTION	.D.	CLAY						GRAVEL GRAVEL
DEPTH (FEET)	VELL CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG	PERCEN		FACIES I.D.	CLAY SILTY CLAY	SILT	VF SAND F SAND	M SAND	C SAND	VC SAND	SM GRAVEL
+ + 30 - 435			13.9-33.3 ft; Fine Sand, dark gray, 10YR 4/1, wet, soft; with very fine sand below 25.3 ft, (fine sand and clay slough probable at top of 20.0-30.0 ft S.S.).	FP/ Lev		:					
		78									
35 430		78	33.3-36.5 ft; Fine Sand to Coarse Sand, trace medium sand, dark gray, 10YR 4/1, wet, loose.								
			BORING TERMINATED IN COARSE SAND @36.5 FT								
40 - 425											
45 420 											
50 - 415											
55 - 410											
DRILLING CO.: M	-		STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES WATER LE	VELS:			ILLING				
DRILLER: LOGGED BY: DATE DRILLED: START TIME: END TIME: BOREHOLE DIA.:	Dave Hunziker T. Doll 10/05/09 5:00PM 9/30 9:35AM 10/5 10.25"		ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES. PIEZON NOTES: Chris Vierrether (MDNR) and M. Carlson (Gredell) onsite observing drilling activities. WERTICAL D. WEATHER: Warr	ATUM: ATUM:	DATE: INSTA NAVD 83 NAD 83	LLED	LING: AT +/-	34	.8	FEE	_

#### GREDELL **BORING LOG P-106 ENGINEERING RESOURCES, INC. Ameren Missouri Labadie Power Plant** LOCATION: Heisel-West, S of LBR, W of farm access Rd **Proposed Utility Waste Disposal Area** G.S. ELEVATION: 465.11' T.O.C. ELEVATION: 468.10' **Detailed Site Investigation** CLIENT: Reitz & Jens, Inc. NORTHING: 993103.56 **EASTING:** 728837.82 LITHOLOGY ĒRY RECOVE WELL CONSTRUCTION DIAGRAM CLAY **GRAPHIC LOG** SAMPLE TYPE SM GRAVEI GRAVEL ОЕРТН (FEET) WATER TABL DESCRIPTION VC SAND ELEVATION VF SAND FACIES I.D. **M SAND** C SAND F SAND PERCENT SILTY CLAY SILT Ö 0 465 0.0-1.0 ft; Clayey Silt grading to Clayey Sandy FB . . Silt, thin beds, dark brown and dark yellowish brown, 10YR 3/3 and 4/4, slightly plastic, 65 moist, soft. 1.0-4.2 ft; Silty Clay, very dark grayish brown, 10YR 3/2, plastic, very stiff, moist, mottles 5 460 \(10YR 4/6). 4.2-6.8 ft; Poor recovery, probable Silty Clay slough. 30 6.8-14.5 ft; Silty Sand, dark gravish brown and brown, 10YR 4/2 and 4/3, herringbone laminae to 9.0 ft, wet, soft grading to loose. 10 -- 455 80 14.5-23.3 ft, Very Fine Sand, trace fine sand FP/ 15 -- 450 100 and coarse sand, dark grayish brown, 10YR 4/ Lev 2, wet. 20 - 445 100 23.3-28.3 ft; Fine Sand, trace medium sand and coarse sand, dark gray, 10YR 4/1, wet. 25 440 100 STRATIFICATION LINES ARE WATER LEVELS: DRILLING CO.: Max's Enterprises, Inc. DURING DRILLING 6.8 FEET APPROXIMATE LITHOLOGIC BOUNDARIES AFTER DRILLING: FEET DRILLER: ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN Ryan Hunziker LOGGED BY: DATE: T. Doll SAMPLES. PIEZOMETER: INSTALLED AT +/- 35.0 FEET DATE DRILLED: 10/29/09 NOTES: M. Carlson (Gredell) onsite START TIME: 8:15AM VERTICAL DATUM: NAVD 88 aquifer testing piezometers. HORIZONTAL DATUM: NAD 83 END TIME: 10:10AM BOREHOLE DIA .: 10.25" WEATHER: Cool, 50°F, Overcast, 10-15 MPH Wind from NE.

11/17/2010

Printed:

Date

### BORING LOG P-106

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/17/2010

LOCATION: Heisel-West, S of LBR, W of farm access Rd

G.S. ELEVATION: 465.11' T.O.C. ELEVATION: 468.10'

**NORTHING:** 993103.56 **EASTING:** 728837.82

				RΥ					l		HO	LO	<u>GY</u>			
DEPTH (FEET)	ELEVATION	WELL CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
30	- - - 435 - - - - - - - - - - - - - -		X	100	28.3-36.5 ft; Fine Sand to Medium Sand, trace coarse sand and gravel, dark gray, 10YR 4/1, wet, 10 mm subrounded clasts.	FP/ Lev CM/ Sp										
40	- - - 425 -				BORING TERMINATED IN MEDIUM SAND @36.5 FT SHELBY TUBE SAMPLE COLLECTED AT 1.0-3.0 FT DEPTH AT COMPLETION OF DRILLING.											
45	- 420 															
	- 410				STRATIFICATION LINES ARE											
DRILLER LOGGED DATE DI START 1 END TIM	R: D BY: RILLED: FIME:	x's Enterprises, Inc. Ryan Hunziker T. Doll 10/29/09 8:15AM 10:10AM 10:25"			STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES. NOTES: M. Carlson (Gredell) onsite aquifer testing piezometers. HORIZONTAL D WEATHER: Cool	IETER: ATUM: ATUM:	Ai D IN NA NAI	FTEF ATE: ISTA VD 8 D 83	LLEC	) AT	IG: _	35	.0	FEI FEI	ET	

#### Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

## BORING LOG P-108

LOCATION: Newman-Central, S of LBR, E of farm access

G.S. ELEVATION: 465.71' T.O.C. ELEVATION: 468.55'

EASTING: 729427.93 NORTHING: 993084.09 LITHOLOGY PERCENT RECOVERY CONSTRUCTION DIAGRAM CLAY **GRAPHIC LOG** SAMPLE TYPE SM GRAVEI **G GRAVEL JEPTH** (FEET) WATER TABL DESCRIPTION VC SAND ELEVATION VF SAND ACIES I.D. C SAND SAND **M SAND** SILTY CLAY SILT WELL -1 0 0.0-0.8 ft; Clayey Silt, dark brown, 10YR 3/3, FB 465 \_\_\_\_ moist, soft, roots.0.8-2.3 ft; Silty Clay, very dark gravish brown, 90 10YR 3/2, plastic, stiff, moist, mottles (10YR (4/6), becoming very stiff below 1.4 ft. 2.3-2.8 ft; Clayey Silt, dark brown, 10YR 3/3, 5 slightly plastic, soft, moist, mottles (10YR 4/6). 460 2.8-3.5 ft; Silty Clay, dark brown, 10YR 3/3, plastic, soft, moist, mottles (10YR 4/6). 0 3.5-4.1 ft; Clayey Silt grading to Silty Clay, FP/ thin beds, dark brown, 10YR 3/3, moist, soft, Lev plastic below 3.8 ft. 10 4.1-7.5 ft; Clayey Silt, dark gray and dark 455 grayish brown, 10YR 4/1 and 4/2, moist, soft, laminated, mottles (10YR 4/6), (No recovery 85 from 5.0-10.0 ft). 7.5-15.7 ft; Silty Sand, Clayey Silty Sand and Sandy Silt, alternating thin beds, brown, 10YR 15 4/3, wet, soft grading to very soft, laminations 450 61 common; clayey silty sand from 12.3-12.6 ft, dark gray, 10YR 4/1; dark gray below 14.1 ft, 10YR 4/1; mottles (10YR 4/6) from 12.6-13.3 ft. 15.7-18.3 ft; Very Fine Sand grading to 20 Medium Sand, thin beds, trace coarse sand and 445 100 gravel, dark gray, 10YR 4/1, wet, soft to stiff, trace fine wood fragments, 5-50 mm coalified wood fragments, 10 mm subrounded clast. 18.3-26.0 ft; Very Fine Sand and Sandy Silty Clay, thin beds, dark gray, 10YR 4/1, trace coarse sand and fine sand, wet; sandy silty clay, 25 plastic. 440 100 26.0-36.5 ft; Very Fine Sand to Medium Sand, CM/ STRATIFICATION LINES ARE DRILLING CO .: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING 10 FEET APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE FEET DRILLER: AFTER DRILLING: Rvan Hunziker GRADUAL OR MAY OCCUR BETWEEN LOGGED BY: T. Doll DATE: SAMPLES. PIEZOMETER: INSTALLED AT +/-FEET DATE DRILLED: 11/04/09 NOTES: Chris Vierrether, MDNR, VERTICAL DATUM: NAVD 88 START TIME: 11:07AM 11/3 onsite observing drilling END TIME: HORIZONTAL DATUM: NAD 83 9:05AM activities. S. King onsite WEATHER: Cool, 50°F, Clear Skies, Mild, 5 MPH Wind from S. BOREHOLE DIA .: 8.25" developing piezometers.

Ameren Missouri Labadie Power Plant

**Proposed Utility Waste Disposal Area** 

## BORING LOG P-108

**LOCATION:** Newman-Central, S of LBR, E of farm access

G.S. ELEVATION: 465.71' T.O.C. ELEVATION: 468.55'

Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

11/8/2010

Printed:

Date

NORTHING: 993084.09

**EASTING:** 729427.93

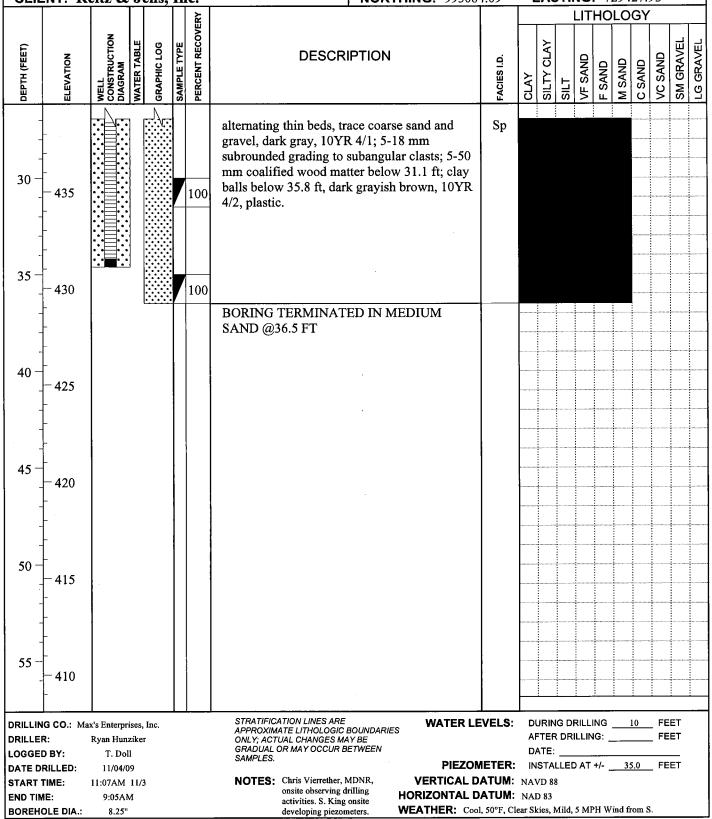


Figure P-108 Sheet 2 of 2

#### Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

## BORING LOG P-110

LOCATION: Newman-E Central, S of LBR, W of Davis Rd

G.S. ELEVATION: 466.14' T.O.C. ELEVATION: 468.99'

**NORTHING:** 993066.85 **EASTING:** 730012.30

CLIENT: Rei	tz & Jens,	In	ic.	NORTHING: 99306	6.85		=A3	STI			_				
			ERY							HO	LO	GY			
DEPTH (FEET) ELEVATION	WELL CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES 1.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
			100	<ul> <li>0.0-1.3 ft; Clayey Silt, dark brown, 10YR 3/3, moist, soft, roots.</li> <li>1.3-2.0 ft; becoming stiff, slightly plastic, damp, mottles (10YR 4/6); trace clay below 1.7 ft, dark yellowish brown, 10YR 3/4, non-plastic soft, moist.</li> </ul>	FB										
5 460			100	<ul> <li>2.0-2.5 ft; Silty Clay, very dark grayish brown, 10YR 3/2, plastic, stiff, damp, mottles (10YR 4/6).</li> <li>2.5-3.6 ft; Silt and Clay, trace very fine sand, interbedded, dark grayish brown and dark yellowish brown, 10YR 3/2 and 3/4; silt, soft;</li> </ul>											
10 455   			75	clay, stiff, plastic, moist to wet. 3.6-4.5 ft; Silty Clay, dark brown, 10YR 3/3, stiff, plastic, moist, mottles (10YR 4/6). 4.5-5.0 ft; Sandy Silt, brown, 10YR 4/3, laminated, wet, mottles (10YR 4/6). 5.0-8.1 ft; Poor recovery, probable Silty Clay	CO/ BS										
			78	slough. 8.1-8.6 ft; Sandy Silt, dark gray and brown, 10YR 4/1 and 4/3, laminated, wet, soft. 8.6-9.3 ft; Silty Clay, dark gray, 10YR 4/1, plastic, soft, laminated, iron concretions, mottles (10YR 4/6).	FP/ Lev										
20 			61	9.3-10.2 ft; Silty Sand, dark gray and brown, 10YR 4/1 and 4/3, laminated, wet, soft. 10.2-15.4 ft; Silty Clay, Clayey Silt, Sandy Silt and Silty Sand, alternating thin beds, dark gray, (Gley) 1 4/N, laminations common; silty clay beds, highly plastic, very dark gray (Gley 1 3/											
			78	N) mottles, laminated; black organic fibrous (bog) material from 12.3 to 12.4 ft. 15.4-18.3 ft; Very Fine Sand, dark gray, 10YR											
LOGGED BY:	ug Hunziker T. Doll			STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.		Al D/	TER	G DR	LLIN	G: _			FE	ET	
	11/04/09 10:15AM 1:32PM 8.25"			PIEZON NOTES: M. Carlson (Gredell) onsite to observe drilling activities. WEATHER: Cool	ATUM: ATUM:	NAV NAI	/D 88 D 83			_			-		1 <b>E</b> .

## BORING LOG P-110

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

### LOCATION: Newman-E Central, S of LBR, W of Davis Rd

G.S. ELEVATION: 466.14' T.O.C. ELEVATION: 468.99'

NORTHING: 993066.85 EASTING: 730012.30

						R						LITH	101	_0	GΥ			
DEPTH (FEET)	ELEVATION	WELL CONSTRUCTION DIAGRAM	WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
30	- - - - - - -					100	4/1, wet, soft, (clay slough probable in top of 15.0 ft S.S.). 18.3-36.5 ft; Very Fine to Fine Sand, trace clay, medium sand, alternating thin beds, dark gray and dark grayish brown, 10YR 4/1 and 4/2, 8 mm subrounded clasts, 10 mm pieces coalified wood matter, wet, loose grading to stiff, (coarse sand noted at total depth based on cuttings sample collected from auger bit), (clay slough probable in top of 20.0-30.0 ft S.S.).											
	- 430		•	•••		100		C										
	- 425 - 425 - 425 - 420 - 420 - 415 						BORING TERMINATED IN COARSE SAND @36.5 FT											
DRILLING DRILLER LOGGED DATE DR START T	) BY: RILLED:	s's Enterpris Doug Hunz T. Doll 11/04/09 10:15AM	iker )	nc.	[ ]	-	STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES. NOTES: M. Carlson (Gredell) onsite to VERTICAL D	IETER:	AF DA IN	TER TE: STAI	DRI		∋:			FEE	т —	
END TIM BOREHO	E:	1:32PM 8.25"					observe drilling activities. HORIZONTAL D WEATHER: Cool	ATUM:	NAI	0 83		15-20	мрн	Gus	ting '	Wind	from	E.

### BORING LOG P-112

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

LOCATION: Newman-E Central, S of LBR, W of Davis Rd

G.S. ELEVATION: 465.92' T.O.C. ELEVATION: 468.92'

**NORTHING:** 993051.48 **EASTING:** 730620.74

	Kenz & Jens	<b>9</b> II	<u></u>	NORTHING: 99303	1.40	L	-70		<u>.</u>	1.	100	20.	- <b>T</b>		
			RY					L	ITI.	10	LO	GΥ			
DEPTH (FEET) ELEVATION	WELL WELL CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	сгау	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
0-		<del></del>													
- 465				0.0-1.2 ft; Clayey Silt, dark brown, 10YR $3/3$ , noist, soft, roots; with clay below 0.8 ft,	FB				_						
				brown, 10YR 4/3, laminated, moist, soft,											
		-	90	mottles (10YR 4/6).											
+				1.2-1.9 ft; Sandy Silt, dark brown, 10YR 3/3,											
5-		-		laminated, moist, soft, faint mottles (10YR 4/					_						
- 460		-1		1.9-2.5 ft; Silty Sand, brown, 10YR 4/3,											
			1.0.0	laminated moist soft											
	· · · · ·	-	100	[2.3-4.1] II, SILLY CIAY, UAIK DIOWII, IVIIK 5/5,											
-				plastic, iron concretions, mottles (10YR 4/6), moist, soft; stiff with blocky structure below											
10				4.1 ft.											
+ 455				4.1-4.8 ft; Clayey Sandy Silt, brown, 10YR 4/3,	CO/										
-			100	laminated, moist, soft.	BS										
			100	4.8-8.8 ft; Poor recovery, probable Silty Clay slough.											
				8.8-9.5 ft; Silty Clay, dark brown, 10YR 3/3,				-							
15			70	plastic, soft, moist.				***							
450			72	9.5-10.6 ft; Silty Sand, brown, 10YR 4/3,	FP/				i						
				laminated, moist grading to wet, soft. 10.6-15.9 ft; Clayey Silt, Silty Clay and Silty	Lev										
				Sand, alternating thin beds, dark gray, (Gley)											
		<i></i>		4/N, wet, soft, laminations common; silty clay											
20-		्र	100	beds, highly plastic, mottles (Gley 1 3/N).											
- 445			100	15.9-33.3 ft; Very Fine to Fine Sand, thin beds, trace medium sand, dark gray, 10YR 4/1, wet,											
[		77 34		soft.											
		Ĩ,													
		9													
		1	100												
		Ľ	100												
							-								
DRILLING CO.: DRILLER:	Max's Enterprises, Inc.			STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES	VELS:			G DRI DRIL							
LOGGED BY:	Doug Hunziker T. Doll			ONLY: ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.			TE:							_	
DATE DRILLED				PIEZOM				LED	AT +	/	35.	3	FEE	T	
START TIME:	1:55PM 5:27PM			NOTES: Chris Vierrether (MDNR) and VERTICAL DA M. Carlson (Gredell) onsite HORIZONTAL DA											
BOREHOLE DIA				observing drilling activities.				/ild, 1	5-20	MPH	l Gus	ting <sup>v</sup>	Wind	from	Е.
L															

#### Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

# BORING LOG P-112

LOCATION: Newman-E Central, S of LBR, W of Davis Rd

G.S. ELEVATION: 465.92' T.O.C. ELEVATION: 468.92'

NORTHING: 993051.48 EAST

EASTING: 730620.74

	Kenz & Jens,	<u>1110.</u>	NORTHING. 99303	1.40				7500				$\neg$
		<u>}</u>				L	ITH	OLO	GY	_		
DEPTH (FEET) ELEVATION	WELL CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG	SAMPLE TYPE PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY SILTY CLAY	SILT	VF SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
30 -		89	15.9-33.3 ft; Very Fine to Fine Sand, thin beds, trace medium sand, dark gray, 10YR 4/1, wet, soft.	FP/ Lev								
		09										
35 430		100	33.3-36.5 ft; Very Fine to Coarse Sand, thin beds, dark gray, 10YR 4/1, 5-20 mm subrounded and subangular clasts, wet, soft.	С					•			
			BORING TERMINATED IN COARSE SAND @36.5 FT									
40 425												
45												
50 415												
55												
DRILLER: LOGGED BY:	Max's Enterprises, Inc. Doug Hunziker T. Doll		STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES. PIEZON		DURIN AFTER DATE: INSTAI	DRIL	LING		-	FE	ET	
DATE DRILLED START TIME: END TIME: BOREHOLE DIA	1:55PM 5:27PM		NOTES: Chris Vierrether (MDNR) and M. Carlson (Gredell) onsite observing drilling activities. WEATHER: Cool	ATUM: ATUM:	NAVD 88 NAD 83	8						E.

## **BORING LOG P-114**

Ameren Missouri Labadie Power Plant **Proposed Utility Waste Disposal Area Detailed Site Investigation** . **с.** т.

Date Printed: 11/8/2010

#### LOCATION: Newman-East, S of LBR, Adj to Davis Rd

G.S. ELEVATION: 463.94' T.O.C. ELEVATION: 466.78'

NODTUNG. 003026

6.22	EASTING:	731203.72
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CLIENT: Re	eitz & Jens,	Inc.		NORTHING: 993026	5.22	EA	STI	NG	73	312	03.7	72		
		εRΥ						LIT	HO	LO	GY			
DEPTH (FEET) ELEVATION	WELL CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG	SAMPLE TYPE PERCENT RECOVERY	DESCRI	PTION	FACIES I.D.		SILT CLAI	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
- 														
		85	0.0-0.7 ft; Clayey Silt, v brown, 10YR 3/2, moist 0.7-2.3 ft; Silty Clay, ve 10YR 3/2, plastic, stiff,	, soft, roots. ry dark grayish brown,	FB									
460 5 -			$\frac{4}{6}$ , white 2 mm gastro 2.3-4.0 ft; Sandy Silty C brown, 10YR 4/2, moist 6); clay from 3.1-3.2 ft,	pod (snail). lay, dark grayish , soft, mottles (10YR 4/										
- - - 455		45	4 0-4 7 ft Silty Sand br	own, 10YR 4/3, moist, Clayey Silt, Sandy	FP/ Lev									
		89	Fine Sand, alternating the laminations common to 10YR 3/3 to 5.4 ft; dark 4/2, from 5.4- 6.9 ft; dark dark grayish brown, 10Y	in beds, wet, soft; 6.9 ft; dark brown, grayish brown, 10YR k gray, 10YR 4/1, and										
+- 450 15 - -		61	very fine sand, 7.0-7.3 f 2.5YR 3/4, iron concreti- mottles (10YR 4/6) com and 6.9-7.0 ft; silty clay plastic, stiff.	ons; iron staining and mon from 5.0-6.0 ft										
		39	15.8-25.7 ft; Silty Clay, Fine Sand, alternating th sand, dark gray and brow	in beds, trace coarse wn, 10YR 4/1 and 4/3, e; silty clay bed,										
			probable in top of 20.0 f											
		100	25.7-36.5 ft; Gravelly S	and, with very fine to	С									
LOGGED BY:	Ryan Hunziker T. Doll		STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC B ONLY; ACTUAL CHANGES MAY GRADUAL OR MAY OCCUR BE SAMPLES.	'BE		AFTE DATI	ING D ER DR E: ALLEI	ILLIN	G: _			FEI	ET	
DATE DRILLED: START TIME: END TIME: BOREHOLE DIA.:	11/12/09 7:57AM 12:09PM 10.25"		NOTES:	VERTICAL DA VERTICAL DA HORIZONTAL DA WEATHER: Cold,	ATUM: ATUM:	NAVD NAD 8	88 3			34	r.0	. <sup>rei</sup>	-1	

# BORING LOG P-114

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

LOCATION: Newman-East, S of LBR, Adj to Davis Rd

G.S. ELEVATION: 463.94' T.O.C. ELEVATION: 466.78'

NORTHING: 993026.22 EASTING: 731203.72

	NI: K	$enz \alpha$	Je	ns,	ш	C.	NUR	<b>THING:</b> 99302	<u>20.22 -</u>			511	_						
						ΪRΥ							LIT	HO	LO	<u>GY</u>			
DEPTH (FEET)	ELEVATION	WELL CONSTRUCTION DIAGRAM	WATER TABLE	<b>GRAPHIC LOG</b>	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION		FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
								1											
30	- 435					94	medium sand, alternating thin b gravel, dark gray, 10YR 4/1, we to soft, 5-20 mm subangular an clasts, coarse black (glossy) coa matter, (3-inch well-rounded, p retrieved from base of auger), ( 35.0 ft S.S.).	et, loose grading d subrounded Ilified wood rolate cobbles	C										
	- 430																		
35-	100	<u></u>																	
						72	BORING TERMINATED IN C	DAVELLV											
							SAND @36.5 FT												
	- 425																		
40+																			
	- 420																		
45-																			
-																			
	- 415																		
50	415																		
+																			
	- 410																		
55-	410																		
DRILLING DRILLER:	: 1	Ryan Hunz	iker	nc.			STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIE ONLY: ACTUAL CHANGES MAY BE CRADUAL OR MAY OCCUB RETAKEEN	water L	EVELS:	AF	TER	DRI	RILLII LLIN				-		
LOGGED		T. Doll 11/12/09					GRADUAL OR MAY OCCUR BETWEEN SAMPLES.	PIEZO	METER:		ATE: STAL		AT	+/	34	.8	FE	ET	
START TI	ME:	7:57AM	ſ				NOTES:							~					
END TIME		12:09PN 10.25"						HORIZONTAL I WEATHER: Col				calm,	Frost						
												,							

#### GREDELL **BORING LOG P-116 ENGINEERING RESOURCES, INC.** Ameren Missouri Labadie Power Plant LOCATION: Heisel-West-S of LBR, W of farm access Rd **Proposed Utility Waste Disposal Area** G.S. ELEVATION: 464.82' T.O.C. ELEVATION: 467.55' **Detailed Site Investigation** CLIENT: Reitz & Jens, Inc. NORTHING: 992841.30 **EASTING:** 727788.60 LITHOLOGY PERCENT RECOVERY WELL CONSTRUCTION DIAGRAM CLAY **SRAPHIC LOG** SAMPLE TYPE SM GRAVEI GRAVEL JEPTH (FEET) NATER TABI DESCRIPTION /C SAND ELEVATION VF SAND FACIES I.D. **M SAND** F SAND SAND SILTY CLAY SILT Q Ο 14 465 0 FB 0.0-0.8 ft; Clayey Silt, 10YR 3/3, damp, soft. . 0.8-4.8 ft; Clay, very dark grayish brown, 10YR 3/2, plastic, firm, moist, mottles (10YR 100 4/6), silt interbeds <1 inch thick. 460 5 4.8-5.0 ft; Clayey Silt, grayish brown, 10YR 5/ 2, moist, soft.5.0-6.8 ft; Poor recovery, probable Clay slough. FP/ 70 6.8-7.3 ft; Clayey Silt and Silty Clay, thin beds, Lev dark grayish brown, 10YR 4/2, moist; clayey silt to 7.0 ft, soft; silty clay below 7.0 ft, plastic, 455 10 firm, moist, gray mottles (10YR 5/1). 7.3-11.8 ft; Silty Sand, dark yellowish brown, 10YR 4/4, wet, soft, becoming dark grav below CO/ 100 10.0 ft, 10YR 4/1, <1-inch thick silty clay bed BS at 11.0 ft. 11.8-12.4 ft; grading to very dark gray, (Gley) 450 15 1 3/N, wet. 100 12.4-13.0 ft; Silty Clay, very dark gray, (Gley) 1 3/N, plastic, soft, wet. 13.0-15.0 ft; Sandy Silt, very dark gray, (Gley) 1 3/N, laminated, plant detritus laminae, wet, soft. 445 15.5-23.3 ft; Fine Sand, trace very fine sand, 20 67 dark gray, (Gley) 1 3/N, wet, soft, small wood fragments, (clay slough probable in top of 15.0 ft S.S). FP/ 23.3-28.3 ft; Fine to Medium Sand, trace gravel, alternating thin beds, dark gray, 10YR Lev 440 25 4/1, wet, soft, (clay slough probable in top of 72 25.0 ft S.S.). STRATIFICATION LINES ARE WATER LEVELS: DURING DRILLING 7.3 FEET DRILLING CO .: Max's Enterprises, Inc. APPROXIMATE LITHOLOGIC BOUNDARIES ONLY, ACTUAL CHANGES MAY BE AFTER DRILLING: FEET DRILLER: Doug Hunziker GRADUAL OR MAY OCCUR BETWEEN DATE: LOGGED BY: T. Doll SAMPLES. PIEZOMETER: INSTALLED AT +/- 35.0 FEET DATE DRILLED: 09/29/09 NOTES: Chris Vierrether, MDNR. VERTICAL DATUM: NAVD 88 START TIME: 10:38AM onsite observing drilling HORIZONTAL DATUM: NAD 83 END TIME: 1:25PM activities. WEATHER: Cool, 65°F, Clear Skies, Mild, 15-20 MPH NW Gusting Wind. BOREHOLE DIA .: 8.25"

# Date Printed: 11/8/2010

#### GREDELL **BORING LOG P-116 ENGINEERING RESOURCES, INC. Ameren Missouri Labadie Power Plant** LOCATION: Heisel-West-S of LBR, W of farm access Rd **Proposed Utility Waste Disposal Area** G.S. ELEVATION: 464.82' T.O.C. ELEVATION: 467.55' **Detailed Site Investigation** CLIENT: Reitz & Jens, Inc. **NORTHING:** 992841.30 EASTING: 727788.60 LITHOLOGY PERCENT RECOVERY WELL CONSTRUCTION DIAGRAM CLAY SM GRAVEL SAMPLE TYPE LG GRAVEL **GRAPHIC LOG** ОЕРТН (FEET) TABL DESCRIPTION VF SAND ELEVATION VC SAND FACIES I.D. M SAND F SAND C SAND WATER 1 SILTY CLAY SILT FP/ Lev 28.3-36.5 ft; Coarse Sand, with gravel, dark . С gray, 10YR 4/1, trace clay balls and pockets of 435 30 silt, wet. 67 430 35 78 BORING TERMINATED IN COARSE SAND @36.5 FT 425 40 420 45 -415 50 410 55 STRATIFICATION LINES ARE WATER LEVELS: DURING DRILLING \_\_\_\_\_\_\_ FEET DRILLING CO.: Max's Enterprises, Inc. APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE AFTER DRILLING: FEET DRILLER: Doug Hunziker GRADUAL OR MAY OCCUR BETWEEN DATE: LOGGED BY: T. Doll SAMPLES. PIEZOMETER: INSTALLED AT +/- \_\_\_\_\_\_\_\_ FEET DATE DRILLED: 09/29/09 NOTES: Chris Vierrether, MDNR, START TIME: 10:38AM VERTICAL DATUM: NAVD 88 onsite observing drilling END TIME: 1:25PM HORIZONTAL DATUM: NAD 83 activities. BOREHOLE DIA .: WEATHER: Cool, 65°F, Clear Skies, Mild, 15-20 MPH NW Gusting Wind. 8.25"

Date Printed: 11/8/2010

#### GREDELL **BORING LOG P-118 ENGINEERING RESOURCES, INC. Ameren Missouri Labadie Power Plant** LOCATION: Heisel-West-S of LBR, W of farm access Rd **Proposed Utility Waste Disposal Area** G.S. ELEVATION: 464.81' T.O.C. ELEVATION: 467.70' **Detailed Site Investigation** CLIENT: Reitz & Jens, Inc. NORTHING: 992825.03 EASTING: 728377.28 LITHOLOGY PERCENT RECOVERY WELL CONSTRUCTION DIAGRAM CLAY SM GRAVEL SAMPLE TYPE GRAVEL **GRAPHIC LOG** DEPTH (FEET) WATER TABI DESCRIPTION VC SAND VF SAND ELEVATION M SAND FACIES I.D. SAND SAND SILTY CLAY SILT Q Ó 465 0 0.0-0.7 ft; Clayey Silt, dark brown, 10YR 3/3, FB damp, soft; without clay below 0.5 ft, dark yellowish brown, 10YR 3/4, very soft. 100 0.7-5.0 ft; Silty Clay, dark brown, plastic, firm, mottles (10YR 4/6), silt interbeds <1-inch thick at 1.8 ft; becoming dark gravish brown below 460 5 \4.3 ft, 10YR 4/2. 5.0-6.2 ft; Poor recovery, probable Silty Clay \slough. 100 ¥ 6.2-9.8 ft; Clayey Silt, Silty Clay and Sandy Silt, alternating thin beds; clayey silt to 7.1 ft, dark grayish brown, 10YR 4/2, moist to wet, 455 10 soft, clay and silt interbeds <1-inch thick; clay CO/ below 7.1 ft, dark grayish brown and dark gray, BS 10YR 4/1 and 4/2, highly plastic, soft, moist; 85 sandy silt below 7.8 ft, brown, 10YR 4/2, wet soft, clay and silt interbeds <1-inch thick; becoming dark gray below 8.3 ft, 10YR 4/1, 450 15 iron/manganese concretions. FP/ 94 9.8-14.7 ft; Sandy Silt, Clayey Silt, and Silty Lev Clay, alternating thin beds, very dark gray, (Gley) 1 3/N, wet, soft; clayey silt from 10.0-11.5 ft, dark gray and dark grayish brown, 10YR 4/1 and 4/2, iron/manganese concretions, iron staining; silty clay, plastic, soft; laminated 445 20 below 12.5 ft in clayey silt and sandy silt beds. 94 3 14.7-28.3 ft; Fine Sand, trace very fine sand, dark gray, 10YR 4/1, wet, soft, (fine sand and clay slough probable in top of 15.0 and 20.0 ft S.S.). 440 25 78 STRATIFICATION LINES ARE WATER LEVELS: DURING DRILLING \_\_\_\_\_\_ FEET DRILLING CO.: Max's Enterprises, Inc. APPROXIMATE LITHOLOGIC BOUNDARIES AFTER DRILLING: FEET DRILLER: ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN Doug Hunziker DATE: LOGGED BY: T. Doll SAMPLES PIEZOMETER: INSTALLED AT +/-FEET 35.2 DATE DRILLED: 09/29/09 NOTES: Chris Vierrether (MDNR) and VERTICAL DATUM: NAVD 88 START TIME: 2:05PM John Eimer (Ameren) onsite HORIZONTAL DATUM: NAD 83 END TIME: 4:38PM observing drilling activities. WEATHER: Cool, 65°F, Clear Skies, Mild, 15-20 MPH NW Gusting Wind.

BOREHOLE DIA .:

8.25"

Figure P-118 Sheet 1 of 2

## **BORING LOG P-118**

LOCATION: Heisel-West-S of LBR, W of farm access Rd

Proposed Utility Waste Disposal Area Detailed Site Investigation

Ameren Missouri Labadie Power Plant

Detailed Site Investigation CLIENT: Reitz & Jens. Inc.

Date Printed: 11/8/2010

## **G.S. ELEVATION:** 464.81' **T.O.C. ELEVATION:** 467.70'

NORTHING: 992825.03 E

EASTING:	728377.28
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	<u>_NI. N</u>		UCH	<u>, 1</u>		•	NORTHING. 99282	5.05			<u>, , , , , , , , , , , , , , , , , , , </u>	10.	14	205	11.2	-0		
1						≿					- 1	LITI	HO	LO	GΥ			
DEPTH (FEET)	ELEVATION	WELL CONSTRUCTION DIAGRAM	WATER TABLE	SAMPI F TYPF		PERCENT RECOVERY	DESCRIPTION	FACIES 1.D.	CLAY	SILTY CLAY	SILT		F SAND			VC SAND	SM GRAVEL	LG GRAVEL
-		A		<b>∖</b> [s														
30	-  				7	72	28.3-36.5 ft; Fine to Medium Sand, thin beds, trace very fine sand, coarse sand and gravel, dark gray, 10YR 4/1, wet, soft, (fine sand and clay slough probable in top of 30.0 and 35.0 ft S.S.).	FP/ Lev					-					
-	-							CM/										
-	-							Sp										
35	- 430					_												
-	-			<u>.</u>	10	00												
-	-						BORING TERMINATED IN MEDIUM											
-	-						SAND @36.5 FT											
-	-																	
40 -	- 425																	
-	-				}													
-	_																	
-	-																	
-	-																	
45 -	- 420																	
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50 -	-415																	
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55 -	-410																	
55																		
	_																	
DRILLIN DRILLEF LOGGEE		k's Enterpris Doug Hunz T. Doll	iker		]	.	STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY: ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN	VELS:	AF		DRIL							
DATE DE		09/29/09					SAMPLES. PIEZON	IETER:				AT +	·/	35.	2	FEE	ET	
START 1	IME:	2:05PM					NOTES: Chris Vierrether (MDNR) and VERTICAL D. John Eimer (Ameren) onsite											
	E: DLE DIA.:	4:38PM 8.25"					observing drilling activities. HORIZONTAL D.				617 1	5-20	мри	NW	Gue	tine 1	lind	
DOVER	VEL DIA	0,20						, 33 F, CIC	ואכ וה	-3, IVI		5-20	1411 []		Jusi	ing v	, ща,	

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Printed: 11/8/20

Date

## BORING LOG P-120

Ameren Missouri Labadie Power Plant LOCATION: Newman-West-S of LBR, E of farm access Rd **Proposed Utility Waste Disposal Area** G.S. ELEVATION: 464.75' T.O.C. ELEVATION: 467.65' **Detailed Site Investigation** CLIENT: Reitz & Jens, Inc. **NORTHING: 992787.68** EASTING: 729145.90 LITHOLOGY PERCENT RECOVERY CONSTRUCTION DIAGRAM CLAY WATER TABLE SAMPLE TYPE SM GRAVEI -G GRAVEL **GRAPHIC LOG** DEPTH (FEET) DESCRIPTION VC SAND VF SAND ELEVATION FACIES I.D. F SAND **M SAND** C SAND SILTY CLAY WELL SILT +-|+ 465 0 0.0-0.9 ft; Clayey Silt, dark brown, 10YR 3/3, FB \slightly plastic, moist, soft. 0.9-4.4 ft; Silty Clay, very dark grayish brown, 70 plastic, very stiff, moist, mottles (10YR 4/6). 460 4.4-6.8 ft; Poor recovery, probable Silty Clay 5 slough. 6.8-8.0 ft; Sandy Silt, brown, 10YR 4/3, moist, 100 soft, becoming wet below 7.2 ft with laminations. FP/ 8.0-8.8 ft; Sandy Clayey Silt, dark gravish - 455 10 Lev brown, 10YR 4/2, slightly plastic, soft, 78 laminated, mottles (10YR 4/6). 8.8-28.3 ft; Fine Sand, with very fine sand, brown, 10YR 4/3, wet, soft; trace coarse sand (<1%) below 10.7 ft; becoming dark gray, 10YR 4/1, below 15.0 ft, (clay slough probable 450 15 in top of 10.0-20.0 ft S.S.). 83 445 20 94 440 25 94 DRILLING CO .: Max's Enterprises, Inc. STRATIFICATION LINES ARE WATER LEVELS: DURING DRILLING 8.8 FEET APPROXIMATE LITHOLOGIC BOUNDARIES DRILLER: ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN AFTER DRILLING: FEET Ryan Hunziker LOGGED BY: DATE: T. Doll SAMPLES PIEZOMETER: INSTALLED AT +/- 34.9 FEET DATE DRILLED: 10/22/09 VERTICAL DATUM: NAVD 88 NOTES: Chris Vierrether, MDNR, START TIME: 10:07AM onsite observing drilling HORIZONTAL DATUM: NAD 83 END TIME: 1:05PM activities. WEATHER: Cool, 65°F, Clear Skies, Mild, 15-20 MPH NW Gusting Wind. BOREHOLE DIA .: 10.25"

# BORING LOG P-120

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

#### LOCATION: Newman-West-S of LBR, E of farm access Rd

G.S. ELEVATION: 464.75' T.O.C. ELEVATION: 467.65'

**NORTHING:** 992787.68 **EAST** 

EASTING:	729145.90
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	: Reit		Jen	18, 1	Ц		NORTHING: 99278	67.68		EA:		NG	: 7	<u>291</u>	<u>45.9</u>	<del>1</del> 0		
					Γ	μ						LIT	HO	LO	GΥ			
DEPTH (FEET)	ELEVATION WEI 1	DIAGRAM	WATER TABLE	GRAPHIC LOG SAMDI E TVDE	SAMPLE ITE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
$30^{-1}$	335 300 225 200 115				1	100	<ul> <li>28.3-35.0 ft; Coarse Sand, grading to fine sand with medium sand, very fine sand and gravel, dark gray matrix, 10YR 4/1, wet, loose to soft, 5 mm subrounded clasts, trace clay balls, (clay slough and fine sand slough probable in top of 35.0 ft S.S.).</li> <li>35.0-36.5 ft; Fine Sand, with very fine to medium sand, dark gray, 10YR 4/1, wet, soft, (clay slough and fine sand slough probable in top of 35.0 ft S.S.).</li> <li>BORING TERMINATED IN FINE SAND @36.5 FT</li> </ul>	CM/ Sp FP/ Lev										
DRILLING CC DRILLER: LOGGED BY DATE DRILLI START TIME END TIME: BOREHOLE	Rya ED: 1	Enterprise an Hunzik T. Doll 10/22/09 10:07AM 1:05PM 10.25"	ter				STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES. NOTES: Chris Vierrether, MDNR, onsite observing drilling activities. WEATHER: Cod	METER: ATUM: ATUM:	A D IN NA	D 83		AT	IG: _ +/	34	.9	FEE	:T  :T	

#### Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

2

Printed: 11/8/20

Date

# BORING LOG P-122

**LOCATION:** Bean Field-Newman Central

NORTHING: 992758.84

G.S. ELEVATION: 464.74' T.O.C. ELEVATION: 467.71'

EASTING: 729781.01

LITHOLOGY PERCENT RECOVERY CONSTRUCTION DIAGRAM CLAY SAMPLE TYPE SM GRAVEI **GRAPHIC LOG** GRAVEL DEPTH (FEET) DESCRIPTION WATER TABI VC SAND ELEVATION VF SAND **M SAND** ACIES I.D. SAND SAND SILTY CLAY SILT WELL Ċ O 465 0 0-1.2 ft; Clayey Silt, dark brown, soft. FB 1.2-4.6 ft; Clay, olive gray, 5Y 4/1, plastic, 100 stiff. 460 5 4.6-9.7 ft; Very Fine Sand, Silt and Clay, highly interlaminated, pale yellowish brown, 10YR 6/2, soft, saturated below 5 ft. 100 455 10 9.7-11.5 ft; Clay, distinct very dark gray (Gley) CO/ 1 3/N, highly plastic, "gumbo". BS 100 11.5-13.0 ft; Very Fine to Fine Sand, Silt and Clay, highly interlaminated, distinct very dark \gray (Gley) 1 3/N, fine sand at base. 13.0-17.5 ft; Silty Sand, distinct very dark grav 450 15 (Gley) 1 3/N. 94 17.5-32.5 ft; Very Fine to Fine Sand, grayish FP/ orange, 10YR 7/4, becoming coarser toward Lev base. 445 20 100 440 25 100 STRATIFICATION LINES ARE DRILLING CO .: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING 5 FEET APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN DRILLER: AFTER DRILLING: FEET Rvan Hunziker LOGGED BY: M Carlson DATE: SAMPLES. PIEZOMETER: INSTALLED AT +/- 35.2 DATE DRILLED: 11/10/09 FEET NOTES: VERTICAL DATUM: NAVD 88 START TIME: 11:22AM HORIZONTAL DATUM: NAD 83 END TIME: 2:16PM BOREHOLE DIA .: 8.25" WEATHER: Cool, 55°F, Cloudy, Mild, 10-15 MPH Wind from N.

# BORING LOG P-122

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

#### **LOCATION:** Bean Field-Newman Central

G.S. ELEVATION: 464.74' T.O.C. ELEVATION: 467.71'

NORTHING: 992758.84

**EASTING:** 729781.01

					R						LITI	но	LO	GY			
DEPTH (FEET)	ELEVATION	WELL CONSTRUCTION DIAGRAM	WATER TABLE	SAMPLE IYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND				SM GRAVEL	LG GRAVEL
30 -	- 			1	100	17.5-32.5 ft; Very Fine to Fine Sand, grayish orange, 10YR 7/4, becoming coarser toward base.	FP/ Lev										
35 -	- 				72	32.5-36.5 ft; Coarse Sand, grayish orange, 10YR 7/4, gravelly with abundant granules 2-4 mm in size, (fine sand slough in top S.S.).	C										
40 -	- - - - - -					BORING TERMINATED IN COARSE SAND AND @36.5 FT											
45 -	- 420 																
50 -	- 																
55	- 410 -																
DRILLER		Ryan Hunzi	ker	 		STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY, ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN	VELS:	AF	TER	DRII	LINC	3:			FEE		
LOGGED DATE DR START T END TIM BOREHO	RILLED: IME: E:	M. Carlso 11/10/09 11:22AM 2:16PM 8.25"	ſ			SAMPLES. PIEZON NOTES: VERTICAL D. HORIZONTAL D. WEATHER: Cool	ATUM: ATUM:	INS NAV NAD	STAL D 88 83	LED	AT +	/		2	FEE	- .т	

## **BORING LOG P-124**

**Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation** 

LOCATION: Newman-East Central-S of LBR W of Davis Rd G.S. ELEVATION: 464.92' T.O.C. ELEVATION: 467.99'

CLIENT: Reitz & Jens, Inc. NORTHING: 992775.57 EASTING: 730303.49 LITHOLOGY RECOV CONSTRUCTION DIAGRAM CLAY SM GRAVEL SAMPLE TYPE -G GRAVEL **GRAPHIC LOG** DEPTH (FEET) VATER TABL DESCRIPTION VC SAND ELEVATION VF SAND ACIES I.D. C SAND F SAND M SAND PERCENT SILTY CLAY SILT WELL 465 0 0.0-0.6 ft; Clayey Silt, very dark gravish FB brown, 10YR 3/2, moist, soft, roots. 0.6-1.7 ft; Silty Clay, very dark grayish brown, 75 10YR 3/2, plastic, very stiff, moist, faint mottles (10YR 4/6). 1.7-2.8 ft; Clayey Silt, dark grayish brown, 460 5 10YR 4/2, moist, soft, mottles (10YR 4/6). 2.8-3.6 ft; Silty Clay, very dark gravish brown. 10YR 3/2, plastic, stiff, moist. 85 3.6-4.4 ft; Clayey Silt, dark gravish brown, 10YR 4/2, moist, soft, mottles (10YR 4/6). 4.4-7.6 ft; Poor recovery, probable Silty Clay - 455 10 -CO/ slough noted. BS 7.6-8.5 ft; Silty Clay, dark gray and dark grayish brown, 10YR 4/1 and 4/2, plastic, soft 85 moist, iron concretions (10YR 4/6). 8.5-9.7 ft; Clayey Sandy Silt and Silty Sand, thin beds, soft; clayey sandy silt, dark gray and 450 15 dark grayish brown, 10YR 4/1 and 4/2, moist, 100 mottles (10YR 4/6); silty sand, brown, 10YR 4/ 3, wet, laminated. 9.7-20.5 ft; Clavey Silt, Silty Clay, Sandy Silt, Sandy Clayey Silt, Clayey Silty Sand, Fine Sand and Very Fine Sand, alternating thin beds, 445 20 very dark gray, (Gley) 1 3/N, moist to wet; silty 56 clay, plastic; black mottles (Gley 1 2.5/N) in FP/ clay bed from 10.5-11.3 ft; laminations Lev common in "silt" and very fine sand beds below 12.8 ft. 20.5-25.6 ft; Very Fine Sand, with clay and silt, dark yellowish brown laminations, 10YR 4/6, 25 - 440 wet, stiff, becoming dark gray, 10YR 4/1 below 72 C 25.0 ft. STRATIFICATION LINES ARE DRILLING CO .: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING 8.8 FEET APPROXIMATE LITHOLOGIC BOUNDARIES DRILLER: AFTER DRILLING: FEET Rvan Hunziker ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN LOGGED BY: DATE: T. Doll SAMPLES. PIEZOMETER: INSTALLED AT +/- 35.3 FEET DATE DRILLED: 11/11/09 NOTES: M. Carlson and S. King

(Gredell) onsite.

START TIME:

BOREHOLE DIA .:

END TIME:

10:46AM

1:52PM

8.25"

VERTICAL DATUM: NAVD 88

WEATHER: Cool, 45°F, Clear Skies, Mild, Calm.

HORIZONTAL DATUM: NAD 83

## BORING LOG P-124

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

LOCATION: Newman-East Central-S of LBR W of Davis Rd G.S. ELEVATION: 464.92' T.O.C. ELEVATION: 467.99'

NORTHING: 992775.57 EASTING: 730303.49

	1 1 1 1											
		ERY			<u> </u>	- <b></b>	LIT	HO	LO	GY		
DEPTH (FEET) ELEVATION	WELL WELL CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG	SAMPLE TYPE PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY SII TY CI AY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND SM GRAVFI	LG GRAVEL
30 - 435 $- 435$ $- 430$ $- 435$ $- 430$ $- 425$ $- 420$ $- 415$ $- 55 - 410$		100	<ul> <li>25.6-35.0 ft; Coarse Sand, with fine to medium sand, alternating thin beds, trace fine gravel, possibly fine sand toward base, dark gray, 10YR 4/1, 5-20 mm subrounded clasts, wet, loose to soft, (fine sand noted at total depth based on cuttings sample collected from auger bit).</li> <li>25.6-35.0 ft; Coarse Sand, with fine to medium sand, alternating thin beds, trace fine gravel, possibly fine sand toward base, dark gray, 10YR 4/1, 5-20 mm subrounded clasts, wet, loose to soft, (fine sand noted at total depth based on cuttings sample collected from auger bit).</li> <li>35.0-36.5 ft; Fine Sand, with very fine to coarse sand, trace gravel, 5-30 mm subangular clasts, dark gray, 10YR 4 1.</li> <li>BORING TERMINATED IN FINE SAND @36.5 FT</li> </ul>	C FP/ Lev								
DRILLING CO.: Ma DRILLER: LOGGED BY: DATE DRILLED: START TIME: END TIME:	k's Enterprises, Inc. Ryan Hunziker T. Doll 11/11/09 10:46AM 1:52PM		STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES. NOTES: M. Carlson and S. King (Gredell) onsite. WATER LE PIEZOM VERTICAL DA HORIZONTAL DA	ETER: ATUM:	AFTE DATE INSTA NAVD 8		LINC	G: _		F	EET	

# BORING LOG P-126

NORTHING: 992667.51

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

LOCATION: Newman-East Central-S of LBR Adj Davis Rd G.S. ELEVATION: 465.77' T.O.C. ELEVATION: 468.83'

EASTING: 730879.77

LITHOLOGY PERCENT RECOVERY WELL CONSTRUCTION DIAGRAM CLAY SM GRAVEL **SRAPHIC LOG** -G GRAVEL SAMPLE TYPE **DEPTH** (FEET) WATER TABL DESCRIPTION VF SAND VC SAND ELEVATION M SAND ACIES I.D. SAND F SAND SILTY CLAY SILT ö 0 0.0-0.8 ft; Clayey Silt grading to Silty Clay, FB 465 thin beds; silty clay, dark brown, 10YR 3/3, moist, soft, roots; silty clay below 0.6 ft, very 50 dark gravish brown, 10YR 3/2, plastic, stiff, ---moist, mottles (10YR 4/6). 0.8-3.8 ft; Clayey Silt, dark brown, 10YR 3/3,  $\nabla$ 5 moist, soft, mottles (10YR 4/6), roots, 460 becoming stiff below 1.7 ft. 3.8-5.4 ft; Poor recovery, probable Silty Clay 50 slough. 5.4-8.8 ft; Silty Sand, brown, 10YR 4/3, wet, CO/ soft, stiff from 7.1-7.3 ft, without silt below 7. $\beta$ 10 BS ft. 455 100 8.8-13.3 ft; Clayey Sandy Silt, very dark gray, (Gley) 1 3/N, laminated, wet, soft, with clay below 10.5 ft, trace clay below 10.9 ft. 13.3-22.5 ft; Silty Sand, very dark gray, (Gley) 100 1 3/N, laminated, wet, soft; stiff below 16.1 ft; 15 trace fine sand below 20.0 ft, dark gray, (Gley) 450 1 4/N. 20 445 94 22.5-28.3 ft; Very Fine Sand, trace very fine FP/ sand, dark gray, 10YR 4/1, wet, soft, (clay Lev slough probable in 25.0 ft S.S.). 25 440 78 STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES DRILLING CO.: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING 5 FEET AFTER DRILLING: FEET DRILLER: ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN Ryan Hunziker DATE: LOGGED BY: T. Doll SAMPLES PIEZOMETER: INSTALLED AT +/- 34.2 FEET DATE DRILLED: 11/11/09 NOTES: M. Carlson and S. King VERTICAL DATUM: NAVD 88 START TIME: 2:18PM (Gredell) onsite. END TIME: HORIZONTAL DATUM: NAD 83 5:15PM

BOREHOLE DIA.:

10.25"

WEATHER: Warm, 65°F, Clear Skies, Mild, 5-10 MPH Wind from N.

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Printed: 11/8/2010

Date

# BORING LOG P-126

LOCATION: Newman-East Central-S of LBR Adj Davis Rd G.S. ELEVATION: 465.77' T.O.C. ELEVATION: 468.83'

EASTING: 730879.77 NORTHING: 992667.51 LITHOLOGY PERCENT RECOVERY WELL CONSTRUCTION DIAGRAM CLAY SM GRAVEL WATER TABLE SAMPLE TYPE **GRAPHIC LOG** -G GRAVEL **JEPTH (FEET)** DESCRIPTION VF SAND VC SAND ELEVATION FACIES I.D. M SAND SAND C SAND SILTY ( CLAY SILT ш. FP/ Lev 28.3-36.5 ft; Medium Sand, thin beds, trace CM/ fine sand, coarse sand and gravel, dark gray, Sp 30 10YR 4/1, 5-12 mm subangular clasts, wet, 100 435 soft. 35 430 100 BORING TERMINATED IN MEDIUM SAND @36.5 FT 40 425 45 420 50 415 55 410 STRATIFICATION LINES ARE WATER LEVELS: DRILLING CO.: Max's Enterprises, Inc. DURING DRILLING 5 FEET APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE AFTER DRILLING: FEET DRILLER: Ryan Hunziker GRADUAL OR MAY OCCUR BETWEEN SAMPLES. DATE: LOGGED BY: T. Doll DATE DRILLED: 11/11/09 NOTES: M. Carlson and S. King VERTICAL DATUM: NAVD 88 START TIME: 2:18PM (Gredell) onsite. HORIZONTAL DATUM: NAD 83 END TIME: 5:15PM WEATHER: Warm, 65°F, Clear Skies, Mild, 5-10 MPH Wind from N. BOREHOLE DIA .: 10,25"

## **BORING LOG P-128**

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

LOCATION: Heisel-W Central-Adj to Ameren Power Lines G.S. ELEVATION: 465.74' T.O.C. ELEVATION: 468.60'

NORTHING: 992561.87 EASTING: 727385.52 LITHOLOGY RECOVERY CONSTRUCTION DIAGRAM CLAY SM GRAVEL L0G SAMPLE TYPE G GRAVEL ОЕРТН (FEET) WATER TABL DESCRIPTION VC SAND VF SAND ELEVATION ACIES I.D. F SAND C SAND **M SAND** PERCENT GRAPHIC SILTY CLAY SILT WELL 0 0.0-0.6 ft; Clayey Silt, dark brown, 10YR 3/3, FB 465 . moist, soft, roots, becoming dark yellowish brown, 10YR 3/4, below 0.5 ft. 65 0.6-2.7 ft; Silty Clay, very dark grayish brown, \10YR 3/2, plastic, stiff, moist. 2.7-4.2 ft; Clayey Silt, brown, 10YR 4/3, moist, 5 soft, mottles (10YR 4/6). 460 4.2-6.8 ft; Poor recovery, probable Silty Clay \slough noted. FP/ 65 6.8.0-15.7 ft; Very Fine to Fine Sand, thin beds, Lev brown and dark grayish brown, 10YR 4/3 and 4/2, wet below 6.8 ft, loose grading to soft; 10 trace clav below 11.3 ft. 100 455 15 450 100 15.7-20.8 ft; Silty Sand, dark gray, 10YR 4/1, wet, soft, (very fine sand and clay slough probable in top of 20.0 S.S.). 20 100 445 20.8-31.3 ft; Very Fine to Medium Sand, CM/ alternating thin beds, trace coarse sand, dark Sp gray, 10YR 4/1, (very fine sand and clay slough probable in top of 25.0 ft S.S.). 25 100 440 STRATIFICATION LINES ARE DRILLING CO .: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING \_\_\_\_\_4 FEET APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN DRILLER: Ryan Hunziker AFTER DRILLING: FEET DATE: LOGGED BY: T. Doll SAMPLES. PIEZOMETER: INSTALLED AT +/- 34.7 FEET DATE DRILLED: 11/07/09 START TIME: NOTES: M. Carlson (Gredell) onsite. VERTICAL DATUM: NAVD 88 3:49PM 11/6 END TIME: HORIZONTAL DATUM: NAD 83 8:47AM

BOREHOLE DIA .:

10.25"

Figure P-128 Sheet 1 of 2

WEATHER: Warm, 60°F, Clear Skies, Mild.

# BORING LOG P-128

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/17/2010

LOCATION: Heisel-W Central-Adj to Ameren Power Lines

G.S. ELEVATION: 465.74' T.O.C. ELEVATION: 468.60'

NORTHING: 992561.87 E

7	EASTING:	777285 57
1	EASTING:	121383.32

CLIENI: Reitz & Jens,	mc.	NORTHING: 99256	1.0/		A	511	10	. /.	213	0	<u>, 7</u>		
	R						LIT	HO	LO	<u>GY</u>			
DEPTH (FEET) ELEVATION WELL WELL CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG	SAMPLE TYPE PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
	100	20.8-31.3 ft; Very Fine to Medium Sand, alternating thin beds, trace coarse sand, dark gray, 10YR 4/1, (very fine sand and clay slough probable in top of 25.0 ft S.S.).	CM/ Sp										
	100	31.3-36.5 ft; Very Fine to Fine Sand grading to Medium Sand, dark gray and dark grayish brown, 10YR 4/1 and 4/2, 20-35 mm subrounded clasts, brown and black wood detritus thin bed from 36.1-36.2 ft, 20 mm wood piece below 36.2 ft, wet, soft grading to Noose.	C										
40		BORING TERMINATED IN MEDIUM SAND @36.5 FT SHELBY TUBE SAMPLE COLLECTED AT 0.7-2.7 FT DEPTH AT COMPLETION OF DRILLING.											
45 - 420													
50 415 415 													
DRILLING CO.: Max's Enterprises, Inc. DRILLER: Ryan Hunziker LOGGED BY: T. Doll DATE DRILLED: 11/07/09 START TIME: 3:49PM 11/6		STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY: ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES. NOTES: M. Carlson (Gredell) onsite. UDDIZONTAL D	ETER: ATUM:	AF DA INS NAV	TER TE: STAL	G DRI	LLIN	G:			FEE	т -	
END TIME: 8:47AM BOREHOLE DIA.: 10.25"		HORIZONTAL DA WEATHER: Warn				Mild.					_		

#### Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Printed:

Date

# BORING LOG P-130

LOCATION: Heisel-West-S of LBR, W of farm access Rd G.S. ELEVATION: 465.15' T.O.C. ELEVATION: 468.13'

NORTHING: 992537.68 EASTING: 728075.04 LITHOLOGY PERCENT RECOVERY CONSTRUCTION DIAGRAM CLAY SAMPLE TYPE SM GRAVEL **GRAPHIC LOG** G GRAVEL DEPTH (FEET) NATER TABL DESCRIPTION VC SAND ELEVATION FACIES I.D. VF SAND SAND SAND SAND SILTY CLAY SILT WELL ≥ 4 0 465 0.0-0.8 ft; Clayey Silt, dark brown, 10YR 3/3, FB \damp, soft. 0.8-2.6 ft; Silty Clay, very dark grayish brown, 100 \10YR 3/2, plastic, firm, damp. 2.6-5.0 ft; becoming with silt, mottles (10YR 4/ 6). 5 460 5.0-6.5 ft; Poor recovery, probable Silty Clay slough. 6.5-7.5 ft; Clayey Silt, dark gray, 10YR 4/1, 95 wet, soft.= 7.5-8.0 ft; Silty Clay, dark gray, 10YR 4/1, plastic, moist, soft. FP/ 10 - 455 8.0-9.4 ft; Clayey Silt, dark gray, 10YR 4/1, Lev mottles and iron concretions (10YR 4/6), wet, soft. 30 9.4-13.3 ft; Fine Sand, dark grayish brown, \10YR 4/2, wet, soft. 13.3-15.6 ft; Sandy Silty Clay, dark grayish 15 - 450 brown, 10YR 4 2, low plasticity, wet, soft./ 67 15.6-25.8 ft; Fine Sand, with very fine sand, dark gray, 10YR 4/1, with coalified wood matter laminae from 20.9-25.3 ft, wet, soft; trace very fine sand below 20.9 ft, (clay and fine sand slough probable in top of 20.0 and 20 445 25.0 ft S.S.). 100 25 - 440 67 25.8-30.6 ft; Coarse Sand, thin beds, with fine CM/ STRATIFICATION LINES ARE DRILLING CO .: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING FEET 8 APPROXIMATE LITHOLOGIC BOUNDARIES DRILLER: AFTER DRILLING: FEET Doug Hunziker ONLY: ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN LOGGED BY: T. Doll DATE: SAMPLES DATE DRILLED: PIEZOMETER: INSTALLED AT +/- 34.9 FEET 09/30/09 VERTICAL DATUM: NAVD 88 START TIME: NOTES: Chris Vierrether, MDNR, 10:18AM onsite observing drilling HORIZONTAL DATUM: NAD 83 END TIME: 12:50PM activities. BOREHOLE DIA .: 8.25" WEATHER: Cool, 50°F, Heavy Fog, Humid, Calm.

## BORING LOG P-130

NORTHING: 992537.68

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Printed: 11/8/2010

Date

LOCATION: Heisel-West-S of LBR, W of farm access Rd G.S. ELEVATION: 465.15' T.O.C. ELEVATION: 468.13'

**5. ELEVATION:** 405.15° **I.U.C. ELEVATION:** 408.12

EASTING: 728075.04

LITHOLOGY PERCENT RECOVERY WELL CONSTRUCTION DIAGRAM CLAY SAMPLE TYPE **GRAPHIC LOG** -G GRAVEL ОЕРТН (FEET) SM GRAVEI NATER TABL DESCRIPTION VC SAND ELEVATION VF SAND FACIES I.D. **M SAND** C SAND SAND SILTY CLAY SILT LL. •\ to medium sand, trace very fine sand, dark Sp gray, 10YR 4/1, wet, loose to soft. 30 -- 435 78 30.6-36.5 ft; Medium to Coarse Sand, with fine С sand, grading to gravelly sand, alternating thin beds, dark gray, 10YR 4/1, subrounded clasts, wet, loose to soft, (fine sand and clay slough in top of 35.0 ft S.S.). 35 -- 430 94 BORING TERMINATED IN GRAVELLY SAND @36.5 FT 40 -425 45 420 50 415 55 - 410 STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES DRILLING CO.: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING 8 FEET AFTER DRILLING: DRILLER: FEET Doug Hunziker ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN DATE: LOGGED BY: T. Doll SAMPLES. PIEZOMETER: INSTALLED AT +/- \_\_\_\_34.9 FEET DATE DRILLED: 09/30/09 NOTES: Chris Vierrether, MDNR, START TIME: 10:18AM VERTICAL DATUM: NAVD 88 onsite observing drilling END TIME: HORIZONTAL DATUM: NAD 83 12:50PM activities. BOREHOLE DIA .: WEATHER: Cool, 50°F, Heavy Fog, Humid, Calm. 8.25"

# BORING LOG P-132

NORTHING: 992536.17

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date

LOCATION: Newman-Central West-Adj to farm access Rd

G.S. ELEVATION: 465.36' T.O.C. ELEVATION: 468.47'

**EASTING:** 728817.00

LITHOLOGY RECOVERY CONSTRUCTION DIAGRAM CLAY SM GRAVEL **GRAPHIC LOG** .G GRAVEL SAMPLE TYPE **DEPTH** (FEET) WATER TABL DESCRIPTION ELEVATION VF SAND VC SAND ACIES I.D. SAND **M SAND** SAND PERCENT SILTY CLAY SILT WELL 4 0 465 0.0-0.7 ft; Clayey Silt, dark brown, 10YR 3/3, FB \wet, soft. 0.7-2.5 ft; Silty Clay, very dark grayish brown, 100 10YR 3/2, plastic, stiff, mottles (10YR 4/6), moist. 2.5-5.0 ft; Sandy Clayey Silt grading to Fine 5 Sand, thin beds, dark grayish brown, 10YR 4/2, 460 moist, stiff, wet and soft below 3.3 ft, laminated below 4.3 ft. 85 5.0-7.3 ft; Silty Clay, very dark gravish brown, 10YR 3/2, highly plastic, stiff, moist, silt interbeds <2 mm. 10 -7.3-11.0 ft; Sandy Clayey Silt grading to Fine 455 FP/ 83 Sand, thin beds, dark gray to brown, 10YR 4/1 Lev to 4/3, moist, wet below 8.8 ft; sandy clayey silt, slightly plastic; iron concretions and staining (10YR 4/6) from 8.3-8.8 ft; laminations from 8.8-9.3 ft, (fine sand and clay 15 slough probable in top of 10.0 ft S.S.) 450 100 11.0-13.3 ft; Fine Sand, trace coarse sand and gravel, dark grayish brown, 10YR 4/2, subrounded clasts. 13.3-16.3 ft; Fine Sand, trace very fine sand, dark grayish brown, 10YR 4/2, wet, soft grading to firm, (fine sand slough probable in 20 445 top of 15.0 ft S.S.). 61 16.3-18.3 ft; Coarse Sand, trace very fine to fine sand, dark grayish brown, 10YR 4/2, wet. 18.3-28.3 ft; Fine Sand, trace very fine to coarse sand, dark gravish brown, 10YR 4/2, wet, soft grading to firm, trace clay balls, (fine 25 440 sand and clay slough probable in top of 20.0 ft 100 S.S.). STRATIFICATION LINES ARE DRILLING CO .: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING FEET 8.8 APPROXIMATE LITHOLOGIC BOUNDARIES AFTER DRILLING: DRILLER: Ryan Hunziker FEET ONLY: ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN LOGGED BY: DATE: T. Doll SAMPLES DATE DRILLED: PIEZOMETER: INSTALLED AT +/- 35.0 FEET 10/15/09 NOTES: S. King (Gredell) onsite VERTICAL DATUM: NAVD 88 START TIME: 8:00AM developing piezometers. END TIME: HORIZONTAL DATUM: NAD 83 10:06AM BOREHOLE DIA .: 8.25" WEATHER: Cold, 45°F, Overcast, Drizzle.

BORING LOG P-132

NORTHING: 992536.17

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Printed: 11/8/2010

Date

## LOCATION: Newman-Central West-Adj to farm access Rd

G.S. ELEVATION: 465.36' T.O.C. ELEVATION: 468.47'

EASTING: 728817.00

LITHOLOGY PERCENT RECOVERY WELL CONSTRUCTION DIAGRAM CLAY SAMPLE TYPE **GRAPHIC LOG JEPTH (FEET)** SM GRAVEI -G GRAVEL WATER TABL DESCRIPTION VF SAND ELEVATION VC SAND FACIES I.D. M SAND C SAND F SAND SILTY CLAY SILT Æ FP/ 28.3-33.3 ft; Fine to Medium Sand, thin beds, trace very fine sand, dark grayish brown, 10YR Lev 30 -435 4/2, 5-10 mm subrounded clasts, 10 mm black 100 coalified wood matter piece, wet, soft. 33.3-36.5 ft; Coarse Sand, with fine to medium С sand and gravel, dark grayish brown, 10YR 4/ 35 430 2, 5-30 mm subangular clasts. 100 BORING TERMINATED IN COARSE SAND @36.5 FT 40 425 45 420 50 415 55 410 STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES DRILLING CO.: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING 8.8 FEET AFTER DRILLING: DRILLER: ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN FEET Ryan Hunziker LOGGED BY: DATE: T. Doll SAMPLES. PIEZOMETER: INSTALLED AT +/- 35.0 FEET DATE DRILLED: 10/15/09 NOTES: S. King (Gredell) onsite VERTICAL DATUM: NAVD 88 START TIME: 8:00AM developing piezometers. END TIME: 10:06AM HORIZONTAL DATUM: NAD 83 BOREHOLE DIA .: WEATHER: Cold, 45°F, Overcast, Drizzle. 8.25"

11/8/2010

Printed:

Date

## BORING LOG P-134

Ameren Missouri Labadie Power Plant LOCATION: Bean Field-Newman Central **Proposed Utility Waste Disposal Area** G.S. ELEVATION: 464.10' T.O.C. ELEVATION: 466.82' **Detailed Site Investigation** CLIENT: Reitz & Jens, Inc. NORTHING: 992491.31 EASTING: 729438.21 LITHOLOGY RECOVERY WELL CONSTRUCTION DIAGRAM CLAY SAMPLE TYPE SM GRAVEL **GRAPHIC LOG** .G GRAVEL **DEPTH** (FEET) **NATER TABL** DESCRIPTION VC SAND ELEVATION VF SAND FACIES I.D. PERCENT F SAND **M SAND** SAND SILTY CLAY SILT ö 465 0 0-1.0 ft; Clayey Silt, olive gray, 5Y 4/1, soft. FB ŀ 1.0-2.8 ft; Clay, olive gray, 5Y 4/1, plastic, stiff. 100 2.8-3.5 ft; Silty Clay, olive gray, 5Y 4/1, 460 slightly plastic, soft. 3.5-6.8 ft; Clay, light olive gray, 5Y 6/1, 5 plastic. 100 6.8-7.8 ft; Very Fine Sand, Silt and Clay, interlaminated, pale yellowish brown, 10YR 6, FP/ 2, saturated. 455 Lev 7.8-20.7 ft; Very Fine to Fine Sand, grayish 10 orange, 10YR 7/4, clean, gradational lower 100 contact. 450 15 100 445 20 100 20.7-26.0 ft; Very Coarse Sand, grayish orange, С 10YR 7/4. 440 25 72 26.0-36.5 ft; Gravelly Sand to Sandy Gravel, С STRATIFICATION LINES ARE DRILLING CO.: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING FEET APPROXIMATE LITHOLOGIC BOUNDARIES AFTER DRILLING: DRILLER: FEET Ryan Hunziker ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN LOGGED BY: DATE: M. Carlson SAMPLES. PIEZOMETER: INSTALLED AT +/- \_ DATE DRILLED: 34.9 FEET 11/10/09 NOTES: Blake Smotherman, MDNR, VERTICAL DATUM: NAVD 88 START TIME: 8:30AM onsite observing drilling HORIZONTAL DATUM: NAD 83 END TIME: 10:35AM activities. BOREHOLE DIA .: 8.25" WEATHER: Cool, 55°F, Cloudy, Mild, 20-25 MPH Wind from W.

# **BORING LOG P-134**

Ameren Missouri Labadie Power Plant **Proposed Utility Waste Disposal Area Detailed Site Investigation** CLIENT: Reitz & Jens, Inc.

#### LOCATION: Bean Field-Newman Central

G.S. ELEVATION: 464.10' T.O.C. ELEVATION: 466.82'

Date Printed: 11/8/2010

**NORTHING:** 992491.31 **EASTING:** 729438.21

					NORTHING, 39249	1.51	-	-/	2111							_
				RY			LITHOLOGY									
DEPTH (FEET)	ELEVATION	WELL CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
30 -	- 435				grayish orange, 10YR 7/4, (3-inch well- rounded, prolate cobbles retrieved from base of auger), (fine sand slough in top of S.S.).	C									-	
-	-			78												
35 -	- 430 - -		Z	100	BORING TERMINATED IN GRAVELLY											
40 -	- 425  -				SAND @36.5 FT	-										
45	- 420															
50	- 415															
55	- 410															
DRILLER LOGGED DATE DR	: F BY: ILLED:	's Enterprises, Inc. Ryan Hunziker M. Carlson 11/10/09			STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES. PIEZON	IETER:	AF DA INS	TER TE: STAL	LED	LING	B:			FEE	т-	
START TI END TIME BOREHO	≣;	8:30AM 10:35AM 8.25"			NOTES: Blake Smotherman, MDNR, onsite observing drilling activities. VERTICAL D HORIZONTAL D WEATHER: Cool	ATUM:	NAD	83		5 MPI	H Wi	nd fro	om W	r.		

## **BORING LOG P-136**

Ameren Missouri Labadie Power Plant **Proposed Utility Waste Disposal Area** Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

**LOCATION:** Bean Field-Newman Central

G.S. ELEVATION: 463.71' T.O.C. ELEVATION: 466.73'

**NORTHING:** 992488.64

**EASTING:** 730004.49

	enz & Jens,	111		NORTHING: 99248	0.04		EAC		<b>1</b> G.		500	04.4	<del>1</del> 9		
			ERY					L	ודו	10	LO	GΥ			
DEPTH (FEET) ELEVATION	WELL WELL CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND		LG GRAVEL
465															
- - - - - - - - - - - - - - - - - - -			100	0.0-1.5 ft; Clay, olive gray, 5Y 4/1, plastic, stiff. 1.5-6.7 ft; Silt and Clay, alternating very thinly bedded, clayey silt in places, light olive gray (5Y 6/1) to pale yellowish brown (10YR 6/2), soft, saturated below 5 ft.	FB										
			100	6.7-9.2 ft; Very Fine to Fine Sand, Silt and Clay, interlaminated to very thinly bedded, light olive gray (5Y 6/1) to pale yellowish brown (10YR 6/2), common rust-colored	FP/ Lev CO/										
			70 89	<ul> <li>mottles and nodules, sharp contact w/below.</li> <li>9.2-12.2 ft; Silt and Clay, interlaminated, very dark gray (Gley) 1 3/N, clay highly plastic.</li> <li>12.2-13.5 ft; Very Fine Sand, laminated, silty, gley-colored as above.</li> <li>13.5-18.3 ft; Very Fine to Fine Sand, dark gray (Gley) 1 3/N.</li> </ul>	BS										
20 - 445			100	18.3-27.5 ft; Medium to Coarse Sand, gley- colored as above, trace granules and small pebbles.					-						
25 -			100												
DRILLING CO.: May DRILLER: LOGGED BY: DATE DRILLED:	x's Enterprises, Inc. Ryan Hunziker M. Carlson 11/11/09			STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES. PIEZOM		AF DA	TER TE:	G DRI DRIL	LING	):				т	
	3:48PM 11/10 9:06AM 10.25"			NOTES: T. Doll (Gredell) onsite field staking piezometer locations. HORIZONTAL D/ WEATHER: Cool,	ATUM:	NAE	83	10-15	MPH	I Wi	nd fro	om N			

## Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

# **BORING LOG P-136**

LOCATION: Bean Field-Newman Central

G.S. ELEVATION: 463.71' T.O.C. ELEVATION: 466.73'

Date Printed: 11/8/2010

**NORTHING:** 992488.64 **EASTING:** 730004.49

CLIENT: REI	itz & Jens, Inc.	NORTHING: 99248	8.64	EAS	STIN	<u>G:</u> 7	300	04.4	9	
T	ERV				LI	THC	LO	GY		
DEPTH (FEET) ELEVATION	WELL CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG SAMPLE TYPE PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY SILTY CLAY	SILT	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL LG GRAVEL
-		······································							-	
30 -	89	27.5-32.5 ft; Very Coarse Sand, grayish orange, 10YR 7/4, common granule to small pebble-sized clasts up to 5 mm dia (fine sand slough in top of S.S.).	С							
35 -		32.5-36.5 ft; Medium Sand, grayish orange, 10YR 7/4, based marked by 15 mm gravel fragment, (fine sand noted at total depth based on cuttings sampled collected from auger bit).	CM/ Sp							
40 -		BORING TERMINATED IN FINE SAND @36.5 FT								
45										
50										
55 - 410										
LOGGED BY: M	Enterprises, Inc. an Hunziker A. Carlson 11/11/09	STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES. PIEZOM		DURING AFTER DATE: INSTAL	DRILLI	NG: _		·	FEET	
	8PM 11/10 9:06AM 10.25"	NOTES: T. Doll (Gredeli) onsite field staking piezometer locations. HORIZONTAL DA WEATHER: Cool,	TUM:	NAD 83		1PH Wi	ind fro	om N.		

Printed:

Date

# BORING LOG P-138

**Ameren Missouri Labadie Power Plant** LOCATION: Bean Field-Newman-East Central **Proposed Utility Waste Disposal Area** G.S. ELEVATION: 464.10' T.O.C. ELEVATION: 466.99' **Detailed Site Investigation** CLIENT: Reitz & Jens, Inc. NORTHING: 992469.33 EASTING: 730675.26 LITHOLOGY RECOVERY WELL CONSTRUCTION DIAGRAM CLAY GRAVEL WATER TABLE SM GRAVEL SAMPLE TYPE **GRAPHIC LOG JEPTH** (FEET) DESCRIPTION /C SAND ELEVATION VF SAND M SAND FACIES I.D. SAND PERCENT SAND SILTY CLAY SILT G Ó 465 0 0-6.5 ft; Clay, olive gray, 5Y 4/1, sparse streaks FB silty clay, plastic, stiff. 100 460 5 6.5-8.4 ft; Silt and Clay, alternating very thinly 100 bedded to laminated, some silty clay, light olive gray (5Y 6/1) to pale yellowish brown (10YR)CO/ 455 6/2), saturated below 6 ft, sharp contact w/ BS 10 below. 8.4-11.0 ft; Clay, very dark gray (Gley) 1 3/N, sparse silt laminae, highly plastic. 30 11.0-17.5 ft; Very Fine Sand, silty, gleycolored as above. 450 15 39 17.5-36.0 ft; Very Fine to Fine Sand, very dark gray (Gley) 1 3/N, abundant black 445 carbonaceous matter throughout, some clay rip-20 ups, sparse silty laminae above 25 ft, sharp 100 contact with below. 440 25 56 STRATIFICATION LINES ARE DRILLING CO.: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING FEET 6 APPROXIMATE LITHOLOGIC BOUNDARIES AFTER DRILLING: FEET DRILLER: Dave Hunziker ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN DATE: LOGGED BY: M. Carlson SAMPLES. PIEZOMETER: INSTALLED AT +/-35.0 FEET DATE DRILLED: 11/12/09 NOTES: Chris Vierrether, MDNR, VERTICAL DATUM: NAVD 88 START TIME: 11:10AM onsite observing drilling HORIZONTAL DATUM: NAD 83 END TIME: 4:00PM activities. BOREHOLE DIA .: WEATHER: Warm, 60°F, Mostly Sunny, 5 MPH Wind from SE. 8.25"

#### Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation

# BORING LOG P-138

**LOCATION:** Bean Field-Newman-East Central

**G.S. ELEVATION:** 464.10' **T.O.C. ELEVATION:** 466.99'

Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

NORTHING: 992469.33 EASTING: 730675.26

		INT. IN	enz & J	ens,	11	IC.	NORTHING: 99246	9.33		:A3		10.		000	15.2	20		
						¥					L	ITI.	HO	LO	GΥ			
	DEPTH (FEET)	ELEVATION	WELL CONSTRUCTION DIAGRAM WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
	30	- 435 - - - - - 430 -				72	17.5-36.0 ft; Very Fine to Fine Sand, very dark gray (Gley) 1 3/N, abundant black carbonaceous matter throughout, some clay rip- ups, sparse silty laminae above 25 ft, sharp contact with below.	BS										
	40	- - - 425 - -				61	36.0-36.5 ft; Medium to Coarse Sand, gley- colored as above, trace granules and small pebbles less than 5 mm dia., (coarse sand noted at total depth based on cuttings sample collected from auger bit). BORING TERMINATED IN COARSE SAND @36.5 FT											
	45	- 420 - - - - 415 -																
		- 410							•	-								
Date Printed: 11/8/2010	DRILLER LOGGEI DATE DI START 1 END TIM	R: D BY: RILLED: TIME:	s's Enterprises Dave Hunzike M. Carlson 11/12/09 11:10AM 4:00PM 8.25"				STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY, ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES. NOTES: Chris Vierrether, MDNR, onsite observing drilling activities. WATER LE VERTICAL D HORIZONTAL D WEATHER: War	IETER: ATUM: ATUM:	AF DA INS NAV NAC	TER (TE: STAL (D 88 0 83		AT +	G:	35	.0	FE	:т —	

## BORING LOG P-140

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

LOCATION: Newman-East-S of LBR, Adj to Davis Rd

G.S. ELEVATION: 465.72' T.O.C. ELEVATION: 468.57'

NORTHING: 992404.70

EAS	TING:	731394.9	)3

	<u>NI: K</u>		Je	ens,	ın	IC.	NORTHING: 99240	4.70	E	ASI	ING		/31	<u>99</u> 4.	93					
· ·						ERY				LITHOLOGY										
DEPTH (FEET)	ELEVATION	WELL CONSTRUCTION DIAGRAM	WATER TABLE	<b>GRAPHIC LOG</b>	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL			
														-						
			•																	
0	- 465						0.0-0.8 ft; Clayey Silt, dark brown, 10YR 3/3, \slightly plastic, moist, soft.	FB		:										
					I	90	$\sqrt{0.8-2.0}$ ft; Silty Clay, very dark grayish brown,													
] ]							10YR 3/2, plastic, stiff, mottles (10YR 4/6), moist.													
5-			-				2.0-3.4 ft; Clayey Silt, dark grayish brown and brown, 10YR 4/2 and 4/3, slightly plastic,													
	- 460		-		I		moist, soft, trace very fine sand and wet 2.3-3.2 ft.													
						80	3.4-7.1 ft; Silty Clay, dark grayish brown,	-												
			¥				10YR 4/2, plastic, soft, moist; stiff from 3.8-4.5 ft; trace very fine sand below 6.9 ft.	5												
10-	- 455						7.1-8.4 ft; Clayey Silt, brown, 10YR 4/3,	CO/												
	433						laminated, moist, soft; trace very fine and mottles (10YR 4/6) below 7.3 ft; with clay	BS												
			-		I	40	below 8.2 ft.													
							8.4-20.7 ft; Very Fine Sand, Silty Sand, Silty Clay and Clayey Silty Sand, alternating thin													
15				1. 1.			beds, wet, soft; brown to 9.0 ft, 10YR 4/3, iron	FP/												
	- 450		12.14			61	staining (10YR 4/6); dark gray from 10.0-10.9 ft and 15.2-15.9 ft, (Gley) 1 4/N; silty clay bed													
							from 10.7-10.9 ft, plastic; dark yellowish													
							brown from 10.9-12.0 ft, 10YR 4/4; dark grayish brown below 20.0 ft, 10YR 4/2.							-						
20-																				
	- 445					72	20.7-26.0 ft; Very Fine Sand, trace fine to	1												
							medium sand, dark gray, 10YR 4/1, wet, soft.													
25														-						
	- 440				[	72	26.0-30.8 ft; Medium to Coarse Sand, with fine	CM/												
	<u>-</u>		6	- Vi-																
4	CO.: Max			nc.			STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES WATER LE	VELS:		RING I					•					
DRILLER:		yan Hunzi T. Doll					ONLY, ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.					. <b>.</b> .			. ""					
DATE DRI		10/27/09					PIEZON				ED AT	+/-	34	1.7	FE	ET				
START TIN		9:08AM 11:46AN					NOTES: VERTICAL D HORIZONTAL D													
BOREHOL		8.25"					WEATHER: Cool				g.									

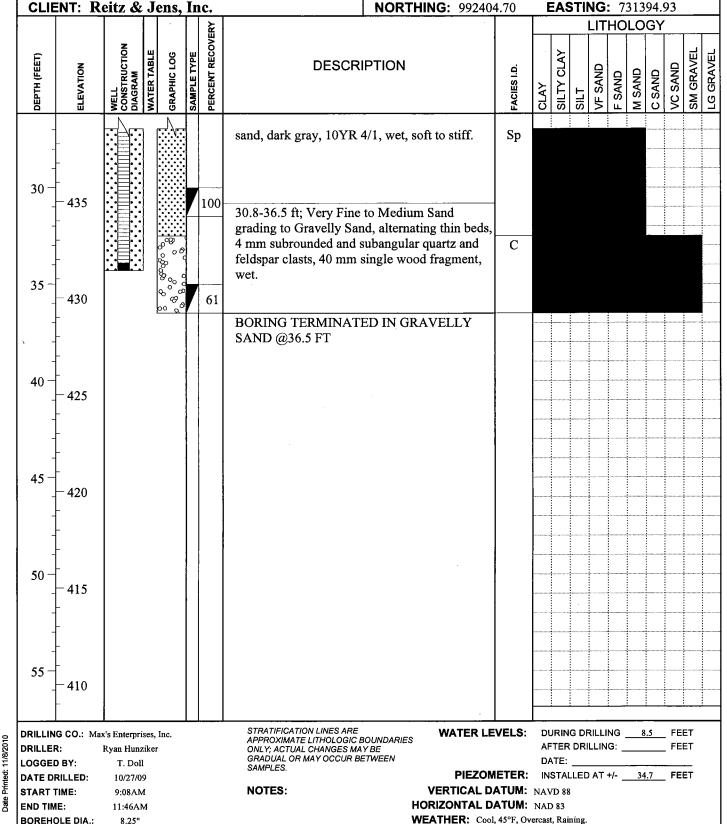
#### Ameren Missouri Labadie Power Plant **Proposed Utility Waste Disposal Area Detailed Site Investigation** CLIENT: Reitz & Jens, Inc.

# **BORING LOG P-140**

LOCATION: Newman-East-S of LBR, Adj to Davis Rd

G.S. ELEVATION: 465.72' T.O.C. ELEVATION: 468.57'

**NORTHING: 992404.70** 



# BORING LOG P-142

Ameren Missouri Labadie Power Plant LOCATION: Bean Field-West Margin Project Area **Proposed Utility Waste Disposal Area** G.S. ELEVATION: 464.83' T.O.C. ELEVATION: 467.66' **Detailed Site Investigation** CLIENT: Reitz & Jens, Inc. NORTHING: 992250.72 EASTING: 727764.69 LITHOLOGY PERCENT RECOVERY WELL CONSTRUCTION DIAGRAM CLAY SM GRAVEL GRAVEL SAMPLE TYPE **GRAPHIC LOG** DEPTH (FEET) WATER TABL DESCRIPTION VC SAND ELEVATION FACIES I.D. VF SAND M SAND SAND SAND SILTY CLAY SILT Ő 465 0 0-0.7 ft; Silty Clay, olive gray, 5Y 4/1, slightly FB \plastic. 0.7-2.3 ft; Clay, olive gray, 5Y 4/1, trace silt, 100 \plastic. 2.3-3.2 ft; Silty Clay and Clayey Silt, alternating very thin beds, Clay, olive gray, 5Y 460 5 4/1, mottled, soft. 3.2-5.9 ft; Clay, olive gray, 5Y 4/1, orangish CO/ overtones below 4.5 ft, plastic. 100 BS 5.9-8.3 ft; Silt and Clay, alternating very thin to thin beds, silt laminated, marked by VF sand FP/ interlaminae and thicker layers "gley"-colored Lev 455 10 clay, clay beds highly plastic, light olive gray 89 5Y 6/1, contacts between silt and clay beds sharp. 8.3-26.5 ft; Fine Sand, gravish orange, 10YR 7/ 4, saturated, clean, 2-inch clay seam noted at 11.3 ft (possible slough), base marked by large 450 15 (15 mm) pebble, sharp contact w/below. 67 445 20 100 440 25 100 STRATIFICATION LINES ARE DRILLING CO .: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING FEET 5 APPROXIMATE LITHOLOGIC BOUNDARIES AFTER DRILLING: \_ FEET DRILLER: Doug Hunziker ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN DATE: LOGGED BY: M. Carlson SAMPLES. PIEZOMETER: INSTALLED AT +/- 35.1 FEET DATE DRILLED: 11/06/09 NOTES: T. Doll (Gredell) onsite field VERTICAL DATUM: NAVD 88 START TIME: 10:56AM staking piezometer locations HORIZONTAL DATUM: NAD 83 END TIME: 3:00PM and observing drilling **BOREHOLE DIA.:** WEATHER: Warm, 65°F, Mostly Sunny, Mild, 10-15 MPH Wind from S. 8.25" activities.

## BORING LOG P-142

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Printed: 11/8/2010

Date

LOCATION: Bean Field-West Margin Project Area G.S. ELEVATION: 464.83' T.O.C. ELEVATION: 467.66'

**NORTHING:** 992250.72 **EASTING:** 727764.69

LITHOLOGY PERCENT RECOVERY WELL CONSTRUCTION DIAGRAM CLAY SM GRAVEL **GRAPHIC LOG** SAMPLE TYPE G GRAVEL ОЕРТН (FEET) WATER TABL DESCRIPTION ELEVATION VF SAND VC SAND FACIES I.D. C SAND F SAND **M SAND** SILTY CLAY SILT С 26.5-36.5 ft; Medium to Coarse Sand, grayish orange, 10YR 7/4, gravelly w/abundant granule to small pebble-sized felsitic clasts, (gravelly sand consisting of 2-inch well-rounded to 435 • 30 subangular clasts noted at total depth based on 78 cuttings sample collected from auger bit), (fine sand slough in top of S.S.). 430 35 56 BORING TERMINATED IN SANDY GRAVEL @36.5 FT 425 40 420 45 415 50 - 410 55 STRATIFICATION LINES ARE WATER LEVELS: DRILLING CO.: Max's Enterprises, Inc. DURING DRILLING \_\_\_\_\_5 FEET APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE AFTER DRILLING: FEET DRILLER: Doug Hunziker GRADUAL OR MAY OCCUR BETWEEN DATE: LOGGED BY: M. Carlson SAMPLES. PIEZOMETER: INSTALLED AT +/- 35.1 FEET DATE DRILLED: 11/06/09 START TIME: NOTES: T. Doll (Gredell) onsite field VERTICAL DATUM: NAVD 88 10:56AM staking piezometer locations HORIZONTAL DATUM: NAD 83 END TIME: 3:00PM and observing drilling BOREHOLE DIA .: WEATHER: Warm, 65°F, Mostly Sunny, Mild, 10-15 MPH Wind from S. 8.25" activities.

#### Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Printed: 11/8/2010

Date

## BORING LOG P-144

NORTHING: 992236.95

LOCATION: Heisel-West-S of LBR, W of farm access Rd G.S. ELEVATION: 464.56' T.O.C. ELEVATION: 467.74'

EASTING: 728361.22

LITHOLOGY PERCENT RECOVERY CONSTRUCTION DIAGRAM ТҮРЕ CLAY SM GRAVEL -G GRAVEL LOG ОЕРТН (FEET) WATER TABL DESCRIPTION VC SAND ELEVATION VF SAND ACIES I.D. C SAND SAND M SAND GRAPHIC SAMPLE SILTY CLAY SILT WELL 465 0 0.0-1.0 ft; Clavey Silt, dark brown, 10YR 3/3, FB  $\det$ , soft. 1.0-4.5 ft; Silty Clay, very dark grayish brown, 80 10YR 3/2, plastic, stiff, moist, mottles (10YR 4/6) from 3.0 to 4.0 ft. 460 4.5-6.0 ft; Poor recovery, probable Silty Clay 5 slough. 6.0-10.8 ft; Silty Clay and Clayey Silt; dark 60 gravish brown to 6.8 ft, 10YR 4/2, moist, soft; dark gray below 6.8 ft, 10YR 4/1, iron/ manganese concretions and staining. 455 10 10.8-18.3 ft; Fine Sand and Silty Clay, trace FP/ 86 very fine sand, alternating thin beds, dark Lev yellowish brown to 12.0 ft, 10YR 4/4; dark gray below 12.0 ft, 10YR 4/1; silty clay bed 100 from 12.0-12.4 ft, slightly plastic, (clay slough 450 15 probable in top of 15.0-25.0 ft S.S.). 89 18.3-31.0 ft; Very Fine to Fine Sand, CO/ alternating thin beds, very dark gray, (Gley) 1 BS 445 20 3/N, and dark gray, 10YR 4/1, black and brown 28 fine wood fragments, wet, soft, (fine sand and clay slough probable in top of 30.0 ft S.S.). 440 25 72 STRATIFICATION LINES ARE DRILLING CO .: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING 8 FEET APPROXIMATE LITHOLOGIC BOUNDARIES AFTER DRILLING: FEET DRILLER: Dave Hunziker ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN DATE: LOGGED BY: T. Doll SAMPLES. PIEZOMETER: INSTALLED AT +/- \_\_\_\_\_\_\_\_ FEET DATE DRILLED: 09/30/09 NOTES: Chris Vierrether (MDNR) and VERTICAL DATUM: NAVD 88 START TIME: 1:30PM M. Carlson (Gredell) onsite HORIZONTAL DATUM: NAD 83 END TIME: 4:40PM observing drilling activities. BOREHOLE DIA .: WEATHER: Weather, 70°F, Mostly Sunny, Mild, 5 MPH Wind from SE. 10.25"

## **BORING LOG P-144**

**NORTHING:** 992236.95

Ameren Missouri Labadie Power Plant **Proposed Utility Waste Disposal Area Detailed Site Investigation** CLIENT: Reitz & Jens, Inc.

11/8/2010

Printed:

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LOCATION: Heisel-West-S of LBR, W of farm access Rd G.S. ELEVATION: 464.56' T.O.C. ELEVATION: 467.74'

EASTING: 728361.22

LITHOLOGY PERCENT RECOVERY CONSTRUCTION CLAY SM GRAVEL **GRAPHIC LOG** SAMPLE TYPE -G GRAVEL DEPTH (FEET) TABL DESCRIPTION VF SAND VC SAND ELEVATION M SAND C SAND FACIES I.D. F SAND WATER 1 SILTY CLAY SILT WELL 18.3-31.0 ft; Very Fine to Fine Sand, CO/ alternating thin beds, very dark gray, (Gley) 1 BS 3/N, and dark gray, 10YR 4/1, black and brown 435 fine wood fragments, wet, soft, (fine sand and 30 clay slough probable in top of 30.0 ft S.S.). 100 С 31.0-36.5 ft; Coarse Sand, alternating thin beds, with fine and medium sand, trace very fine sand and gravel, dark gray, 10YR 4/1, subrounded clasts, 20 mm wood piece, clay 430 ball. 35 72 BORING TERMINATED IN COARSE SAND @36.5 FT 425 40 420 45 415 50 410 55 STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES WATER LEVELS: DRILLING CO .: Max's Enterprises, Inc. DURING DRILLING 8 FEET AFTER DRILLING: FEET DRILLER: Dave Hunziker ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN DATE: LOGGED BY: T. Doll SAMPLES. PIEZOMETER: INSTALLED AT +/- 34.7 FEET DATE DRILLED: 09/30/09 NOTES: Chris Vierrether (MDNR) and VERTICAL DATUM: NAVD 88 START TIME: 1:30PM M. Carlson (Gredell) onsite END TIME: HORIZONTAL DATUM: NAD 83 4:40PM observing drilling activities. BOREHOLE DIA .: WEATHER: Weather, 70°F, Mostly Sunny, Mild, 5 MPH Wind from SE. 10.25"

#### **Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation** CLIENT: Reitz & Jens, Inc.

11/8/2010

Printed:

Date

## **BORING LOG P-146**

LOCATION: Bean Field-Newman-Central Project Area G.S. ELEVATION: 464.80' T.O.C. ELEVATION: 467.48'

EASTING: 729102.62

NORTHING: 992265.54 LITHOLOGY ERY PERCENT RECOV *IRUCTION* CLAY SM GRAVEL ğ SAMPLE TYPE GRAVEL **JEPTH (FEET) NATER TABL** DESCRIPTION VC SAND ELEVATION **VF SAND M SAND** ACIES I.D. C SAND CONSTRU( DIAGRAM **GRAPHIC L** SAND SILTY CLAY SILT ğ WELL -1 465 0 0-2.8 ft; Clay, light olive gray, 5Y 6/1, plastic, FB stiff. 80 2.8-4.3 ft; Clayey Silt, light olive gray, 5Y 6/1, slightly plastic, soft, wet at base. 11 FP/ 460 4.3-10.4 ft; Very Fine Sand, grayish orange, 5 Lev 10YR 7/4, silty, faint laminae, common black carbonaceous fragments, clean, saturated. 50 455 10 89 CO/ 10.4-15.0 ft; Very Fine Sand, Silt and Clay, interlaminated, very dark greenish gray (Gley) BS 1.3/1, gradational contact with below. 450 15 15.0-21.0 ft; Very Fine to Fine Sand, pale FP/ 89 yellowish brown, 10YR 6/2, with some Gley-Lev colored overtones, clean. 445 20 89 С 21.0-25.0 ft; Medium to Coarse Sand, pale yellowish brown, 10YR 6/2, gravelly with clasts up to 5 mm dia, common black carbonaceous fragments (fine sand slough in top of S.S.). 440 25 25.0-36.5 ft; Coarse Sand, pale yellowish 100 brown, 10YR 6/2, pebble sized clasts up to 20 STRATIFICATION LINES ARE WATER LEVELS: DURING DRILLING DRILLING CO .: Max's Enterprises, Inc. 4.5 FEET APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE AFTER DRILLING: FEET DRILLER: Ryan Hunziker GRADUAL OR MAY OCCUR BETWEEN DATE: LOGGED BY: M. Carlson SAMPLES. PIEZOMETER: INSTALLED AT +/- 34.8 FEET DATE DRILLED: 11/09/09 NOTES: VERTICAL DATUM: NAVD 88 START TIME: 11:13AM HORIZONTAL DATUM: NAD 83 END TIME: 1:28PM BOREHOLE DIA .: WEATHER: Warm, 65°F, Overcast, Mild, Calm. 8.25"

# BORING LOG P-146

Ameren Missouri Labadie Power Plant LOCATION: Bean Field-Newman-Central Project Area **Proposed Utility Waste Disposal Area** G.S. ELEVATION: 464.80' T.O.C. ELEVATION: 467.48' **Detailed Site Investigation** CLIENT: Reitz & Jens, Inc. NORTHING: 992265.54 **EASTING:** 729102.62 LITHOLOGY RECOVERY CONSTRUCTION ТҮРЕ CLAY GRAVEL SM GRAVEL ОЕРТН (FEET) **GRAPHIC LOG VATER TABL** DESCRIPTION VC SAND ELEVATION VF SAND FACIES I.D. **M SAND** C SAND F SAND DIAGRAM SAMPLE 7 PERCENT SILTY CLAY SILT WELL ŏ mm dia, poorly sorted, common fine sand, (3-С inch well-rounded, prolate cobbles retrieved from base of auger), (fine sand slough in top of S.S.). 435 30 100 - 430 35 100 BORING TERMINATED IN SANDY GRAVEL @36.5 FT 425 40 - 420 45 - 415 50 - 410 55 STRATIFICATION LINES ARE DRILLING CO.: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING \_\_\_\_\_ FEET APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN DRILLER: AFTER DRILLING: FEET Ryan Hunziker LOGGED BY: DATE: M. Carlson SAMPLES. PIEZOMETER: INSTALLED AT +/- 34.8 FEET DATE DRILLED: 11/09/09 NOTES: VERTICAL DATUM: NAVD 88 START TIME: 11:13AM HORIZONTAL DATUM: NAD 83 END TIME: 1:28PM BOREHOLE DIA .: 8.25" WEATHER: Warm, 65°F, Overcast, Mild, Calm.

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

## BORING LOG P-148

NORTHING: 992252.64

LOCATION: Bean Field-Newman-Central Project Area

G.S. ELEVATION: 463.86' T.O.C. ELEVATION: 466.84'

**EASTING:** 729630.10

LITHOLOGY PERCENT RECOVERY WELL CONSTRUCTION DIAGRAM WATER TABLE CLAY SAMPLE TYPE **GRAPHIC LOG** SM GRAVEL **G GRAVEL JEPTH** (FEET DESCRIPTION SAND' ELEVATION VC SAND FACIES I.D. **M SAND** C SAND SAND SILTY CLAY SILT ĥ H 465 0 0-3.5 ft; Clay, olive gray, 5Y 4/1, plastic, stiff. FB 100 460 3.5-4.8 ft; Silty Clay and Clayey Silt, alternating very thin beds grading downward 5 FP/ into more silt and sparse very fine sand with 100 Lev faint laminations, greenish gray grading downward to dark yellowish orange, 10YR 6/6, soft. 4.8-7.0 ft; Very Fine Sand, gravish orange, 455 10YR 7/4, silty, saturated. 10 7.0-15.4 ft; Very Fine to Fine Sand, gravish 72 orange, 10YR 7/4, sparse granules, saturated, sharp contact with below. 450 15 100 15.4-22.5 ft; As above, but with sharp color CO/ change to very dark gray (Gley) 1 3/1, silty BS toward base (some fine sand slough noted in top of S.S.). 445 20 100 22.5-36.5 ft; Gravelly Sand, pale yellowish С 00 പ്പ brown, 10YR 6/2, w/abundant granule to small 440 8000 pebble-sized clasts up to 20 mm dia (fine sand 25 slough in top of S.S.). 72 Ъ G DRILLING CO .: Max's Enterprises, Inc. STRATIFICATION LINES ARE WATER LEVELS: DURING DRILLING FEET APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE DRILLER: AFTER DRILLING: \_ Ryan Hunziker FEET LOGGED BY: GRADUAL OR MAY OCCUR BETWEEN M. Carlson DATE: SAMPLES. DATE DRILLED: 11/09/09 START TIME: NOTES: 3:00PM VERTICAL DATUM: NAVD 88 END TIME: HORIZONTAL DATUM: NAD 83 5:15PM

Date Printed: 11/8/2010

BOREHOLE DIA .:

8.25"

Figure P-148 Sheet 1 of 2

WEATHER: Weather, 65°F, Overcast, Mild, Calm.

### **BORING LOG P-148**

Ameren Missouri Labadie Power Plant **Proposed Utility Waste Disposal Area Detailed Site Investigation** CLIENT: Reitz & Jens, Inc.

### LOCATION: Bean Field-Newman-Central Project Area

G.S. ELEVATION: 463.86' T.O.C. ELEVATION: 466.84'

Date Printed: 11/8/2010

**NORTHING:** 992252.64

**EASTING:** 729630.10

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DEPTH (FEET)	ELEVATION	WELL CONSTRUCTION DIAGRAM	WATER TABLE GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
		Ν	Ν														٦
30 -	- 435 - - -		္ဂ မိုင္လ လွ်ပ္ လွ်ပ္လ လွ်ပ		72	22.5-36.5 ft; Gravelly Sand, pale yellowish brown, 10YR 6/2, w/abundant granule to small pebble-sized clasts up to 20 mm dia (fine sand slough in top of S.S.).	С					·			·	· · · ·	
35	- 430 			800 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	100												
-	-					BORING TERMINATED IN GRAVELLY											
-	-					SAND @36.5 FT											
	- 425					·											
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DRILLING DRILLER LOGGED DATE DR	BY:	s's Enterpris Ryan Hunzi M. Carlso 11/09/09	ker n		<u> </u>	STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES. PIEZOM		AF1 DA1	TER ( TE: _	DRILI	LLING LING	:			FEE1 FEE1	г -	
START TI		3:00PM				NOTES: VERTICAL D											
		5:15PM				HORIZONTAL D											
BOREHO	LE DIA.:	8.25"				WEATHER: Weat	her, 65°F,	Overc	ast, M	fild, C	Calm.						
																	_

### BORING LOG P-150

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/17/2010

#### LOCATION: Newman-Central-S of LBR, W of Davis Rd

G.S. ELEVATION: 463.22' T.O.C. ELEVATION: 465.91'

**NORTHING:** 992189.21 **EASTING:** 730256.27

CLIENT: Reitz & J	Jens, l	lnc.		NORTHING: 99218	9.21	E	AST	ING	i: 7	<u>302</u>	. <u>56.</u> 2	27		
		RY						LIT	<u>HC</u>	LO	GY			
DEPTH (FEET) ELEVATION ELEVATION WELL CONSTRUCTION CONSTRUCTION	GRAPHIC LOG	SAMPLE TYPE PERCENT RECOVERY	DESCRI	PTION	FACIES I.D.	CLAY	SILTY CLAY	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
465														
	F		, 0.0-0.7 ft; Clayey Silt, v	ery dark gravish	FB									
			brown, 10YR $3/2$ , slight											
		60	roots.				·····							
		00	0.7-5.1 ft; Silty Clay, ve											
-			10YR 3/2, plastic, stiff, (10YR 4/6), roots, gradi											
5			$\uparrow$ 2.6 ft with mottles (10Y											
			grayish brown below 5.	0 ft, 10YR 4/2,										
-		30	laminated, soft. 5.1-8.3 ft; Sandy Silt an	d Silty Sand thin heds					1					
- 455	· · · · · · · · · · · · · · · · · · ·		$\cap$ dark gray and dark gray		CO/				1					
			and 4/2, laminated, iron	staining in channels	BS									
10 -			(10 YR  4/6) and herring	oone laminae below 5.5										
			ft. 8.3-20.8 ft, Clayey Silt,	Silty Clay, Sandy Silt								1		
		80	and Very Fine to Fine S											
- 450			beds, dark gray, (Gley)											
15			clay beds, plastic; very dark yellowish brown, 1							<u>.</u>				
15			detritus at 13.5 ft, 2 mm							<u> </u>	<u> </u>			
			20.0 ft with medium sar											
		100								ļ				
445														
20 -										-				
		100	20.9.22.5 G. Madian S.		СМ									
			20.8-32.5 ft; Medium Sa sand, trace medium to c											
			alternating thin beds, da	rk gray, 10YR 4/1, 5-										
			10 mm subrounded clas	ts, wet, soft grading to										
			loose.											
		100												
											L	<u> </u>		<u> </u>
DRILLING CO.: Max's Enterprise.	s, Inc.		STRATIFICATION LINES ARE	WATER LE	VELS:	DU	RING	DRILL	ING	5	5.1	FE	ET	
DRILLER: Ryan Hunzik			APPROXIMATE LITHOLOGIC B ONLY; ACTUAL CHANGES MA	OUNDARIES Y BE		AF	TER D					_	ET	
LOGGED BY: T. Doll			GRADUAL OR MAY OCCUR BE SAMPLES.	PIEZON			TE: _	ED AT	+/-	34	5.1	FE	ET	
DATE DRILLED: 11/14/09 START TIME: 7:20AM			NOTES:	VERTICAL D					• •		<u> </u>			
END TIME: 10:00AM				HORIZONTAL D										
BOREHOLE DIA.: 8.25"				WEATHER: Cool	, 45°F, Mo	ostly C	loudy,	Calm,	Mild.					

Printed: 11/17/2010

Date

# **BORING LOG P-150**

SM GRAVEL

VC SAND

**G GRAVEL** 

Ameren Missouri Labadie Power Plant LOCATION: Newman-Central-S of LBR, W of Davis Rd **Proposed Utility Waste Disposal Area** G.S. ELEVATION: 463.22' T.O.C. ELEVATION: 465.91' **Detailed Site Investigation** CLIENT: Reitz & Jens, Inc. NORTHING: 992189.21 EASTING: 730256.27 LITHOLOGY RECOVERY CONSTRUCTION CLAY SAMPLE TYPE **GRAPHIC LOG** ОЕРТН (FEET) DESCRIPTION WATER TABI VF SAND ELEVATION **M SAND** FACIES I.D. F SAND C SAND DIAGRAM PERCENT SILTY CLAY WELL SILT 20.8-32.5 ft; Medium Sand, with very fine CM 435 sand, trace medium to coarse sand and gravel, alternating thin beds, dark gray, 10YR 4/1, 5-10 mm subrounded clasts, wet, soft grading to 30 100 loose. 32.5-36.5 ft; Coarse Sand, trace medium sand С 430 and gravel, dark gray, 10YR 4/1, 5-15 mm subrounded clasts, wet, loose. 35 100 BORING TERMINATED IN COARSE SAND @36.5 FT 425 SHELBY TUBE SAMPLE COLLECTED AT 40 1.0-3.0 FT DEPTH AT COMPLETION OF DRILLING. 420 45 415 50 410 55 STRATIFICATION LINES ARE WATER LEVELS: DURING DRILLING 5.1 FEET DRILLING CO .: Max's Enterprises, Inc. APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN AFTER DRILLING: \_\_ DRILLER: Ryan Hunziker LOGGED BY: T. Doll DATE: SAMPLES. PIEZOMETER: INSTALLED AT +/- \_\_\_\_\_\_\_ FEET DATE DRILLED: 11/14/09 VERTICAL DATUM: NAVD 88 NOTES: START TIME: 7:20AM HORIZONTAL DATUM: NAD 83 END TIME: 10:00AM WEATHER: Cool, 45°F, Mostly Cloudy, Calm, Mild. BOREHOLE DIA .: 8,25"

FEET

# BORING LOG P-152

Ameren Missouri Labadie Power Plant LOCATION: Newman-SE-S of LBR, W of Davis Rd **Proposed Utility Waste Disposal Area** G.S. ELEVATION: 463.55' T.O.C. ELEVATION: 466.31' **Detailed Site Investigation** CLIENT: Reitz & Jens, Inc. NORTHING: 992168.58 EASTING: 730889.93 LITHOLOGY PERCENT RECOVERY WELL CONSTRUCTION DIAGRAM CLAY SM GRAVEL WATER TABLE SAMPLE TYPE **GRAPHIC LOG G GRAVEL** DEPTH (FEET) DESCRIPTION VC SAND ELEVATION VF SAND ACIES I.D. SAND SAND **M SAND** SILTY CLAY SILT 465 0 0.0-0.6 ft; Clayey Silt, very dark grayish FB brown, 10YR 3/2, moist, soft, roots. 0.6-3.8 ft; Silty Clay grading to Clayey Silt, 90 alternating thin beds, very dark gravish brown, 460 10YR 3/2, plastic, stiff, moist; dark gray and dark gravish brown, 10YR 4/1 and 4/2 below 5 1.5 ft, mottles (10YR 4/6); silty clay below 1.8 ft, brown, 10YR 4/3; very dark grayish brown, 10YR 3/2, plastic, stiff, faint mottles (10YR 4/ 45 6); wet below 2.9 ft; brown below 3.5 ft, 10YR  $\frac{4}{3}$ , iron concretions and mottles (10YR  $\frac{4}{6}$ ). 455 3.8-5.3 ft; Sandy Silt grading to Silty Clay, thin 10 beds, dark grayish brown, 10YR 4/2, mottles 100 (10YR 4/6), wet, soft grading to stiff. 5.3-13.3 ft; Sandy Clayey Silt, Silty Clay and Silty Sand, alternating thin beds, dark gray to brown, 10YR 4/1 to 4/3, wet, soft, laminated 450 FP/ and iron staining to 6.1 ft, iron concretions Lev 15 (10YR 4/6) from 6.1-7.3 ft, trace fine sand 100 from 10.0-11.5 ft. 13.3-23.3 ft; Very Fine Sand, trace fine sand and medium sand, brown, 10YR 4/3, wet, soft, becoming stiff below 20.0 ft, abrupt color 445 change to dark gray (10YR 4/1) at 20.8 ft. 20 100 Ş 440 23.3-36.5 ft; Fine Sand to Medium Sand, alternating thin beds, with very fine sand, trace 25 coarse sand and gravel, dark gray, 10YR 4/1, 83 10 mm subrounded clasts, black coalified wood STRATIFICATION LINES ARE DRILLING CO .: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING 2.9 FEET APPROXIMATE LITHOLOGIC BOUNDARIES AFTER DRILLING: FEET DRILLER: Rvan Hunziker ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN LOGGED BY: DATE: T. Doll SAMPLES PIEZOMETER: INSTALLED AT +/-FEET 34.8 DATE DRILLED: 11/12/09 NOTES: Chris Vierrether, MDNR, VERTICAL DATUM: NAVD 88 START TIME: 1:35PM onsite observing drilling HORIZONTAL DATUM: NAD 83 END TIME: 4:10PM activities. **BOREHOLE DIA.:** WEATHER: Warm, 60°F, Mostly Sunny, 5 MPH Wind from SE. 8.25"

Figure P-152 Sheet 1 of 2

# BORING LOG P-152

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

LOCATION: Newman-SE- S of LBR, W of Davis Rd

G.S. ELEVATION: 463.55' T.O.C. ELEVATION: 466.31'

NORTHING: 992168.58 E

<b>EASTING:</b> 730889.93	5	
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		1 1 1	NORTHING: 99210					750				-
		<u>}</u>		1		!	LITH	IOL	UGY	' 	,	
DEPTH (FEET) ELEVATION	WELL CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG	SAMPLE IYPE PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY SILTY CLAY	SILT	VF SAND	F SAND		VC SAND	SM GRAVEL	LG GRAVEL
			matter below 35.9 ft, wet, soft grading to stiff.									
30 -			23.3-36.5 ft; Fine Sand to Medium Sand, alternating thin beds, with very fine sand, trace coarse sand and gravel, dark gray, 10YR 4/1,	CM/ Sp								
		100	10 mm subrounded clasts, black coalified wood matter below 35.9 ft, wet, soft grading to stiff.									
35 - 430				FP/ Lev								
		100										
			BORING TERMINATED IN FINE SAND @36.5 FT									
425			(#30.3 F1									
40 -												
45 -												
-												
415												
-												
410												
55 -												
DRILLING CO.: M DRILLER: LOGGED BY:	ax's Enterprises, Inc. Ryan Hunziker T. Doll		STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY, ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.		DURIN AFTEF DATE:			):		FE	ET	
DATE DRILLED: START TIME: END TIME: BOREHOLE DIA.:	11/12/09 1:35PM 4:10PM 8.25"		NOTES: Chris Vierrether, MDNR, onsite observing drilling activities. PIEZON VERTICAL D. HORIZONTAL D. WEATHER: Warr	ATUM: ATUM:	NAD 83	8				_	ET	

#### Ameren Missouri Labadie Power Plant **Proposed Utility Waste Disposal Area Detailed Site Investigation** CLIENT: Reitz & Jens, Inc.

### **BORING LOG P-155**

LOCATION: Heisel-West-S of LBR, W of farm access Rd

G.S. ELEVATION: 463.44' T.O.C. ELEVATION: 466.27'

EASTING: 728065.97

**NORTHING: 991943.98** 

PERCENT RECOVERY LITHOLOGY WELL CONSTRUCTION DIAGRAM WATER TABLE CLAY SAMPLE TYPE **GRAPHIC LOG DEPTH (FEET)** SM GRAVEI GRAVEL DESCRIPTION ELEVATION /C SAND ġ **VF SAND M SAND** SAND SAND FACIES I. SILTY CLAY SILT Ċ  $\circ$ 465 0 0.0-0.5 ft; Clayey Silt, dark brown, 10YR 3/3, FB damp, soft. 0.5-4.0 ft; Silty Clay, very dark grayish brown, 60 10YR 3/2, highly plastic, firm, moist, silt 460 interbed at 1.8 ft <1 inch thick, mottles (10YR (4/6) below 2.7 ft. 5 4.0-6.9 ft; Poor recovery, probable Silty Clay slough. . 6.9-9.2 ft; Clayey Silt grading to Silty Clay, 100 dark gray, 10YR 4/1, highly plastic, soft, moist, 455 iron staining, iron staining more prominent below 8.6 ft. 10 9.2-9.8 ft; Silty Sand, dark gray, 10YR 4/1, CO/ 100 wet, soft. BS 9.8-10.3 ft; Silty Clay, dark gray, 10YR 4/1, highly plastic, soft, moist to wet. 450 10.3-12.0 ft; Clayey Sandy Silt and Silty Clay, thin beds, very dark gray, (Gley) 1 3/N, wet, 15 soft; laminated to 11.6 ft; silty clay, highly 33 plastic. 12.0-23.2 ft; Fine Sand, with very fine sand, very dark gray, (Gley) 1 3/N, wet, soft; dark 445 gray below 25.3 ft, 10YR 4/1, (clay slough probable in top of 15.0-25.0 ft S.S.). 20 33 440 23.2-33.3 ft; Medium Sand, with coarse sand, CM/ trace fine sand, dark gray, 10YR 4/1, wet, soft. Sp 25 72 DRILLING CO .: Max's Enterprises, Inc. STRATIFICATION LINES ARE WATER LEVELS: DURING DRILLING FEET APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE 9.2 DRILLER: Doug Hunziker AFTER DRILLING: FEET GRADUAL OR MAY OCCUR BETWEEN LOGGED BY: T. Doll DATE: SAMPLES DATE DRILLED: PIEZOMETER: INSTALLED AT +/- 34.8 FEET 09/30/09 START TIME: NOTES: Chris Vierrether (MDNR), 5:04PM 9/29 VERTICAL DATUM: NAVD 88 Jeff Fouse (R&J) and M. END TIME: 9:41AM HORIZONTAL DATUM: NAD 83 Carlson (Gredell) onsite BOREHOLE DIA .: WEATHER: Cool, 50°F, Heavy Fog, Humid, Calm. 8.25"

observing drilling activities

#### Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

# BORING LOG P-155

LOCATION: Heisel-West-S of LBR, W of farm access Rd

G.S. ELEVATION: 463.44' T.O.C. ELEVATION: 466.27'

**NORTHING:** 991943.98 **EASTING:** 728065.97

			Ϋ́.							<u>H0</u>		<u>GY</u>			
DEPTH (FEET)	ELEVATION	WELL CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION		FACIES I.D.	CLAY	SILTY CLAY	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
30 -	- <b>435</b> -			2-33.3 ft; Medium Sand, with c e fine sand, dark gray, 10YR 4,		CM/ Sp									
35 -	- 430		83 trac	8-36.5 ft; Fine sand, with media e coarse sand and gravel, subro e clay balls, wet, soft.	unded clasts,										
- - 40 -	- 425 - -			RING TERMINATED IN FIN 6.5 FT	E SAND										
45	- - 420 - -														
50 -	- 415														
55	- 410 - -														
DRILLIN DRILLEF LOGGED	र:	x's Enterprises, Inc. Doug Hunziker T. Doll	AF OI GF	RATIFICATION LINES ARE PROXIMATE LITHOLOGIC BOUNDARIES VLY; ACTUAL CHANGES MAY BE RADUAL OR MAY OCCUR BETWEEN MPLES.	WATER LE	/ELS:	AF DA	TER D		IG: _			FEE		
DATE DI START 1 END TIM BOREHO	TIME: IE:	09/30/09 5:04PM 9/29 9:41AM 8.25"		OTES: Chris Vierrether (MDNR), Jeff Fouse (R&J) and M. Carlson (Gredell) onsite	PIEZOMI VERTICAL DA DRIZONTAL DA EATHER: Cool,	TUM:	NAV NAD	D 88 83	ED AT nid, Cal		34	.8	FEE	T	

### **BORING LOG P-156**

Ameren Missouri Labadie Power Plant **Proposed Utility Waste Disposal Area** Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

LOCATION: Newman-W Central-Adj to farm access Rd

G.S. ELEVATION: 464.89' T.O.C. ELEVATION: 467.70'

\_\_\_\_\_ NORTHING: 991964.

.30	EAS	TING:	728791.30	

CLIENT: R	enz & je	<u>113, 11</u>	uc.	NURTHING: 991964	1.30		:421							
			רא					LIT	THC	LO	GY			
DEPTH (FEET) ELEVATION	WELL CONSTRUCTION DIAGRAM WATER TABLE	GRAPHIC LOG	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
										ļ				
0 465				0.0-1.0 ft; Clayey Silt, very dark grayish brown, 10YR 3/2, slightly plastic, soft, moist,	FB									
   5 460			70	roots. 1.0-2.3 ft; Silty Clay, very dark grayish brown, 10YR 3/2, plastic, stiff, moist, faint mottles (10YR 4/6).			****							
- - - - - - - - - - - - - - - - - - -			50	2.3-5.6 ft; Clayey Silt, dark grayish brown, 10YR 4/2, moist, soft, mottles (10YR 4/6) to 3.5 ft; wet, loose and with clay below 5.0 ft. 5.6-13.3 ft; Silty Sand, dark grayish brown, 10YR 4/2, laminated, wet, soft.	FP/ Lev									
15 450			33	13.3-20.8 ft; Sandy Silt, dark gray, (Gley) 1 4/ N, laminated, wet, soft; becoming dark gray	CO/ BS	-								
			72	and dark grayish brown, 10YR 4/1 and 4/2 below 20.7 ft, (sand and clay slough probable in top of 15.0 and 20.0 ft S.S.).										
20-445			78											
25 - 440				20.8-25.9 ft; Very Fine to Fine Sand, thin beds, dark gray and dark grayish brown, 10YR 4/1 and 4/2, wet, alternating loose to soft consistency, (fine sand and clay slough probable in top of 25.0 ft S.S.).	FP/ Lev									
		 	100	25.9-36.5 ft; Coarse Sand grading to Gravelly	CM/			- 1	_					
DRILLING CO.: M DRILLER: LOGGED BY:	ax's Enterprises, I Dave Hunziker T. Doll	nc.		STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.		Ał D/	JRING TER D ATE: _	RILLI	NG:			FE	ET	
DATE DRILLED: START TIME: END TIME: BOREHOLE DIA.:	11/09/09 11:30AM 3:17PM 8.25"			NOTES: PIEZON NOTES: VERTICAL D. HORIZONTAL D. WEATHER: War	ATUM: ATUM:	NA' NAI	D 83			34	4.8	_ FE	ΕT	
LONCHOLL DIA.	640				,,.		.,							

### **BORING LOG P-156**

NORTHING: 991964.30

Ameren Missouri Labadie Power Plant **Proposed Utility Waste Disposal Area Detailed Site Investigation** CLIENT: Reitz & Jens, Inc.

Printed: 11/8/2010

Date

LOCATION: Newman-W Central-Adj to farm access Rd G.S. ELEVATION: 464.89' T.O.C. ELEVATION: 467.70'

EASTING: 728791.30

LITHOLOGY ERY RECOVE WELL CONSTRUCTION DIAGRAM CLAY SAMPLE TYPE SM GRAVEI LOG -G GRAVEL DEPTH (FEET) WATER TABL DESCRIPTION VC SAND VF SAND **EVATION** FACIES I.D. M SAND C SAND SAND GRAPHIC PERCENT SILTY CLAY SILT 11 Sand, with medium sand, trace gravel and fine Sp sand, dark gray, 10YR 4/1, 5-40 mm subangular and subrounded clasts, wet, loose, (fine sand and clay slough probable in top of - 435 30 -30.0 and 35.0 ft S.S.). C ••• 100 مھ - 430 35 -്ക് 56 BORING TERMINATED IN GRAVELLY SAND @36.5 FT - 425 40 · - 420 45 · - 415 50 -- 410 55 STRATIFICATION LINES ARE DRILLING CO .: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING \_\_\_\_5 FEET APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN AFTER DRILLING: \_\_\_ \_\_\_ FEET DRILLER: Dave Hunziker DATE: LOGGED BY: T. Doll SAMPLES. DATE DRILLED: 11/09/09 NOTES: VERTICAL DATUM: NAVD 88 START TIME: 11:30AM HORIZONTAL DATUM: NAD 83 END TIME: 3:17PM BOREHOLE DIA .: WEATHER: Warm, 65°F, Overcast, Mild, Calm. 8.25"

#### Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

### BORING LOG P-158

LOCATION: Newman-SW-E of farm access Rd, S of LBR

G.S. ELEVATION: 464.72' T.O.C. ELEVATION: 467.63'

NORTHING: 991945.43 EA

1945.43 **EASTING:** 729368.05

CLIENT: Reitz & Jens,	inc.	NORTHING: 99194	5.43	EAS	ING:	129:	.600	05	
	ERY					OLC	ΟGΥ	, 1	
DEPTH (FEET) ELEVATION WELL WELL CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG	SAMPLE TYPE PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY SILTY CLAY	VF SAND		C SAND	VC SAND	SM GRAVEL LG GRAVEL
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	**       #         50       50         35       35         90       61         6       6	<ul> <li>0.0-0.8 ft; Clayey Silt, very dark grayish brown, 10YR 3/2, moist, soft, roots.</li> <li>0.8-2.4 ft; Silty Clay, very dark grayish brown, 10YR 3/2, plastic, stiff, moist, roots, becoming soft with mottles (10YR 4/6) below 2.0 ft.</li> <li>2.4-3.8 ft; Clayey Silt, dark gray and dark grayish brown, 10YR 4/1 and 4/2, moist, soft, mottles (10YR 4/6).</li> <li>3.8-10.5 ft; Silty Sand, brown, 10YR 4/3, laminated, iron staining in layers (10YR 4/6), muscovite mica flakes, wet, soft.</li> <li>10.5-12.3 ft; Sandy Silt and Silty Sand, thin beds, wet, soft; dark gray, 10YR 4/1, to 11.1 ft, black coalified wood matter and plant detritus; black, (Gley) 1 2.5/N from 11.1-11.2 ft; dark grayish brown below 11.2 ft, 10YR 4/2, laminated, iron staining in layers (10YR 4/6); dark yellowish brown, 10YR 4/4, below 12.0 ft.</li> <li>12.3-15.0 ft; Fine Sand, with very fine sand, trace coarse sand, dark gray is brown, 10YR 4/2, laminated, wet; dark gray below 12.8 ft, 10YR 4/1, trace brown wood fragments.</li> <li>15.0-23.3 ft; Fine Sand, with very fine sand, trace coarse sand and gravel, dark gray, (Gley) 1 2.5/N, wet, 20 mm x 40 mm wood fragments (sticks).</li> <li>23.3-33.3 ft; Very Fine Sand, trace fine sand,</li> </ul>	FB FP/ Lev						
	50	dark gray, (Gley) 1 4/N, muscovite mica flakes, wet, soft.							
DRILLING CO.: Max's Enterprises, Inc. DRILLER: Ryan Hunziker LOGGED BY: T. Doll		STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY, ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.		DURING AFTER D DATE:	RILLING			FEE	:т —
DATE DRILLED:         11/13/09           START TIME:         12:30PM           END TIME:         2:50PM           BOREHOLE DIA.:         8.25"		PIEZOM NOTES: VERTICAL D. HORIZONTAL D. WEATHER: Warr	ATUM: ATUM:	NAD 83				-	Т

# **BORING LOG P-158**

Ameren Missouri Labadie Power Plant **Proposed Utility Waste Disposal Area Detailed Site Investigation** CLIENT: Reitz & Jens, Inc.

#### **LOCATION:** Newman-SW-E of farm access Rd, S of LBR

G.S. ELEVATION: 464.72' T.O.C. ELEVATION: 467.63'

Date Printed: 11/8/2010

**NORTHING:** 991945.43

**EASTING:** 729368.05

				Ϋ́						LIT	HO	LO	GY			
DEPTH (FEET)	ELEVATION	WELL CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
-													_			
30 -	- 			83	23.3-33.3 ft; Very Fine Sand, trace fine sand, dark gray, (Gley) 1 4/N, muscovite mica flakes wet, soft.	CO/ BS	i									
-																
35 -	- 430 			0	33.3-36.5 ft; FROM BIT: Coarse Sand, with fine sand, trace medium sand and gravel, very dark gray, (Gley) 1 3/N, 5-40 mm subrounded clasts, 40 mm wood fragment, wet.	CM/ Sp	-									
-	_				BORING TERMINATED IN COARSE SAND											
-	_				@36.5 FT											
40 -	- 425 -															
	-															
-	-															
_	-															
45 -	- 420															
	-															18 annail 8 a ba
	-															
-	-															
50 -	- 415															
	-															
-	-															
-	-															
55 –	- 410 -									_		_			_	
	-															
	G CO. · May	's Enterprises, Inc.			STRATIFICATION LINES ARE WATER LE			RING				5		FEE	т	_
DRILLER	: 1	Ryan Hunziker			APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN		AF	TER	DRIL	LING	3: _			FEE		
LOGGED		T. Doll 11/13/09			SAMPLES. PIEZOM	ETER:				AT +		34.9	9	FEE	- T	
START T		12:30PM 2:50PM			NOTES: VERTICAL DA HORIZONTAL DA								_			
BOREHO		8.25"			WEATHER: Warn				y, Mil	d, 5 I	MPH	Wind	l fron	1 <b>S</b> .		

# Ameren Missouri Labadie Power Plant **Proposed Utility Waste Disposal Area**

### **BORING LOG P-160**

LOCATION: Newman-SE-W of Davis Rd, S of LBR

G.S. ELEVATION: 463.70' T.O.C. ELEVATION: 466.42' **Detailed Site Investigation** CLIENT: Reitz & Jens, Inc. EASTING: 729979.25 NORTHING: 991884.45 LITHOLOGY PERCENT RECOVERY WELL CONSTRUCTION DIAGRAM CLAY WATER TABLE SAMPLE TYPE -G GRAVEL SM GRAVEI **DEPTH (FEET) GRAPHIC LOG** DESCRIPTION VC SAND ELEVATION VF SAND **M SAND** FACIES I.D. F SAND SAND SILTY CLAY SILT ö 465 0 0.0-0.5 ft; Clavey Silt, dark brown, 10YR 3/3, FB . \non-plastic, moist, soft, roots. 0.5-2.4 ft; Silty Clay, very dark gravish brown, 80 10YR 3/2, plastic, stiff, few faint mottles 460 (10YR 4/6), moist, roots. 2.4-3.5 ft; Clayey Silt, brown, 10YR 4/3, non-5 plastic, moist, soft, many mottles (10YR 4/6). 3.5-6.1 ft; Silty Clay, very dark grayish brown FP/ 10YR 3/2, plastic, stiff, moist, few mottles Lev 30 (10YR 4/6). 455 6.1-13.3 ft; Very Fine Sand, brown, 10YR 4/3, laminated, trace brown wood fragments, wet, 10 loose, trace fine sand below 10.0 ft with 5 mm 100 black coalified wood matter. 450 13.3-26.4 ft; Very Fine to Medium Sand, alternating thin beds, with coarse sand, trace 15 gravel, dark gray to brown, 10YR 4/1 to 4/3, 5-6 10 mm subangular clasts, wet, loose. 445 20 100 CM/ 440 Sp 25 100 STRATIFICATION LINES ARE DURING DRILLING 5 FEET DRILLING CO .: Max's Enterprises, Inc. WATER LEVELS: APPROXIMATE LITHOLOGIC BOUNDARIES AFTER DRILLING: FEET DRILLER: Doug Hunziker ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN DATE: LOGGED BY: T. Doll SAMPLES. PIEZOMETER: INSTALLED AT +/- 35.0 FEET DATE DRILLED: 12/11/09 START TIME: NOTES: VERTICAL DATUM: NAVD 88 2:55PM 12/10 HORIZONTAL DATUM: NAD 83 END TIME: 9:48AM WEATHER: Cold, 15°F, Partly Cloudy, Calm.

Printed: 11/8/2010 Date

BOREHOLE DIA .:

8.25"

# BORING LOG P-160

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

LOCATION: Newman-SE-W of Davis Rd, S of LBR

G.S. ELEVATION: 463.70' T.O.C. ELEVATION: 466.42'

NORTHING: 991884.45 EAS

	884.45	EASTING:	729979.25	
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					≿					l		HO	LO	GY			
DEPTH (FEET)	ELEVATION	WELL CONSTRUCTION DIAGRAM WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND		M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
30	- - 435 - -			7	0	26.4-36.5 ft; Medium Sand, with fine to coarse sand, trace very fine sand and gravel, alternating thin beds, dark gray, 10YR 4/1, 5- 15 mm subrounded and subangular clasts, soft grading to loose, wet, black organic residue below 36.2 ft.	CM/ Sp										
35 -	- 430 				100		C										· · · · · · · · · · · · · · · · · · ·
  40 	- 425  -					BORING TERMINATED IN MEDIUM SAND @36.5 FT											
45 -	- 420 				·												
50	- - 415 - - -																
55 -	- 410 																
DRILLEF LOGGEI DATE DI START 1 END TIM	R: ) BY: RILLED: 'IME:	c's Enterprises, Doug Hunzike T. Doll 12/11/09 2:55PM 12/10 9:48AM 8.25"	er			STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES. NOTES: NOTES: HORIZONTAL D HORIZONTAL D WEATHER: Coll	METER: ATUM: ATUM:	AF DA IN: NAV NAI	83	.ED		G: _			FEE	:T 	

#### Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

### BORING LOG P-162

LOCATION: Newman-SE-W of Davis Rd, S of LBR G.S. ELEVATION: 463.28' T.O.C. ELEVATION: 465.98' NORTHING: 991801.20 EASTING: 730561.78

NORTHING: 991801.20 LITHOLOGY PERCENT RECOVERY CONSTRUCTION CLAY SAMPLE TYPE SM GRAVEL WATER TABLE .G GRAVEL **GRAPHIC LOG** DEPTH (FEET) DESCRIPTION ELEVATION VF SAND VC SAND ACIES I.D. M SAND C SAND SAND DIAGRAM SILTY СLAY SILT WELL 465 0 0.0-0.5 ft; Clavey Silt, very dark gravish FB brown, 10YR 3/2, slightly plastic, soft, moist, roots. 55 0.5-7.1 ft; Silty Clay, very dark grayish brown, 460 10YR 3/2, plastic, stiff, moist, many mottles (10YR 4/6) below 2.3 ft, with silt and iron 5 concretions below 5.0 ft. 6.1-9.3 ft; Clayey Silt, Silty Sand, and Silty Clay, alternating thin beds, wet, soft; clayey 70 CO/ silt, dark gravish brown, 10YR 4/2, slightly 455 BS plastic, iron concretions (10YR 4/6); silty sand, FP/ dark brown, 10YR 3/3, iron staining; dark 10 yellowish brown (10YR 4/3) from 7.1-7.2 ft; Lev dark gray, (Gley) 1 4/N below 7.2 ft, plastic; mottles (10YR 4/6) from 7.2-7.5 ft. 80 9.3-23.3 ft; Fine Sand, with very fine sand, 450 brown, 10YR 4/3, wet, loose; silty clay thin bed from 13.4-13.5 ft, very dark gray, (Gley) 1 3/N, 15 plastic, (clay slough probable in top of 15.0 ft 94 S.S.). 445 20 100 440 23.3-33.2 ft; Very Fine to Medium Sand, alternating thin beds, with coarse sand, trace 25 fine gravel, brown, 10YR 4/3; black coalified 100 matter laminated at 26.4 ft; 10 mm angular STRATIFICATION LINES ARE DRILLING CO .: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING 6.1 FEET APPROXIMATE LITHOLOGIC BOUNDARIES AFTER DRILLING: FEET DRILLER: Doug Hunziker ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN DATE: LOGGED BY: T. Doll SAMPLES. PIEZOMETER: INSTALLED AT +/- 34.6 FEET DATE DRILLED: 12/10/09 NOTES: VERTICAL DATUM: NAVD 88 START TIME: 8:25AM HORIZONTAL DATUM: NAD 83 END TIME: 2.18PM BOREHOLE DIA .: WEATHER: Cold, 10°F, Clear Skies, 5 MPH Wind from W. 10.25"

Date Printed:

11/8/2010

# BORING LOG P-162

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

LOCATION: Newman-SE-W of Davis Rd, S of LBR

G.S. ELEVATION: 463.28' T.O.C. ELEVATION: 465.98'

**NORTHING:** 991801.20 **EASTING:** 730561.78

CLIENT:	Reitz &	Jens	<u>, II</u>	ic.	NORTHING: 99180	1.20		AJ		<u>IG:</u>	12	502	01.7	/ð		
			T	RY					L		10	LO	GΥ			٦
DEPTH (FEET) ELEVATION	WELL CONSTRUCTION DIAGRAM	WATER TABLE GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY					C SAND	VC SAND	SM GRAVEL	LG GRAVEL
30 -				83	Clasts below 25.0 ft. 23.3-33.2 ft; Very Fine to Medium Sand, alternating thin beds, with coarse sand, trace fine gravel, brown, 10YR 4/3; black coalified matter laminated at 26.4 ft; 10 mm angular clasts below 25.0 ft.	FP/ Lev	- - - -									
			7	100	33.2-36.5 ft; Medium Sand, with coarse sand and gravel, dark gray 10YR 4/1, 5-30 mm subrounded and subangular clasts, wet.	С										
40 -					BORING TERMINATED IN MEDIUM SAND @36.5 FT											
													· · · · ·			
50 - 415																
55 -																
					STRATIFICATION LINES ARE										<b>T</b>	
DRILLER: LOGGED BY:	LOGGED BY: T. Doll DATE DRILLED: 12/10/09				APPROXIMATE LITHOLOGIC BOUNDARIES ONLY, ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES. NOTES: PIEZOI	NETER: ATUM:	AF DA INS NAV	TER TE: _ STAL D 88	DRIL	ILLIN LING AT +	3: _			FEE	ET	
END TIME: BOREHOLE DI	2:18PM : 10.25"				HORIZONTAL E WEATHER: Col				MPH	Winc	l froi	n W.				

### **BORING LOG P-164**

Ameren Missouri Labadie Power Plant **Proposed Utility Waste Disposal Area** Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

**LOCATION:** Newman-SE-W of Davis Rd, S of LBR

G.S. ELEVATION: 463.42' T.O.C. ELEVATION: 465.83'

**NORTHING:** 991871.12 **EASTING:** 731169.33

ULIENT:	kenz & Jens,	Inc.	NORTHING: 99187	1.12	EA	SIIN	10:	/31	109.	33		
		ER				L	ITH	OLC	)GY	·		
DEPTH (FEET) ELEVATION	WELL WELL CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG	SAMPLE TYPE PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY SII TY CI AY	SILT	VF SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
465												
		100	0.0-0.5 ft; Clayey Silt, very dark grayish brown, 10YR 3/2, slightly plastic, soft, moist, roots.	FB								
- 460 5 -			0.5-2.3 ft; Silty Clay, very dark grayish brown, 10YR 3/2, plastic, stiff, moist, few faint mottles (10YR 4/6). 2.3-3.2 ft; Clayey Silt and Silty Sand, thin bed\$,									
		40	2.3-3.2 ft; Clayey Silt and Silty Sand, thin beds, brown, 10YR 4/3, moist, soft; silty clay bed below 2.9 ft, plastic, wet 3.2-5.2 ft; Clayey Silt, brown, 10YR 4/3,	FP/ Lev								
10 - 455			slightly plastic, moist, soft, laminated and many mottles (10YR 4/6) below 3.5 ft. 5.2-13.3 ft; Fine Sand, with very fine sand,									
		72	dark grayish brown, 10YR 4/2, laminated, iron staining (10YR 4/6), 10 mm thin bed of silty clay at 6.1 ft with prominent iron staining, wet,									
15 - 450			\(fine sand slough in top of 15.0 ft S.S.). 13.3-28.3 ft; Silty Sand, dark gray, (Gley) 1 4/ N, laminations of brown wood and black	CO/ BS								
		89	coalified wood matter repeating sequence every 10-22 mm; black (Gley 1 2.5/N) fibrous plant detritus with muscovite mica flakes from 20.5-									
20 -		89	20.8 ft and 25.6-25.9 ft; very dark gray from 20.8-21.3 and 25.9-26.4 ft, (Gley 1 3/N), laminated, (very fine sand slough probable in top of 20.0 ft S.S.).									
440		69	lop of 20.0 it 9.0.j.									
		94										
		94	STRATIFICATION LINES ARE									
DRILLER: LOGGED BY:	ax's Enterprises, Inc. Ryan Hunziker T. Doll		STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES. PIEZOM		AFTE DATE	NG DRI R DRIL : ALLED /	LING:			FEE	:т —	
DATE DRILLED: START TIME: END TIME: BOREHOLE DIA.:	12/04/09 1:32PM 4:18PM 10.25"		NOTES: VERTICAL D/ HORIZONTAL D/ WEATHER: Cold,	ATUM: ATUM:	NAVD 8 NAD 83	8				rct	-1	
						, . o .vi						

Figure P-164 Sheet 1 of 2

# **BORING LOG P-164**

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area **Detailed Site Investigation** CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

#### **LOCATION:** Newman-SE-W of Davis Rd, S of LBR

G.S. ELEVATION: 463.42' T.O.C. ELEVATION: 465.83'

NORTHING: 9918

371.12	EASTING:	731169.33

									, , , ,							
				RY					l	LIT	HO	LO	GΥ			
DEPTH (FEET)	ELEVATION	WELL CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	сгау	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
													_			
30 -	- - 435 -			39	28.3-36.5 ft; Medium to Gravelly Sand, alternating thin beds, dark gray (Gley) 1 4/N and 10YR 4/1, 5-30 mm rounded and well-	CO/ BS C										
	- - 430 -				rounded clasts consisting of basalt, quartz and feldspar, wet, loose, (fine sand slough in top of 35.0 ft S.S.).											
35 -	_		7	67												
	- 425				BORING TERMINATED IN GRAVELLY SAND @36.5 FT											
40 -																
45 -	- <b>42</b> 0															
	-  415															
50 -	-															
55 -	- - 410 -															
	-	de Redección - Y													-	
DRILLING DRILLER LOGGED DATE DR	l: ) BY:	r's Enterprises, Inc. Ryan Hunziker T. Doll 12/04/09			APPROXIMATE LITHOLOGIC BOUNDARIES ONLY, ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES. PIEZOM		AF DA	TER TE:	G DR DRIL  LED	LING	3:			FEE	т -	
START T END TIMI BOREHO	E:	1:32PM 4:18PM 10.25"			NOTES: VERTICAL D/ HORIZONTAL D/ WEATHER: Cold,	ATUM:	NAD	83		1PH Y	Wind	from	w.			

# **BORING LOG P-165**

SM GRAVEL

VC SAND

C SAND

**M SAND** 

.G GRAVEI

**Ameren Missouri Labadie Power Plant** LOCATION: Heisel-SW- Adj to Power Lines, S of LBR **Proposed Utility Waste Disposal Area** G.S. ELEVATION: 464.05' T.O.C. ELEVATION: 466.80' **Detailed Site Investigation** CLIENT: Reitz & Jens, Inc. NORTHING: 991660.67 EASTING: 727734.64 LITHOLOGY RECOVERY WELL CONSTRUCTION DIAGRAM CLAY SAMPLE TYPE **GRAPHIC LOG DEPTH** (FEET) WATER TABL DESCRIPTION ELEVATION VF SAND ACIES I.D. PERCENT SAND SILTY CLAY SILT 465 0 0.0-0.5 ft; Clayey Silt, very dark gray, 10YR 3/ FB 1, slightly plastic, soft, moist. 0.5-1.8 ft; Silty Clay, very dark gray, 10YR 3/ 40 1, plastic, stiff, moist, roots. 1.8-5.4 ft; Clayey Silt, dark gray and dark 460 grayish brown, 10YR 4/1 and 4/2, moist, soft, 5 mottles (10YR 4/6). 5.4-8.4 ft; Sandy Silt, brown, 10YR 4/3, herringbone laminae, muscovite mica flakes, 35 moist, soft, wet below 5.8 ft. 8.4-20.8 ft; Very Fine Sand, with fine sand, FP/ 455 alternating color changes, brown and dark gray, Lev 10 10YR 4/3 and 4/1; very dark gray (Gley) 1 3/N, 67 20-30 mm brown wood fragments below 15.4 ft, wet, soft. CO/ BS 450 15 67 445 20 78 20.8-25.9 ft; Fine to Medium Sand, alternating FP/ thin beds, dark gray, 10YR 4/1, 15 mm Lev subangular clasts, wet, alternating loose and soft consistency. 440 25 83 25.9-28.3 ft; Coarse Sand, trace medium sand С STRATIFICATION I INFS ARE DRILLING CO .: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING APPROXIMATE LITHOLOGIC BOUNDARIES DRILLER: AFTER DRILLING: Ryan Hunziker ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN DATE: LOGGED BY: T. Doll SAMPLES. PIEZOMETER: INSTALLED AT +/- \_\_\_\_\_34.9 DATE DRILLED: 11/13/09 NOTES: VERTICAL DATUM: NAVD 88 START TIME: 7:48AM

11/8/2010 Printed: Date

END TIME:

BOREHOLE DIA .:

11:00AM

10.25"

Figure P-165 Sheet 1 of 2

HORIZONTAL DATUM: NAD 83

WEATHER: Cold, 40°F, Mostly Cloudy, Mild, Calm.

5.8

FEET

FEET

FEET

### BORING LOG P-165

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

#### LOCATION: Heisel-SW- Adj to Power Lines, S of LBR G.S. ELEVATION: 464.05' T.O.C. ELEVATION: 466.80'

**NORTHING:** 991660.67 **EASTING:** 727734.64

	}				ERY					<u> </u>	<u>ITH</u>	HOL	<u>_0(</u>	<u>37</u>			
<b>DEPTH (FEET)</b>	ELEVATION	WELL CONSTRUCTION DIAGRAM WATED TARI E	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
						and gravel, 10 mm clasts, dark gray, 10YR 4/1,											
30 -	- 435 				100	wet. 28.3-36.5 ft; Gravelly Sand, with medium sand, 5-40 mm subrounded clasts, dark gray and gray, 10YR 4/1 and 5/1, wet.	С										
35 -	- 			/	78												
.						BORING TERMINATED IN GRAVELLY SAND @36.5 FT											
40 -	- 425																
-	- 																
45																	
50 -	- 415																
-	-																
55 —	- 410 -																
DRILLIN DRILLEF LOGGEI	२:	's Enterprises, Ryan Hunzike T. Doll			l	STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY, ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN	VELS:	AF	RING TER D TE:	RILL	ING	:					
DATE DI START 1 END TIM	RILLED: FIME:	11/13/09 7:48AM 11:00AM 10.25"				SAMPLES. PIEZOM NOTES: VERTICAL DA HORIZONTAL DA WEATHER: Cold	ATUM: ATUM:	INS NAV NAD	5TALL D 88 83	ED A	\T +/·		34.9	·	FEE	- F	

#### Ameren Missouri Labadie Power Plant **Proposed Utility Waste Disposal Area Detailed Site Investigation**

### **BORING LOG P-167**

LOCATION: Heisel-South-S of LBR, W farm access Rd

G.S. ELEVATION: 463.60' T.O.C. ELEVATION: 466.56'

CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

**NORTHING:** 991646.82

**EASTING:** 728350.01

						ïRΥ					_	LIT	ΗΟ	LO	GΥ			
DEPTH (FEET)	ELEVATION	WELL CONSTRUCTION DIAGRAM	WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND		LG GRAVEL
			) - r				· · · · · · · · · · · · · · · · · · ·											
5-	- - 460					65	0.0-1.0 ft; Clayey Silt, dark brown, 10YR 3/3, <u>damp, firm.</u> 1.0-4.2 ft; Silty Clay, very dark grayish brown, 10YR 3/2, plastic, stiff, moist; mottles (10YR 4/6) below 2.0 ft; dark yellowish brown, 10YR <u>3/4, below 3.0 ft.</u>	FB	-									******
	- - - 455		¥			40	<ul> <li>4.2-8.5 ft; Poor recovery, probable Silty Clay slough.</li> <li>8.5-11.9 ft; Clayey Silt, dark gray, 10YR 4/1, wet, soft.</li> </ul>											
	- - - - 450 -		والإلاق والمراجعة المراجع المراجع والمراجع			77	11.9-12.7 ft; Silty Sand, dark gray, 10YR 4/1, black plant detritus laminated, wet, soft. 12.7-13.3 ft; Silty Clay, dark gray, 10YR 4/1, plastic, soft, wet. 13.3-18.3 ft; Silty Sand, dark gray, 10YR 4/1,	FP/ Lev										
20 -	- - 445 -						wet, soft, (clay slough probable in top of 15.0 and 20.0 ft S.S.) .											
25	- - - 440 -					83 78	20.7-28.3 ft; Medium Sand, trace fine sand and coarse sand, dark gray, 10YR 4/1, wet, loose, coalified wood matter, (fine sand and clay slough probable in top of 25.0 and 30.0 ft S.S.).											
DRILLING DRILLER LOGGED DATE DR START TI END TIME	BY: ILLED: IME:	s's Enterprise Ryan Hunzil T. Doll 10/05/09 10:23AM 1 6:43PM	ker				STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES. NOTES: John Eimer (Ameren) onsite observing field activities. HORIZONTAL DA	ETER: ATUM:	AF DA INS NAV	TER TE: STAL D 88	G DR DRIL LED	LINC.	3: <u> </u>			FEE	т —	
BOREHOLE DIA.: 8.25"							WEATHER: Warn				Mild,	5-10	MPH	Win	d fro	n SE		

# BORING LOG P-167

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

LOCATION: Heisel-South-S of LBR, W farm access Rd G.S. ELEVATION: 463.60' T.O.C. ELEVATION: 466.56'

**5. ELEVATION:** 463.60<sup>°</sup> **1.O.C. ELEVATION:** 466.50

NORTHING: 991646.82 EASTING: 728350.01

							R					<u> </u>		HO	LO	GY			
	DEPTH (FEET)	ELEVATION	WELL CONSTRUCTION DIAGRAM	WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
	30 -	435				7	61	28.3-36.5 ft; Medium Sand grading to Coarse Sand, trace fine sand and gravel, dark gray, 10YR 4/1, clasts subangular to angular, wet, loose, (fine sand and clay slough probable in top of 35.0 ft S.S.).	CM/ Sp										
	35 -	- 430 					83	BORING TERMINATED IN COARSE SAND	С	-									
	40 -	425						@36.5 FT											
	45 -	- - 420																	
	50 -	- 415 					i												
	55 -	- 410 																	
Date Printed: 11/8/2010	DRILLE LOGGE	R: D BY:	ax's Enterpris Ryan Hunz T. Doll	iker	Inc.			STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES. PIEZON		AF DA	JRING TER ATE: STAL	DRIL	LIN	G: _			FEE	т —	
	START		10/05/09 10:23AM 6:43PM 8.25"	10/5				NOTES: John Eimer (Ameren) onsite observing field activities. WEATHER: Warn	ATUM: ATUM:	NAV NAE	/D 88 D 83								

### **BORING LOG P-169**

**NORTHING: 991653.97** 

**Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation** CLIENT: Reitz & Jens, Inc.

### LOCATION: Newman-SE-S of LBR, E of farm access Rd

G.S. ELEVATION: 464.75' T.O.C. ELEVATION: 467.42'

**EASTING:** 729053.82

LITHOLOGY PERCENT RECOVERY *IRUCTION* CLAY SAMPLE TYPE SM GRAVEL Ő G GRAVEL **DEPTH** (FEET) **VATER TABL** DESCRIPTION VC SAND ELEVATION FACIES I.D. VF SAND CONSTRUC DIAGRAM M SAND SAND SAND GRAPHIC SILTY CLAY SILT WELL  $\alpha$ -14 465 0 0.0-0.8 ft; Silty Clay, very dark grayish brown, FB 10YR 3/2, slightly plastic, soft, moist, roots. 0.8-4.0 ft; Silty Clay, very dark gravish brown, 60 10YR 3/2, plastic, stiff, moist, few faint mottles (10YR 4/6), becoming stiff and many mottles below 2.1 ft. 460 5 4.0-10.5 ft; Clayey Silty Sand, brown, 10YR 4/ 3, laminated, wet, soft; with clay and mottles (10YR 4/6) from 5.3-5.6 ft; herringbone 35 laminae from 5.6-6.3 ft; muscovite mica flakes below 5.6 ft. 455 10 100 10.5-13.3 ft; Sandy Silt, dark gray, (Gley) 1 4/ CO/ N, laminated, muscovite mica flakes, fibrous BS plant detritus to 11.0 ft, wet, soft. 13.3-20.9 ft; Fine Sand, with very fine sand, FP/ dark gray, 10YR 4/1, wet, soft. Lev 450 15 100 445 20 100 20.9-23.3 ft; Fine Sand grading to Coarse Sand, with medium sand and very fine sand, trace gravel, thin beds, dark gray, 10YR 4/1, 20 mm subangular clast, wet. 23.3-33.3 ft; Fine Sand, with very fine sand and 440 25 medium sand, dark gray, (Gley) 1 4/N and 100 10YR 4/1, 5-10 mm pieces of coalified wood STRATIFICATION LINES ARE DRILLING CO .: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING FEET APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE DRILLER: AFTER DRILLING: FEET Ryan Hunziker GRADUAL OR MAY OCCUR BETWEEN LOGGED BY: DATE: T. Doll SAMPLES. DATE DRILLED: 12/02/09 PIEZOMETER: INSTALLED AT +/- 35.0 FEET VERTICAL DATUM: NAVD 88 START TIME: NOTES: 7:45AM END TIME: HORIZONTAL DATUM: NAD 83 11:44AM WEATHER: Cold, 35°F, Overcast, Calm. BOREHOLE DIA .:

10.25"

# **BORING LOG P-169**

NORTHING: 991653.97

Ameren Missouri Labadie Power Plant **Proposed Utility Waste Disposal Area Detailed Site Investigation** CLIENT: Reitz & Jens, Inc.

LOCATION: Newman-SE-S of LBR, E of farm access Rd

G.S. ELEVATION: 464.75' T.O.C. ELEVATION: 467.42'

EASTING: 729053.82

LITHOLOGY PERCENT RECOVERY WELL CONSTRUCTION DIAGRAM CLAY SM GRAVEL SAMPLE TYPE WATER TABLE **GRAPHIC LOG** -G GRAVEI DEPTH (FEET) DESCRIPTION VC SAND VF SAND ELEVATION FACIES I.D. **M SAND** C SAND SAND SILTY CLAY SILT ш matter below 30.3 ft with 5 mm bed of FP/ coalified wood matter at 30. 6 ft. Lev 23.3-33.3 ft; Fine Sand, with very fine sand and 435 medium sand, dark gray, (Gley) 1 4/N and 30 10YR 4/1, 5-10 mm pieces of coalified wood 67 matter below 30.3 ft with 5 mm bed of coalified wood matter at 30. 6 ft. ŝ 33.3-36.5 ft; Fine Sand, with very fine sand, trace coarse sand and gravel, 22 mm 430 35 subangular clast, wet, soft. 72 ÷ BORING TERMINATED IN FINE SAND @36.5 FT 425 40 420 45 415 50 - 410 55 STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES WATER LEVELS: DURING DRILLING DRILLING CO .: Max's Enterprises, Inc. 5 FEET AFTER DRILLING: FEET ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN DRILLER: Ryan Hunziker DATE: LOGGED BY: T. Doll SAMPLES. PIEZOMETER: INSTALLED AT +/- 35.0 FEET DATE DRILLED: 12/02/09 START TIME: NOTES: VERTICAL DATUM: NAVD 88 7:45AM END TIME: HORIZONTAL DATUM: NAD 83 11:44AM BOREHOLE DIA .: WEATHER: Cold, 35°F, Overcast, Calm. 10.25"

11/8/2010

Printed:

Date

#### GREDELL **BORING LOG P-171 ENGINEERING RESOURCES, INC. Ameren Missouri Labadie Power Plant** LOCATION: Newman-South Central-E of farm access Rd **Proposed Utility Waste Disposal Area** G.S. ELEVATION: 463.97' T.O.C. ELEVATION: 466.87' **Detailed Site Investigation** CLIENT: Reitz & Jens, Inc. NORTHING: 991629.80 EASTING: 729636.72 PERCENT RECOVERY LITHOLOGY WELL CONSTRUCTION DIAGRAM CLAY **GRAPHIC LOG** SAMPLE TYPE SM GRAVEL DEPTH (FEET) GRAVEL WATER TABL DESCRIPTION ELEVATION **VF SAND** /C SAND ġ SAND **M SAND** SAND FACIES I SILTY CLAY SILT õ o н 465 0 0.0-0.6 ft; Silty Clay, very dark gravish brown, FB . 10YR 3/2, slightly plastic, soft, moist, roots. 0.6-3.4 ft; Silty Clay, very dark gravish brown, 35 10YR 3/2, plastic, stiff, moist, many mottles (10YR 4/6) below 1.4 ft. FP/ 460 3.4-10.9 ft; Silty Sand, brown, 10YR 4/3, Lev $\nabla$ 5 herringbone laminae, wet, soft. 35 455 10 83 10.9-30.7 ft; Fine Sand, with very fine sand, alternating beds of dark gray to brown, 10YR 4/1 to 4/3, fine black coalified wood matter from 15.0-16.5 ft, (fine sand slough noted in 450 top of 15.0 ft S.S.). 15 94 445 20 100 440 25 100

Date Printed: 11/8/2010

DRILLING CO.: Max's Enterprises, Inc. DRILLER: Ryan Hunziker LOGGED BY: T. Doll DATE DRILLED: 12/02/09 START TIME: 12:05PM END TIME: 2:22PM BOREHOLE DIA .: 8.25"

GRADUAL OR MAY OCCUR BETWEEN SAMPLES.
NOTES:

STRATIFICATION LINES ARE

APPROXIMATE LITHOLOGIC BOUNDARIES ONLY: ACTUAL CHANGES MAY BE	WATER LEVELS:	DURING DRILLING AFTER DRILLING:	5
GRADUAL OR MAY OCCUR BETWEEN		DATE:	
	PIEZOMETER:	INSTALLED AT +/-	35.0
NOTES:	VERTICAL DATUM:	NAVD 88	
	HORIZONTAL DATUM:	NAD 83	
·	WEATHER: Cold, 40°F, Ove	rcast, 10-20 MPH Wind	from N.

WATER LEVELS:

DURING DRILLING

FEET

\_ FEET

FEET

# BORING LOG P-171

LOCATION: Newman-South Central-E of farm access Rd

Proposed Utility Waste Disposal Area Detailed Site Investigation

Ameren Missouri Labadie Power Plant

CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

### G.S. ELEVATION: 463.97' T.O.C. ELEVATION: 466.87'

NORTHING: 991629.80 E

EASTING:	729636.72
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1       1	-	11. IX		<u> </u>				NORTHING: 33102				,							_
End         Description         End         End <th< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td>~≿  </td><td></td><td></td><td></td><td></td><td>1</td><td>LITI</td><td>ΗО</td><td>LO</td><td>GΥ</td><td></td><td></td><td></td></th<>							~≿					1	LITI	ΗО	LO	GΥ			
435       10.9-30.7 ft; Fine Sand, with very fine sand, alternating beds of dark gray to brown, 10VR 4/1 to 4/3, fine black coalified wood matter from 15.0-16.5 ft, (fine sand slough noted in top of 15.0 ft S.S.).       FP/         30       61       top of 15.0 ft S.S.).       30.7-35.8 ft; Fine to Medium Sand, trace coarse sand, dark gray, 10YR 4/1, wet, soft, black coalified wood matter from 30.7-30.9 ft.       C         430       78       35.8-36.5 ft; Coarse Sand, with medium sand, trace fine sand and gravel, dark gray, 10YR 4/1, 1, 5 ms subrounded and subangular clasts, wet, loose.       C         40       425       61       61       61         41       50       78       35.8-36.5 ft; Coarse Sand, with medium sand, trace fine sand and gravel, dark gray, 10YR 4/1, 1, 5 ms subrounded and subangular clasts, wet, loose.       C         425       40       83.5.8-36.5 ft; Coarse Sand, with medium sand, trace fine sand and gravel, dark gray, 10YR 4/1, 1, 5 ms subrounded and subangular clasts, wet, loose.       C         410       93.5.5 ft       93.5.5 ft       93.5.5 ft         50       410       93.5.5 ft       93.5.5 ft         51       410       93.5.5 ft       93.5.5 ft         52       410       93.5.5 ft       93.5.5 ft         53       93.5.5 ft       93.5.5 ft       93.5.5 ft         54.5       93.5 ft       93.5.5 ft       93.5 ft	DEPTH (FEET)	ELEVATION	WELL CONSTRUCTION DIAGRAM	WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVE	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY						VC SAND	SM GRAVEL	LG GRAVEL
435       alternating beds of dark gray to brown, 10YR 4/1 to 4/3, fine black coalified wood matter from 15.0 cf 5. th, (fine sand slough noted in top of 15.0 cf S.S.).       Lev         430       61       top of 15.0 cf S.S.). 30.7-33.8 ft; Fine to Medium Sand, trace coarse sand, dark gray, 10YR 4/1, wet, soft, black coalified wood matter from 30.7-30.9 ft.       C         430       78       35.8-36.5 ft; Coarse Sand, with medium sand, trace fine sand and gravel, dark gray, 10YR 4/1 1, 5 mm subrounded and subangular clasts, livet, loose.       C         40       Ø36.5 FT       Ø36.5 FT       Ø36.5 FT			Ν		Ν	П													
430       sand, dark gray, 10YR 4/1, wet, soft, black coalified wood matter from 30.7-30.9 ft.         35       430         430       35.8-36.5 ft; Coarse Sand, with medium sand, trace fine sand and gravel, dark gray, 10YR 4/1, 5 mm subrounded and subangular clasts, wet, loose.       C         40       425       BORING TERMINATED IN COARSE SAND         40       425       BORING TERMINATED IN COARSE SAND         410       55       410		435					61	alternating beds of dark gray to brown, 10YR 4/1 to 4/3, fine black coalified wood matter from 15.0-16.5 ft, (fine sand slough noted in top of 15.0 ft S.S.).	Lev										
425 40 425 40 425 40 425 40 420 45 410 55 57 50 50 50 50 50 50 50 50 50 50		430					78	sand, dark gray, 10YR 4/1, wet, soft, black coalified wood matter from 30.7-30.9 ft.											
40       425         40       425         BORING TERMINATED IN COARSE SAND         @36.5 FT         415         50         410         55         410				l	• •	ҝ				-									
40       BORING TERMINATED IN COARSE SAND         -420								1, 5 mm subrounded and subangular clasts,											
40 - 420 45 - 415 50 - 410 55 - 410	+ 4	425																	
	+																		
	÷																		
	+																		,
		100																	
	1-4	420																	
	15 +																		
	+																		
	L																		
	T																		
	+	415																	
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	÷				-					ļ									
		110																	
		410																	
	55+																		
	+																		
										<u> </u>									
DRILLER:     Ryan Hunziker     APPROXIMATE LITHOLOGIC BOUNDARIES     AFTER DRILLING       DRILLER:     Ryan Hunziker     ONLY; ACTUAL CHANGES MAY BE     AFTER DRILLING:	· ·					I		ONLY; ACTUAL CHANGES MAY BE	VELS:	AF	TER	DRI	LLIN	G: _			•		
LOGGED BY: I. Doll SAMPLES.								SAMPLES.	ETCD										
													AT	+/	35	.0	FEI	= 1	
START TIME: 12:05PM NOTES: VERTICAL DATUM: NAVD 88																			
END TIME: 2:22PM HORIZONTAL DATUM: NAD 83				1										, .					
BOREHOLE DIA.: 8.25" WEATHER: Cold, 40°F, Overcast, 10-20 MPH Wind from N.	REHOLE	E DIA.:	8.25"					WEATHER: Cold	, 40°F, Ov	ercast,	, 10-2	20 MI	PH W	ind f	TOR	N			

#### Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

# BORING LOG P-173

LOCATION: Corn Field-Newman-SE Project Area

G.S. ELEVATION: 463.40' T.O.C. ELEVATION: 466.33'

NORTHING: 991592.90

EASTING: 730278.01

CLIENT:	<u>Reitz &amp; Jens,</u>	Inc.		NORTHING: 991592	2.90	EA	STIN	<u>G:</u> (	7 <u>30</u> 2	<u>.78.</u>	01		
		۲. ۲					L	ITHO	DLO	GY	,		
DEPTH (FEET) ELEVATION	WELL WELL CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG	SAMPLE TYPE PERCENT RECOVERY	DESCRIF	PTION	FACIES I.D.	CLAY SILTY CLAY	SILT	VF SAND F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
-				-									
465													
		40	0-3.0 ft; Poor sample rec and silty clay.	overy, possible clay	FB								
- 460			3.0-3.9 ft; Clay, dark bro										
5 -			3.9-4.2 ft; Silt, light olive										
			4.2-7.4 ft; Silty Clay and alternating thin beds grad										
			clay, pale yellowish brov										
-		52	7.4-9.7 ft; Very Fine San										
- 455			alternating very thin bed	s, pale yellowish					_				
10-			brown, 10YR 6/2, satura	ted below 7.8 ft, sharp	FP/								
		67	contact with below. 9.7-10.0 ft; As above, bu	t very dark grav (Glev)	Lev								
			1 3/N with common blac										
- 450			fragments.	х									
450			10.0-15.8 ft; Fine Sand, g										
15-			7/4, moderately sorted w medium to coarse sand as										
} -[		100	$\subset$ contact with below.		CO/								
] -[			15.8-17.5 ft; Very Fine to	Fine Sand, very dark	BS								
445			<u>gray (Gley) 1 3/1.</u>										
443			17.5-27.5 ft; Fine to Med gray (Gley) 1 3/N, comm										
20 -			(granules) (fine sand slow										
-		100											
440	☆  ☆   =												
25 -									••••••				
		100											
													-
DRILLING CO.: M	lax's Enterprises, Inc.		STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BO	WATER LE	VELS:	DURIN	IG DRII	LING	7	.8	FEE	T	
DRILLER:	Doug Hunziker		ONLY; ACTUAL CHANGES MAY GRADUAL OR MAY OCCUR BET	BE				•			FEE	T	
LOGGED BY: DATE DRILLED:	M. Carlson 12/12/09		SAMPLES.	PIEZOM	ETER:		LLED A		35	5.0	FEF	- T	
START TIME:	7:30AM		NOTES:	VERTICAL DA								-	
END TIME:	11:27AM			HORIZONTAL DA									
BOREHOLE DIA.:	8.25"			WEATHER: Cold,	30°F, Par	tly Cloudy	у.						

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Printed: 11/8/2010

Date

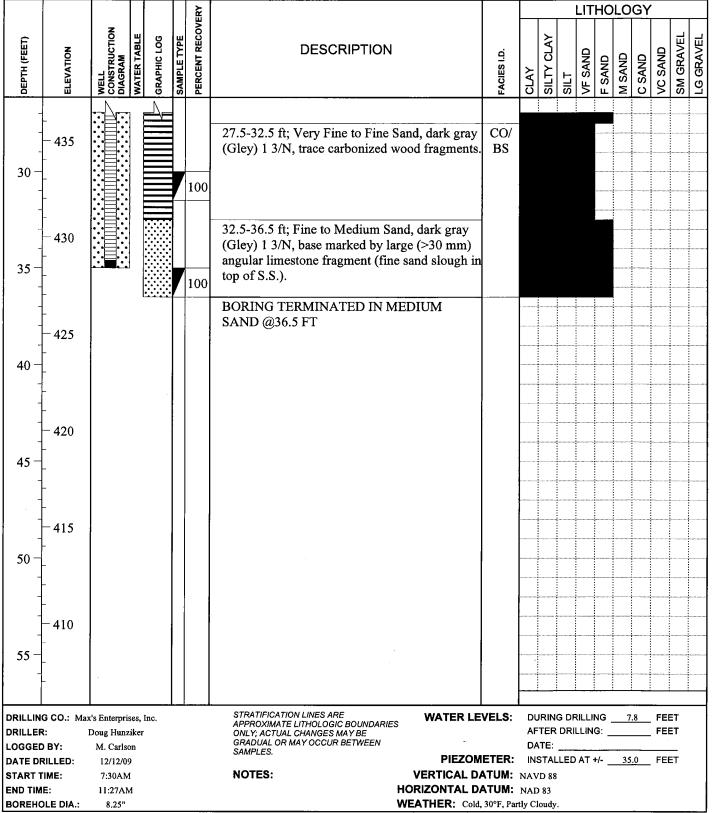
# BORING LOG P-173

LOCATION: Corn Field-Newman-SE Project Area

G.S. ELEVATION: 463.40' T.O.C. ELEVATION: 466.33'

NORTHING: 991592.90

92.90 **EASTING:** 730278.01



Printed: 11/17/2010

Date

DATE DRILLED:

BOREHOLE DIA .:

START TIME:

END TIME:

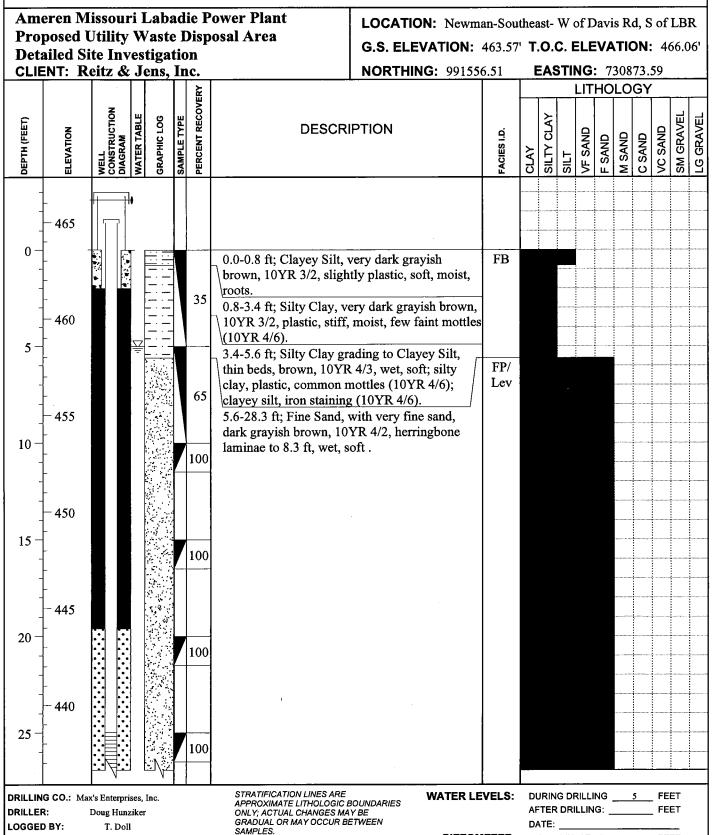
12/15/09

8:54AM

1:40PM

8.25"

### **BORING LOG P-175**



NOTES: M. Carlson and F. Phillips

piezometers.

INSTALLED AT +/-

FEET

35.0

PIEZOMETER:

(Gredell) onsite aquifer testing HORIZONTAL DATUM: NAD 83

VERTICAL DATUM: NAVD 88

### BORING LOG P-175

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/17/2010

#### LOCATION: Newman-Southeast- W of Davis Rd, S of LBR

G.S. ELEVATION: 463.57' T.O.C. ELEVATION: 466.06'

NORTHING: 991556.51 EAS

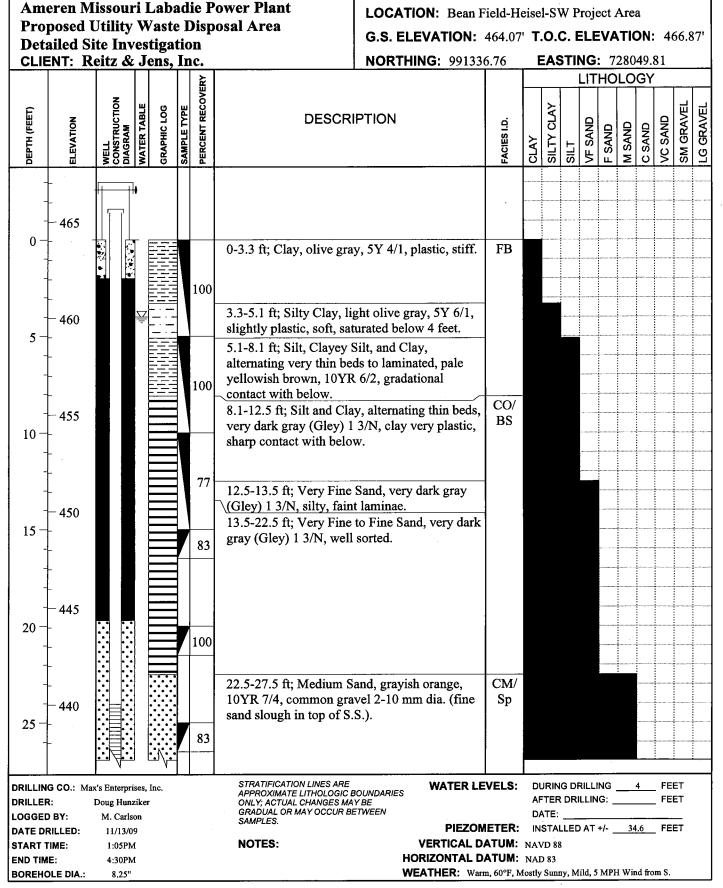
556.51 **EASTING:** 730873.59

			1	<u> </u>													
					R					L	ITI.	10	LO	GΥ			
ОЕРТН (FEET)	ELEVATION	WELL CONSTRUCTION DIAGRAM WATEP TARI F	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	сгау	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
	- - 435 - - - - - 430				78	28.3-35.9 ft; Fine Sand, with very fine sand, trace medium and coarse sand, dark grayish brown, 10YR 4/2, wet, soft.	FP/ Lev C										
25	-																
35 - 40 -	- - - - - - - - - - - - - - - - - - -				83	35.9-36.5 ft; Coarse Sand, with medium sand, trace gravel, dark gray, 10YR 4/1, 5-25 mm subrounded and subangular clasts, clay balls (plastic, dark brown, 10YR 3/3). BORING TERMINATED IN COARSE SAND @36.5 FT SHELBY TUBE SAMPLE COLLECTED AT 1.0-3.0 FT DEPTH AT COMPLETION OF DRILLING.											
45	- - 415 -																······································
55 -	- 						-							-			
DRILLER LOGGED DATE DR START T END TIM	) BY: RILLED: 'IME:	s's Enterprises Doug Hunziko T. Doll 12/15/09 8:54AM 1:40PM 8.25"				STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY: ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES. NOTES: M. Carlson and F. Phillips (Gredell) onsite aquifer testing piezometers. WATER LEY PIEZOM VERTICAL DA HORIZONTAL DA WEATHER: Cold,	ETER: ATUM: ATUM:	AF DA INS NAVI NAD	83	ED /	LING AT +	3: /	35	.0	FEE	T	

11/17/2010

Printed:

# BORING LOG P-177



# BORING LOG P-177

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/17/2010

#### LOCATION: Bean Field-Heisel-SW Project Area

G.S. ELEVATION: 464.07' T.O.C. ELEVATION: 466.87'

NORTHING: 991336.76 EASTING: 728049.81

					ž				LITHOLOGY							
<b>DEPTH (FEET)</b>	ELEVATION	WELL WELL CONSTRUCTION DIAGRAM WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	SILT		M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
	- - 435 - - - - 430				100	27.5-36.5 ft; Coarse Sand grading to Gravelly Sand, grayish orange, 10YR 7/4, pebbles up to 20 mm dia, (fine sand slough in top of S.S.).	С									
40	- - - 425 - -		8 0 0 0		100	BORING TERMINATED IN GRAVELLY SAND @36.5 FT SHELBY TUBE SAMPLE COLLECTED AT 2.0-4.0 FT DEPTH AT COMPLETION OF DRILLING.										
- 45 — -	- 420  															
- 50 -	- - 415 - -													· · · · · · · · · · · · · · · · · · ·		
- . 55 — -	- 410 - -															
DRILLING CO.: Max's Enterprises, Inc.         DRILLER:       Doug Hunziker         LOGGED BY:       M. Carlson         DATE DRILLED:       11/13/09         START TIME:       1:05PM         END TIME:       4:30PM         BOREHOLE DIA.:       8.25"					,	NOTES: VERTICAL D HORIZONTAL D	IETER: ATUM: ATUM:	AFTER DRILLING: FEET DATE: TER: INSTALLED AT +/- <u>34.6</u> FEET FUM: NAVD 88								

#### Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

### BORING LOG P-179

LOCATION: Newman-Southwest-Adj to farm access Rd

G.S. ELEVATION: 464.19' T.O.C. ELEVATION: 466.93'

**NORTHING:** 991350.86 **EASTING:** 728780.92

LITHOLOGY PERCENT RECOVERY WELL CONSTRUCTION DIAGRAM CLAY **GRAPHIC LOG** SAMPLE TYPE SM GRAVEL -G GRAVEL DEPTH (FEET) WATER TABL DESCRIPTION ELEVATION VC SAND VF SAND FACIES I.D. **M SAND** SAND SAND SILTY CLAY SILT  $\mathbf{O}$ 465 0 0.0-0.7 ft; Silty Clay, very dark grayish brown, FB 10YR 3/2, slightly plastic, soft, moist, roots. 0.7-4.4 ft; Silty Clay, very dark grayish brown, 75 10YR 3/2, plastic, stiff, moist, few faint mottles, (10YR 4/6); brown, 10YR 4/3, and 460 many mottles below 2.9 ft. 5 4.4-7.9 ft; Poor recovery, probable Silty Clay slough. 95 7.9-9.8 ft; Clayey Silt and Clayey Sandy Silt; 455 thin beds, dark grayish brown and dark gray, 10 10YR 4/1 and 4/2, many mottles (10YR 4/6), FP/ laminated, herringbone laminae and iron Lev staining below 8.2 ft 9.8-21.5 ft; Very Fine to Fine Sand, thin beds, 80 CO/ wet; brown, 10YR 4/3 to 11.7 ft, loose; with BS clay below 12.2 ft, dark gray, (Gley) 1 4/N, 450 plastic, soft, herringbone laminae, soft; without 15 FP/ clay below 12.2 ft; dark gray (Gley) 1 4/N to 100 14.0 ft; dark gray, 10YR 4/1 below 15.0 ft. Lev 445 20 100 21.5-31.1 ft; Fine Sand, with medium to coarse sand and gravel, alternating thin beds, dark gray, 10YR 4/1, alternating thin beds of 440 coalified wood matter from 25.6-26.5 ft; clay 25 balls (dark gray, Gley 1 4/N, plastic) from 100 30.8-31.1 ft, wet, loose to soft. STRATIFICATION LINES ARE DRILLING CO .: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING 8.2 FEET APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE DRILLER: AFTER DRILLING: Ryan Hunziker FEET GRADUAL OR MAY OCCUR BETWEEN LOGGED BY: T. Doll DATE: \_ SAMPLES PIEZOMETER: INSTALLED AT +/- 34.9 FEET DATE DRILLED: 12/03/09 START TIME: NOTES: S. King (Gredell) onsite VERTICAL DATUM: NAVD 88 8:32AM developing piezometers. END TIME: HORIZONTAL DATUM: NAD 83 11:04AM BOREHOLE DIA .: 8.25" WEATHER: Cold, 30°F, Overcast, Calm.

Date Printed: 11/8/2010

#### Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

# BORING LOG P-179

LOCATION: Newman-Southwest-Adj to farm access Rd

G.S. ELEVATION: 464.19' T.O.C. ELEVATION: 466.93'

NORTHING: 991350.86 EA

6 **EASTING:** 728780.92

ELEVATION 432	WELL WELL CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG	SAMPLE TYPE PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY SILTY CLAY		VF SAND			AND	SM GRAVEL LG GRAVEL
	WELL WELL CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG	SAMPLE TYPE PERCENT RECOVE	DESCRIPTION	ACIES I.D.	LAY LTY CLAY	F	SAND	AND	QN	AND	RAVEL
435		-		<u> </u>	<u></u> v v	SILT	Ч S Ц S Ц S	Σ	C SAND	VC SAND	N CI LG GF
		100	21.5-31.1 ft; Fine Sand, with medium to coarse sand and gravel, alternating thin beds, dark gray, 10YR 4/1, alternating thin beds of coalified wood matter from 25.6-26.5 ft; clay balls (dark gray, Gley 1 4/N, plastic) from 30.8-31.1 ft, wet, loose to soft.	FP/ Lev							
430		100	31.1-36.5 ft; Coarse Sand, with fine to medium sand and gravel, trace very fine sand, dark gray, 10YR 4/1 wet, loose, 20-30 mm subrounded quartz clasts.	С							
425			BORING TERMINATED IN COARSE SAND @36.5 FT								
420											
415											
410											
DRILLING CO.: Max's Enterprises, Inc. DRILLER: Ryan Hunziker LOGGED BY: T. Doll DATE DRILLED: 12/03/09 START TIME: 8:32AM END TIME: 11:04AM			APPROXIMATE LITHOLOGIC BOUNDARIES ONLY: ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES. PIEZOM NOTES: S. King (Gredell) onsite VERTICAL D/	ETER: ATUM:	AFTE DATE INSTA NAVD 8	R DRII : ALLED 38	LLING:			FEE	т -
 CO 3Y:	.: Ma	.: Max's Enterprises, Inc. Ryan Hunziker T. Doll 2D: 12/03/09	.: Max's Enterprises, Inc. Ryan Hunziker T. Doll D: 12/03/09 8:32AM	.: Max's Enterprises, Inc.     STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES T. Doll     WATER LE       T. Doll     ONLY: ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.     PIEZOM       ED:     12/03/09     NOTES:     S. King (Gredell) onsite developing piezometers.     VERTICAL D/ HORIZONTAL D/	.: Max's Enterprises, Inc.       STRATIFICATION LINES ARE       WATER LEVELS:         Ryan Hunziker       APPROXIMATE LITHOLOGIC BOUNDARIES       ONLY: ACTUAL CHANGES MAY BE         T. Doll       GRADUAL OR MAY OCCUR BETWEEN       SAMPLES.         ED:       12/03/09       PIEZOMETER:         8:32AM       NOTES:       S. King (Gredell) onsite       VERTICAL DATUM:         11:04AM       developing piezometers.       HORIZONTAL DATUM:	.: Max's Enterprises, Inc.       STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY: ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.       WATER LEVELS:       DURIL AFTE         T. Doll       ONLY: ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.       WATER LEVELS:       DURIL AFTE         D:       12/03/09       DATES:       S. King (Gredell) onsite developing piezometers.       VERTICAL DATUM:       NAVD 8	.:: Max's Enterprises, Inc.       STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY: ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.       WATER LEVELS:       DURING DF         I: 12/03/09       B:32AM 11:04AM       NOTES:       S. King (Gredell) onsite developing piezometers.       VERTICAL DATUM: NAVD 88 HORIZONTAL DATUM: NAD 83	.:: Max's Enterprises, Inc.       STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES       WATER LEVELS:       DURING DRILLING         Ryan Hunziker T. Doll       ONLY: ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.       WATER LEVELS:       DURING DRILLING         SD:       12/03/09       DURING OR MAY OCCUR BETWEEN SAMPLES.       DATE:       PIEZOMETER:       INSTALLED AT +/-         NOTES:       S. King (Gredell) onsite developing piezometers.       VERTICAL DATUM:       NAVD 88	.: Max's Enterprises, Inc.       STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY: ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.       WATER LEVELS:       DURING DRILLING         I: 12/03/09       B:32AM 11:04AM       NOTES:       S. King (Gredell) onsite developing piezometers.       VERTICAL DATUM:       NAVD 88 HORIZONTAL DATUM:       NAVD 88 HORIZONTAL DATUM:	.:: Max's Enterprises, Inc.       STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY: ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.       WATER LEVELS:       DURING DRILLING       8.2         T. Doll       GRADUAL OR MAY OCCUR BETWEEN SAMPLES.       WATER LEVELS:       DURING DRILLING       8.2         ID:       12/03/09       NOTES:       S. King (Gredell) onsite develoning piezometers.       VERTICAL DATUM:       NAVD 88	.:: Max's Enterprises, Inc.       STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES       WATER LEVELS:       DURING DRILLING       8.2       FEET         Ryan Hunziker T. Doll       ONLY: ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.       WATER LEVELS:       DURING DRILLING       8.2       FEET         DURING DRILLING:         FEET       DURING DRILLING:          DITE:         DURING DRILLING:        FEET         NOTES:       S. King (Gredell) onsite developing piezometers.       VERTICAL DATUM:       NAVD 88         HORIZONTAL DATUM:       NAD 83

### **BORING LOG P-181**

**Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area** Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/17/2010

#### LOCATION: Newman-Southwest-E of farm access Rd

G.S. ELEVATION: 464.42' T.O.C. ELEVATION: 467.35'

**NORTHING:** 991334.49 **EASTING:** 729380.23

91334.49	EASI	ING:	729

CLIENT: Reitz & Jen	s, n	<u>ic.</u>	NORTHING: 99133												
		ΞRΥ					Ĺ	<u> T </u>	HO	LO	<u>GY</u>				
DEPTH (FEET) ELEVATION WELL WELL CONSTRUCTION DIAGRAM WATER TABLE	GRAFING LOG SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL	
	· -		0.0-0.6 ft; Clayey Silt, very dark grayish brown, 10YR 3/2, slightly plastic, soft, moist,	FB											
- - - - - - - - - - - - - - - - - - -		60	roots. 0.6-4.0 ft; Silty Clay, very dark grayish brown, 10YR 3/2, plastic, stiff, moist, few faint mottles (10YR 4/6), dark brown, 10YR 3/3, below 2.6 ft, soft grading to stiff, many mottles. 4.0-6.7 ft; Sandy Clayey Silt and Sandy Silt,	-											
455		50	thin beds, brown, 10YR 4/3, wet, soft, non- plastic, laminated below 5.3 ft. 6.7-18.3 ft; Silty Sand, dark grayish brown, 10YR 4/2, laminated, wet, soft; black fibrous plant detritus from 10.6-10.8 ft; black coalified wood matter and muscovite mica flakes from	FP/ Lev	-										
		95 100	10.8-11.8 ft; dark gray below 11.8 ft, (Gley) 1 4/N, interbeds of black coalified wood matter and muscovite mica flakes.	CO/ BS											
20 - 445		100	18.3-35.8 ft; Very Fine Sand, Fine Sand, Medium Sand, and Coarse Sand, alternating thin beds, with gravel, very dark gray and dark gray, (Gley 1 3/N) and 10YR 4/1, fine coalified wood matter and wood fragments, 5-20 mm												
25 - 440		94	subrounded and subangular clasts, wet, loose grading to soft, clay balls (brown, 10YR 3/3, plastic) at 35.5 ft.	C											
DRILLING CO.: Max's Enterprises, Inc DRILLER: Ryan Hunziker LOGGED BY: T. Doll	1	I	STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.		Al D	URIN TER ATE:	DRIL	LLIN	G: _			FE	ET		
DATE DRILLED:         12/03/09           START TIME:         11:31AM           END TIME:         2:14PM           BOREHOLE DIA.:         8.25"		SAMPLES:       PIEZOMETER:       INSTALLED AT +/-       34.7       FEE         NOTES:       S. King (Gredell) onsite developing piezometers.       VERTICAL DATUM:       NAVD 88         HORIZONTAL DATUM:       NAD 83         WEATHER:       Cold, 35°F, Mostly Sunny, 10-15 MPH Wind from SW.													

Date Printed: 11/17/2010

# BORING LOG P-181

Amo	LOCATION: Newm	vman-Southwest-E of farm access Rd																	
Proposed Utility Waste Disposal AreaG.S. ELEVATION: 464.42'Detailed Site InvestigationG.S. ELEVATION: 464.42'										T.O.C. ELEVATION: 467.35' EASTING: 729380.23									
CLIENT: Reitz & Jens, Inc. NORTHING: 991334.49											EAS						23		
						VERY						 		<u>101</u>		<u>GY</u>			
<b>DEPTH (FEET)</b>	ELEVATION	WELL CONSTRUCTION DIAGRAM	WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCR	IPTION	FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
30 -	- 435					100	gray, (Gley 1 3/N) and wood matter and wood subrounded and subang	rse Sand, alternating very dark gray and dark 10YR 4/1, fine coalified fragments, 5-20 mm gular clasts, wet, loose											
35 -	430					78	plastic) at 35.5 ft.												
- - - - - - - - - - - - - - - - - - -	- - 425 - - - - 420						trace medium sand, bla (Gley 1 2.5/N) and mus below 35.8 ft. BORING TERMINAT @36.5 FT SHELBY TUBE SAM 1.0-3.0 FT DEPTH AT DRILLING.	ck organic material scovite mica flakes ED IN FINE SAND PLE COLLECTED AT	CO/ BS										
- - 50 - -	- - - 415 - - -																		
55 — -	410  -																		
DRILLING CO.: Max's Enterprises, Inc. DRILLER: Ryan Hunziker LOGGED BY: T. Doll			1	<u>.                                    </u>	STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC I ONLY; ACTUAL CHANGES MA GRADUAL OR MAY OCCUR B SAMPLES.		AFTER DRILLING: FEET DATE:												
START TIME:         11:31.           END TIME:         2:141		12/03/09 11:31AM 2:14PM 8.25"					NOTES: S. King (Gredell) developing piezon	METER: DATUM: DATUM: d, 35°F, Mo	NA' NAJ	VD 88 D 83	l						-1		

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

### BORING LOG P-183

NORTHING: 991309.56

LOCATION: Newman-Southeast-W of Davis Rd, S of LBR

G.S. ELEVATION: 463.40' T.O.C. ELEVATION: 465.96'

**EASTING:** 729980.89

PERCENT RECOVERY LITHOLOGY WELL CONSTRUCTION DIAGRAM CLAY WATER TABLE **GRAPHIC LOG** SAMPLE TYPE SM GRAVEL G GRAVEL **DEPTH (FEET)** DESCRIPTION VF SAND ELEVATION VC SAND FACIES I.D. **M SAND** SAND SAND SILTY CLAY SILT 465 0 0.0-0.5 ft; Clayey Silt, very dark gravish FB brown, 10YR 3/2, slightly plastic, soft, moist, roots. 75 0.5-2.5 ft; Silty Clay, very dark gravish brown, 460 10YR 3/2, plastic, stiff, moist, roots, few faint mottles (10YR 4/6), many mottles below 1.8 ft. 5 2.5-3.8 ft; Silty Clay, very dark gravish brown. 10YR 3/2, highly plastic, stiff, moist. 3.8-6.7 ft; Silty Clay, dark gravish brown, 80 Σ 10YR 4/2, plastic, stiff, moist, many mottles FP/ 455 (10YR 4/6), iron concretions (10YR 4/6) below Lev 5.3 ft. 10 6.7-7.8 ft; Clayey Silt and Silty Clay, thin beds, dark gray and dark grayish brown, 10YR 4/2, moist, soft; slightly plastic, common mottles 85 (10YR 4/6) and muscovite mica flakes to 7.2 ft; 450 plastic and iron concretions (10YR 4/6) below 7.2 ft. 15 7.8-26.2 ft; Very Fine to Fine Sand, thin beds, 17 trace medium and coarse sand, dark gray to dark yellowish brown, 10YR 4/1 to 4/4, wet, loose grading to soft, trace fine black coalified wood matter. 445 20 100 440 25 100 26.2-36.5 ft; Very Fine Sand, Fine Sand, and STRATIFICATION LINES ARE DRILLING CO .: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING \_\_\_\_\_\_ FEET APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE DRILLER: Ryan Hunziker AFTER DRILLING: FEET GRADUAL OR MAY OCCUR BETWEEN LOGGED BY: T. Doll DATE: SAMPLES PIEZOMETER: INSTALLED AT +/- \_FEET DATE DRILLED: 12/11/09 NOTES: START TIME: VERTICAL DATUM: NAVD 88 10:25AM HORIZONTAL DATUM: NAD 83 END TIME: 1:14PM BOREHOLE DIA .: 8.25" WEATHER: Cold, 15°F, Partly Cloudy, Calm.

Date Printed: 11/8/2010

## **BORING LOG P-183**

**Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation** CLIENT: Reitz & Jens, Inc.

DEPTH (FEET)

30

35

40

45

50

ELEVATION

435

430

425

420

415

**LOCATION:** Newman-Southeast-W of Davis Rd, S of LBR

SM GRAVEL

-G GRAVEL

G.S. ELEVATION: 463.40' T.O.C. ELEVATION: 465.96' NORTHING: 991309.56 EASTING: 729980.89 LITHOLOGY PERCENT RECOVERY WELL CONSTRUCTION DIAGRAM **NATER TABLE** CLAY **GRAPHIC LOG** SAMPLE TYPE DESCRIPTION VC SAND VF SAND FACIES I.D. **M SAND** C SAND F SAND SILTY ( CLAY SILT Medium Sand, alternating thin beds, with FP/ coarse sand, trace gravel, dark gray, 10YR 4/1, Lev 5-20 mm subangular clasts, black coalified wood matter and trace clay balls (brown, 10YR 3/3, plastic), wet, soft. CM/ 100 Sp FP/ Lev 100 BORING TERMINATED IN FINE SAND @36.5 FT

Date Printed: 11/8/2010

1 -									<b>:</b>	
										1
-										<u> </u>
-410										
		11		l l						
55 -		i I								
				,						
1 1						+		+		
									_	
DRILLING CO.: Ma	x's Enterprises, Inc.		STRATIFICATION LINES ARE	WATER LEVELS	: DURI			7.8	F	EET
DRILLER:	Ryan Hunziker		APPROXIMATE LITHOLOGIC BOUNDARI ONLY: ACTUAL CHANGES MAY BE	=5	AFTE	R DRIL	LLING:		FI	EET
LOGGED BY:	T. Doll		GRADUAL OR MAY OCCUR BETWEEN		DATE	:				
DATE DRILLED:	12/11/09		SAMPLES.	PIEZOMETER			AT +/-	25.5		 = E T
			NOTEO				<u> </u>		<u> </u>	-
START TIME:	10:25AM		NOTES:		NAVD 8	8				
END TIME:	1:14PM			HORIZONTAL DATUM	: NAD 83					
BOREHOLE DIA .:	8.25"			WEATHER: Cold, 15°F, I	artly Cloud	y, Caln	n.			
•										
				Figu	ro D_193	Sheet	2 . 4 2			

## **BORING LOG P-185**

**Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area** 

Printed: 11/8/2010

Date

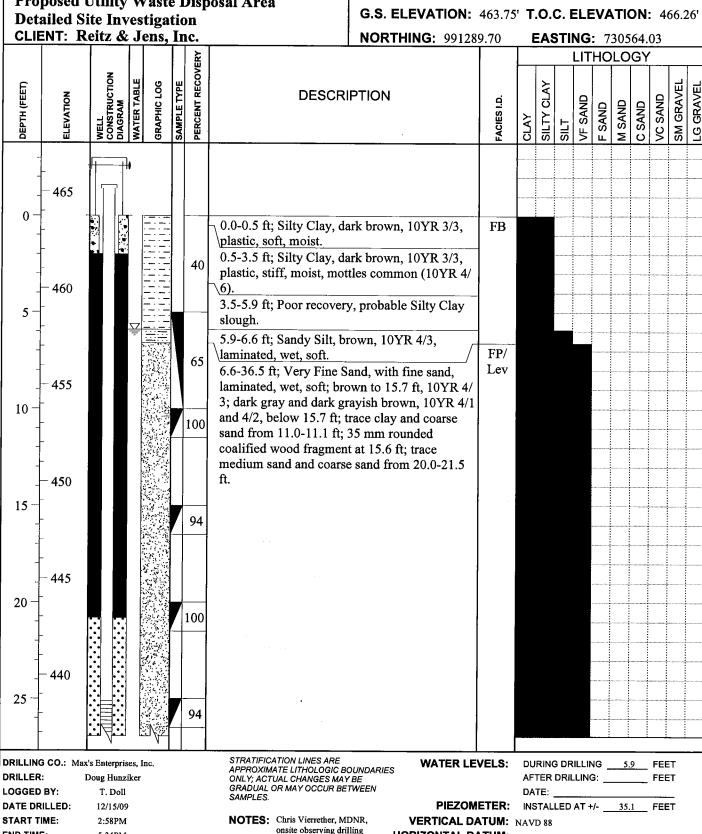
END TIME:

BOREHOLE DIA .:

5:34PM

8.25"

## LOCATION: Newman-Southeast-W of Davis Rd, S of LBR



activities.

WEATHER: Cold, 20°F, Partly Cloudy, 5-10 MPH Wind from N.

HORIZONTAL DATUM: NAD 83

## BORING LOG P-185

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

### LOCATION: Newman-Southeast-W of Davis Rd, S of LBR

G.S. ELEVATION: 463.75' T.O.C. ELEVATION: 466.26'

**NORTHING:** 991289.70 **EASTING:** 730564.03

							RY						LIT	HO	LO	GΥ			
	<b>DEPTH (FEET)</b>	ELEVATION	WELL CONSTRUCTION DIAGRAM	WATER TABLE	<b>GRAPHIC LOG</b>	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
	30	- 435 					72	6.6-36.5 ft; Very Fine Sand, with fine sand, laminated, wet, soft; brown to 15.7 ft, 10YR 4/ 3; dark gray and dark grayish brown, 10YR 4/1 and 4/2, below 15.7 ft; trace clay and coarse sand from 11.0-11.1 ft; 35 mm rounded coalified wood fragment at 15.6 ft; trace medium sand and coarse sand from 20.0-21.5 ft.	FP/ Lev										
	40	- 425 			· · · · · ·			BORING TERMINATED IN VERY FINE SAND @36. 5 FT											
Date Printed: 11/8/2010	DRILLEF LOGGEI DATE DI START 1 END TIM	D BY: RILLED: TIME:	s's Enterpris Doug Hunz T. Doll 12/15/09 2:58PM 5:34PM 8.25"	ziker 9 1	nc.			STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES. NOTES: Chris Vierrether, MDNR, onsite observing drilling activities. WEATHER: Cold	IETER: ATUM: ATUM:	AI D. IN NAT	FTER ATE: ISTA VD 8 D 83			G:	35	.1	FEI	ET	

Ameren Missouri Labadie Power Plant **Proposed Utility Waste Disposal Area Detailed Site Investigation** CLIENT: Reitz & Jens, Inc.

ОЕРТН (FEET)

0

5

10

15

20

25

ELEVATION

465

460

455

450

445

440

## **BORING LOG P-187**

-G GRAVEL

**LOCATION:** Newman-SE-Adj to Davis Rd, S of LBR G.S. ELEVATION: 462.85' T.O.C. ELEVATION: 465.67' NORTHING: 991308.51 EASTING: 731386.11 PERCENT RECOVERY LITHOLOGY WELL CONSTRUCTION DIAGRAM WATER TABLE CLAY **GRAPHIC LOG** SAMPLE TYPE SM GRAVEL DESCRIPTION VC SAND FACIES I.D. VF SAND **M SAND** SAND = SAND SILTY CLAY SILT 0.0-0.5 ft; Silty Sand, dark brown, 10YR 3/3, FB wet, soft. 0.5-3.5 ft; Silty Clay, very dark gravish brown. 40 10YR 3/2, plastic, stiff, moist, mixture of dark grayish brown (10YR 4/2) below 5.0 ft. 3.5-7.5; Poor recovery, probable Silty Clay and Fine Sand slough. 100 7.5-10.0 ft; Silty Clay, thin beds, dark gray and dark grayish brown, 10YR 4/1 and 4/2, mottles (10YR 4/6) to 8.3 ft, highly plastic; laminated CO/ from 8.3-8.6 ft; iron concretions and vertical BS staining (10YR 4/6) below 8.6 ft; dark gray, (Gley) 1 4/N, below 9.1 ft. 80 10.0-15.4 ft; Clayey Silt, Clayey Sandy Silt and Silty Clay, alternating thin beds, dark gray, (Gley) 1 4/N, wet, soft, laminated below 10.5 ft; clayey silt, slightly plastic, (clay slough 50 probable in top of 15.0 ft S.S.). 15.4-36.5 ft; Very Fine to Fine Sand, alternating thin beds, dark gray, (Gley) 1 4/N, wet, loose to soft, 30 mm x 15 mm wood fragments, (clay slough in top of 30.0 and 35.0 ft S.S.). 67 78

Date Printed: 11/8/2010

с.	APPROXIMA ONLY; ACTU	NTION LINES ARE NTE LITHOLOGIC BOUNDARIE JAL CHANGES MAY BE IR MAY OCCUR BETWEEN	WATER LEVELS:	DURING DRILLING10 AFTER DRILLING: DATE:	FEET
	SAMPLES.		PIEZOMETER:	INSTALLED AT +/- 35.1	FEET
		Chris Vierrether (MDNR), M. Carlson and F. Phillips (Gredell) onsite.	VERTICAL DATUM: HORIZONTAL DATUM: WEATHER: Cold, 50°F, Ov	NAD 83	-

## BORING LOG P-187

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

### LOCATION: Newman-SE-Adj to Davis Rd, S of LBR

G.S. ELEVATION: 462.85' T.O.C. ELEVATION: 465.67'

**NORTHING:** 991308.51 **EASTING:** 731386.11

			Ţ		Ϋ́							но	LO	GΥ			
DEPTH (FEET)	ELEVATION	WELL CONSTRUCTION DIAGRAM WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
30 -	- 435				56	15.4-36.5 ft; Very Fine to Fine Sand, alternating thin beds, dark gray, (Gley) 1 4/N, wet, loose to soft, 30 mm x 15 mm wood fragments, (clay slough in top of 30.0 and 35.0 ft S.S.).	CO/ BS										
35 -	- 430				20	II 5.5. <i>j</i> .											
40 -	- 425				100	BORING TERMINATED IN VERY FINE SAND @36. 5 FT											
45 -	- 420																
50 -	- 415																
55 -	- 410																
DRILLING DRILLER: LOGGED DATE DRI START TI	BY: ILLED:	t's Enterprises Ryan Hunzike T. Doll 10/28/09 9:09AM				STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES. NOTES: Chris Vierrether (MDNR), M. VERTICAL D	AETER:	AF DA IN	TER TE: STAI		LLIN	G: _			FEI	ET	
END TIME BOREHOL	:	9:09AM 11:41AM 8.25"				Carlson and F. Phillips (Gredell) onsite. HORIZONTAL E WEATHER: Cold	ATUM:	NAI	D 83		Calm						

### Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

# BORING LOG P-189

LOCATION: Heisel-SW-S of LBR, W of farm access Rd

G.S. ELEVATION: 464.91' T.O.C. ELEVATION: 467.93'

NORTHING: 991059.00 EASTING: 728325.94

				ΞRY					l		HO	LO	GY			
DEPTH (FEET) ELEVATION	WELL CONSTRUCTION DIAGRAM	WATER TABLE GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
0 465					$\sim 0.0-0.5$ ft; Clayey Silt, dark brown, 10YR 3/3,	FB										
5-460				75	wet, soft. 0.5-1.0 ft; Silty Clay, very dark grayish brown, 10YR 3/3, plastic, soft, wet. 1.0-1.3 ft; Clayey Silt, dark grayish brown, 10YR 4/2, wet, soft, mottles (10YR 4/6 and 4/	ΓD										
5 460				60	<ol> <li>1).</li> <li>1.3-2.8 ft; Clayey Silty Sand, dark grayish brown, 10YR 4/2, silt and clay interbeds &lt;1 inch thick, wet, soft.</li> <li>2.8-6.5 ft; Sandy Silt, dark grayish brown,</li> </ol>											
10 455				100	10YR 4/2, laminated, wet, soft, mottles (10YR 4/6); thin clay bed below 6.3 ft, plastic. 6.5-11.4 ft; Sandy Silt, dark grayish brown, 10YR 4/2, laminated, wet, soft; dark gray, 10YR 4/1, below 7.5 ft; very dark gray, (Gley) 1 3/N, below 10.0 ft.	CO/ BS										
				100	11.4-13.0 ft; Clayey Silt, very dark gray, (Gley) 1 3/N, slightly plastic, laminated, clay and silt interbeds <1 inch thick, wet, soft. 13.0-14.2 ft; Silty Clay and Silty Sand, thin beds, very dark gray, (Gley) 1 3/N, wet, soft;	FP/ Lev										
20 445			7	100	silty clay beds, highly plastic, black mottles (Gley 1 2.5/N) below 13.8. 14.2-26.2 ft; Fine Sand, trace very fine sand, very dark gray, (Gley) 1 3/N, wet, soft; dark gray, 10YR 4/1, below 16.5 ft.	Lev	-									
			7	100												
DRILLING CO.: M DRILLER: LOGGED BY:	Ryan Hunzil	-			26.2-36.5 ft; Medium Sand and Coarse Sand, STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN WATER LE	C VELS:	AF	RING TER I TE:	DRIL		-					
DATE DRILLED: START TIME: END TIME: BOREHOLE DIA.:	T. Doll 10/12/09 4:32AM 7:00PM 8.25"				SAMPLES. PIEZOM NOTES: S. King (Gredell) onsite developing piezometers. VERTICAL DA HORIZONTAL DA WEATHER: Cool,	ATUM: ATUM:	INS NAV NAD	STALI D 88 83	LED					FEE	_ ≞T	

# BORING LOG P-189

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

### LOCATION: Heisel-SW-S of LBR, W of farm access Rd

G.S. ELEVATION: 464.91' T.O.C. ELEVATION: 467.93'

NORTHING: 991059.00

EASTING:	728325.94
----------	-----------

		eitz & Jens,	<u>, IIIC.</u>	NORTHING: 99105	9.00	<u> </u>	AST	NG	1	283	25.5	<del>/4</del>		
			ERY					LIT	ΉО	LO	GY			
<b>DEPTH (FEET)</b>	ELEVATION	WELL CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG	SAMPLE TYPE PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILIY CLAY SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
30-	- - - - -		100	thin beds, trace fine sand and gravel, dark gray, 10YR 4/1, subrounded clasts, wet, loose, (fine sand and clay slough probable in top of 30.0 and 35.0 ft S.S.).	С									
35 -	- 430		100				·	·						
40-	- - - 425 - -			BORING TERMINATED IN COARSE SAND @36.5 FT										
45 -	- 													
50	- 													
55 -	-  410 -													
DRILLING DRILLER LOGGED DATE DR START T END TIMI BOREHO	R: 1 ) BY: RILLED: 'IME: E:	's Enterprises, Inc. Ryan Hunziker T. Doll 10/12/09 4:32AM 7:00PM 8.25"	I	STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY, ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES. NOTES: S. King (Gredell) onsite developing piezometers. HORIZONTAL D WEATHER: Cool	IETER: ATUM: ATUM:	AFTE DATI INST NAVD NAD 8	3	D AT	G: +/	34.	.8	FÈE	:т —	

#### **GREDELL BORING LOG P-191 ENGINEERING RESOURCES, INC.** Ameren Missouri Labadie Power Plant **LOCATION:** Newman-SW-E of farm access Rd, S of LBR **Proposed Utility Waste Disposal Area** G.S. ELEVATION: 464.41 T.O.C. ELEVATION: 467.10' **Detailed Site Investigation** CLIENT: Reitz & Jens, Inc. NORTHING: 991032.57 EASTING: 729099.94 LITHOLOGY RECOVERY WELL CONSTRUCTION DIAGRAM WATER TABLE SAMPLE TYPE CLAY SM GRAVEL ОЕРТН (FEET) **GRAPHIC LOG** .G GRAVEL DESCRIPTION ELEVATION SAND VC SAND ġ M SAND PERCENT SAND C SAND FACIES I SILTY CLAY SILT Щ 465 0 0.0-0.8 ft; Clayey Silt, very dark gravish FB brown, 10YR 3/2, moist, soft, roots. 0.8-4.2 ft; Silty Clay, very dark gravish brown, 65 10YR 3/2, stiff, moist, few faint mottles (10YR 4/6); dark gravish brown, 10YR 4/2, below 2.6 460 ft, soft grading to stiff, many mottles; highly 5 plastic below 6.8 ft, very stiff, few mottles. 4.2-7.8 ft; Poor recovery, probable Silty Clay slough. 60 7.8-9.0 ft; Sandy Clayey Silt, dark gray, 10YR 4/1, laminated, iron staining (10YR 4/6), wet, 455 FP/ 10 \soft. Lev 9.0-13.5 ft; Silty Sand and Fine Sand, dark gray and dark grayish brown, 10YR 4/1 and 4/2, iron staining (10YR 4/6), wet, loose, iron 100 concretions below 12.9 ft. 13.5-15.0 ft; Silty Clay, Sandy Silt, and Silty CO/ 450 Sand, alternating thin beds, dark gray, (Gley) 1 BS 15 4/N, wet, soft; silty clay bed, plastic, mottles 100 FP/ (Gley 1 2.5/N); sandy silt bed, laminated; silty Lev sand bed, black coalified wood matter and wood fragments. 15.0-20.4 ft; Fine Sand, trace very fine sand, 445 dark gray, 10YR 4/1, wet, soft. 20 100 20.4-28.3 ft; Medium to Coarse Sand, С alternating thin beds, trace gravel, dark gray, 10YR 4/1, wet, loose to soft, 5-20 mm subangular and subrounded clasts, (clay slough probable in top of 25.0 ft S.S.). 440 25 100 STRATIFICATION LINES ARE DRILLING CO .: Max's Enterprises, Inc. WATER LEVELS: DURING DRILLING 7.8 FEET APPROXIMATE LITHOLOGIC BOUNDARIES DRILLER: Rvan Hunziker AFTER DRILLING: ONLY; ACTUAL CHANGES MAY B FEET GRADUAL OR MAY OCCUR BETWEEN LOGGED BY: T. Doll DATE: SAMPLES. DATE DRILLED: 12/03/09 PIEZOMETER: INSTALLED AT +/- \_\_\_\_34.8 FEET START TIME: NOTES: S. King (Gredell) onsite 3:00PM VERTICAL DATUM: NAVD 88 END TIME: developing piezometers. 5:07PM HORIZONTAL DATUM: NAD 83 BOREHOLE DIA .: 8.25" WEATHER: Cold, 35°F, Mostly Sunny, 10-15 MPH Wind from SW.

Figure P-191 Sheet 1 of 2

#### Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

## BORING LOG P-191

LOCATION: Newman-SW-E of farm access Rd, S of LBR

G.S. ELEVATION: 464.41 T.O.C. ELEVATION: 467.10'

**NORTHING:** 991032.57 **EASTING:** 729099.94

					ERΥ							HOI	LO	<u>GY</u>	,		
<b>DEPTH (FEET)</b>	ELEVATION	WELL CONSTRUCTION DIAGRAM	WAIER IABLE GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
-		-A-		п.													
-	-						C										
30 -	- 435 - -			<b>/</b>	100	28.3-36.5 ft; Fine to Medium Sand, alternating thin beds, trace coarse sand and gravel, dark gray, 10YR 4/1, wet, loose to soft, 5-20 mm subrounded clasts, 10 mm coalified wood matter below 30.9 ft.	CM/ Sp										
	_						FP/										
-	- 430						Lev										
35-	-			7	100												
-	-		<u> 1997 - 1997</u>	ſ		BORING TERMINATED IN FINE SAND	<u> </u>										
	-					@36.5 FT											
-	- 425																
40 -	-																
	-																
	_																
-	- 420																
45 -	-																
-	_																
-	-																
-	- 415																
50 -	-415 -																
	-																
	-						1										
-	-																
55 -	- 410																
-	-																
										;	i	:	:	:	:	:	
DRILLIN	G CO.: Ма: R:	x's Enterprise Ryan Hunzik				STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY, ACTUAL CHANGES MAY BE	VELS:										
LOGGE	BY:	T. Doll				GRADUAL OR MAY OCCUR BETWEEN SAMPLES. PIEZON			ATE: STAL					8	666	— т	
DATE DI START 1		12/03/09 3:00PM				NOTES: S. King (Gredell) onsite VERTICAL D					A1 1	/		.0	1.66	. '	
		5:07PM				developing piezometers. HORIZONTAL D				, 10 1	5 1.41	บบ	ind f		347		
ROBEHO	DLE DIA.:	8.25"				WEATHER: Cold	1, 35°F, MO	ostiy 3	sunny	, 10-1	i S Mi	п₩	uid fi		wγ.		

## BORING LOG P-193

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

LOCATION: Newman-South Central-E of farm access Rd

G.S. ELEVATION: 464.11 T.O.C. ELEVATION: 467.00'

NORTHING: 991026.43 EASTING: 729688.59

				1	1		171						
DEPTH (FEET) ELEVATION	WELL WELL CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG	SAMPLE TYPE PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	Y CLAY		VF SAND			C SAND		SM GRAVEL	GRAVEL
ELEY	WEL	PERC		FACI	CLAY	SILT	5	¶ S	N S	C S	ŝ	NS NS	Ű
- 465							-						
- 460 5		50	10YR 3/2, plastic, stiff, few faint mottles (10YR 4/6), moist, common mottles below 1.9 <u>ft.</u> 3.8-5.9 ft; Clayey Silt and Silty Clay, thin beds,										
455		40	brown, 10YR 4/3, common mottles (10YR 4/ 6), laminated to 5.5 ft, iron concretions at 5.5 ft, wet below 5.6 ft, silty clay is plastic. 5.9-15.3 ft; Silty Sand, brown, 10YR 4/3, wet, soft, laminated to 7.0 ft; muscovite mica flakes to 7.0 ft and below 15.0 ft; dark grayish brown (10YR 4/2) from 10.0-15.0 ft; with silt below	FP/ Lev									
		65 100	15.0 ft. 15.3-20.6 ft; Silty Sand and Fine Sand, thin	CO/	-								
		50	<ul> <li>beds, dark gray, (Gley) 1 4/N, wet, loose to soft; black coalified wood matter and brown wood laminae repeating sequence every 10-20 mm to 16.5 ft; very dark gray (Gley 1 3/N) below 20.3 ft.</li> <li>20.6-28.3 ft; Very Fine to Coarse Sand,</li> </ul>	BS									
25		100	alternating thin beds, with gravel, dark gray, (Gley) 1 4/N, 5-20 mm subrounded and subangular clasts; 30 mm black coalified wood matter below 25.0 ft; trace clay balls (brown, plastic) below 26.4 ft.										
DRILLING CO.: Ma DRILLER: LOGGED BY: DATE DRILLED:	x's Enterprises, Inc. Ryan Hunziker T. Doll 12/04/09	· · · · ·	STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES. PIEZOM		DURIN AFTEF DATE: INSTA	R DRIL	LING	i:			FEE	т -	
START TIME: END TIME: BOREHOLE DIA.:	8:04AM 11:29AM 10.25"		NOTES: VERTICAL D/ HORIZONTAL D/ WEATHER: Cold,	ATUM: ATUM:	NAVD 8 NAD 83	8							

#### Ameren Missouri Labadie Power Plant **Proposed Utility Waste Disposal Area Detailed Site Investigation** CLIENT: Reitz & Jens, Inc.

## **BORING LOG P-193**

LOCATION: Newman-South Central-E of farm access Rd

G.S. ELEVATION: 464.11 T.O.C. ELEVATION: 467.00'

Date Printed: 11/8/2010

**NORTHING:** 991026.43

**EASTING:** 729688.59

				Ť	RY		ſ			l		HOI		GY			
ОЕРТН (FEET)	ELEVATION	WELL CONSTRUCTION DIAGRAM	WATER TABLE		PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	СГАУ	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
30-	- 435 				100	28.3-36.5 ft; Fine to Medium Sand, alternating thin beds, trace very fine and coarse sand, trace gravel, dark gray, 10YR 4/1, 5-20 mm subrounded and subangular clasts; trace clay balls (brown, plastic) below 26.4 ft; dark gray, 10YR 4/1, below 30.0 ft, (fine sand noted at total depth based on cuttings sample collected from auger bit).	CO/ BS CM/ Sp	-									
35 -	•				100		FP/ Lev		<u>.                                    </u>	·	·						
40	- - - - -					BORING TERMINATED IN FINE SAND @36.5 FT											
45	- - 420 - -																
50	- 415 																
- 55 — -	- - 410 -																
DRILLIN DRILLEF LOGGEE		s's Enterpris Ryan Hunz T. Doll	iker			STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.	VELS:	AF DA	JRING TER I	DRIL	LINC	G:			FEE	T	
DATE DE START 1 END TIM BOREHO	TIME:	12/04/09 8:04AM 11:29AN 10.25"	[			NOTES: PIEZON NOTES: VERTICAL D HORIZONTAL D WEATHER: Cold	ATUM: ATUM:	NAV NAD	83		AT +	·/	34.	9	FEE	T	

## BORING LOG P-195

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/17/2010

### LOCATION: Newman-SE-W of Davis Rd, S of LBR

G.S. ELEVATION: 463.44 T.O.C. ELEVATION: 466.07'

**NORTHING:** 991065.81 **EASTING:** 730256.04

CLIENT: Reitz & J	<u>, , , , , , , , , , , , , , , , , , , </u>	<u>.</u>	NORTHING: 99106	5.81	<u> </u>	A5							
		ERY					LIT	HO	LO	<u>GY</u>			
DEPTH (FEET) ELEVATION WELL CONSTRUCTION DIAGRAM WATER TABLE	GRAPHIC LOG SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
	5												
- 460		80	0.0-0.6 ft; Silty Sand, very dark grayish brown, 10YR 3/2, moist, soft. 0.6-4.5 ft; Silty Clay, very dark grayish brown, 10YR 3/2, plastic, stiff, moist, common mottles (10YR 4/6), roots; soft to stiff from 2.2-2.9 ft	FB	:								
5 		20	and many mottles; stiff below 2.9 ft; highly plastic below 3.3 ft and common mottles. 4.5-6.0 ft; Clayey Silt, brown, 10YR 4/3, non- plastic, soft, moist; with clay below 5.3 ft,	FP/ Lev	_								
10-		30 83	common mottles (10YR 4/6), iron concretions. 6.0-10.8 ft; Silty Sand, brown, 10YR 4/3, wet, loose, dark yellowish brown (10YR 4/4) below 10.0 ft; trace fine sand at 10.8 ft, 10YR 4/6.										
			10.8-20.9 ft; Very Fine Sand, with fine sand, very dark gray, (Gley) 1 3/N, wet, loose to soft, sharp contact with above; black very fine coalified wood matter and muscovite mica flakes to 15.0 ft; dark gray and dark grayish brown, 10YR 4/1 and 4/2, from 15.0-16.1 ft	CO/ BS									
20 -		100	and 20.0-20.9 ft; dark gray (Gley 1 4/N) from 16.1-20.0 ft, (clay slough probable in 20.0 ft S.S.).										
		83	20.9-36.5 ft; Very Fine to Fine Sand, thin beds, trace medium and coarse sand, dark gray and very dark gray (Gley) 1 3/N and 4/N, wet, soft; laminated black coalified wood matter and muscovite mica flakes below 30.9 ft, (very fine										
25-		100	sand and clay slough probable in top of 25.0- 35.0 ft S.S.).	;						_			
DRILLING CO.: Max's Enterprises, DRILLER: Doug Hunziker LOGGED BY: T. Doll DATE DRILLED: 12/11/09			STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY, ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES. PIEZOM	÷	AFT DAT	RING DI ER DR E: TALLEE	ILLIN	G: _			FEE	т -	
DATE DRILLED:         12/11/09           START TIME:         2:45PM           END TIME:         5:50PM           BOREHOLE DIA.:         8.25"		·	NOTES: VERTICAL DA HORIZONTAL DA WEATHER: Cold,	ATUM: ATUM:	NAVE NAD 8	88 33							

## BORING LOG P-195

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/17/2010

LOCATION: Newman-SE-W of Davis Rd, S of LBR

G.S. ELEVATION: 463.44 T.O.C. ELEVATION: 466.07'

NORTHING: 991065.81

EASTING: 730256.04

	<u>:NT: R</u>	eitz & Jens,	Inc.		NORTHING: 991065	5.81	EA	STIN	<u>IG:</u> 7	7302	56.	04		
			ER					ļ	ITHO	)LO	GY			
DEPTH (FEET)	ELEVATION	WELL WELL CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG	SAMPLE TYPE PERCENT RECOVERY	DESCRIP	ΓΙΟΝ	FACIES I.D.	CLAY SILTY CLAY	SILT	VF SAND F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
30 -	- 435 		100	20.9-36.5 ft; Very Fine to trace medium and coarse s very dark gray (Gley) 1 3/ laminated black coalified muscovite mica flakes bel	and, dark gray and N and 4/N, wet, soft; wood matter and	CO/ BS								
35 -	- 			sand and clay slough prob 35.0 ft S.S.).		·								
	-		100	BORING TERMINATED SAND @36.5 FT	IN VERY FINE									
40 -	- 425 - -			SHELBY TUBE SAMPL 2.0-4.0 FT DEPTH AT CO DRILLING.										
45 -	- - - -													
50 -	- 415 -													
	- 410													
55 -	-							-						
DRILLING DRILLER LOGGED DATE DR	R: DBY:	x's Enterprises, Inc. Doug Hunziker T. Doll 12/11/09		STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOU ONLY; ACTUAL CHANGES MAY B GRADUAL OR MAY OCCUR BETW SAMPLES.	Ŧ		AFTEI DATE		ILLING .LING: AT +/-			_ FEE	ET	
START T END TIM BOREHO	'IME: E:	2:45PM 5:50PM 8.25"		NOTES:	VERTICAL DA HORIZONTAL DA WEATHER: Cold,	ATUM:	NAVD 8 NAD 83	8						

Figure P-195 Sheet 2 of 2

## BORING LOG P-197

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

LOCATION: Newman-SE-W of Davis Rd, S of LBR

G.S. ELEVATION: 463.54 T.O.C. ELEVATION: 466.10'

NORTHING: 990891.95

EASTING: 730883.14

CLIENT:	Reitz & Jen	s, Inc	2.	NORTHING: 99089	<u>1.95</u>		EAS	STIN	<u>IG:</u>	<u>7</u> 3	<u>808</u>	<u>83.</u> 1	14		
			ΕRΥ					Ē	_ITI	-IOI	-00	GY	,	,	
DEPTH (FEET) ELEVATION	WELL WELL CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND		LG GRAVEL
465															
				0.0-0.5 ft; Sandy Silt, dark grayish brown, 10YR 4/2, non-plastic, soft, moist, roots.	FB										
- 460			60	0.5-1.3 ft; Silty Clay and Clayey Silt, thin beds, dark brown and brown, 10YR 3/3 and 4/3, stiff, moist, plastic to 0.9 ft, many mottles (10YR 4/ 6) below 0.9 ft.											
			40	1.3-4.0 ft; Silty Clay, very dark grayish brown, 10YR 3/2, plastic, stiff, moist, common mottles (10YR 4/6). 4.0-5.8 ft; Clayey Silt, dark grayish brown,	FP/ Lev										
			83	10YR 4/2, laminated, wet, soft. 5.8-8.5 ft; Silty Sand, dark grayish brown, 10YR 4/2, herringbone laminae, wet, soft; trace clay 5 mm thin bed at 6.4 ft.											
450				8.5-18.3 ft; Fine Sand, with very fine sand, brown, 10YR 4/3, wet, soft; dark gray, 10YR 4/ 1, below 15.3 ft.											
			78												
20			00	18.3-23.3 ft; Fine Sand, with very fine sand, trace medium and coarse sand, dark gray, 10YR 4/1, wet, loose, (fine sand slough noted											
- - - - - - - - - - - 440				in top of 20.0 ft S.S. ).											
				<ul> <li>23.3-28.3 ft; Fine Sand, with medium sand,</li> <li>trace coarse sand and gravel, dark gray, 10YR</li> <li>4/1, 10-15 mm subangular clasts, one piece of</li> </ul>											
			61	black coalified wood matter.											
DRILLING CO.: 1 DRILLER: LOGGED BY:	Max's Enterprises, Inc. Ryan Hunziker T. Doll			STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY, ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.	VELS:	AF	TER	g dri Dril	LING	:					
DATE DRILLED:	12/05/09			PIEZON		IN	STAL	LED			34.	7	FEE	Т	
START TIME: END TIME:	7:42AM 11:08AM			NOTES: VERTICAL D. HORIZONTAL D.											
BOREHOLE DIA.								alm.							
					, 20 1, 01	CAL DE	, 0								

## BORING LOG P-197

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

LOCATION: Newman-SE-W of Davis Rd, S of LBR

G.S. ELEVATION: 463.54 T.O.C. ELEVATION: 466.10'

L95 **EASTING:** 730883.14

CLIENT: F	<u>Reitz &amp; Jens,</u>	Inc.		1.95	EASTING: 730883.14											
		ERY				LITHOLOGY										
DEPTH (FEET) ELEVATION	WELL CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG	SAMPLE TYPE PERCENT RECOVERY	DESCRI	PTION	FACIES I.D.	CLAY	SILTY CLAY	SILT	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL		
		1														
30 -		83	28.3-33.3 ft; Fine to Me sand, trace gravel, dark mm subangular clasts, v pieces of black coalified	gray, 10YR 4/1, 10-15 vet, 10-20 mm flat	CM/ Sp											
430		*	33.3-36.5 ft; Very Fine	Sand, with fine sand,	FP/											
35 -		100	dark gray, 10YR 4/1, w mm black angular and r matter	et, soft to stiff, 15-30	Lev											
	<u>Principals</u>		BORING TERMINATI	ED IN VERY FINE	 :											
425			SAND @36.5 FT													
40 -																
420																
45																
-																
- 415																
50 -																
410																
55 –																
DRILLING CO.: Max's Enterprises, Inc. DRILLER: Ryan Hunziker			STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC B ONLY; ACTUAL CHANGES MA' GRADUAL OR MAY OCCUR BE	YBE	U VELS:	AFTER DRILLING: FEET										
LOGGED BY: DATE DRILLED:	T. Doll 12/05/09	PIEZOM									ET					
START TIME: END TIME:	7:42AM 11:08AM		NOTES:	VERTICAL DA HORIZONTAL DA												
BOREHOLE DIA.:	10.25"			WEATHER: Cold				alm.								

## BORING LOG P-199

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

LOCATION: Newman-SW-E of farm access Rd, S of LBR

G.S. ELEVATION: 465.28 T.O.C. ELEVATION: 468.13'

NORTHING: 990738.72 EAS

.72	EASTING:	728782.05
. / 2	EAGING.	120102.05

CLIENT: Reitz & Jens, Inc.	NORTHING: 99073	8.72	E	: <u>AS</u>	TIN	<u>G:</u>	72	<u>878</u>	2.0:	5		
ERY			LITHOLOGY									
DEPTH (FEET) ELEVATION ELEVATION WELL WATER TABLE GRAPHIC LOG SAMPLE TYPE SAMPLE TYPE	DESCRIPTIÓN	FACIES I.D.	CLAY	SILTY CLAY	SILT	VF SAND	F SAND	M SAND	C SAND	VC SAND	LG GRAVEL	
0 - 465 55	0.0-3.9 ft; Silty Clay, very dark grayish brown, 10YR 3/2, plastic, soft, moist, roots, stiff below 0.5 ft, very stiff and few mottles (10YR 4/6) below 1.8 ft.	FB										
5 - 460	<ul><li>3.9-6.3 ft; Poor recovery, probable Silty Clay slough.</li><li>6.3-7.5 ft; Clayey Silt, brown, 10YR 4/3,</li></ul>											
	muscovite mica flakes, wet, soft, few mottles (10YR 4/6); trace clay below 6.8 ft; with clay and laminated below 7.3 ft.	FP/ Lev										
	<ul> <li>7.5-18.3 ft; Very Fine Sand, trace fine sand, dark grayish brown, 10YR 4/2, wet, loose; clayey silt thin bed at 6.3 ft, dark gray, (Gley) 1 4/N, laminated, sharp contact; brown, 10YR 4/3, below 10.3 ft; dark gray, 10YR 4/1, below 15.3 ft, (clay slough probable in top of 15.0 ft</li> </ul>											
	S.S.).											
	18.3-28.0 ft; Fine Sand, with very fine sand, dark gray and dark grayish brown, 10YR 4/1 and 4/2, wet, soft; silty clay and very fine sand thin beds below 25.7 ft, dark gray, (Gley) 1 4/ N.											
		CO/ BS										
DRILLING CO.: Max's Enterprises, Inc. DRILLER: Ryan Hunziker LOGGED BY: T. Doll	STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.	VELS:	AF	TER I	) DRI	ING	_					
DATE DRILLED:         12/01/09           START TIME:         11:55AM           END TIME:         2:47PM           BOREHOLE DIA.:         10.25"	NOTES: S. King (Gredell) onsite developing piezometers. WEATHER: Cool,	ATUM: ATUM:	NAV NAD	D 88 83	LED A 15-20					FEET V.		

## **BORING LOG P-199**

Ameren Missouri Labadie Power Plant **Proposed Utility Waste Disposal Area Detailed Site Investigation** CLIENT: Reitz & Jens, Inc.

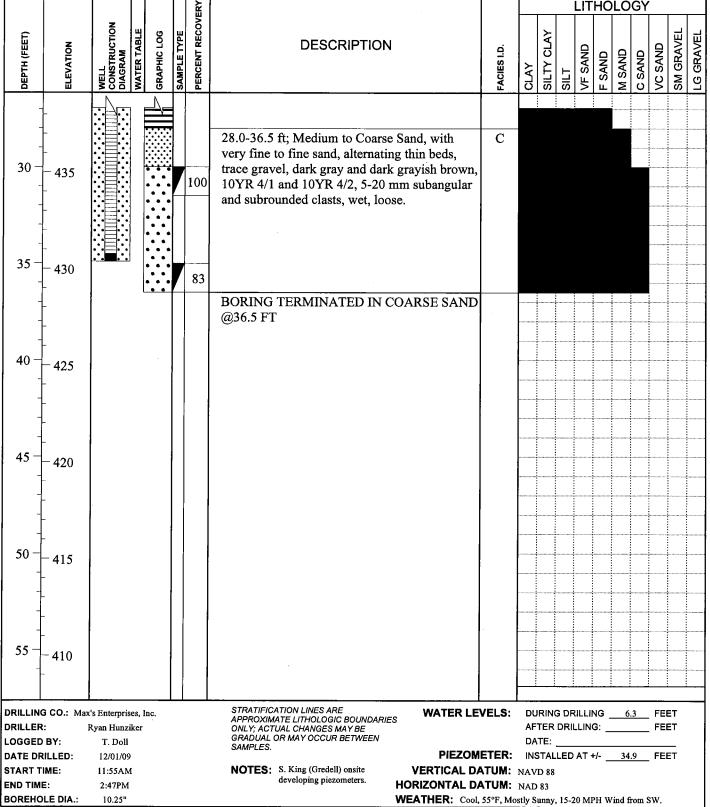
Printed: 11/8/2010

Date

LOCATION: Newman-SW-E of farm access Rd, S of LBR

G.S. ELEVATION: 465.28 T.O.C. ELEVATION: 468.13'

**NORTHING:** 990738.72 EASTING: 728782.05 LITHOLOGY CLAY DESCRIPTION VC SAND VF SAND FACIES I.D. M SAND F SAND C SAND SILTY CLAY SILT С



## Ameren Missouri Labadie Power Plant **Proposed Utility Waste Disposal Area Detailed Site Investigation**

## **BORING LOG P-201**

LOCATION: Newman-SW-E of farm access Rd, S of LBR

G.S. ELEVATION: 464.65 T.O.C. ELEVATION: 467.08'

		lte Inve leitz & .				NORTHING: 99	0567.'	70	EASTING: 729279.14									
					ΞRΥ				LITHOLOGY									
DЕРТН (FEET)	ELEVATION	WELL CONSTRUCTION DIAGRAM	WATER TABLE GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	DESCRIPTION		FACIES I.D.	CLAY	SILTY CLAY	SILI	VF SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
0 -						0.0-4.0 ft; Silty Clay, very dark grayish bro	wn.	FB										
-	-				60	10YR 3/2, plastic, soft, moist, roots, stiff be 0.5 ft, very stiff and mottles (10YR 4/6) bel 2.5 ft. 4.0-6.3 ft; Poor recovery, probable Silty Cla	low ow											
5	- 460 - -	Ţ			80	slough. 6.3-11.9 ft; Clayey Silt, Silty Clay, and San Clayey Silt, alternating thin beds, wet, mott	iy											
10-	- - 455 - -	Π			70	<ul> <li>(10YR 4/6) to 10.5 ft; clayey silt to 6.9 ft, brown, 10YR 4/3, slightly plastic, soft to sti muscovite mica flakes; dark grayish brown dark gray, 10YR 4/2 and 4/1, below 7.7 ft; trace very fine sand and iron concretions from 8.8-10.5 ft; silty clay below 10.5 ft, dark gray</li> </ul>	and m	 CO/	-						-			
15-	- <b>45</b> 0 				39	(Gley) 1 4/N, plastic, soft, laminated, silt interbeds with muscovite mica flakes <1 inc thick, iron staining. 11.9-18.3 ft; Silty Sand, dark gray, (Gley) 1 N, laminated, iron staining, muscovite mica flakes, wet, soft, (clay slough noted in 15.0 20.0 ft S.S.).	h 4/	BS										
20 -	- 445 - -				100	18.3-31.3 ft; Very Fine to Fine Sand, thin be with medium sand, trace clay and coarse san dark gray (Gley) 1 4/N and 10YR 4/1, wet, soft.	nd,	FP/										
25 -	- - 440 -				100		E	Lev										
DRILLEF LOGGEI	R: DBY:	ax's Enterprise Ryan Hunzik T. Doll				STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY, ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.			AF DA	RING TER D TE: _	RIL	LING	:			FEE	т 	
DATE DI START 1		12/01/09 8:10AM				PIE NOTES: S. King (Gredell) onsite VERTICA developing piezometers.		rum:		D 88	ËD	AT +/-		35.(	)	FEE	Т	

developing piezometers.

END TIME:

BOREHOLE DIA .:

11:00PM

8.25"

HORIZONTAL DATUM: NAD 83

WEATHER: Cold, 30°F, Clear Skies, 5 MPH Wind from S.

Ameren Missouri Labadie Power Plant Proposed Utility Waste Disposal Area Detailed Site Investigation

## BORING LOG P-201

LOCATION: Newman-SW-E of farm access Rd, S of LBR

G.S. ELEVATION: 464.65 T.O.C. ELEVATION: 467.08'

CLIENT: Reitz & Jens, Inc.

Date Printed: 11/8/2010

NORTHING: 990567.70 EASTING: 729279.14

				E E											
<b>DEPTH (FEET)</b>	ELEVATION	WELL WELL CONSTRUCTION DIAGRAM WATER TABLE GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVER	DESCRIPTION	FACIES I.D.	CLAY	SILTY CLAY	VE SAND	F SAND	M SAND	C SAND	VC SAND	SM GRAVEL	LG GRAVEL
30	 435			100	18.3-31.3 ft; Very Fine to Fine Sand, thin beds, with medium sand, trace clay and coarse sand, dark gray (Gley) 1 4/N and 10YR 4/1, wet, soft.	FP/ Lev									
35 -	430			78	31.3-36.5 ft; Fine to Medium Sand, thin beds, trace gravel, dark gray, 10YR 4/1, 10 mm subrounded and subangular clasts, wet.	CM/ Sp					•				
40 -	425				BORING TERMINATED IN MEDIUM SAND @36.5 FT										
45 -	- 														
50	- 														
55	- <b>4</b> 10 														i
DRILLING CO.: Max's Enterprises, Inc. DRILLER: Ryan Hunziker LOGGED BY: T. Doll			STRATIFICATION LINES ARE APPROXIMATE LITHOLOGIC BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.		AFTER DRILLING: DATE:						FEEI	Г -			
DATE DI START 1 END TIM BOREHO	TIME:	12/01/09 8:10AM 11:00PM 8.25"			PIEZOMETER: INSTALLED AT +/- <u>35.0</u> FE NOTES: S. King (Gredell) onsite developing piezometers. HORIZONTAL DATUM: NAVD 88 HORIZONTAL DATUM: NAD 83 WEATHER: Cold, 30°F, Clear Skies, 5 MPH Wind from S.								FEET	-	

#### GREDELL Engineering Resources, Inc. Geologic Descriptions of Temporary Borings

#### Log Description for B-10

0-4.8 ft; Clay to Silty Clay, pale yellowish brown, 10YR 6/2, w/light brown mottles, sparse silt layers (Facies I.D. – Flood Basin).

4.8-9.3 ft; Silt to Clayey Silt, pale yellowish brown, 10YR 6/2 (Facies I.D. – Flood Basin).

9.3-16.8 ft; Very Fine Sand, grayish orange, 10YR 7/4, common clay and silt layers above 12 ft, slightly silty below (Facies I.D. – Floodplain/Levee).

16.8-26.8 ft; Very Fine to Fine Sand, grayish orange, 10YR 7/4, clean, well sorted (Facies I.D. – Floodplain/Levee).

26.8-35.0 ft; Gravelly Sand, grayish orange, 10YR 7/4, common granules and rounded pebbles up to 10 mm dia (Facies I.D. – Channel).

#### GREDELL Engineering Resources, Inc. Geologic Descriptions of Temporary Borings

#### Log Description for B-13

0-13.5 ft; Sample not available.

13.5-27.8 ft; Fine Sand, grayish orange, 10YR 7/4, clean, well sorted (Facies I.D. – Floodplain/Levee).

27.8-31.8 ft; Coarse to Very Coarse Sand, grayish orange, 10YR 7/4, gravelly w/common granules to fine pebbles up to 5 mm dia (Facies I.D. – Channel).

31.8-36.8 ft; Gravel, mostly 5-10 mm (poor sample recovery) (Facies I.D. - Channel).

36.8-41.8 ft; Coarse Sand, pale yellowish brown, 10YR 6/2, sparse granules and fine pebbles up to 5 mm dia (Facies I.D. – Channel).

41.8-50.0 ft; Gravel, angular limestone fragments to rounded pebbles up to 15 mm dia, very poorly sorted, poor sample recovery below 45 ft (Facies I.D. – Channel).

#### GREDELL Engineering Resources, Inc. Geologic Descriptions of Temporary Borings

#### Log Description for B-14

0-3.3 ft; Fine Sand interbedded with clay and silt, moderate yellowish brown, 10YR 5/4 (Facies I.D. – Flood Basin).

3.3-6.5 ft; Very Fine to Fine Sand, moderate yellowish brown, 10YR 5/4, silty (Facies I.D. – Flood Basin).

6.5-9.3 ft; Silt, pale yellowish brown, 10YR 6/2, sparse very fine sand (Facies I.D. – Flood Basin).

9.3-12.5 ft; Very Fine Sand, Silt and Clay, alternating very thin beds, pale yellowish brown, 10YR 6/2 (Facies I.D. – Flood Basin).

12.5-16.8 ft; Very Fine Sand, pale yellowish brown, 10YR 6/2, silty, trace fine sand (Facies I.D. – Floodplain/Levee).

16.8-26.8 ft; Very Fine to Fine Sand, pale yellowish brown, 10YR 6/2, clean, well sorted, slight downward increase in grain size (Facies I.D. – Floodplain/Levee).

26.8-35.0 ft; Gravelly Sand, grayish orange (10YR 7/4) to dark yellowish orange (10YR 6/6), abundant granules and pebbles up to 25 mm dia (Facies I.D. – Floodplain/Levee).

#### GREDELL Engineering Resources, Inc. Geologic Descriptions of Temporary Borings

#### Log Description for B-26

0-4.8 ft; Clayey Silt to Silt, pale yellowish brown, 10YR 6/2 (Facies I.D. - Flood Basin).

4.8-9.3 ft; Silt, pale yellowish brown, 10YR 6/2, trace clay (Facies I.D. - Flood Basin).

9.3-12.5 ft; Very Fine Sand, pale yellowish brown, 10YR 6/2, trace silt (Facies I.D. – Floodplain/Levee).

12.5-26.8 ft; Very Fine to Fine Sand, pale yellowish brown (10YR 6/2) to grayish orange (10YR 7/4) (Facies I.D. – Floodplain/Levee).

26.8-41.8 ft; Coarse to Very Coarse Sand, grayish orange, 10YR 7/4, common granules and pebbles up to 10 mm dia (Facies I.D. – Channel).

41.8-45.0 ft; Gravel, pale yellowish brown, 10YR 6/2, angular to well-rounded pebbles up to 30 mm dia (Facies I.D. – Channel).

#### GREDELL Engineering Resources, Inc. Geologic Descriptions of Temporary Borings

#### Log Description for B-50

0-5.8 ft; Very Fine Sand, pale yellowish brown, 10YR 6/2, slightly silty (Facies I.D. – Flood Basin).

5.8-12.0 ft; Silt and Very Fine Sand, alternating thin beds, pale yellowish brown, 10YR 6/2 (Facies I.D. – Flood Basin).

12.0-16.8 ft; Very Fine Sand, grayish orange, 10 YR 7/4, slightly silty (Facies I.D. – Floodplain/Levee).

16.8-21.8 ft; Fine Sand, pale yellowish brown, 10YR 6/2, sparse silt and very fine sand (Facies I.D. – Floodplain/Levee).

21.8-37.5 ft; Medium to Coarse Sand, dark yellowish brown (10YR 4/2) to grayish orange (10YR 7/4), abundant black coalified wood fragments up to 30 mm dia above 25 ft, sparse elsewhere, sparse to common granules (Facies I.D. – Channel, Channel Margin/Splay).

37.5-50.0 ft; Coarse Sand, pale yellowish brown, 10YR 6/2, gravelly, very poorly sorted, common granules and pebbles up to 10 mm dia (Facies I.D. – Channel).

#### GREDELL Engineering Resources, Inc. Geologic Descriptions of Temporary Borings

#### Log Description for B-52

0-4.8 ft; Clay to Silty Clay, pale yellowish brown, 10YR 6/2 (Facies I.D. - Flood Basin).

4.8-12.5 ft; Fine Sand, grayish orange, 10 YR 7/4, scattered clay layers above 9 ft, clean, well sorted below (Facies I.D. - Floodplain/Levee).

12.5-16.8 ft; Very Fine to Fine Sand, pale yellowish brown (10YR 6/2) to dark yellowish brown (10YR 4/2), scattered layers silt and clay (Facies I.D. - Floodplain/Levee).

16.8-21.8 ft; Fine Sand, grayish orange, 10 YR 7/4, well sorted to moderately well sorted, common medium sand, clean (Facies I.D. - Floodplain/Levee).

21.8-26.8 ft; Coarse to Very Coarse Sand, gravish orange, 10 YR 7/4, gravelly w/common granules and pebbles up to 10 mm dia (Facies I.D. - Channel).

26.8-35.0 ft; Medium Sand, pale yellowish brown, 10YR 6/2, trace granules, well sorted toward base (Facies I.D. – Channel Margin/Splay).

#### GREDELL Engineering Resources, Inc. Geologic Descriptions of Temporary Borings

#### Log Description for B-54

0-4.0 ft; No sample available.

4.0-6.3 ft; Fine Sand, grayish orange, 10YR 7/4, clean, well sorted (Facies I.D. – Floodplain/Levee).

6.3-12.5 ft; Very Fine Sand, Silt and Clay, alternating very thin beds, dark yellowish orange, 10YR 6/6, becoming more sandy, pale yellowish brown, 10YR 6/2 below 10 ft (Facies I.D. – Flood Basin).

12.5-16.8 ft; Very Fine Sand, very dark greenish gray (Gley) 1 3/1, silty, saturated (Facies I.D. – Cut-Off/Backswamp).

16.8-21.8 ft; Very Fine Sand, Silt and Clay, alternating very thin beds, pale yellowish brown, 10YR 6/2, no obvious gley coloration (Facies I.D. – Floodplain/Levee).

21.8-35.0 ft; Medium Sand, grayish orange, 10YR 7/4, clean, well sorted, trace black carbonaceous matter at base (Facies I.D. – Floodplain/Levee).

#### GREDELL Engineering Resources, Inc. Geologic Descriptions of Temporary Borings

#### Log Description for B-56

0-4.8 ft; Silty Clay to Clayey Silt, dark yellowish brown, 10YR 4/2 (Facies I.D. – Flood Basin).

4.8-16.8 ft; Very Fine to Fine Sand, pale yellowish brown, 10YR 6/2, slightly silty, saturated (Facies I.D. – Floodplain/Levee).

16.8-21.8 ft; Medium Sand, grayish orange, 10YR 7/4, moderately sorted, common fine and coarse-sized sand, sparse very coarse sand and granules (Facies I.D. – Channel Margin/Splay).

21.8-26.8 ft; Very Fine to Fine Sand, very dark greenish gray (Gley) 1 3/1, silty, common black carbonaceous matter (Facies I.D. – Cutoff/Back Swamp).

26.8-41.8 ft; Medium Sand, grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2), well sorted, grading to moderately sorted, base marked by coarse wood fragments and pebbles up to 30 mm dia., probable scour contact (Facies I.D. – Floodplain/Levee).

41.8-46.8 ft; Coarse Sand, grayish orange, 10YR 7/4, common granules and fine pebbles up to 5 mm dia (Facies I.D. – Channel).

46.8-50.0 ft; Coarse to Very Coarse Sand, pale yellowish brown (10YR 6/2), common granules and pebbles up to 10 mm dia (Facies I.D. – Channel).

#### GREDELL Engineering Resources, Inc. Geologic Descriptions of Temporary Borings

#### Log Description for B-58

0-7.8 ft; Clay to Silty Clay, light olive gray, 5Y 6/1 (Facies I.D. – Flood Basin).

7.8-12.5 ft; Clay, Silt, and Very Fine Sand, alternating very thin beds, pale yellowish brown, 10YR 6/2 (Facies I.D. – Flood Basin).

12.5-26.8 ft; Fine to Medium Sand, pale yellowish brown, 10YR 6/2, well sorted grading to moderately sorted w/common granules and pebbles up to 10 mm dia (Facies I.D. – Floodplain/Levee, Channel Margin/Splay).

26.8-35.0 ft; Medium to Coarse Sand, grayish orange, 10YR 7/4, sparse gravel grading to gravely w/common rounded to angular pebbles up to 30 mm dia (Facies I.D. – Channel).

#### GREDELL Engineering Resources, Inc. Geologic Descriptions of Temporary Borings

#### Log Description for B-72

0-4.8 ft; Silt to Clayey Silt, dark brown, 10YR 3/2, slightly plastic, stiff, damp (Facies I.D. – Flood Basin).

4.8-12.5 ft; Silt to Very Fine Sand, alternating very thin beds to laminated, light brown, 10YR 4/3, clay layers above 10 ft, moist to wet (Facies I.D. – Flood Basin).

12.5-16.8 ft; Silt to Very Fine Sand, as above except Gley colored (1 4/N) (Facies I.D. – Cutoff/Back Swamp).

16.8-26.8 ft; Fine to Medium Sand, brownish gray, 10YR 4/1 to 10YR 4/3, trace coarse sand and fine pebbles up to 5 mm dia (Facies I.D. – Floodplain/Levee).

26.8-31.8 ft; Very Fine Sand, light brown to gray (10YR 4/2) to Gley colored (1 4/N), saturated (Facies I.D. – Cutoff/Back Swamp).

31.8-35.0 ft; Very Fine to Fine Sand, brown and gray (10YR 4/1 and 10YR 4/2), no Gley coloration, trace medium to coarse sand (Facies I.D. – Floodplain/Levee).

#### GREDELL Engineering Resources, Inc. Geologic Descriptions of Temporary Borings

#### Log Description for B-92

0-4.5 ft; Silt and Clay, brown, 10YR 3/3, plastic, stiff, damp (Facies I.D. - Flood Basin).

4.5-8.3 ft; Silt, light brown, 10YR 4/2, sandy, wet (Facies I.D. – Flood Basin).

8.3-31.8 ft; Very Fine to Fine Sand, light brown to gray, 10YR 4/1 to 10YR 4/2, silty above 10 ft, trace medium to coarse sand and fine pebbles at 20 ft and 30 ft, wood fragments noted at 30 ft (Facies I.D. – Floodplain/Levee).

31.8-45.0 ft; Medium to Coarse Sand, gray, 10YR 4/1, gravelly w/sparse to abundant subangular to subrounded pebbles up to 40 mm dia (Facies I.D. – Channel).

#### GREDELL Engineering Resources, Inc. Geologic Descriptions of Temporary Borings

#### Log Description for B-100

0-5.0 ft; Silt and Clay, brownish gray (Facies I.D. - Flood Basin).

5.0-29.0 ft; Very Fine to Fine Sand, light brown, 10YR 4/2, silty above 12 ft, trace medium to coarse sand below (Facies I.D. – Floodplain/Levee).

29.0-37.5 ft; Medium to Coarse Sand, gray, 10YR 4/1, trace to common gravel consisting of subrounded to angular pebbles up to 35 mm dia (Facies I.D. – Channel).

37.5-100.0 ft; Gravelly Sand to Gravel, gray, 10YR 4/1, varying proportions of subrounded to angular pebbles of quartz, feldspathic and basaltic rock fragments, and limestone up to 30 mm dia, mostly in medium to coarse sand matrix (Facies I.D. – Channel).

#### GREDELL Engineering Resources, Inc. Geologic Descriptions of Temporary Borings

#### Log Description for B-101

0-4.8 ft; Silty Clay to Clay, light olive gray, 5Y 6/1 (Facies I.D. - Flood Basin).

4.8-16.8 ft; Very Fine to Fine Sand, grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2), clean w/fine sized black carbonaceous matter grading to poorly sorted w/ silt and medium sand, grading to clean, well sorted at base (Facies I.D. – Floodplain/Levee).

16.8-21.8 ft; Medium to Coarse Sand, grayish orange, 10YR 7/4, grading to very fine to fine sand (Facies I.D. – Channel Margin/Splay).

21.8-31.8 ft; Gravelly Sand, grayish orange, 10YR 7/4, abundant granules and pebbles up to 10 mm dia., in poorly sorted matrix of fine to very coarse sand (Facies I.D. – Channel).

31.8-36.8 ft; Coarse Sand, dark yellowish brown, 10YR 4/2, common black carbonized wood fragments up to 20 mm dia., trace granules and pebbles (Facies I.D. – Channel).

36.8-46.8 ft; Gravelly Sand, grayish orange, 10YR 7/4, abundant pebbles up to 30 mm dia. in coarse sand matrix (Facies I.D. – Channel).

46.8-50.0 ft; Medium to Coarse Sand, pale yellowish brown (10YR 6/2), sparse granules and pebbles up to 10 mm dia (Facies I.D. – Channel Margin/Splay).

#### GREDELL Engineering Resources, Inc. Geologic Descriptions of Temporary Borings

#### Log Description for B-115

0-8.5 ft; Clay, olive gray, 5Y 4/1 (Facies I.D. – Flood Basin).

8.5-15.0 ft; Clay and Silt, interlaminated, dark yellowish orange, 10YR 6/6 (Facies I.D. – Flood Basin).

15.0-26.8 ft; Fine to Medium Sand, grayish orange, 10YR 7/4, moderately sorted, trace granules (Facies I.D. – Floodplain/Levee).

26.8-31.8 ft; Fine Sand, grayish orange, 10YR 7/4, trace very fine sand and silt laminae (Facies I.D. – Floodplain/Levee).

31.8-45.0 ft; Gravelly Sand, dark yellowish brown (10YR 4/2) to pale yellowish brown (10YR 6/2), abundant granules and fine pebbles up to 5 mm dia. with pebble size increasing to 40 mm toward base (Facies I.D. – Channel).

#### GREDELL Engineering Resources, Inc. Geologic Descriptions of Temporary Borings

Log Description for B-127

0-6.3 ft; Clay, brown 10YR 3/3, silty, mottles, 10YR 4/6, plastic, stiff, moist (Facies I.D. – Flood Basin).

6.3-9.5 ft; Silt, gray to brown, 10YR 4/1 and 4/2, trace clay, mottled, 10YR 4/6, wet (Facies I.D. – Flood Basin).

9.5-21.8 ft; Very Fine Sand, light brown to gray, 10YR 4/2 and 4/1, trace fine sand and carbonized wood fragments, wet (Facies I.D. – Floodplain/Levee).

21.8-35.0 ft; Medium to Coarse Sand, gray, 10YR 4/1, common granules and subrounded pebbles of limestone, feldspathic rock fragments, and quartz up to 10 mm dia, trace larger pebbles up to 30 mm dia (Facies I.D. – Channel).

#### GREDELL Engineering Resources, Inc. Geologic Descriptions of Temporary Borings

#### Log Description for B-141

0-4.8 ft; Silty Clay to Clay, pale yellowish brown, 10YR 6/2 (Facies I.D. - Flood Basin).

4.8-16.8 ft; Very Fine to Fine Sand, grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2), silty at top, grading to clean w/common medium sand and black carbonaceous fragments at base, saturated (Facies I.D. – Floodplain/Levee).

16.8-21.8 ft; Fine to Medium Sand, grayish orange, 10YR 7/4, trace silt, moderately sorted to poorly sorted (Facies I.D. – Floodplain/Levee).

21.8-26.8 ft; Medium to Coarse Sand, pale yellowish brown, 10YR 6/2, sparse granules and small pebbles up to 10 mm dia (Facies I.D. – Channel).

26.8-35.0 ft; Gravelly Sand, grayish orange 10YR 7/4, abundant granules and small pebbles up to 10 mm dia. in medium to very coarse sand matrix, poorly sorted (Facies I.D. – Channel).

#### GREDELL Engineering Resources, Inc. Geologic Descriptions of Temporary Borings

#### Log Description for B-153

0-4.8 ft; Clay, dark brown, 10YR 3/2, trace silt, plastic, stiff, damp (Facies I.D. – Flood Basin).

4.8-11.0 ft; Silt, light brown, 10YR 4/2, trace clay, mottles, 10YR 4/6, non cohesive, moist (Facies I.D. – Flood Basin).

11.0-26.8 ft; Very Fine Sand, light brown, 10YR 4/2, grading to gray, 10YR 4/1, trace fine sand (Facies I.D. – Floodplain/Levee).

26.8-36.8 ft; Gravel, granule to cobble-sized, angular to subrounded clasts of quartz, feldspathic and basaltic rock fragments, and limestone up to 30 mm dia in fine to coarse sand matrix (Facies I.D. – Channel).

36.8-41.8 ft; Medium to Coarse Sand, gray, 10YR 4/1, common gravel, subrounded to subangular granules and pebbles up to 10 mm dia., trace cobbles (Facies I.D. – Channel).

41.8-45.0 ft; Gravel, light brown, 10YR 4/2, subrounded to subangular granules and pebbles up to 10 mm dia in coarse sand matrix (Facies I.D. – Channel).

## GREDELL Engineering Resources, Inc. Geologic Descriptions of Temporary Borings

#### Log Description for B-154

0-4.8 ft; Clay, dark brown, 10YR 3/2, silty, plastic, stiff, moist (Facies I.D. – Flood Basin).

4.8-16.8 ft; Very Fine Sand, light brown, 10YR 4/2, grading to grayish, 10YR 4/1 toward base, trace silt and clay, common black carbonaceous material toward base, saturated (Facies I.D. – Floodplain/Levee).

16.8-21.8 ft; Fine Sand, light brown, 10YR 4/1 and 4/2, moderately sorted w/common very fine sand and trace coarse sand and fine gravel, saturated (Facies I.D. – Floodplain/Levee).

21.8-36.8 ft; Medium to Coarse Sand, light brown, 10YR 4/1, common granules and fine pebbles up to 5 mm dia (Facies I.D. – Channel).

36.8-40.0 ft; Gravelly Sand, dark brown, 10YR 3/1, common granules and fine pebbles up to 5 mm dia., trace larger pebbles up to 30 mm dia (Facies I.D. – Channel).

## GREDELL Engineering Resources, Inc. Geologic Descriptions of Temporary Borings

### Log Description for B-176

0-3.3 ft; Clay, olive black, 5Y 2/1, plastic, moist (Facies I.D. – Flood Basin).

3.3-7.8 ft; Clay to Silty Clay, dark yellowish brown, 10YR 4/2, plastic, mottled (Facies I.D. – Flood Basin).

7.8-15.0 ft; Clay, dark yellowish brown, 10YR 4/2, plastic (Facies I.D. - Flood Basin).

15.0-36.8 ft; Fine Sand, grayish orange, 10YR 7/4, clean, trace black carbonaceous matter 28 feet, becoming abundant below (Facies I.D. – Floodplain/Levee).

36.8-41.8 ft; Gravel, pale yellowish brown, 10YR 6/2, poorly sorted, subrounded to angular pebbles up to 20 mm dia. in coarse sand matrix, possible scoured contact w/below (Facies I.D. – Channel).

41.8-46.8 ft; Clay, very dark greenish gray (Gley) 1 3/1, silty, trace very fine sand, no obvious bedding (Facies I.D. – Cutoff/Back Swamp).

46.8-50.0 ft; Very Fine Sand, light olive gray, 5Y 6/1, possible Gley-colored, common black carbonaceous matter (Facies I.D. – Cutoff/Back Swamp).

## GREDELL Engineering Resources, Inc. Geologic Descriptions of Temporary Borings

#### Log Description for B-188

0-7.8 ft; Silt, light brown, 10YR 4/3, trace clay, moist, non cohesive, soft (Facies I.D. – Flood Basin).

7.8-12.5 ft; Very Fine Sand, light brown, 10YR 4/2, saturated (Facies I.D. – Floodplain/Levee).

12.5-16.8 ft; As above, except color change to Gley, 1 4/N (Facies I.D. – Cutoff/Back Swamp).

16.8-26.8 ft; Very Fine to Fine Sand, light brown, 10YR 4/2, trace medium to coarse sand (Facies I.D. – Floodplain/Levee).

26.8-31.8 ft; Medium to Coarse Sand, gray, 10YR 4/1, common granules and subrounded pebbles up to 15 mm dia (Facies I.D. – Channel).

31.8-35.0 ft; Gravelly Sand, gray, 10YR 4/1, mostly subrounded pebbles of quartz, feldspathic and basaltic rock fragments up to 10 mm dia, in medium to coarse sand matrix, trace coarser pebbles up to 25 mm dia (Facies I.D. – Channel).

## GREDELL Engineering Resources, Inc. Geologic Descriptions of Temporary Borings

#### Log Description for B-200

0-4.5 ft; Silty Clay, olive black, 5Y 2/1, slightly plastic, stiff (Facies I.D. – Flood Basin).

4.5-7.8 ft; Silt, pale yellowish orange, 10YR 8/6, laminated, non cohesive (Facies I.D. – Flood Basin).

7.8-11.5 ft; Clay, very dark greenish gray (Gley) 1 3/1, light brown mottles, 5YR 5/6, plastic, soft (Facies I.D. – Cutoff/Back Swamp).

11.5-26.8 ft; Very Fine to Fine Sand, pale yellowish brown, 10YR 6/2, well sorted, clean, possibly Gley coloration toward base (Facies I.D. – Floodplain/Levee).

26.8-36.8 ft; Coarse Sand, grayish orange (10YR 7/4) to dark yellowish orange (10YR 6/6), common subangular to subrounded pebbles up to 20 mm dia, becoming more abundant toward base (Facies I.D. – Channel).

36.8-46.8 ft; Fine Sand, grayish orange, 10YR 7/4, moderately well sorted, trace granules (Facies I.D. – Floodplain/Levee).

46.8-54.3 ft; Gravelly Sand, grayish orange (10YR 7/4) to dark yellowish orange (10YR 6/6), poorly sorted, rounded to subangular pebbles up to 20 mm dia (Facies I.D. – Channel).

54.3-60.0 ft; Medium Sand, grayish orange, 10YR 7/4, trace granules (Facies I.D. – Channel Margin/Splay).

# GREDELL Engineering Resources, Inc. Geologic Descriptions of Temporary Borings

#### Log Description for B-202

0-4.8 ft; Clay to Silty Clay, dark yellowish brown, 10YR 4/2, plastic, firm (Facies I.D. – Flood Basin).

4.8-11.5 ft; Clay, pale yellowish brown, 10YR 6/2, plastic, soft (Facies I.D. – Flood Basin).

11.5-21.8 ft; Very Fine to Fine Sand, grayish orange, 10YR 7/4, well sorted, clean, grading to fine sand w/ trace black carbonaceous fragments toward base (Facies I.D. – Floodplain/Levee).

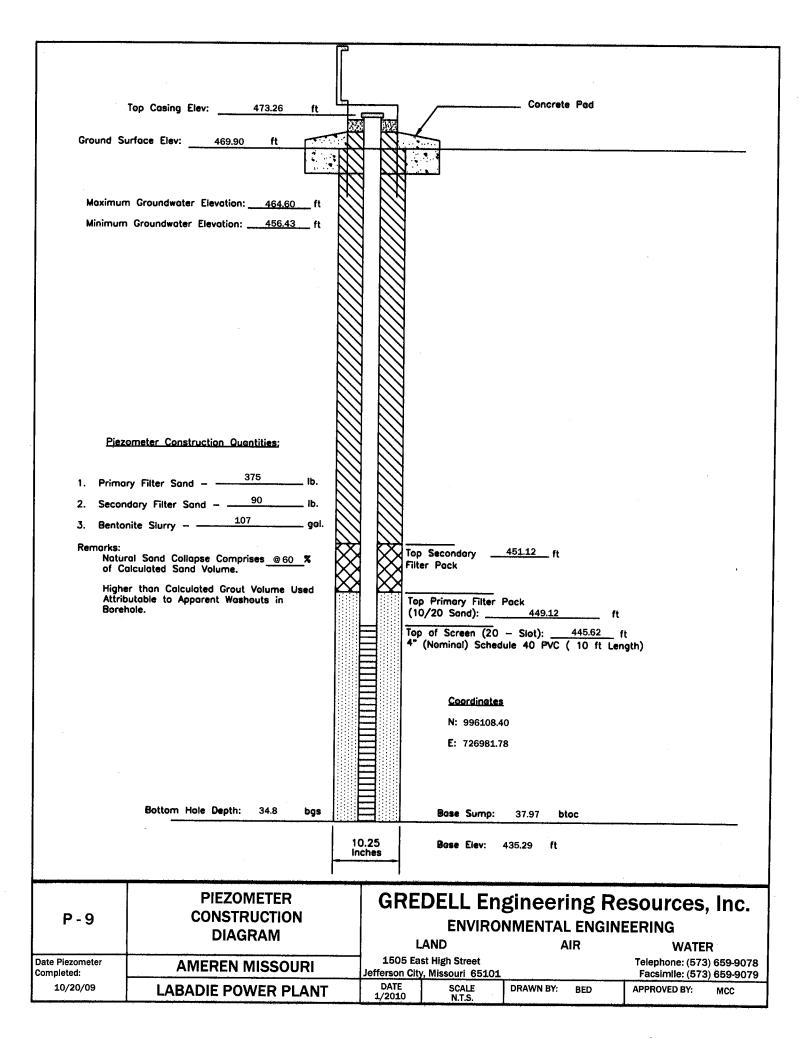
21.8-35.0 ft; Fine to Medium Sand, grayish orange, 10YR 7/4, possible Gley coloration at top, trace granules and fine pebbles up to 5 mm dia (Facies I.D. – Channel Margin/Splay).

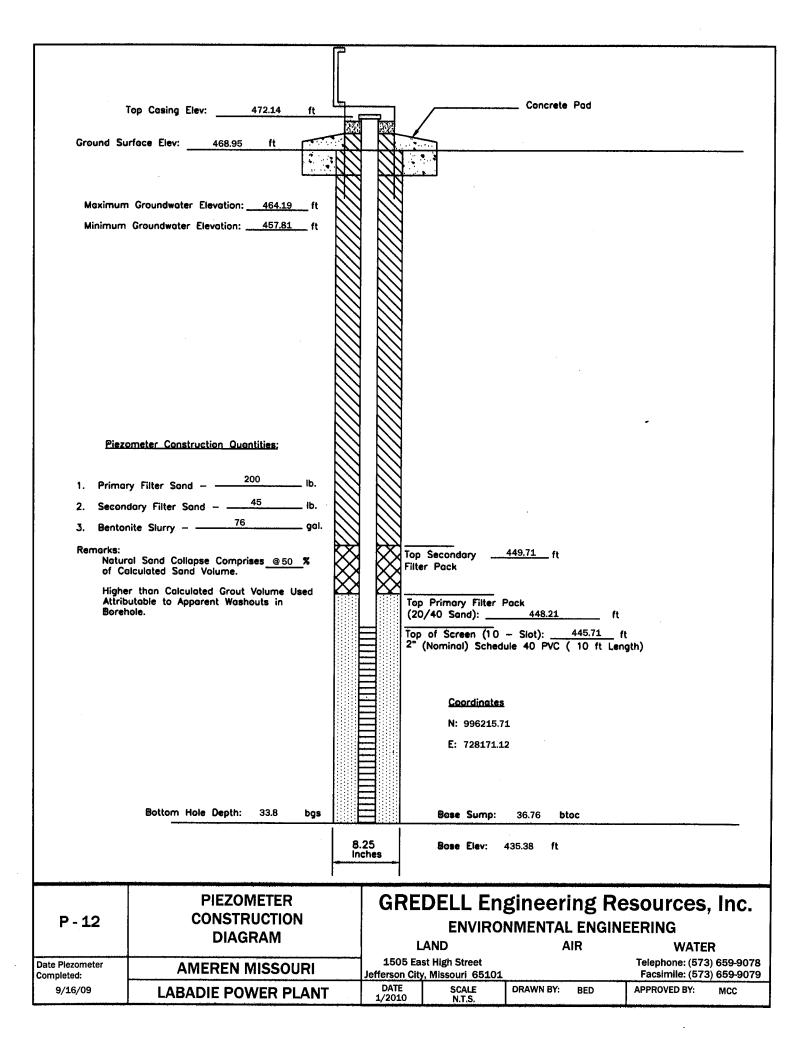
# **Appendix 5**

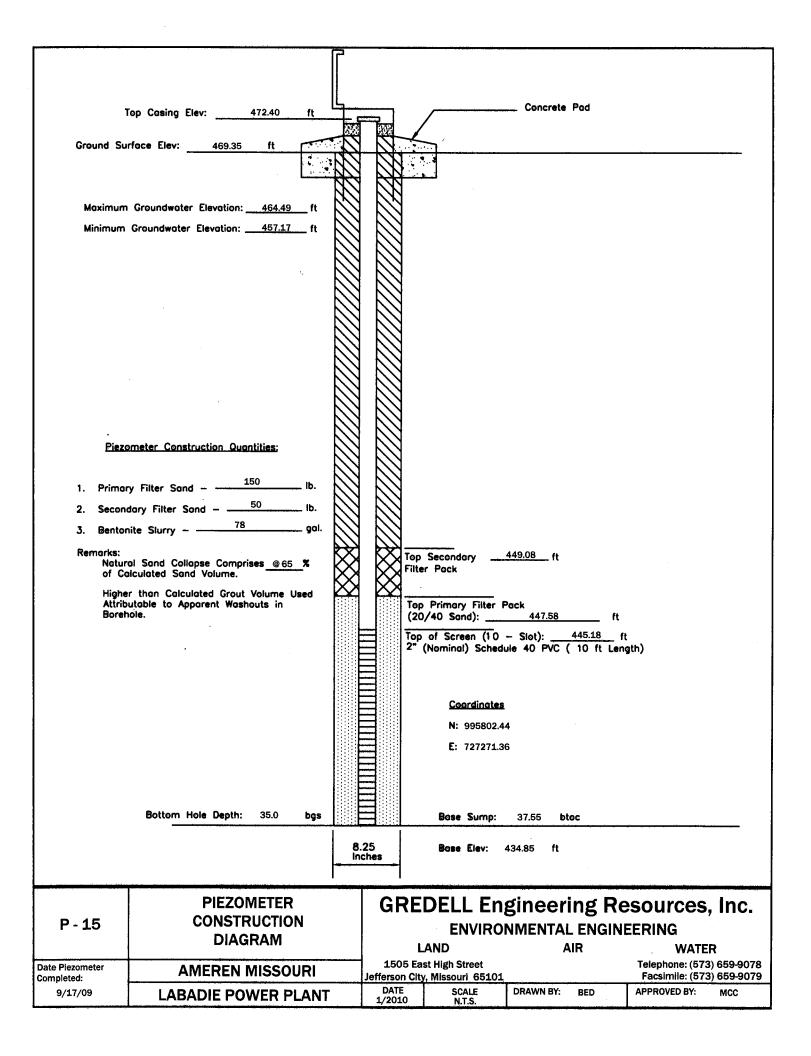
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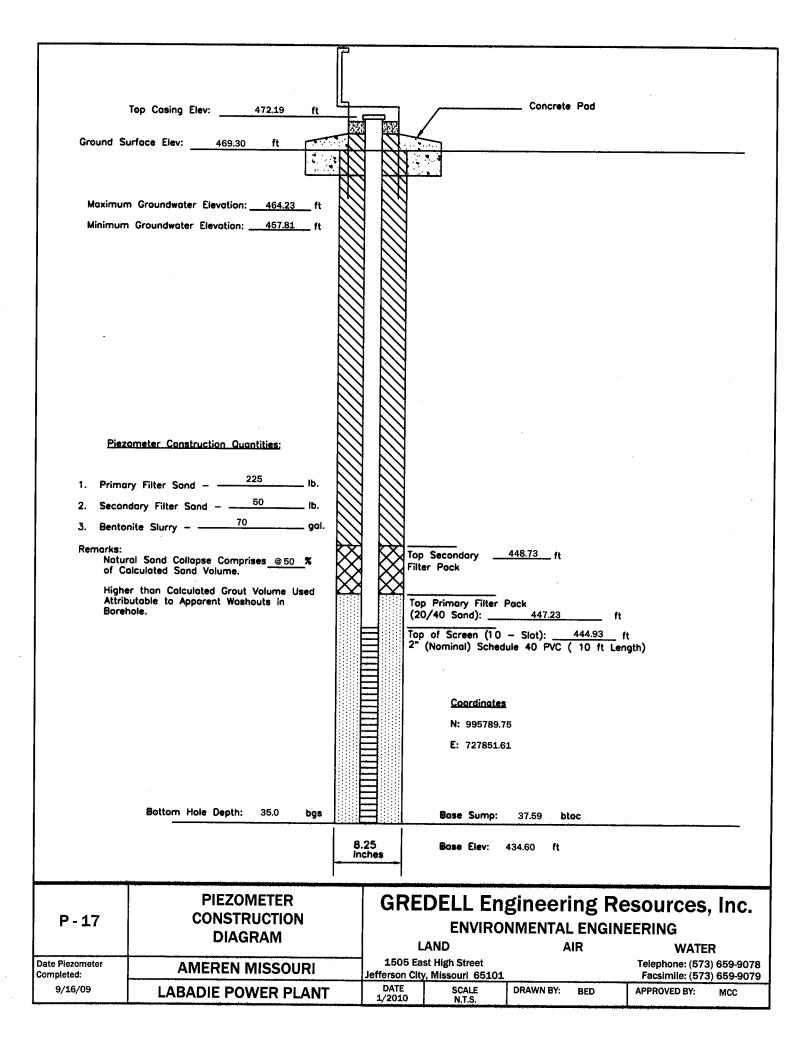
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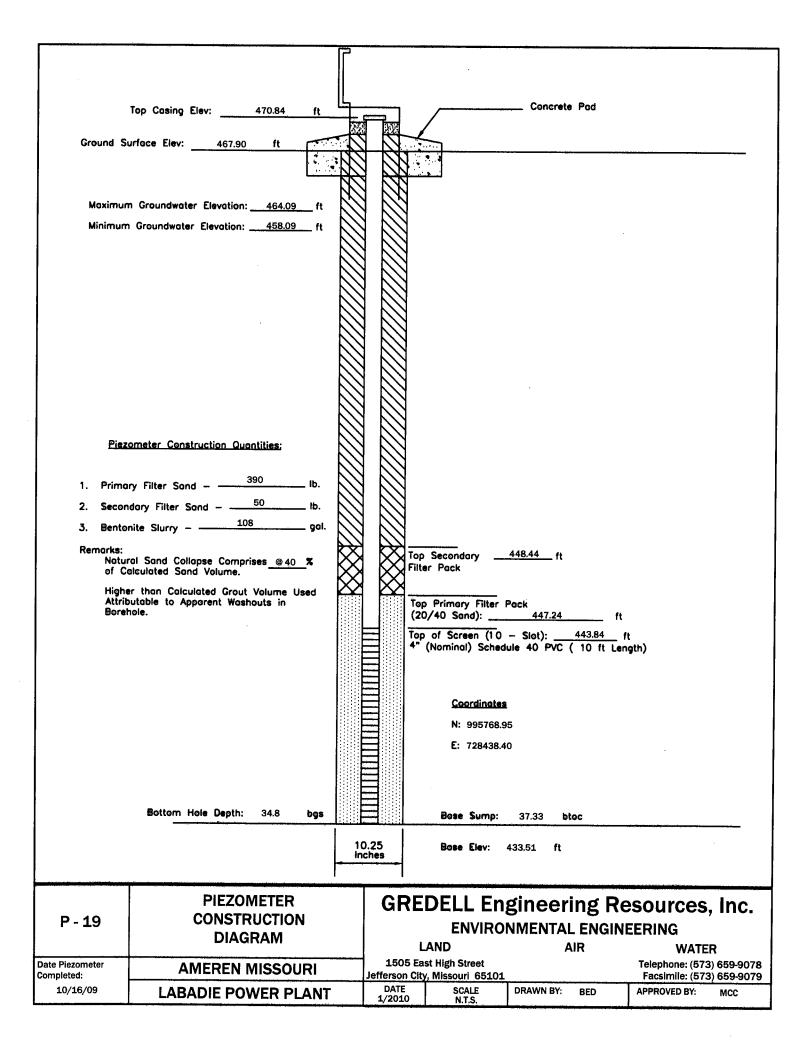
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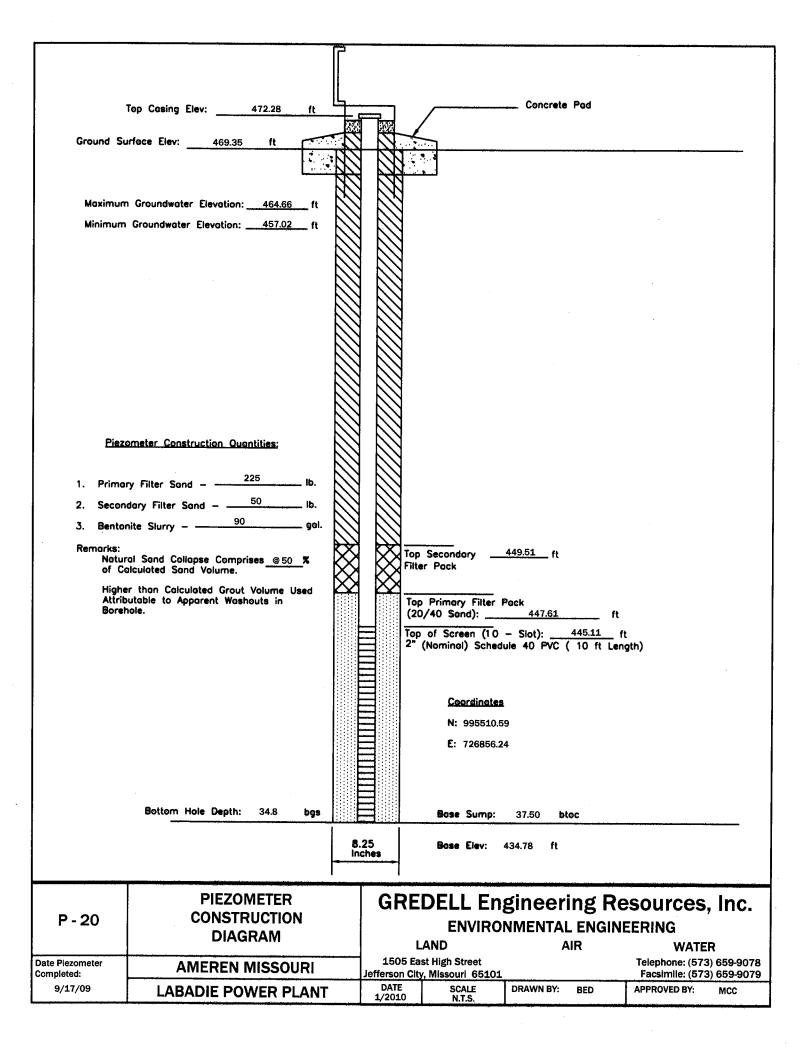


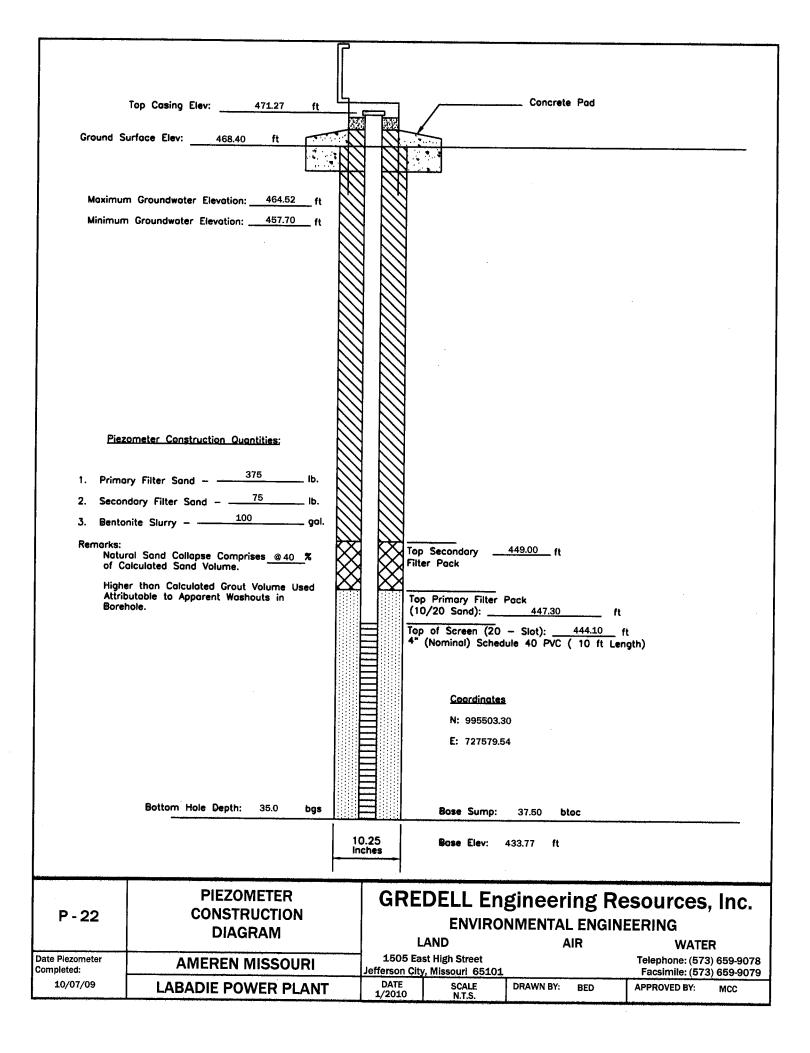


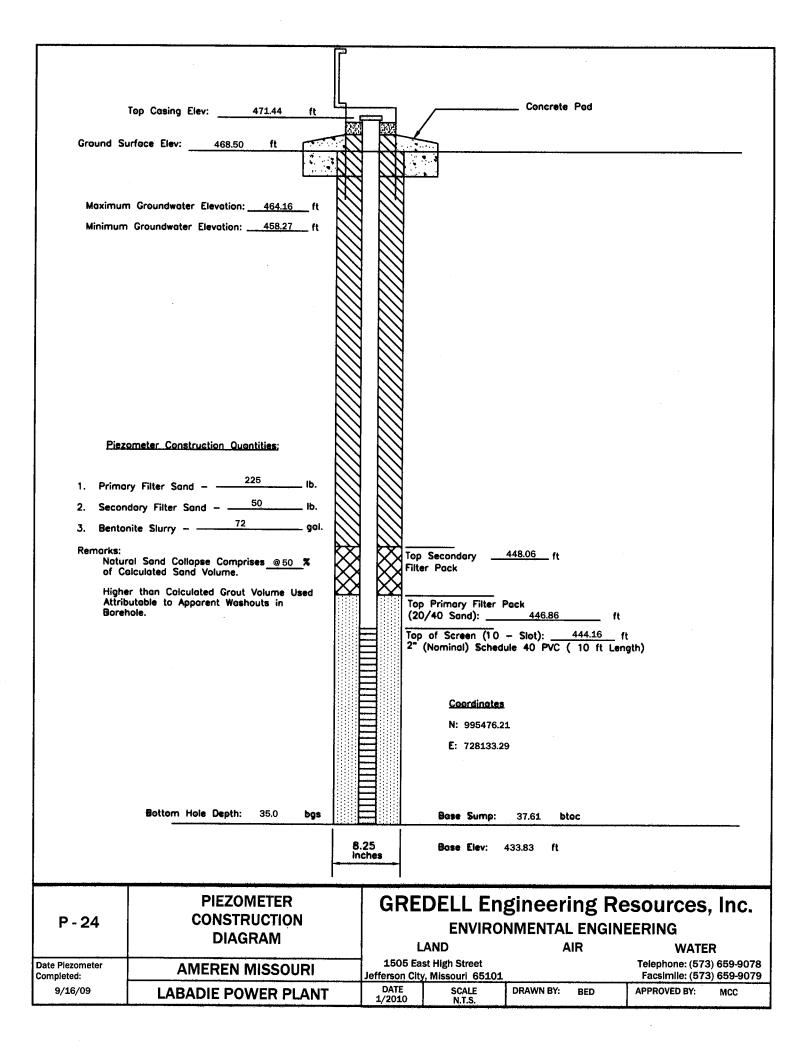


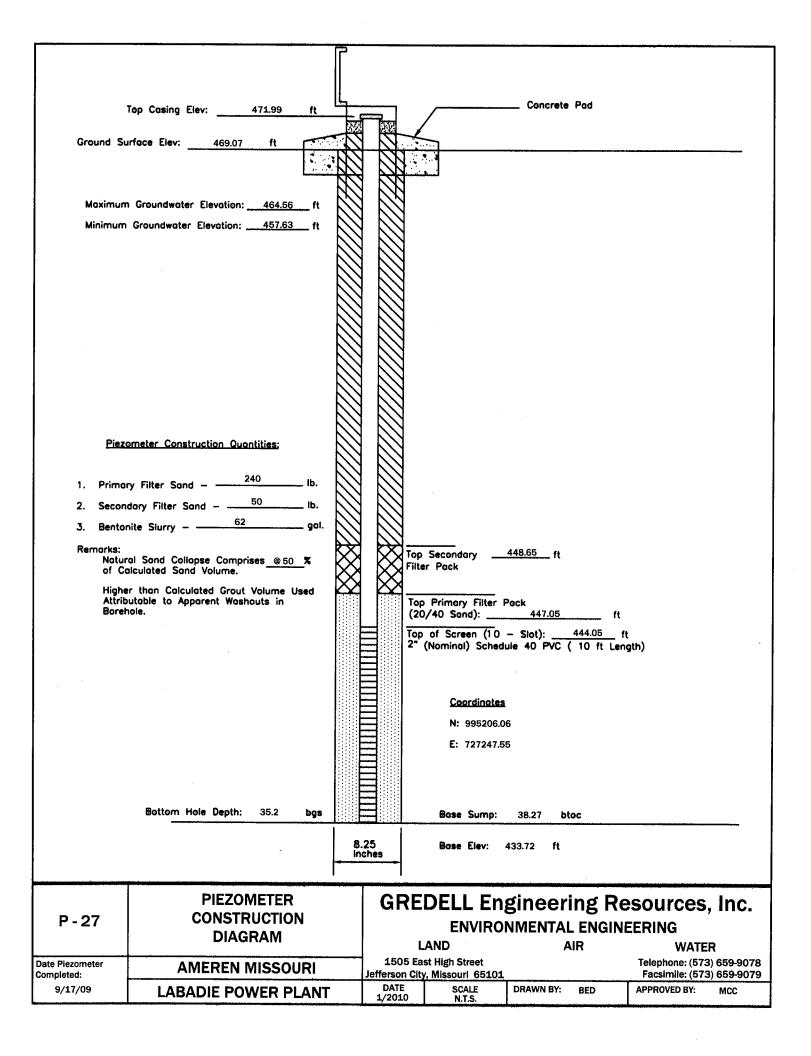


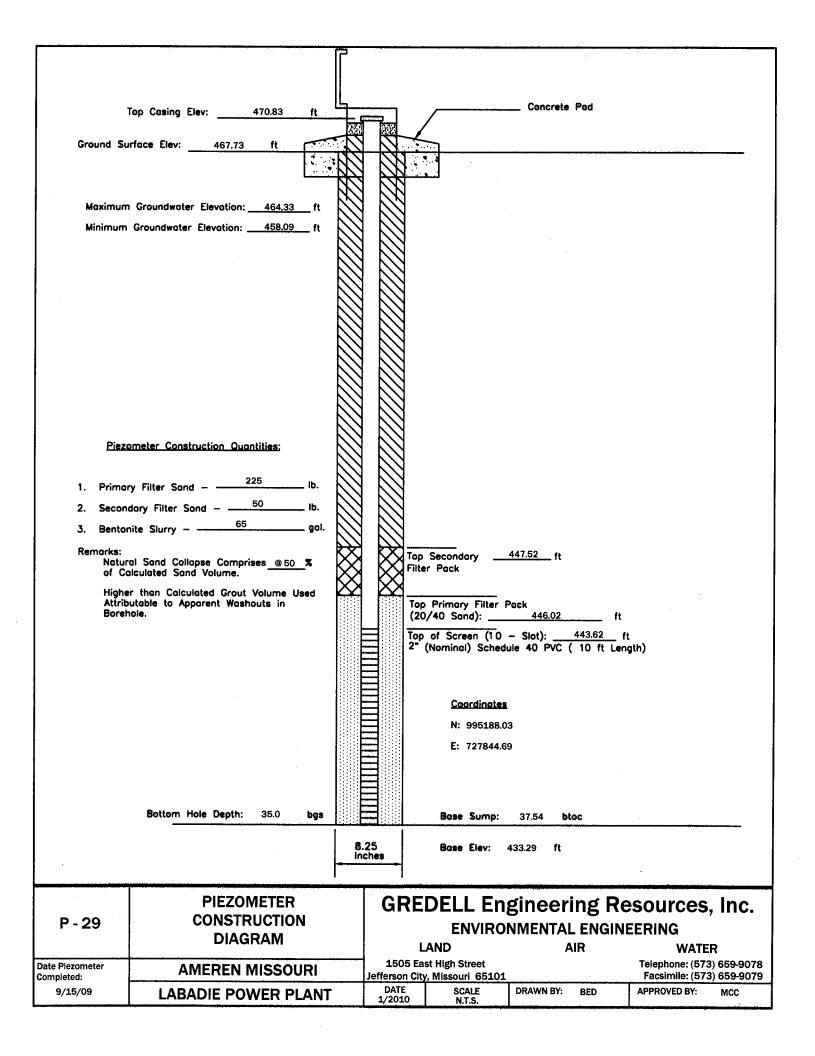


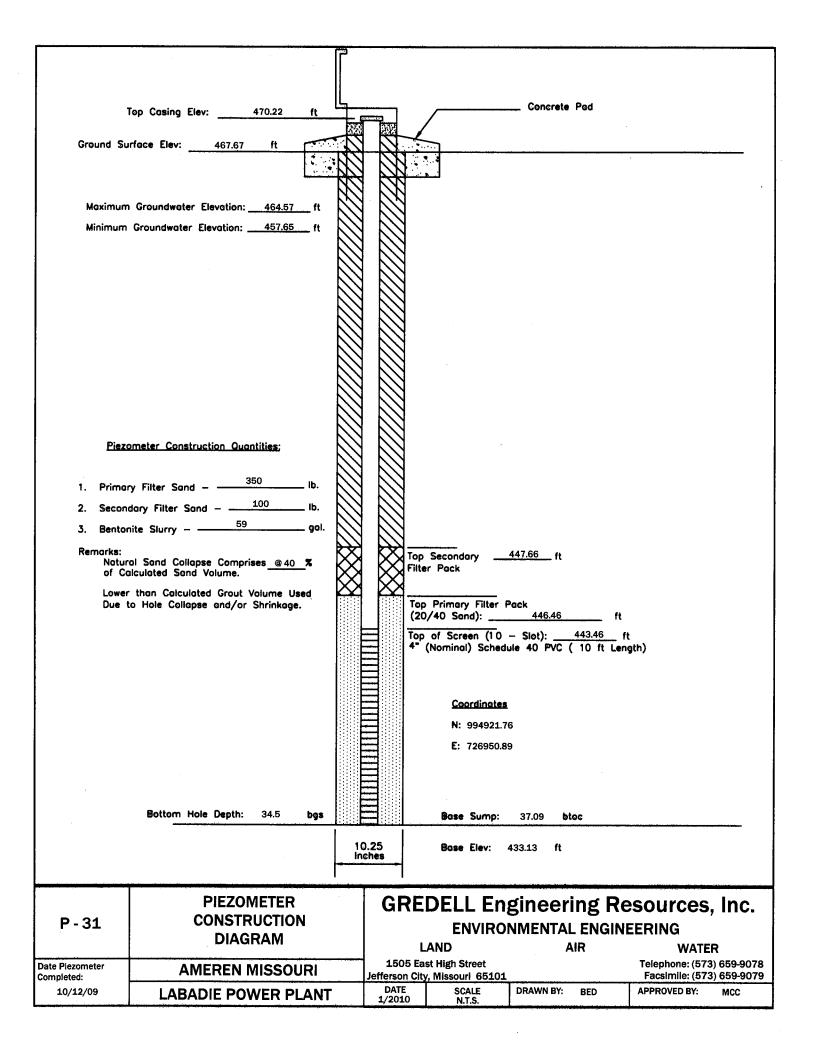


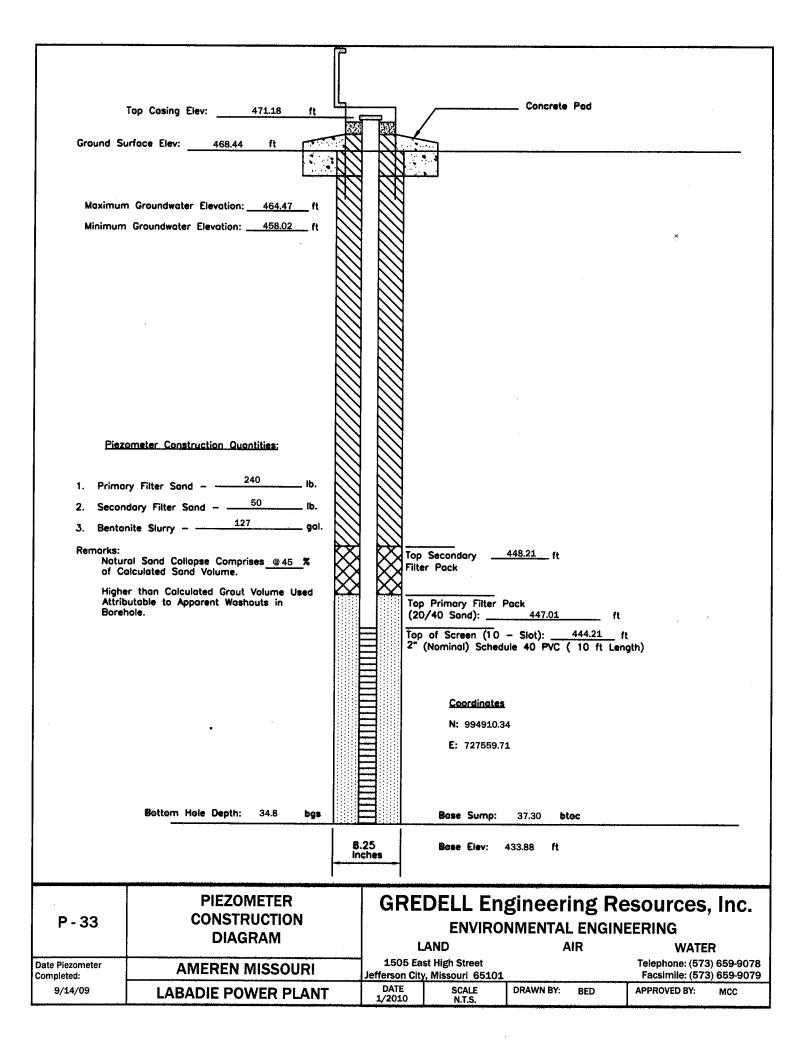


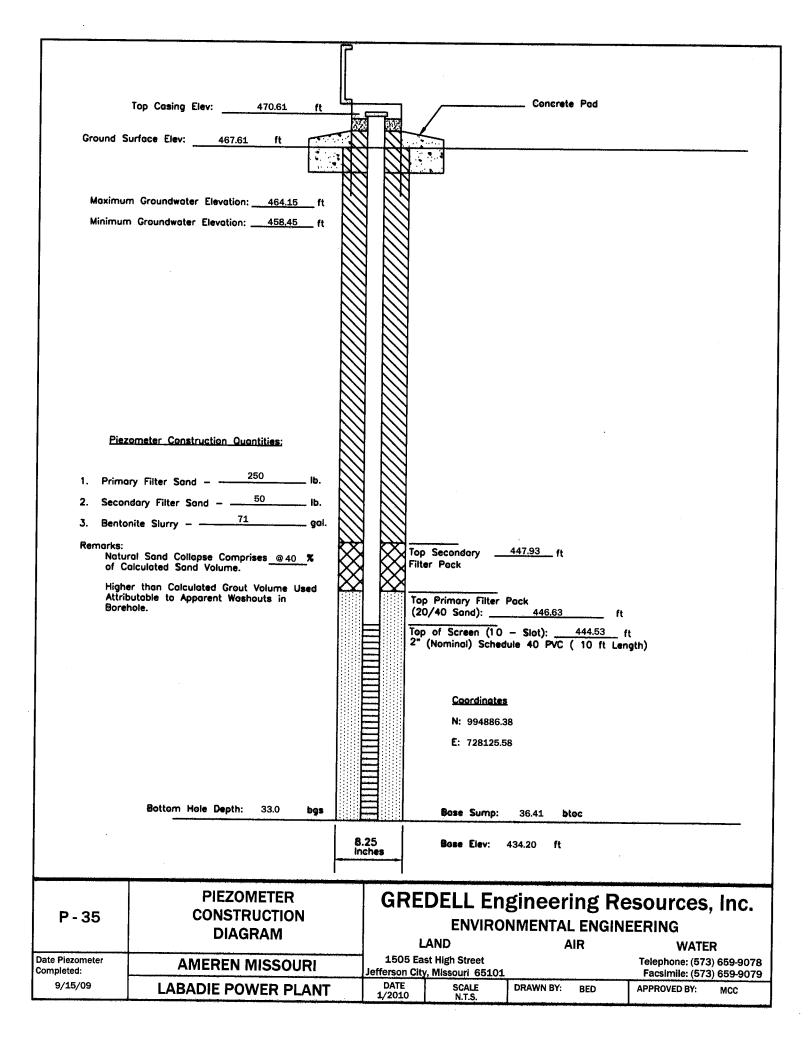


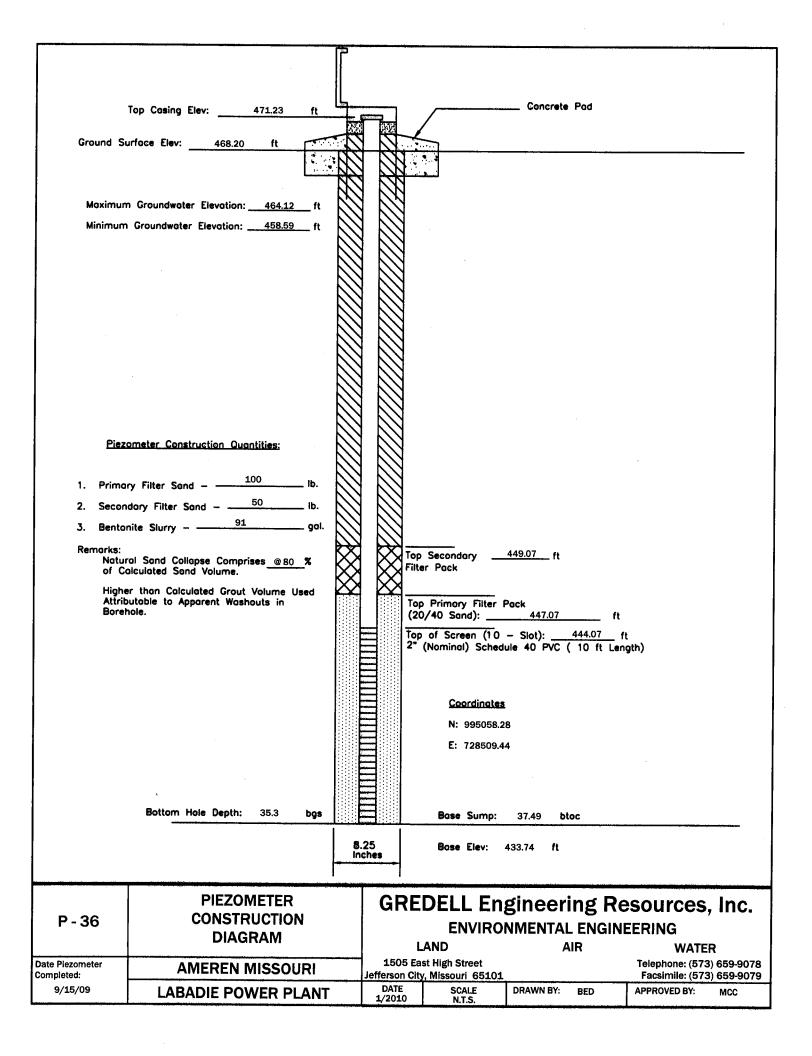


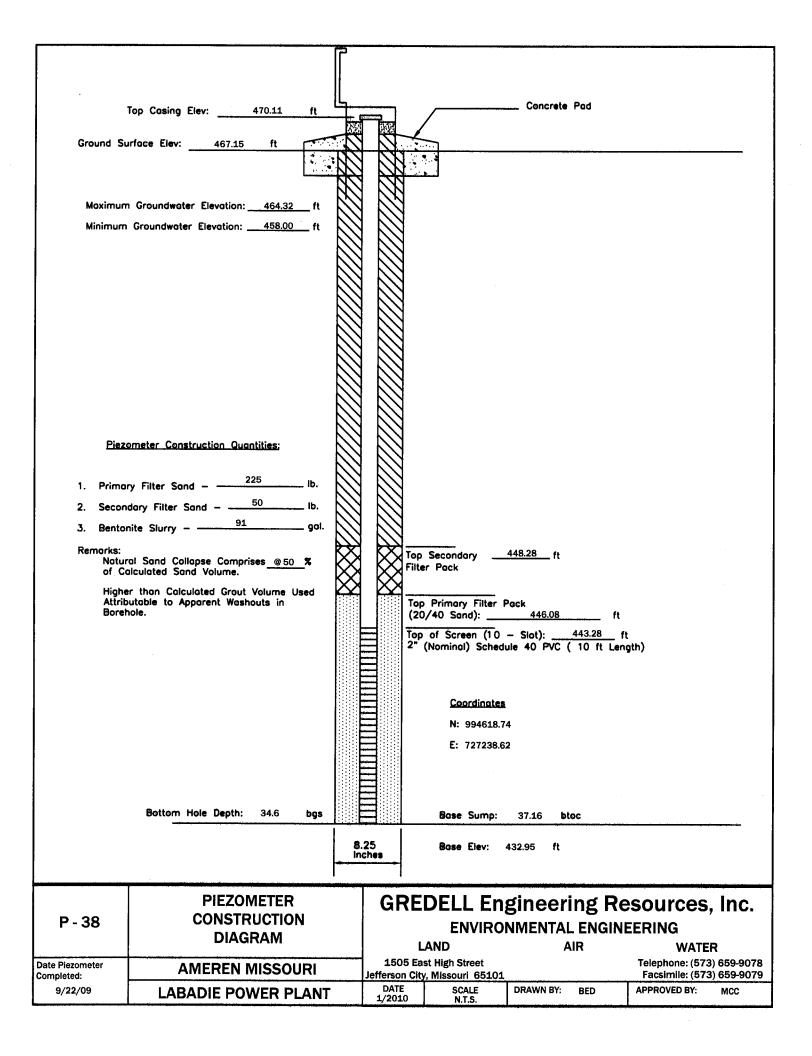


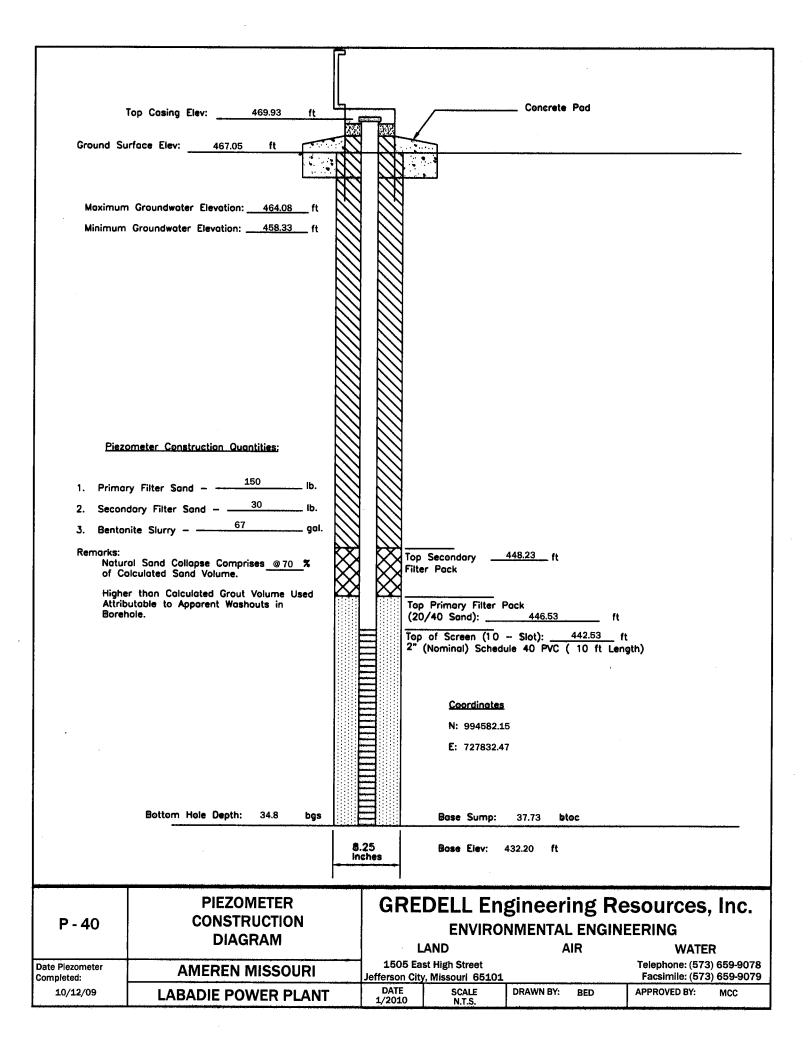


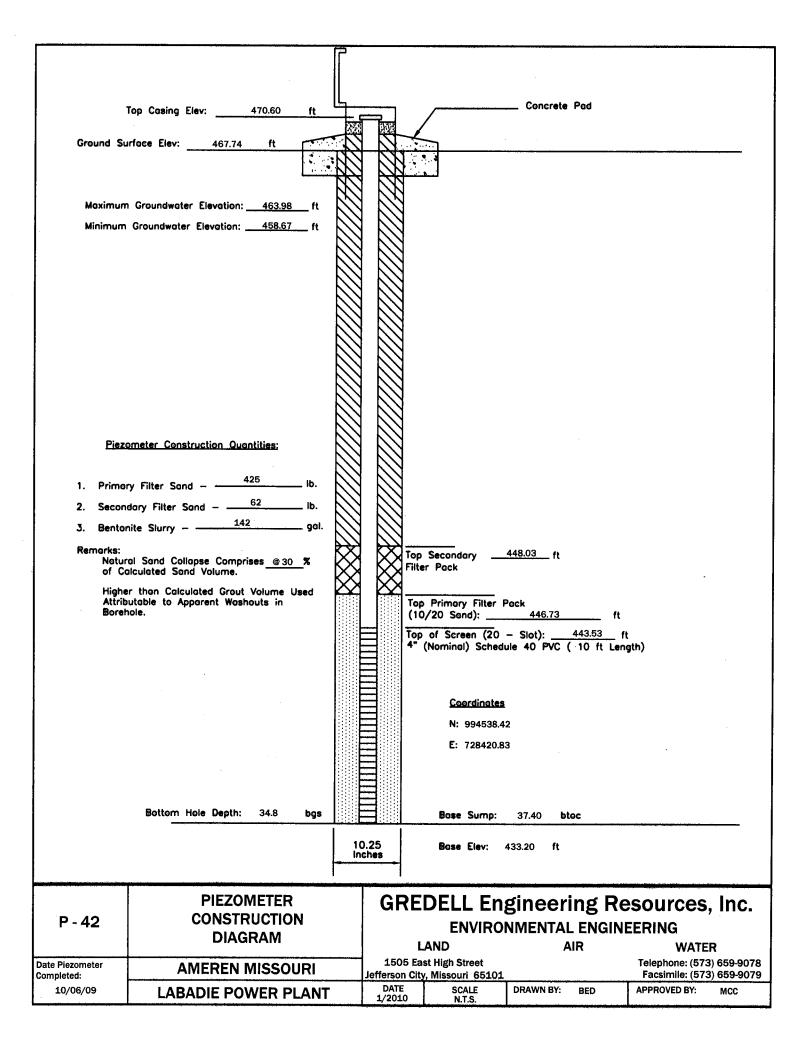


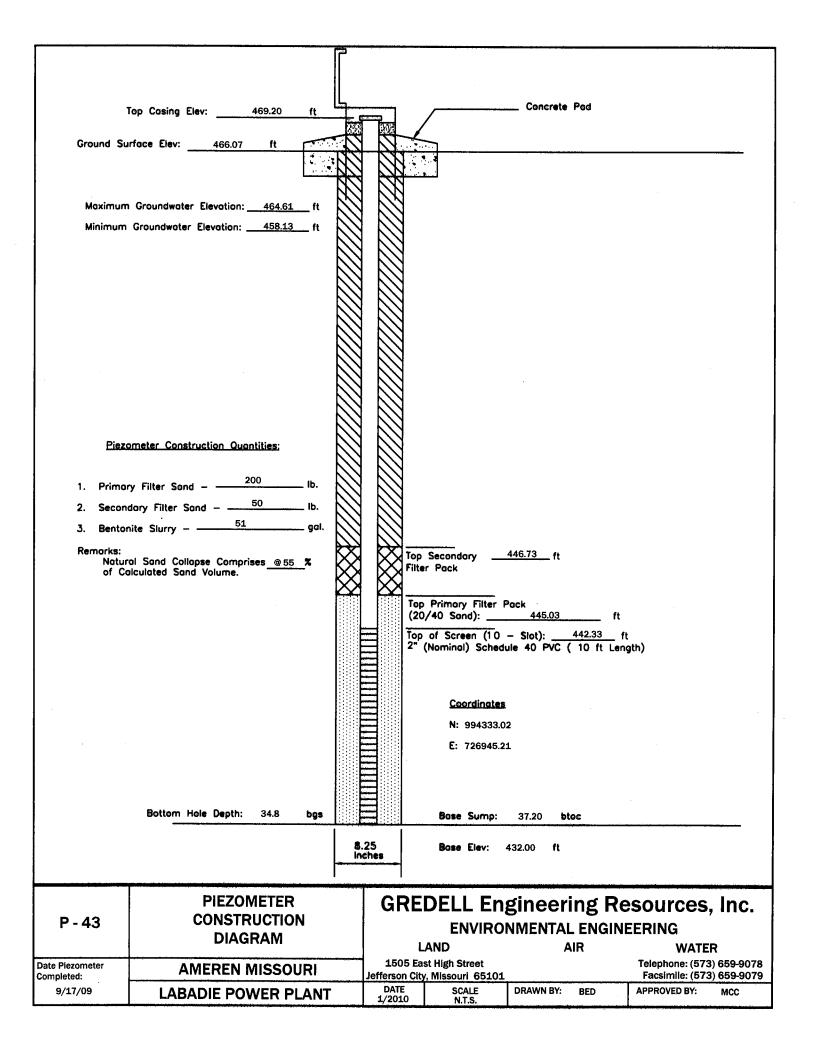


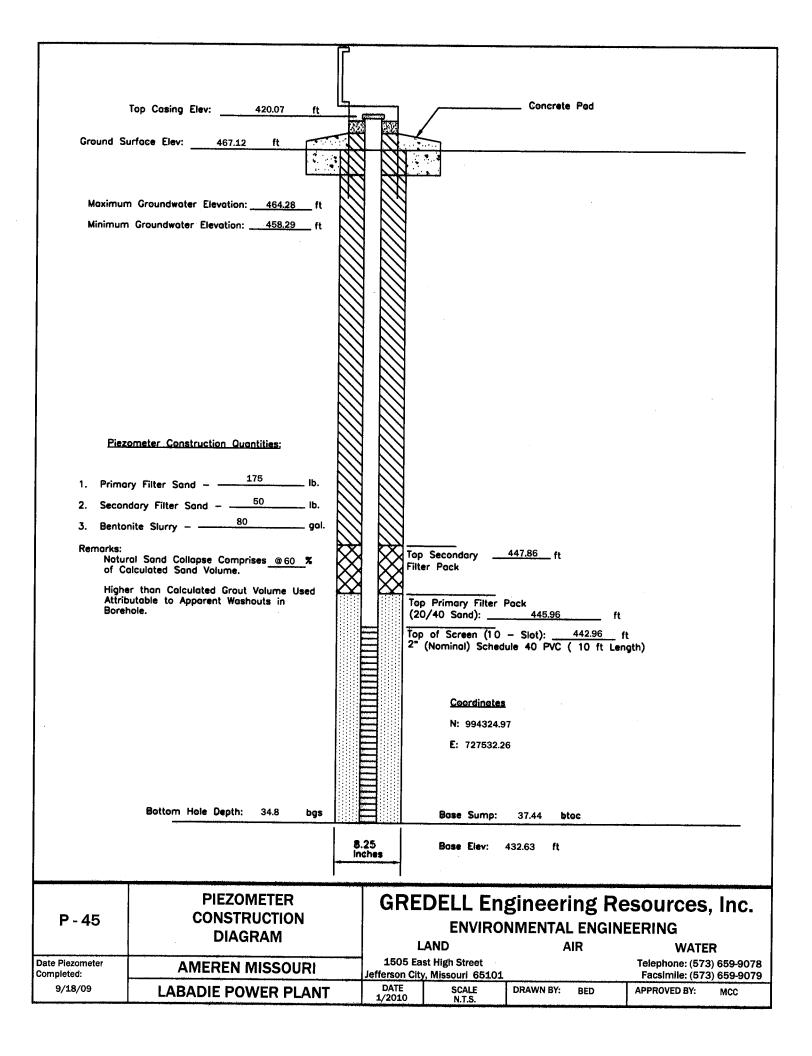


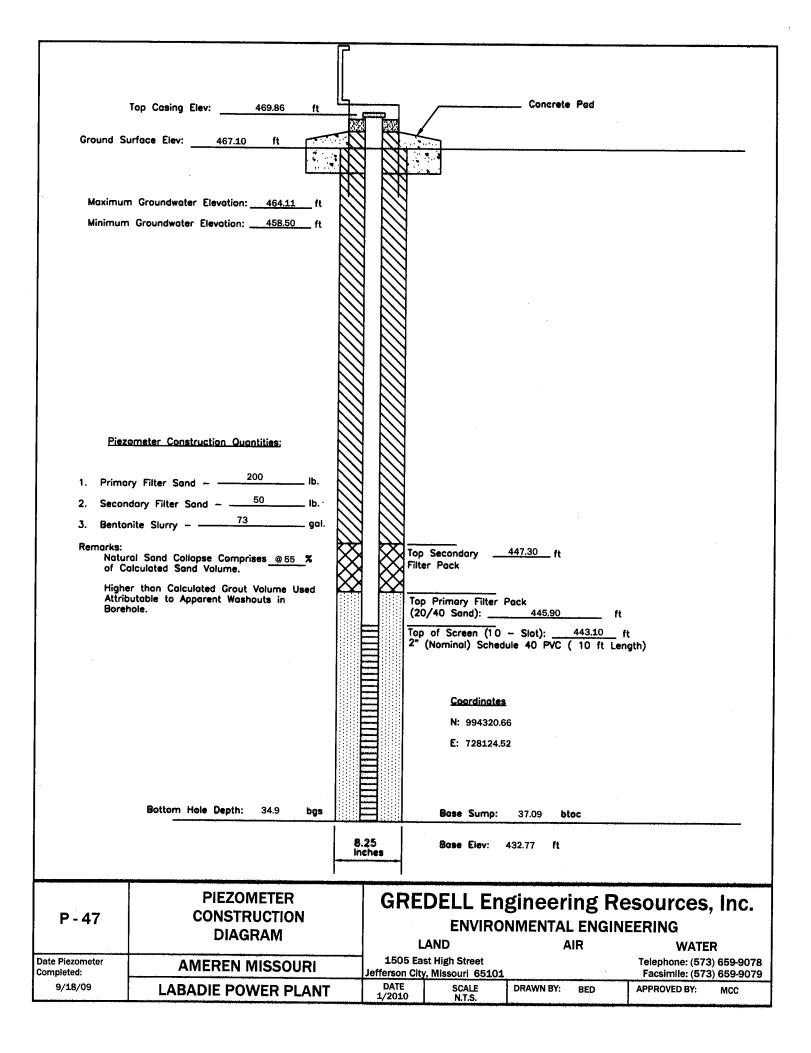


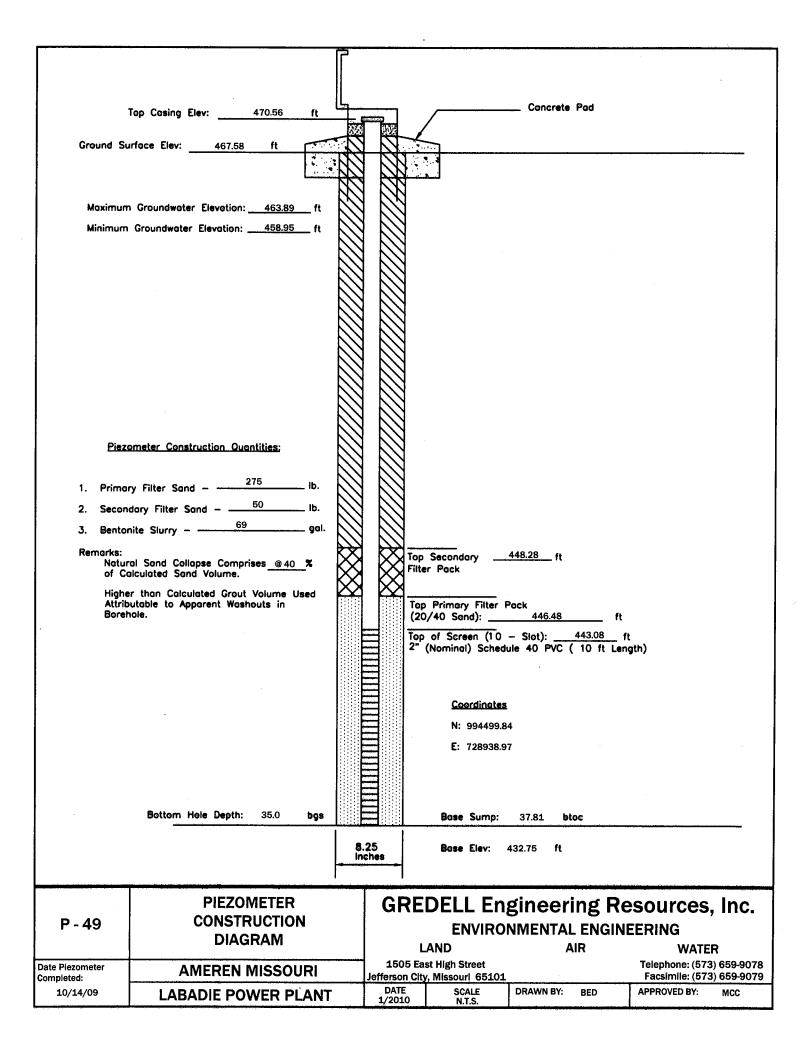


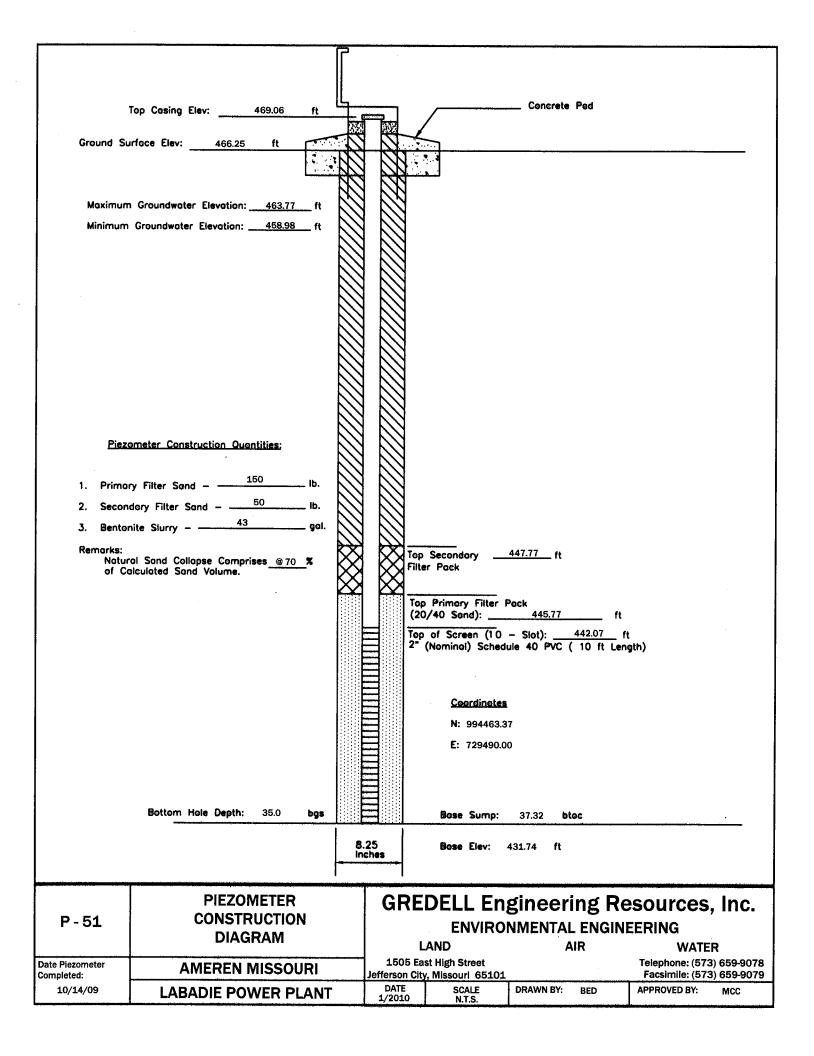


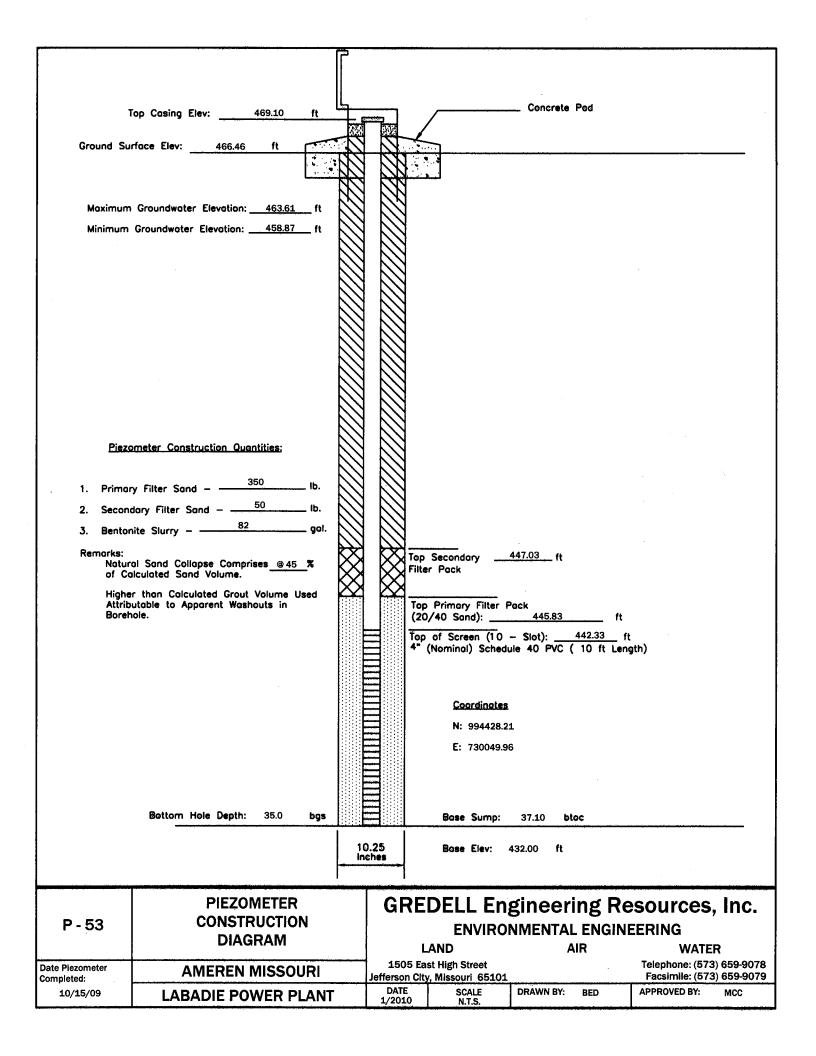


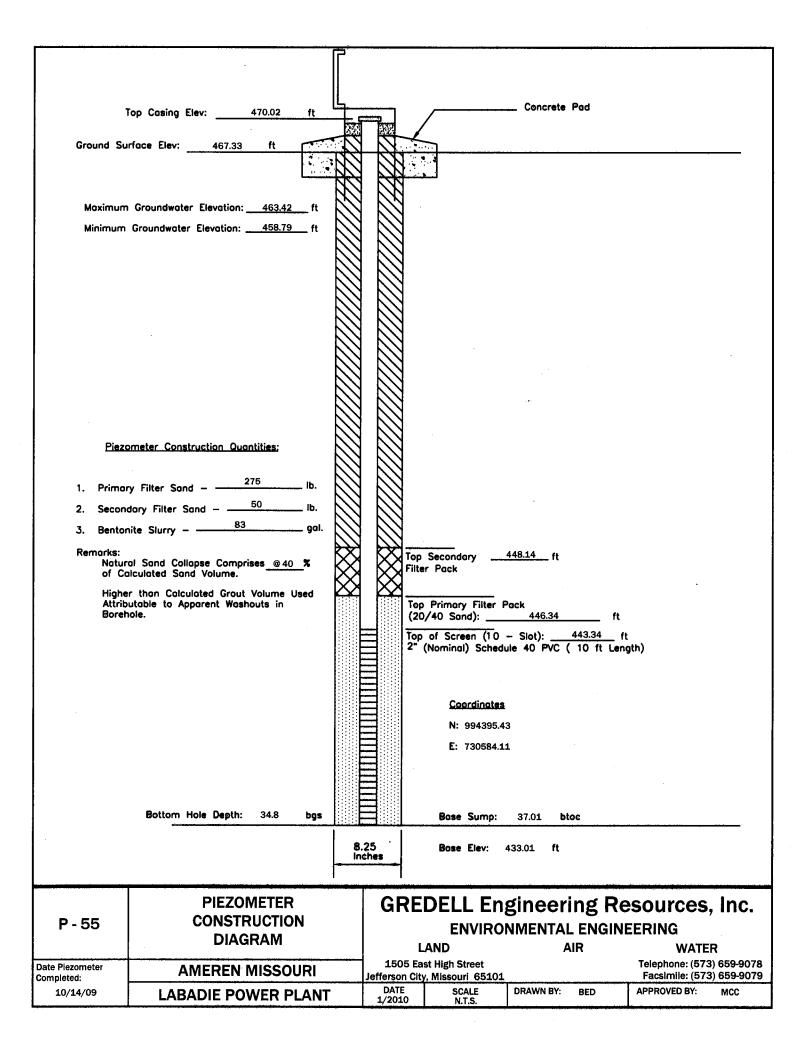


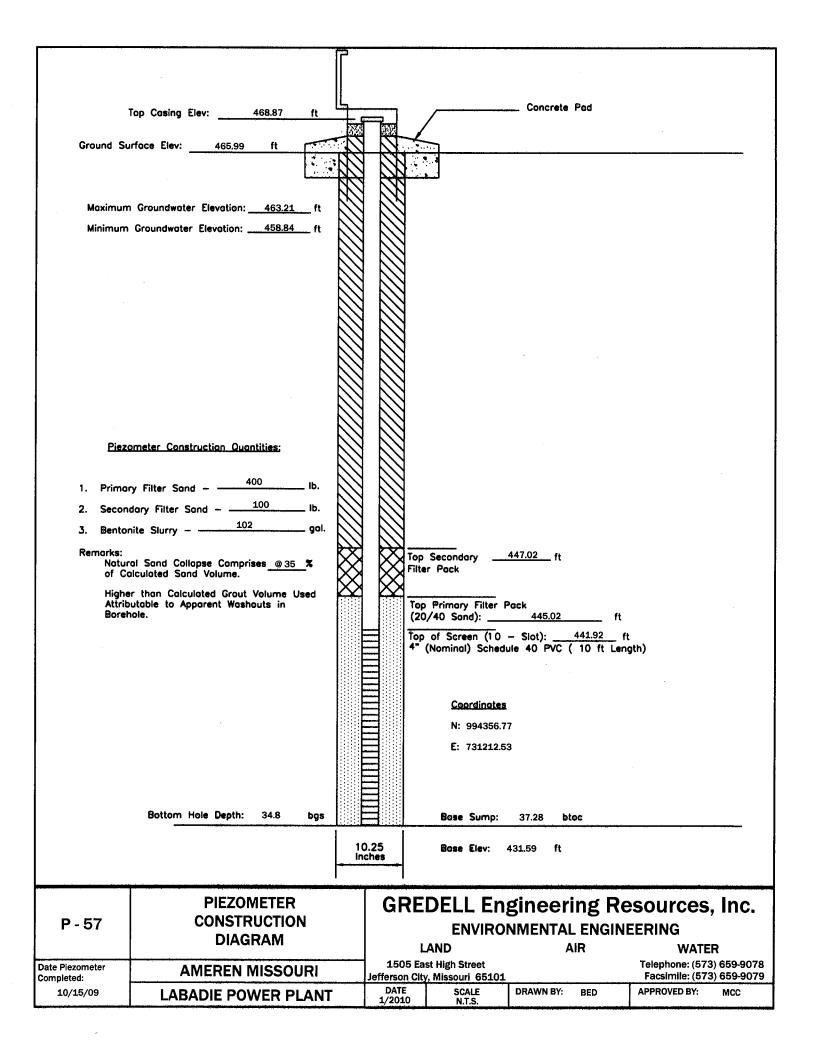


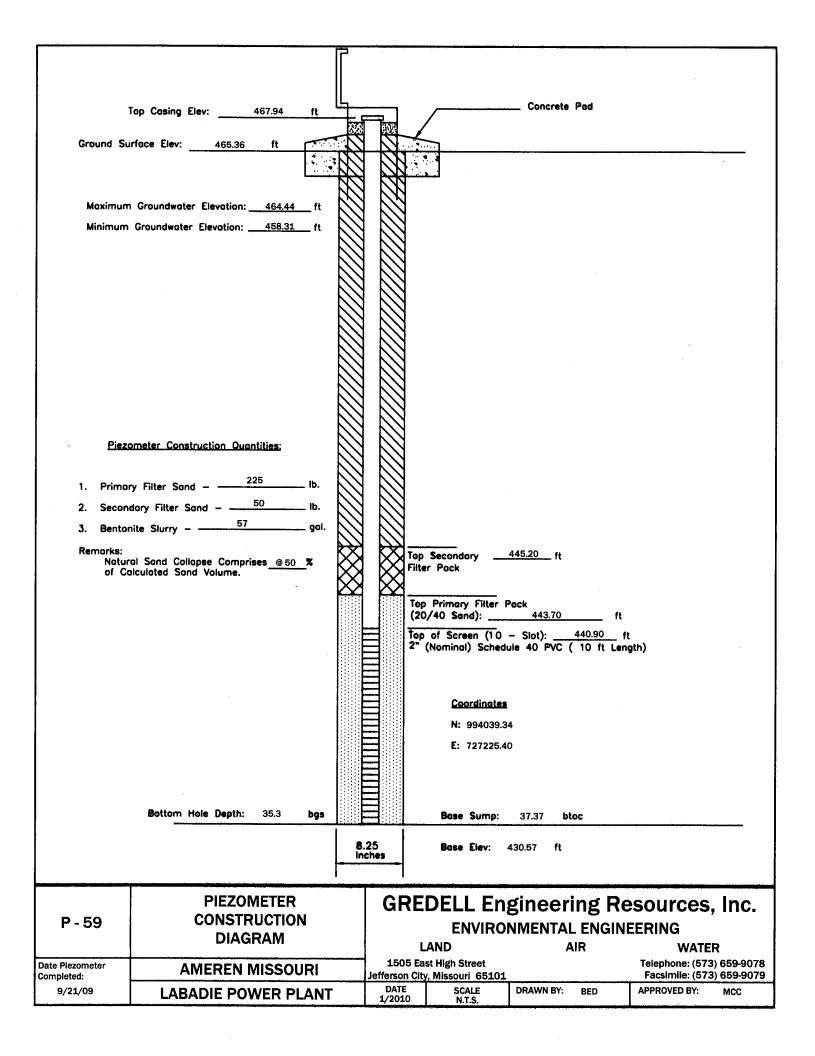


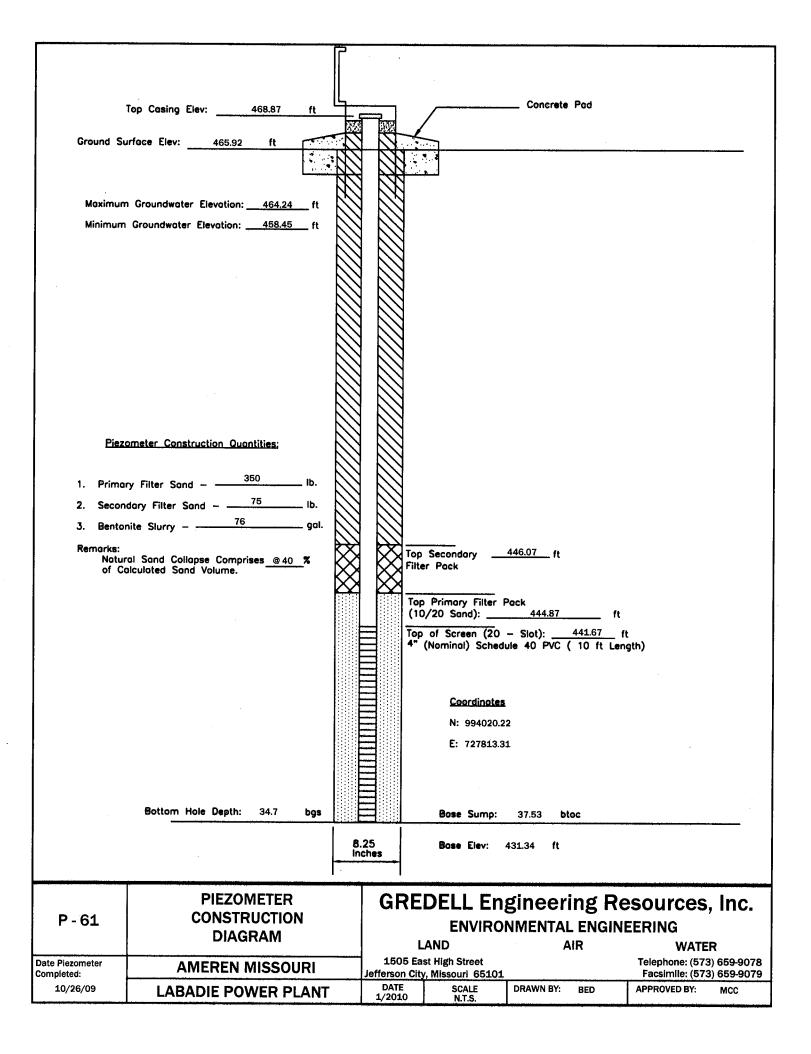


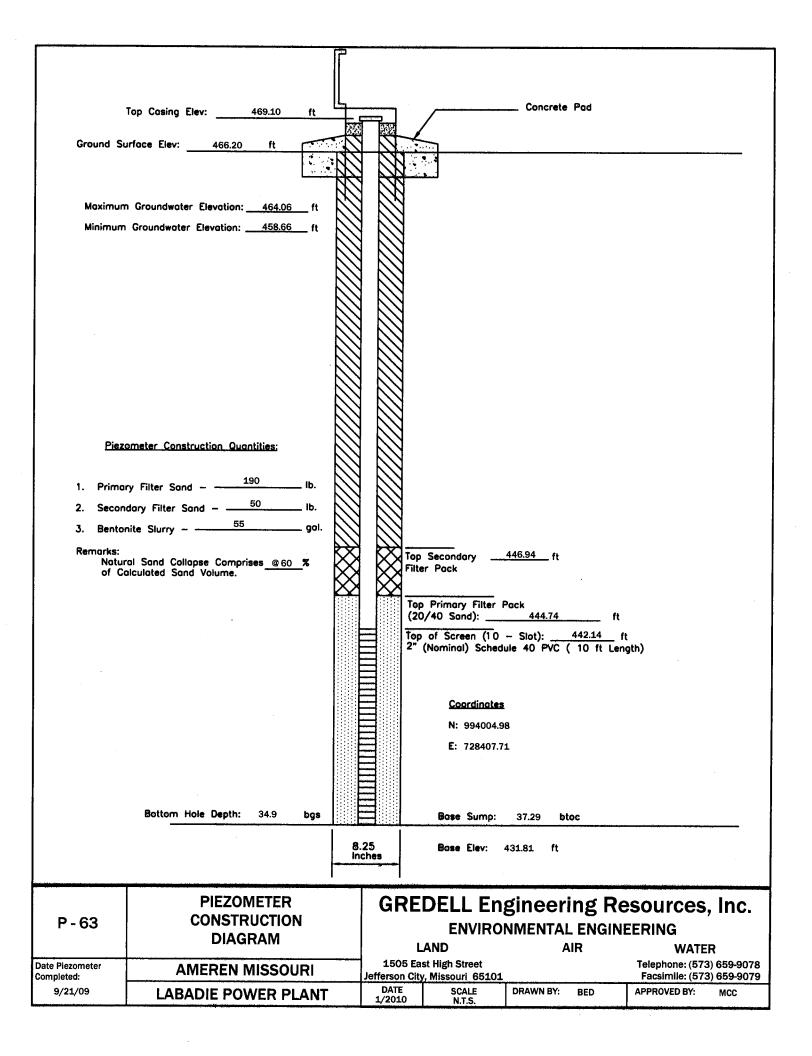


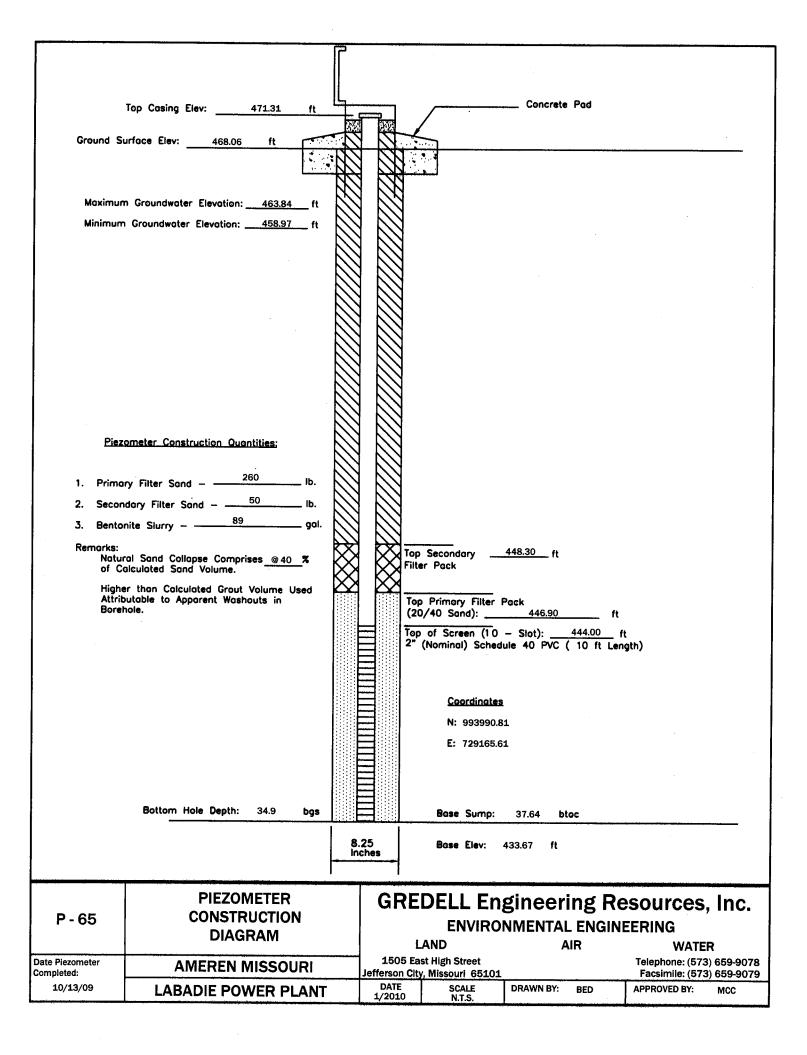


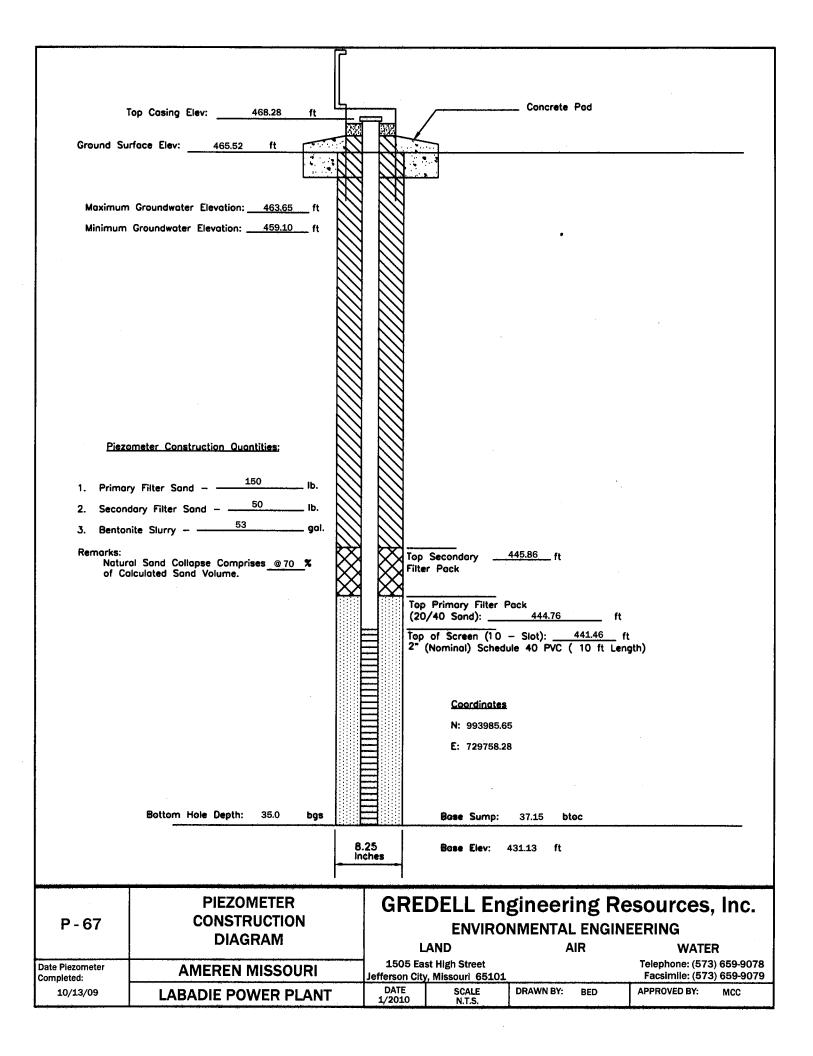


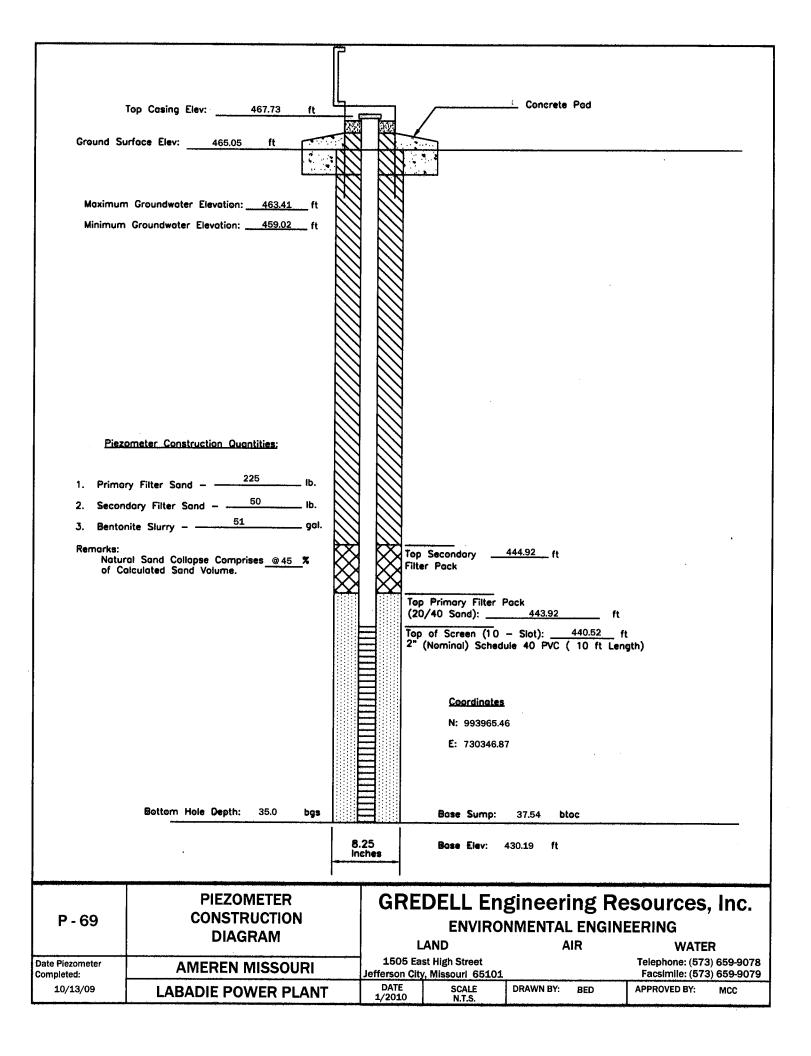


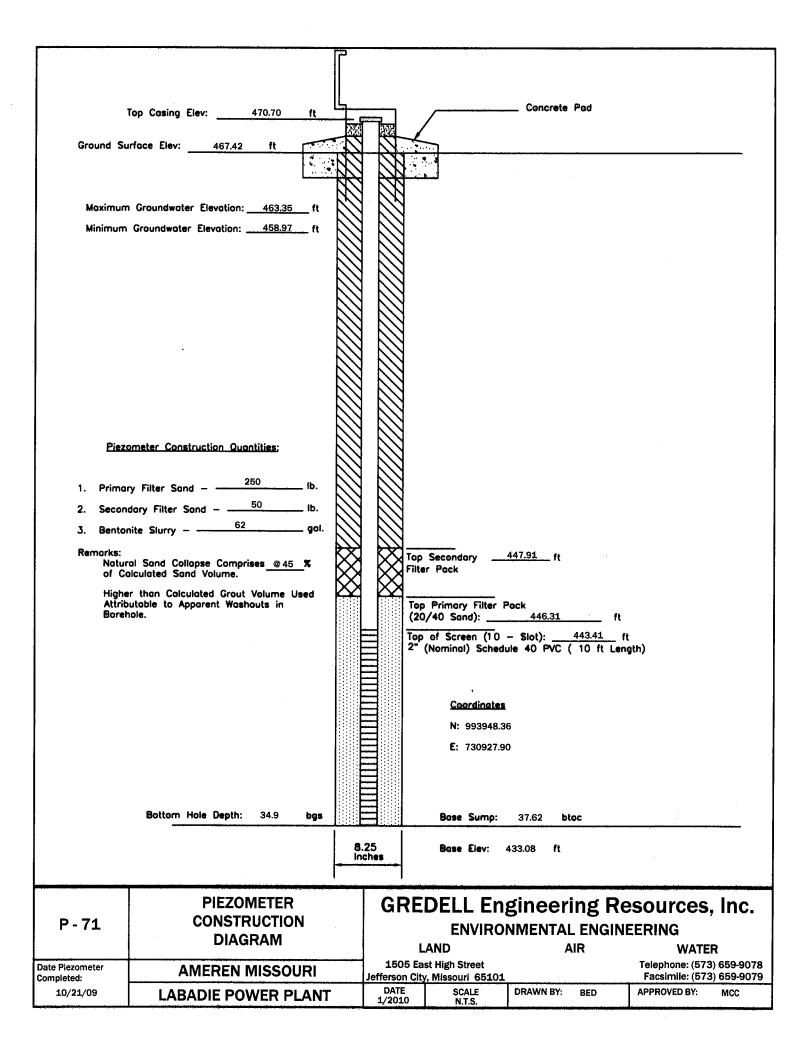


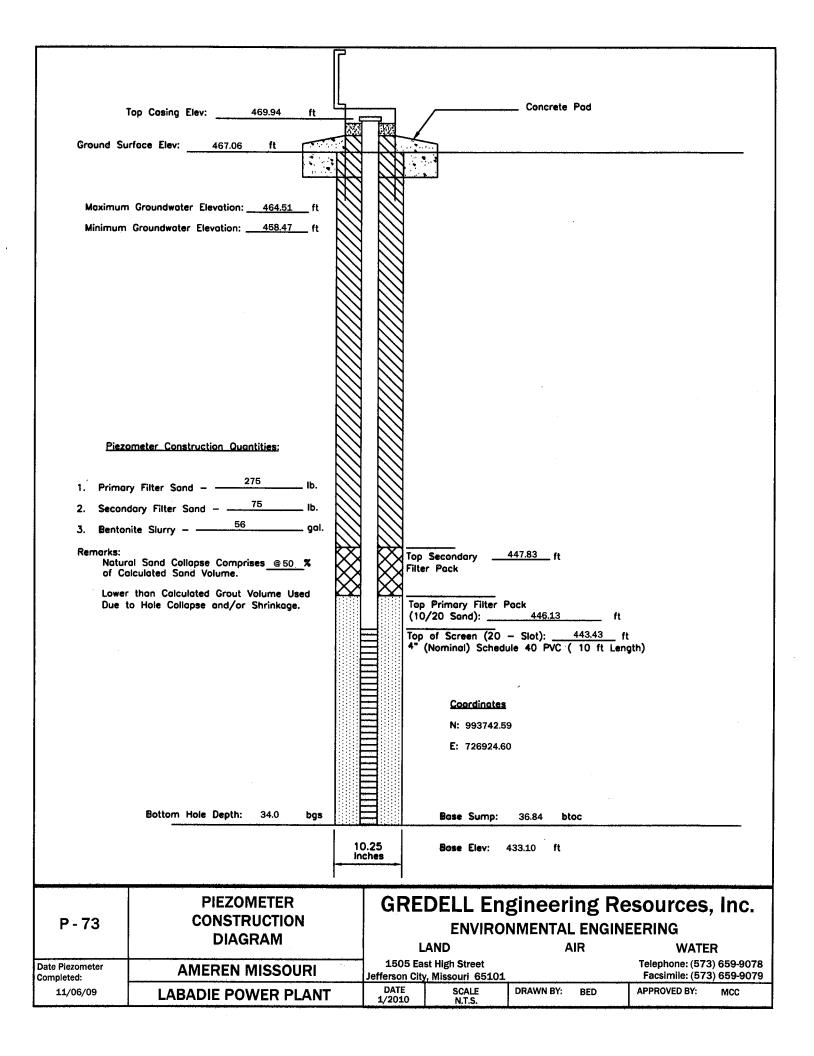


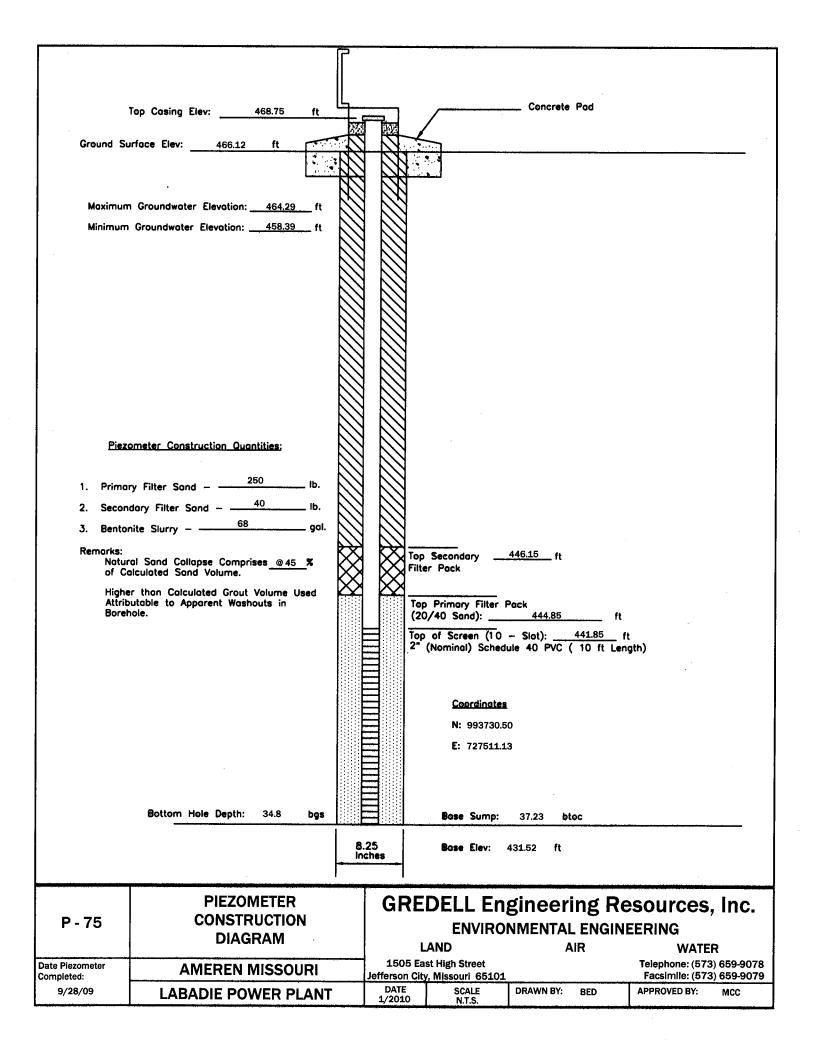


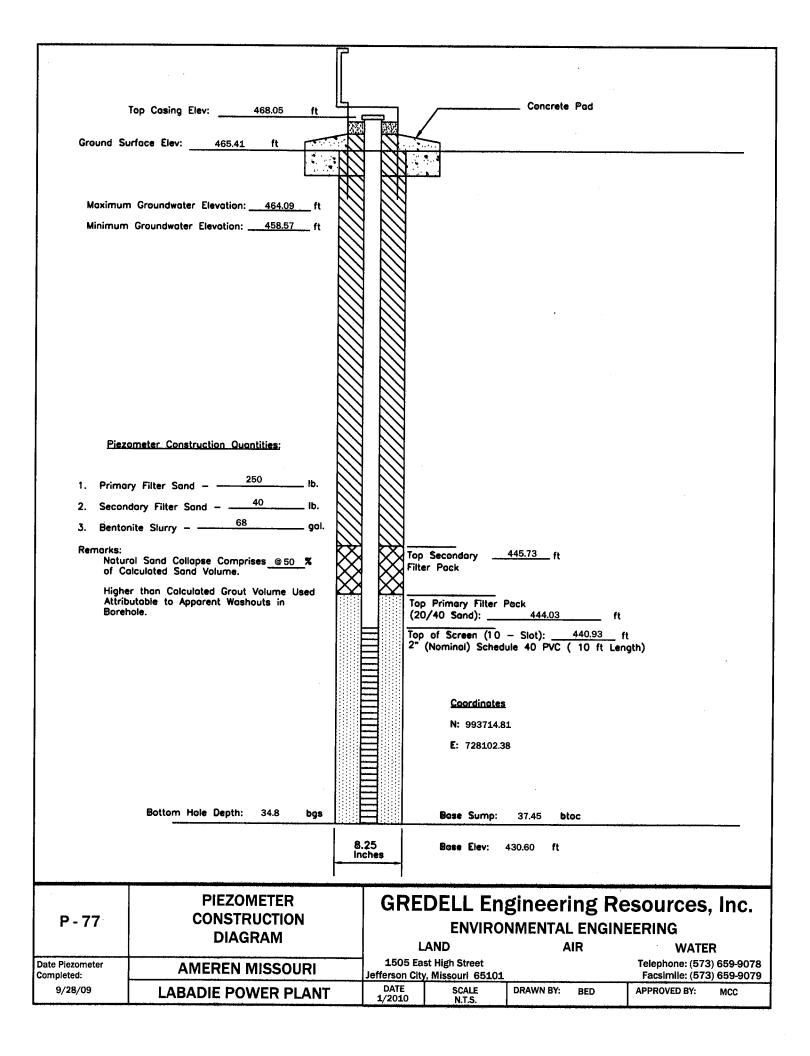


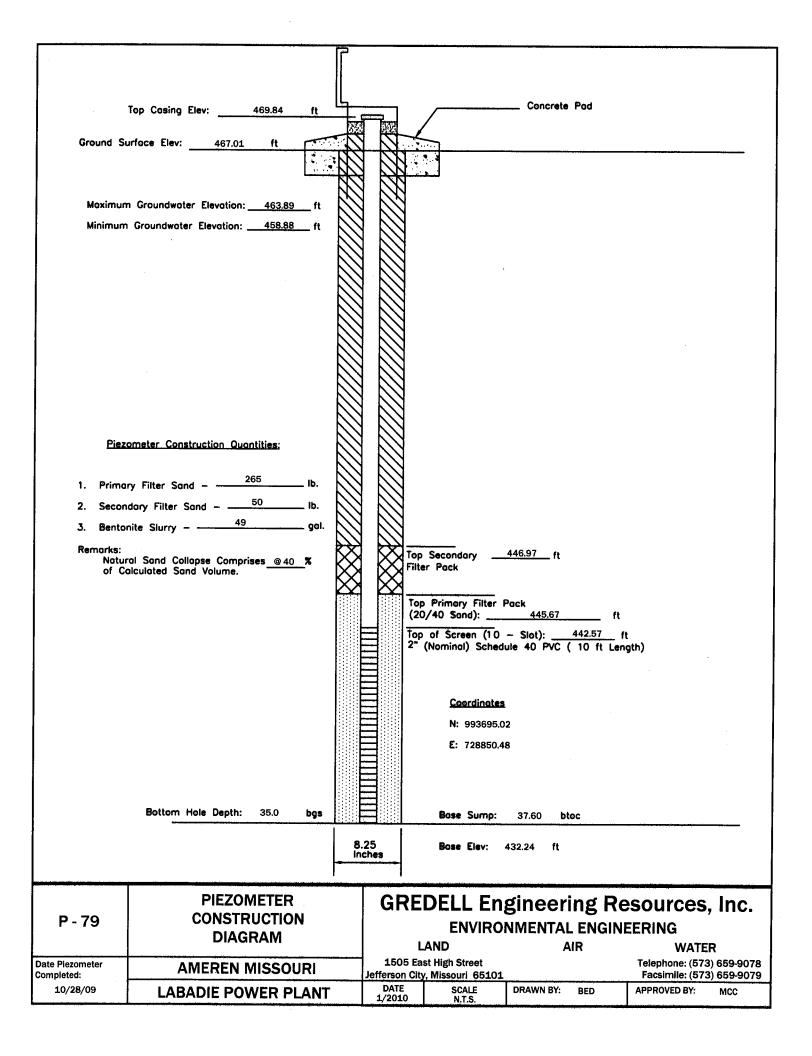


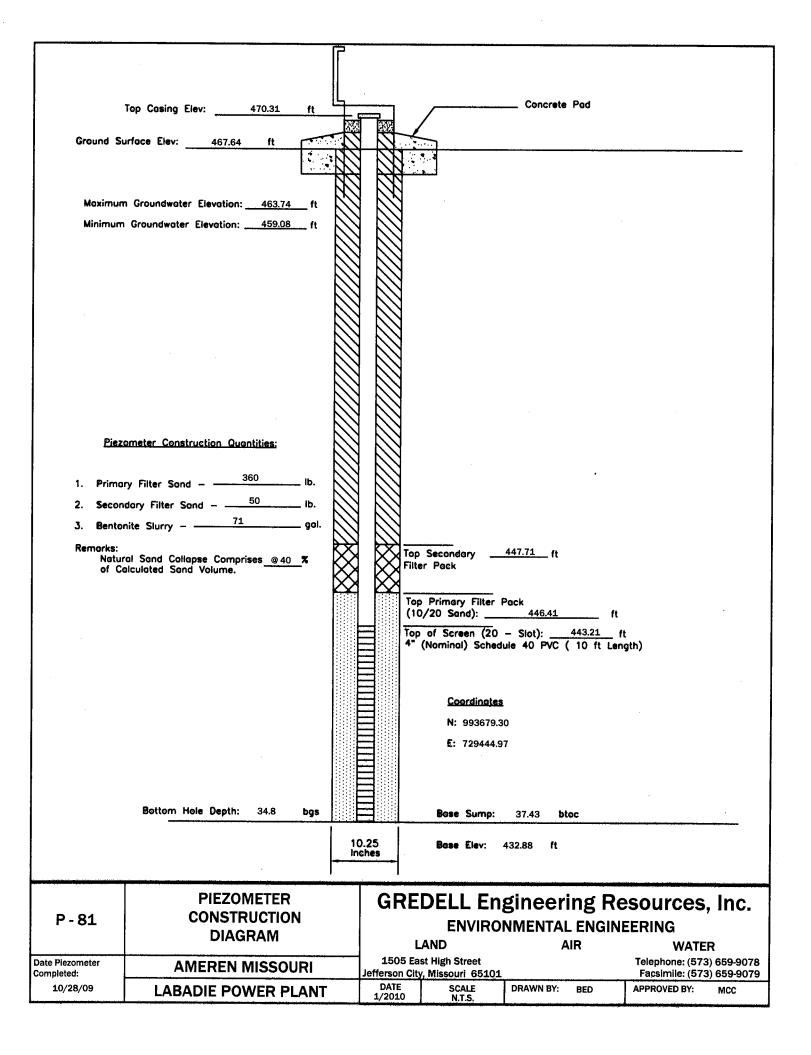


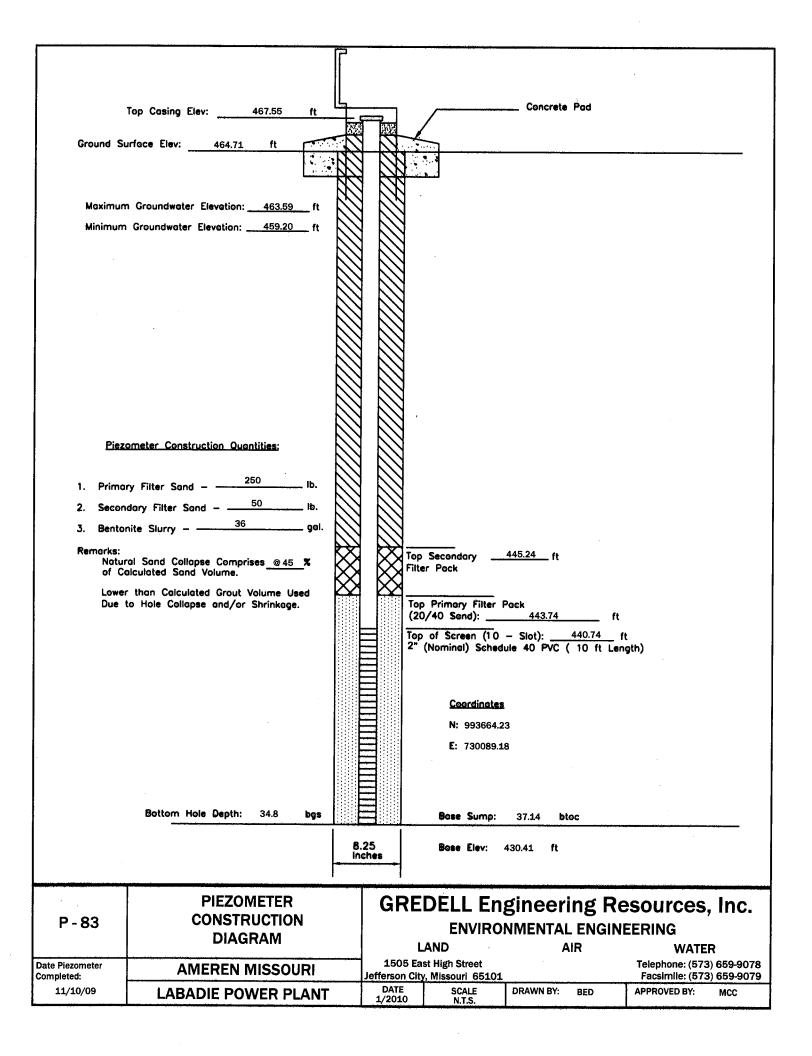


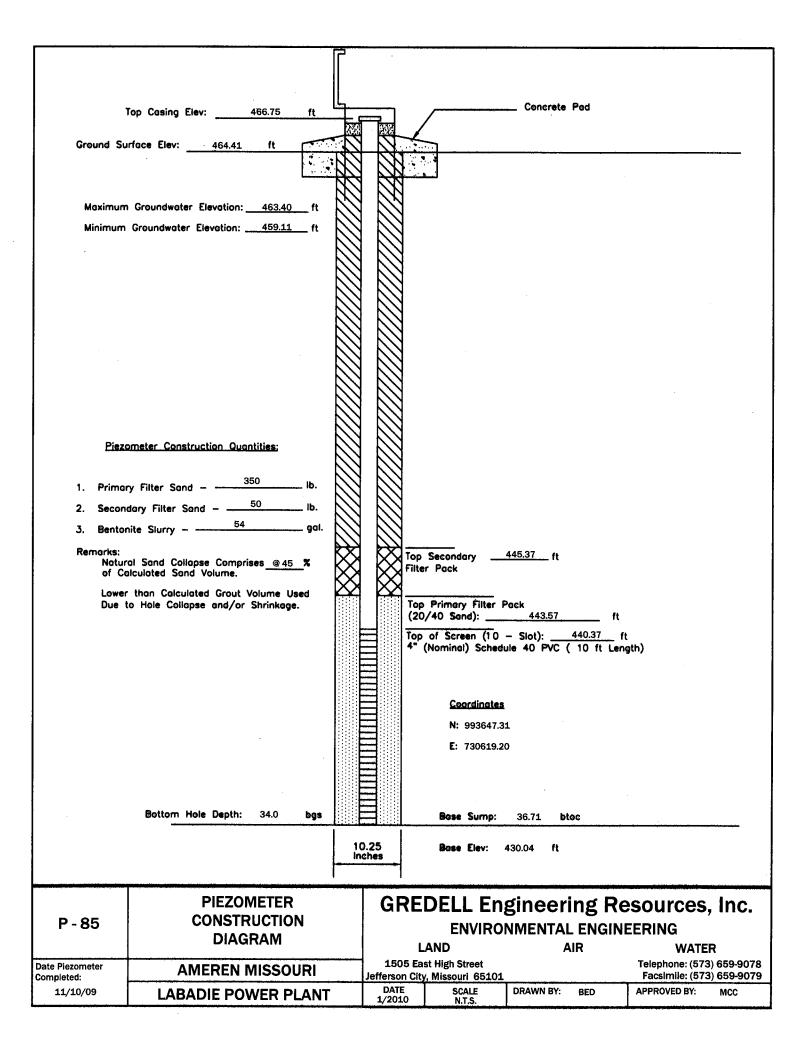


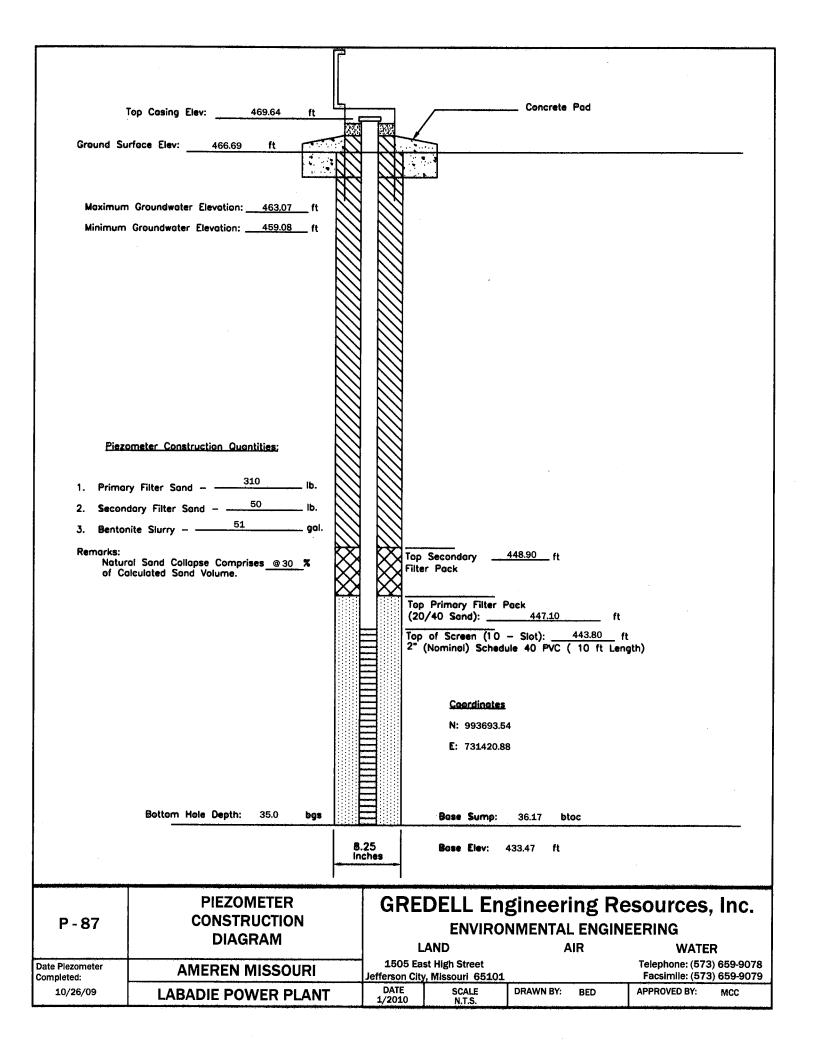


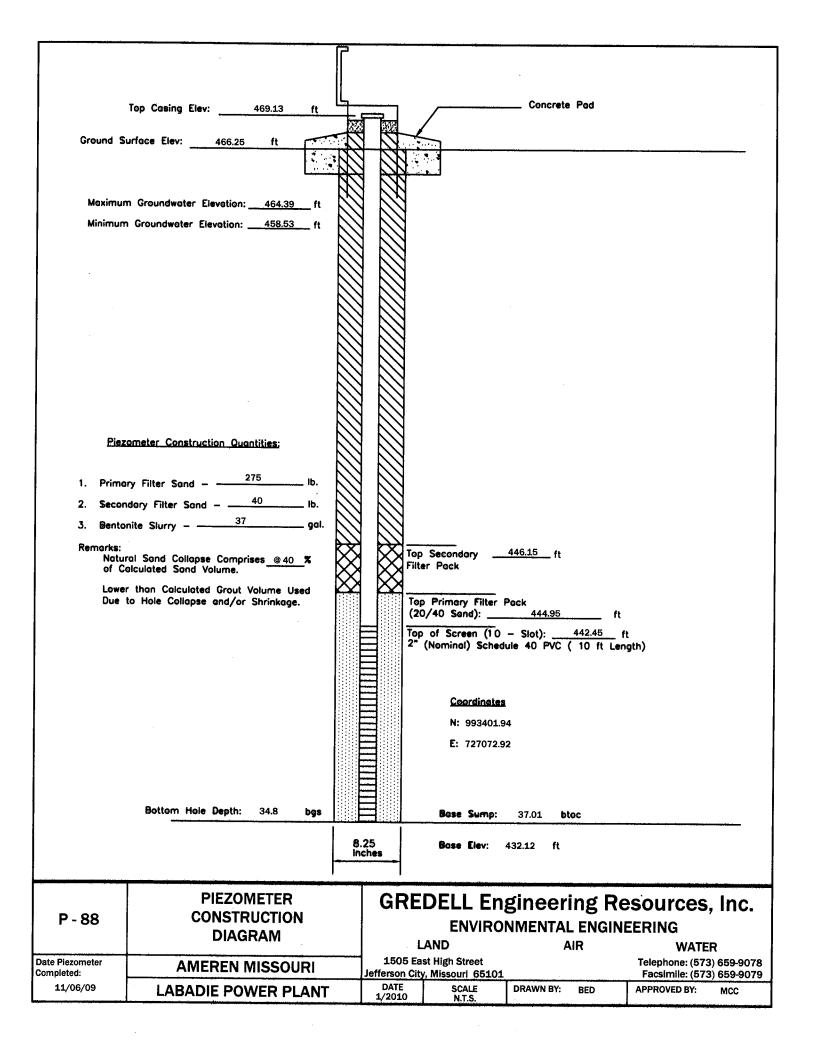


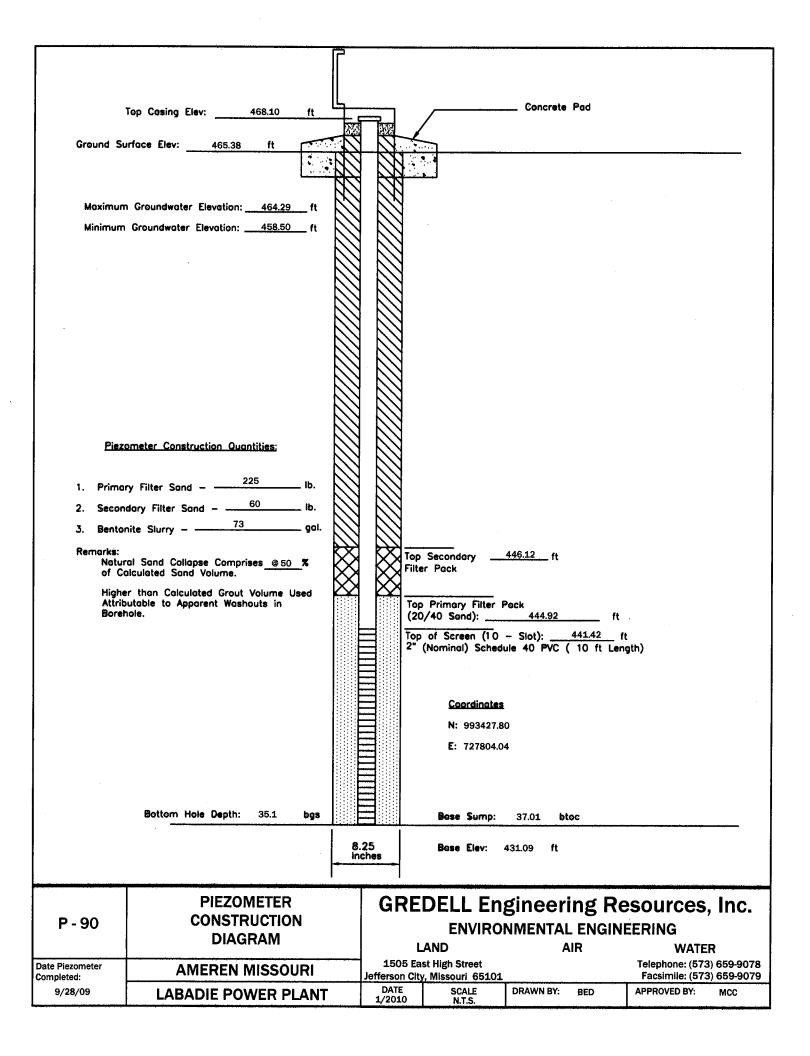


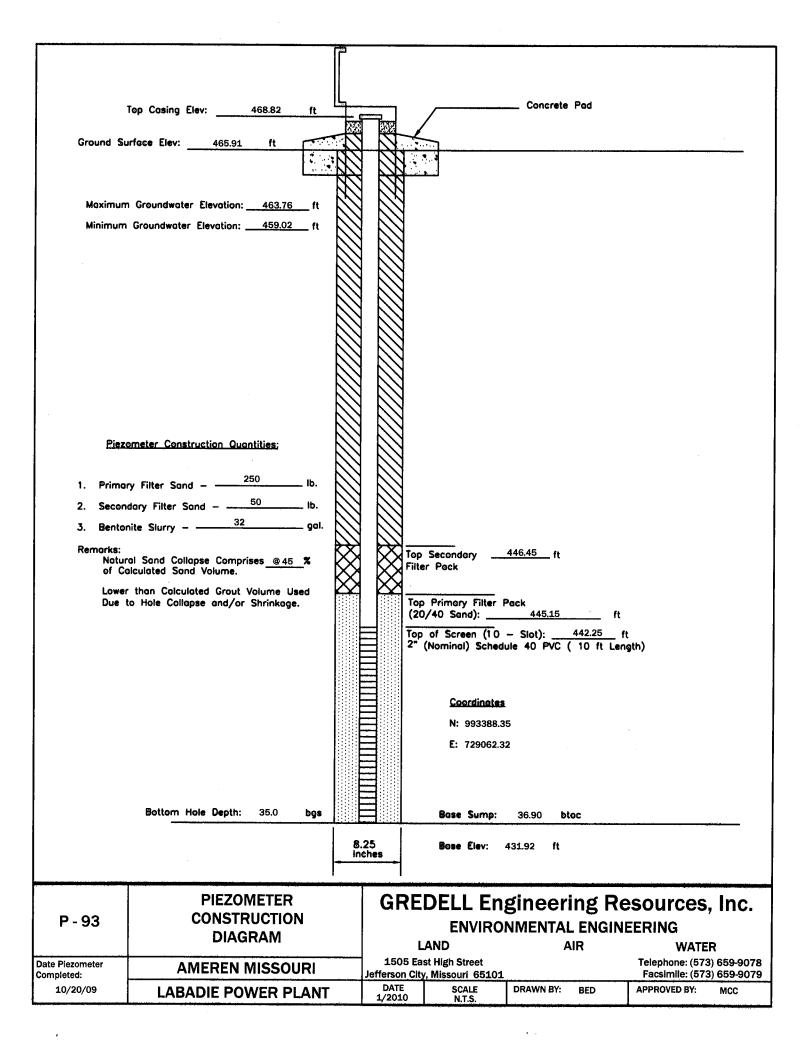


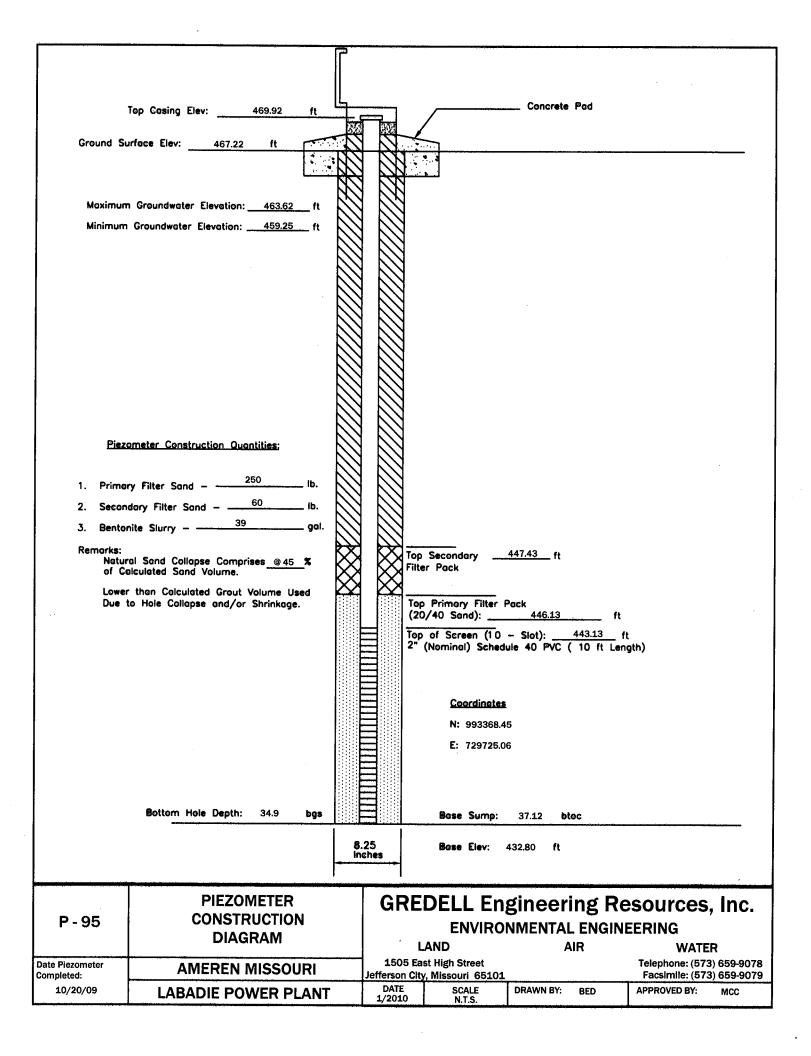


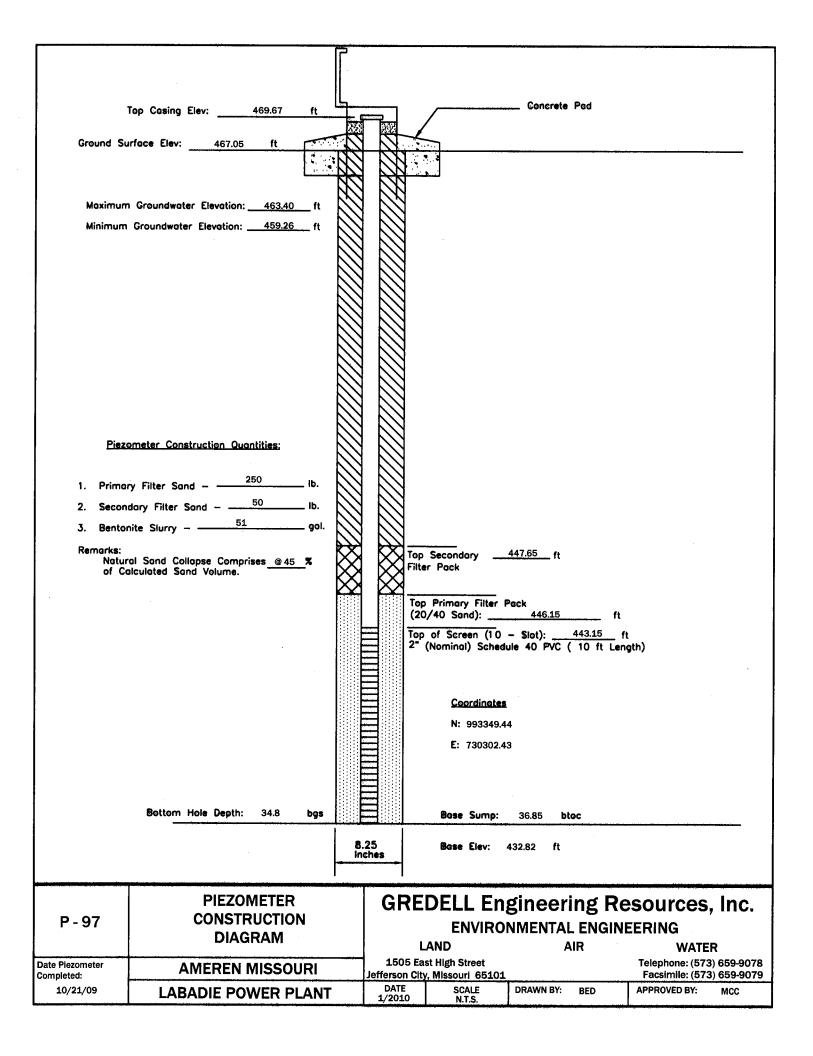


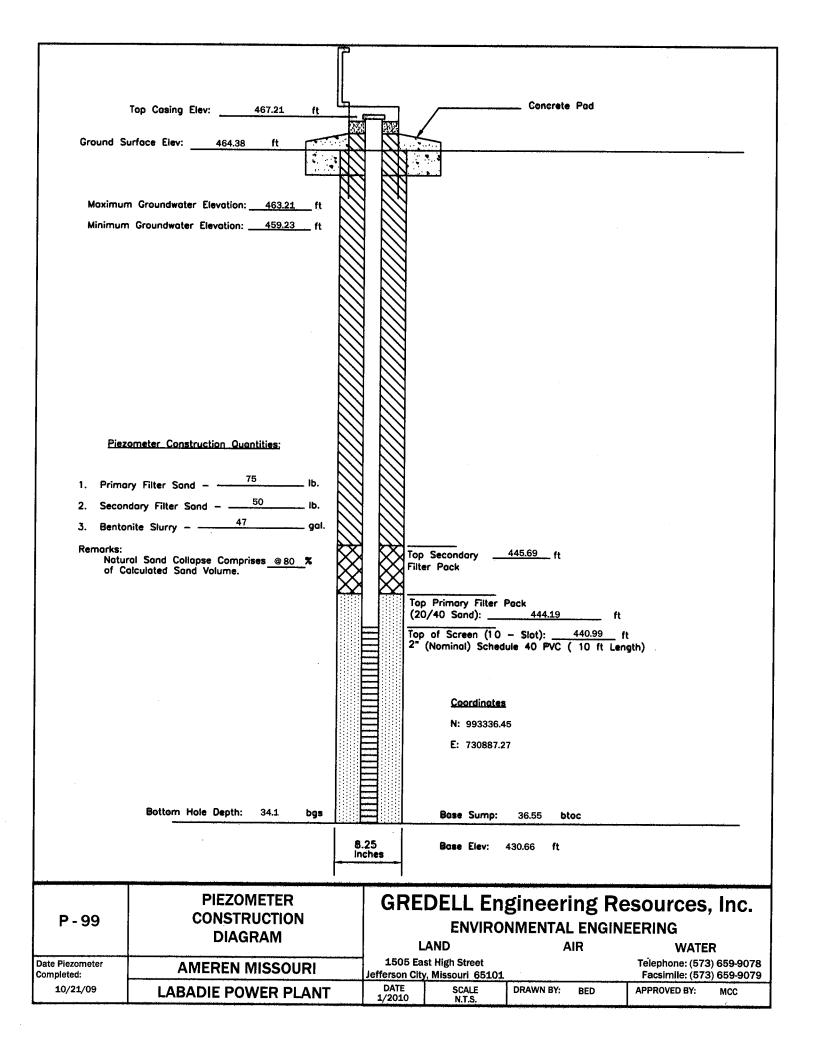


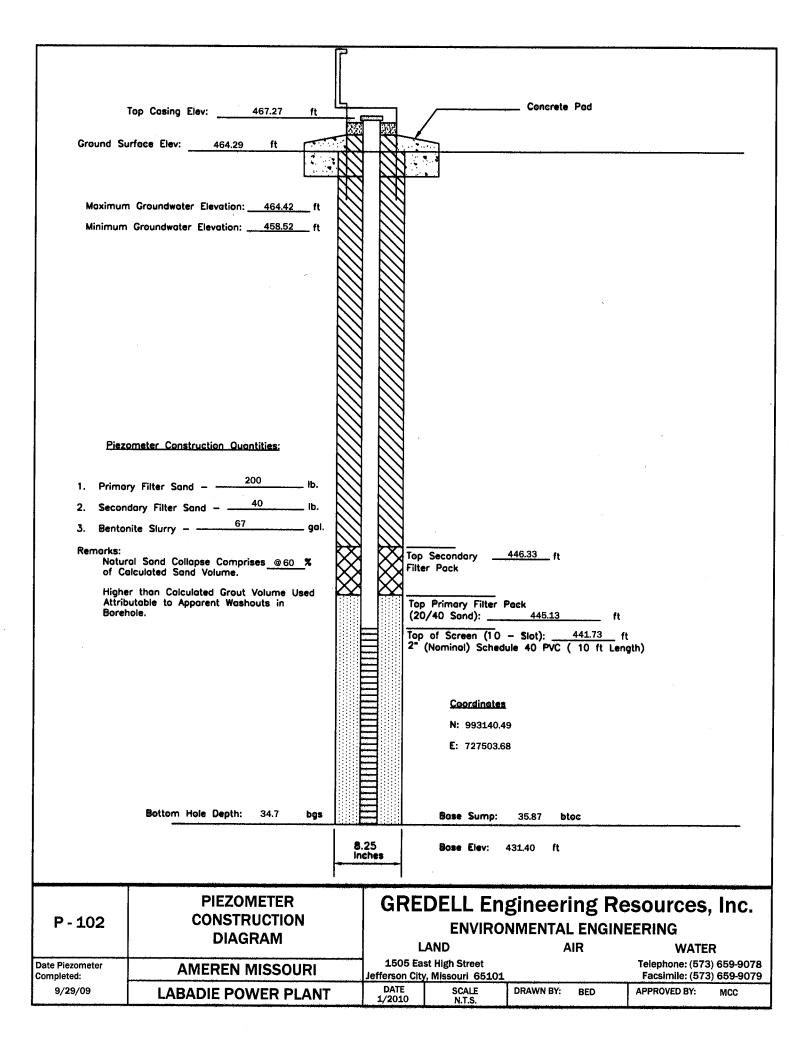


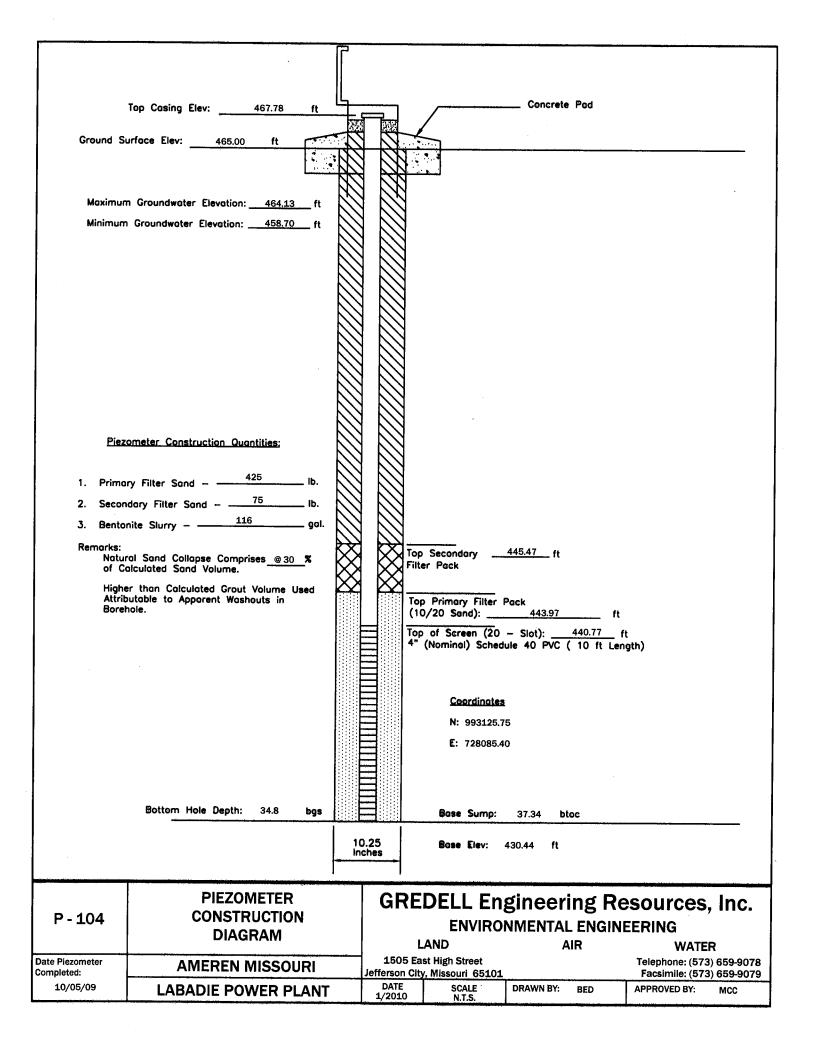


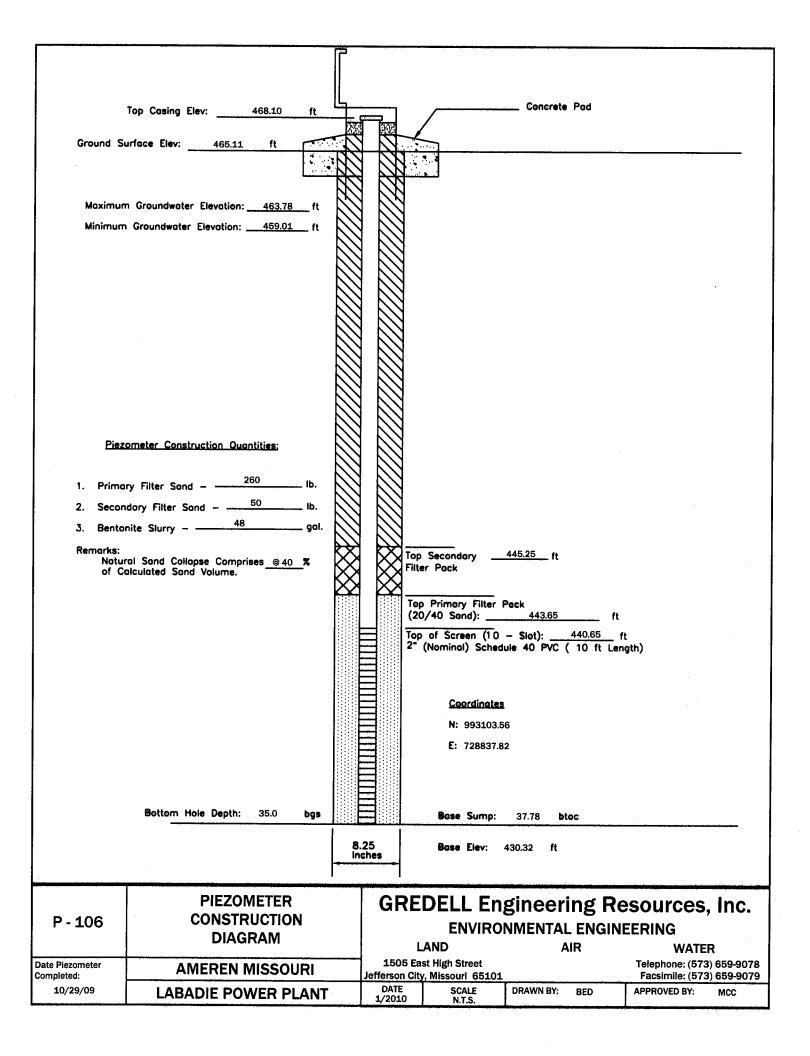


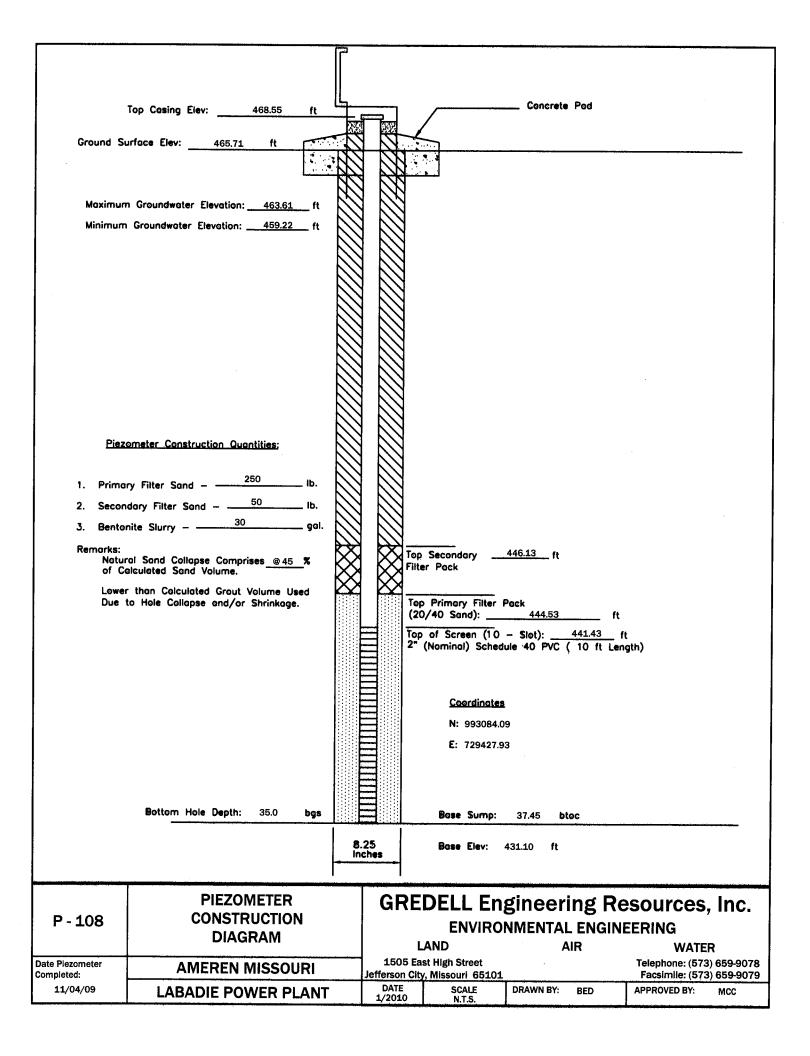


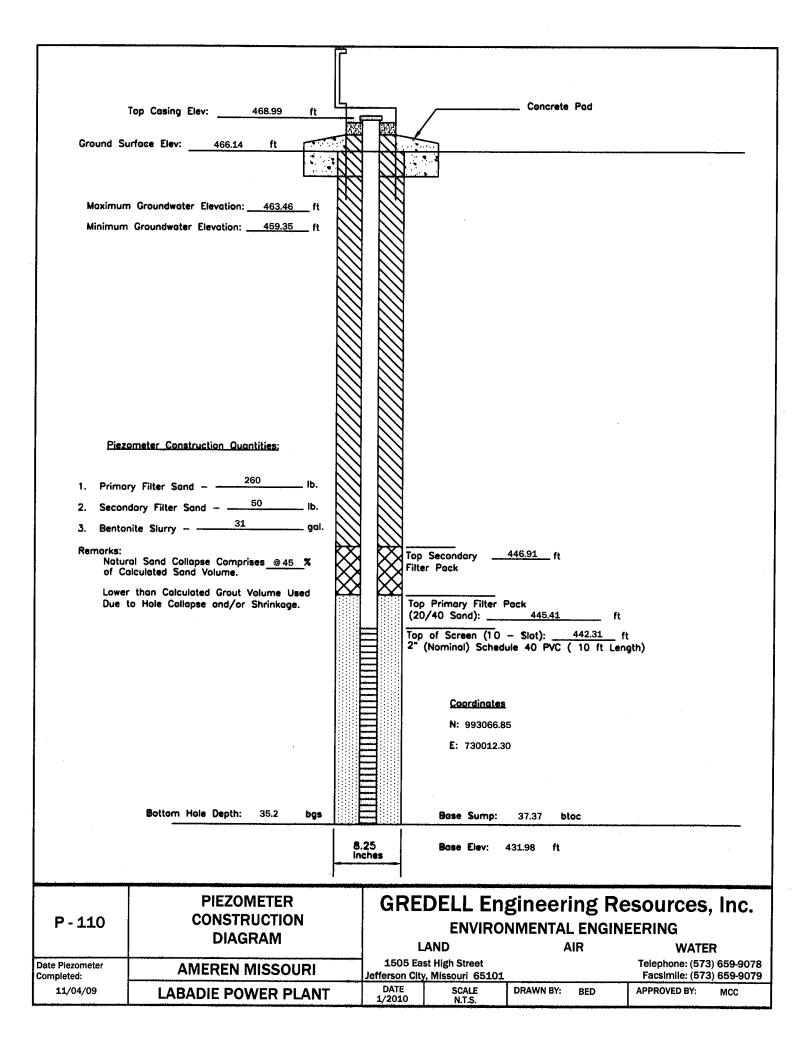


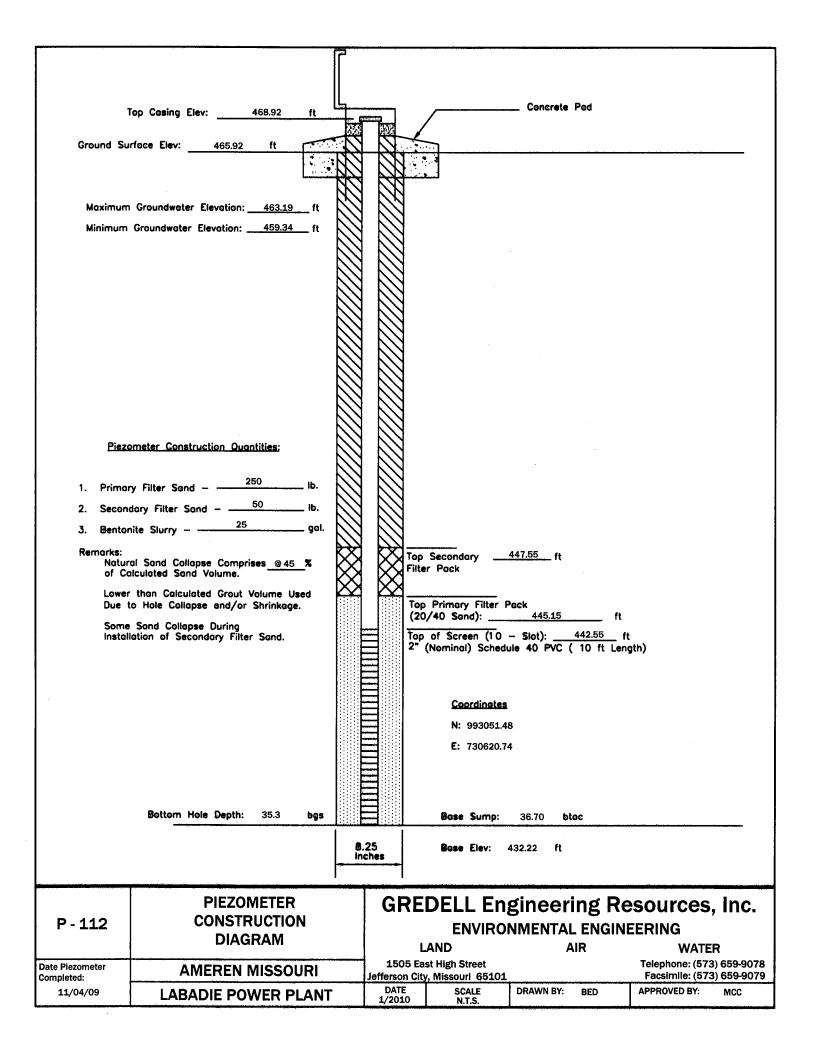


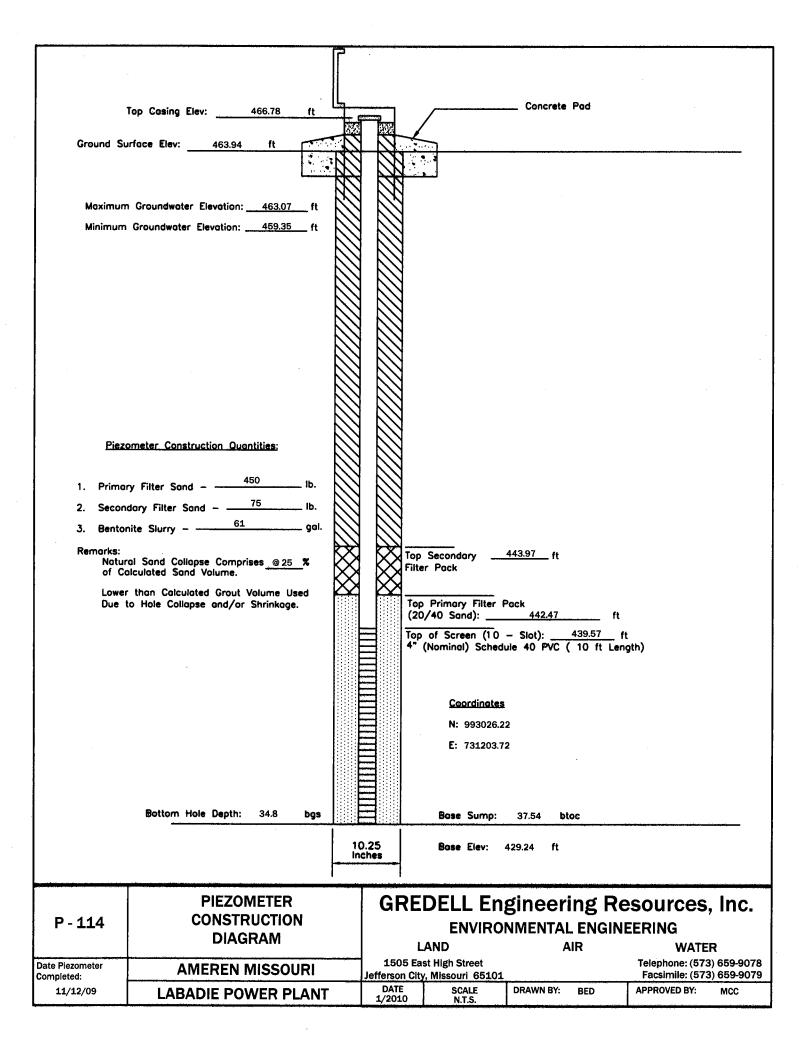


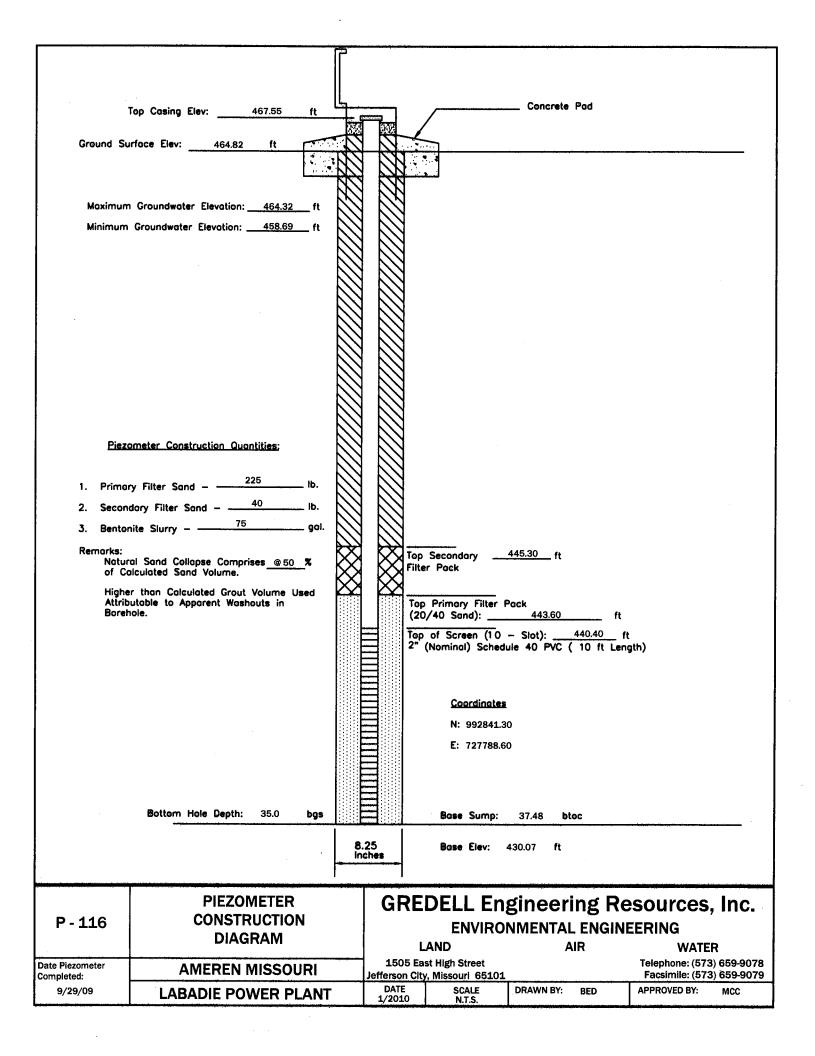


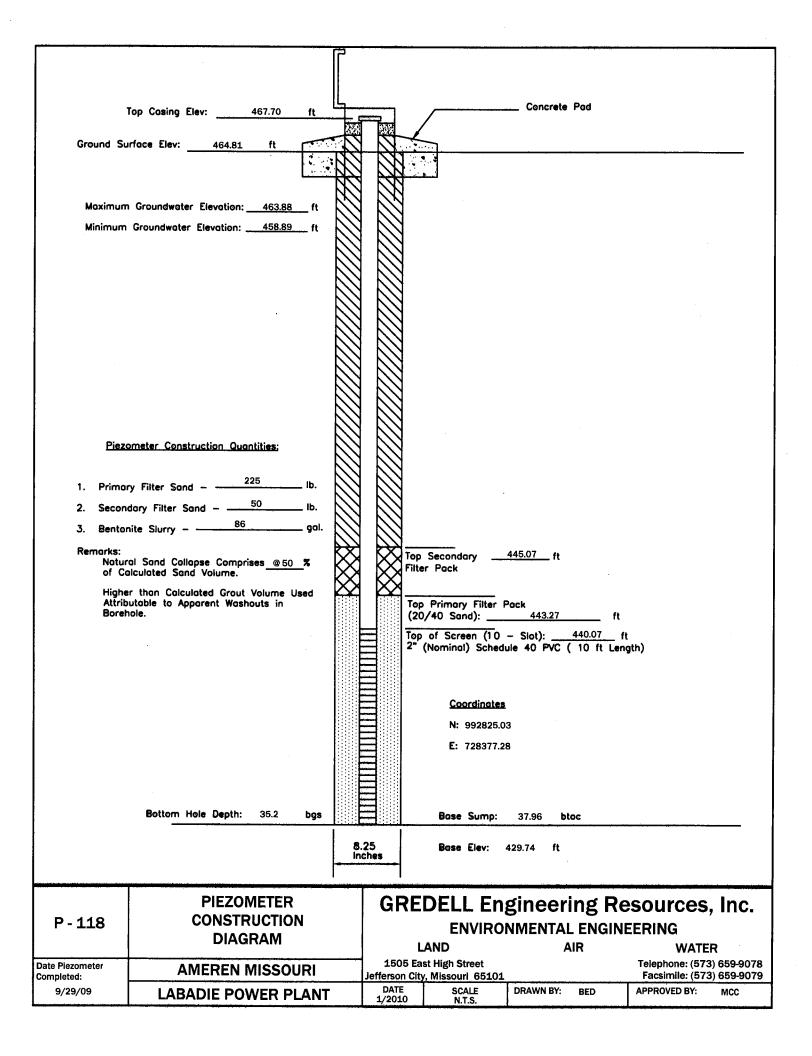


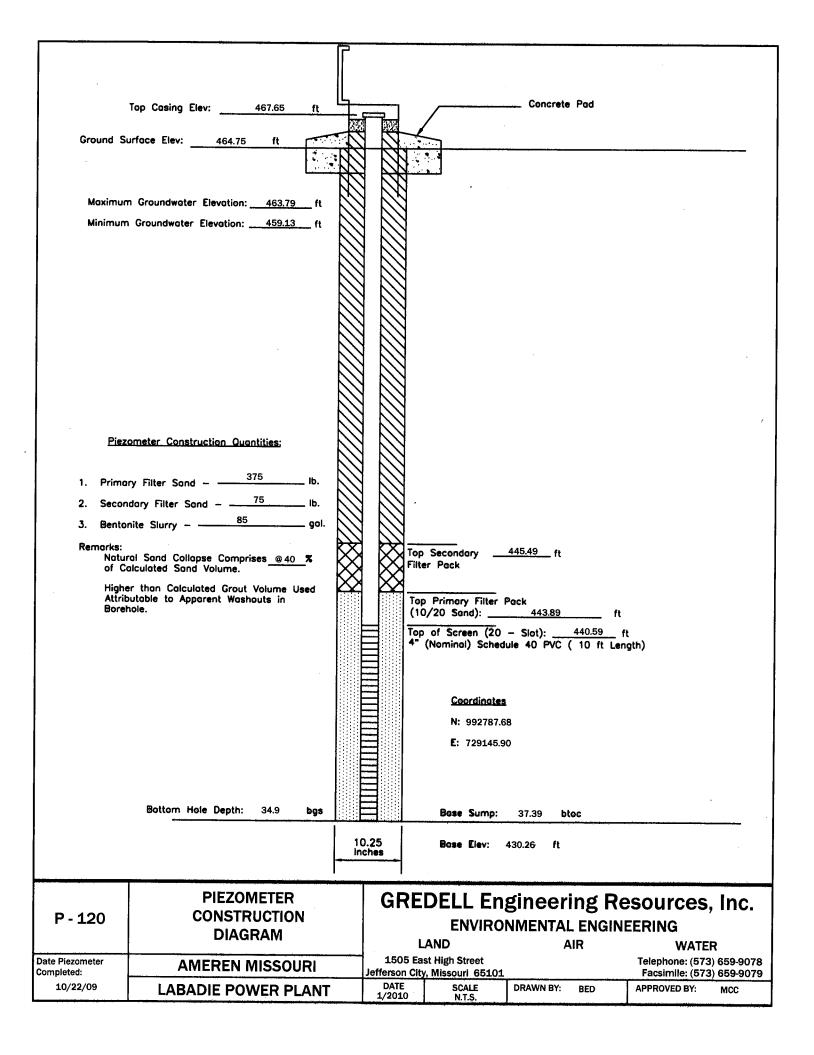


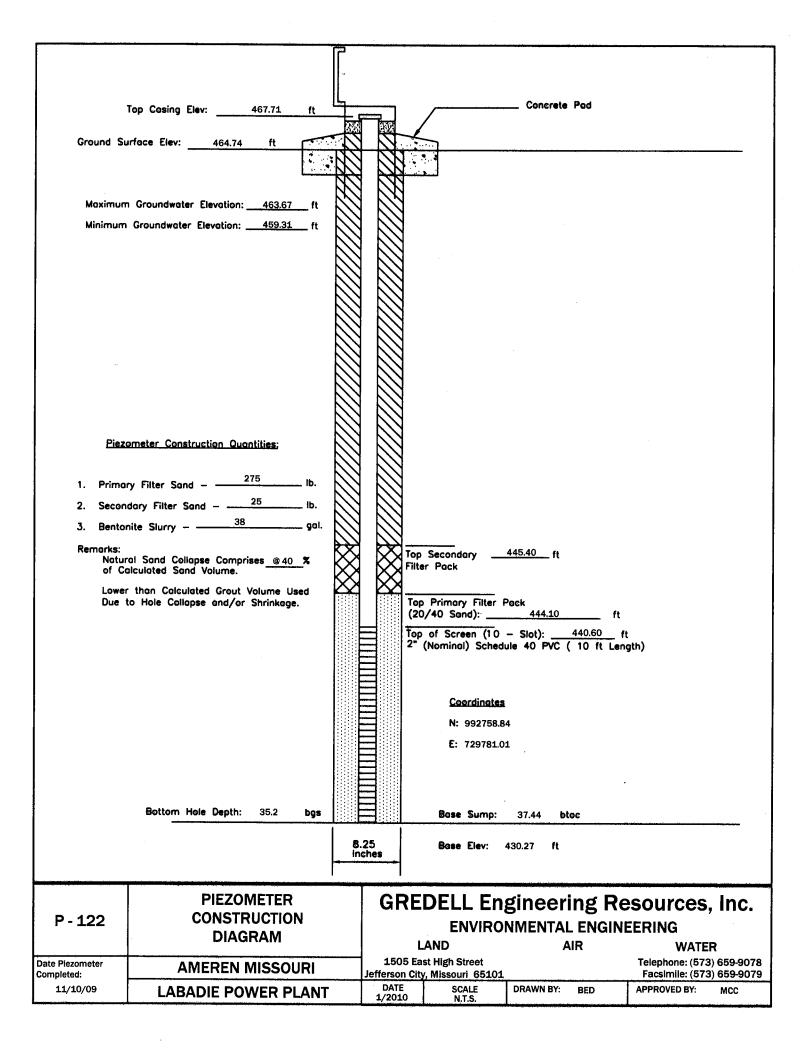


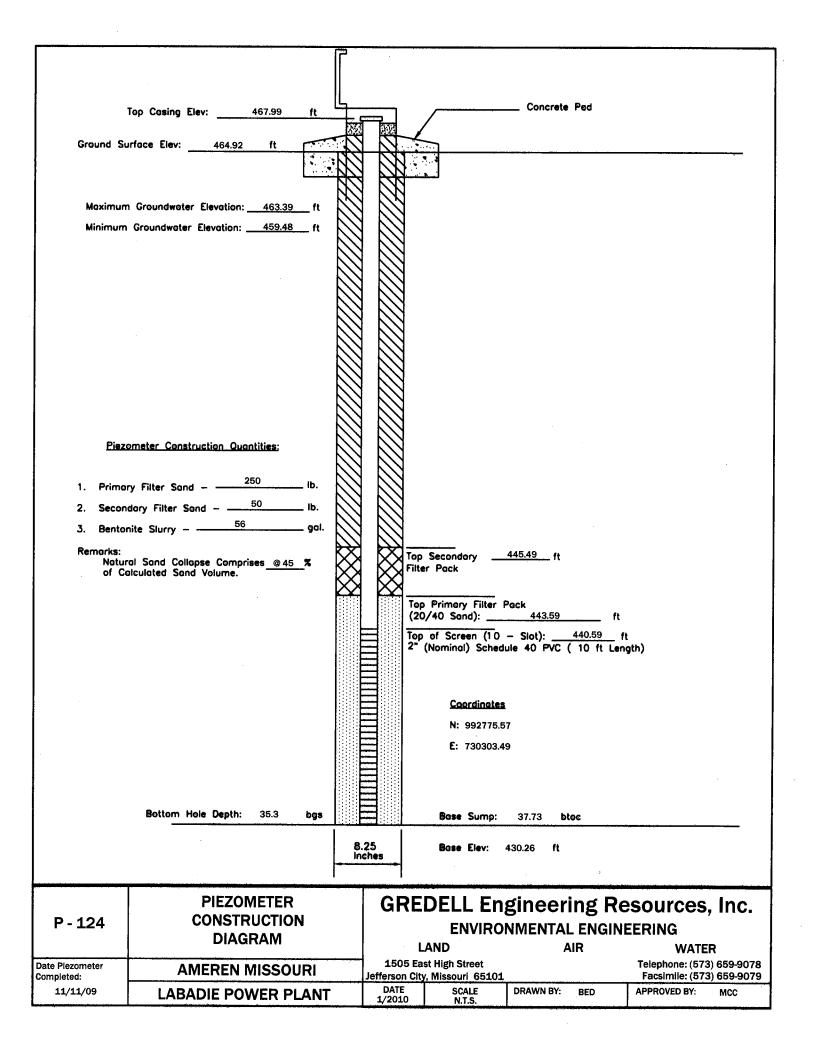


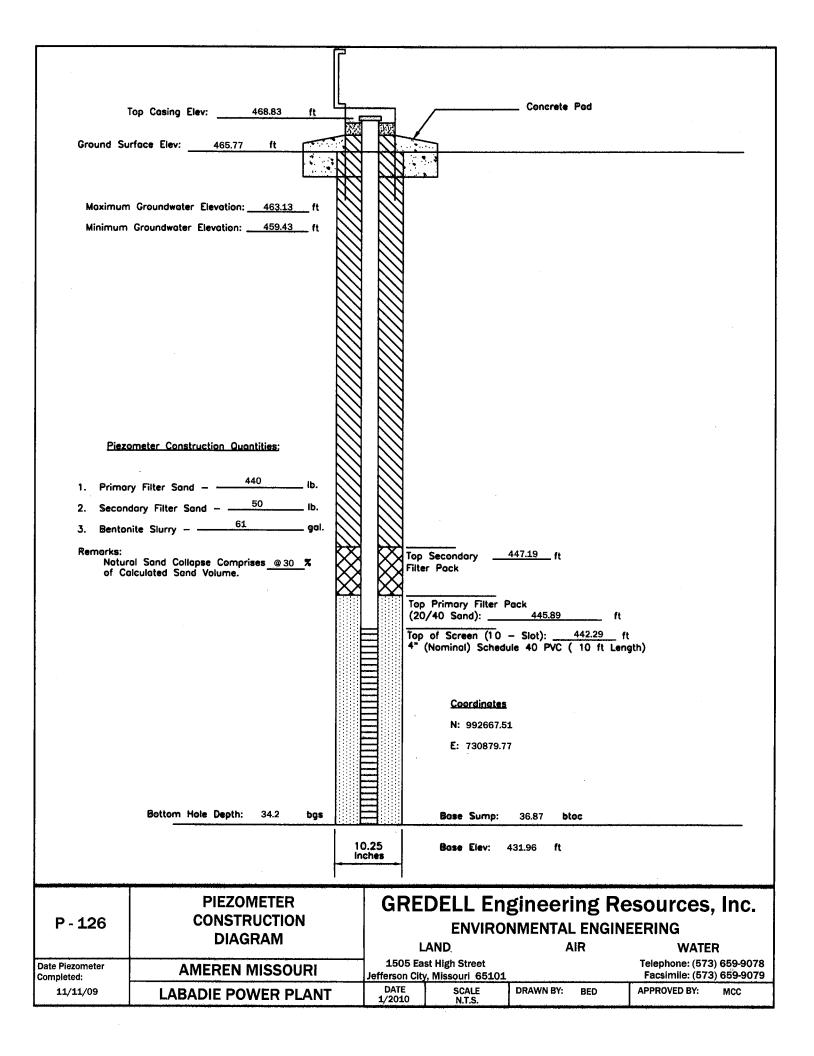


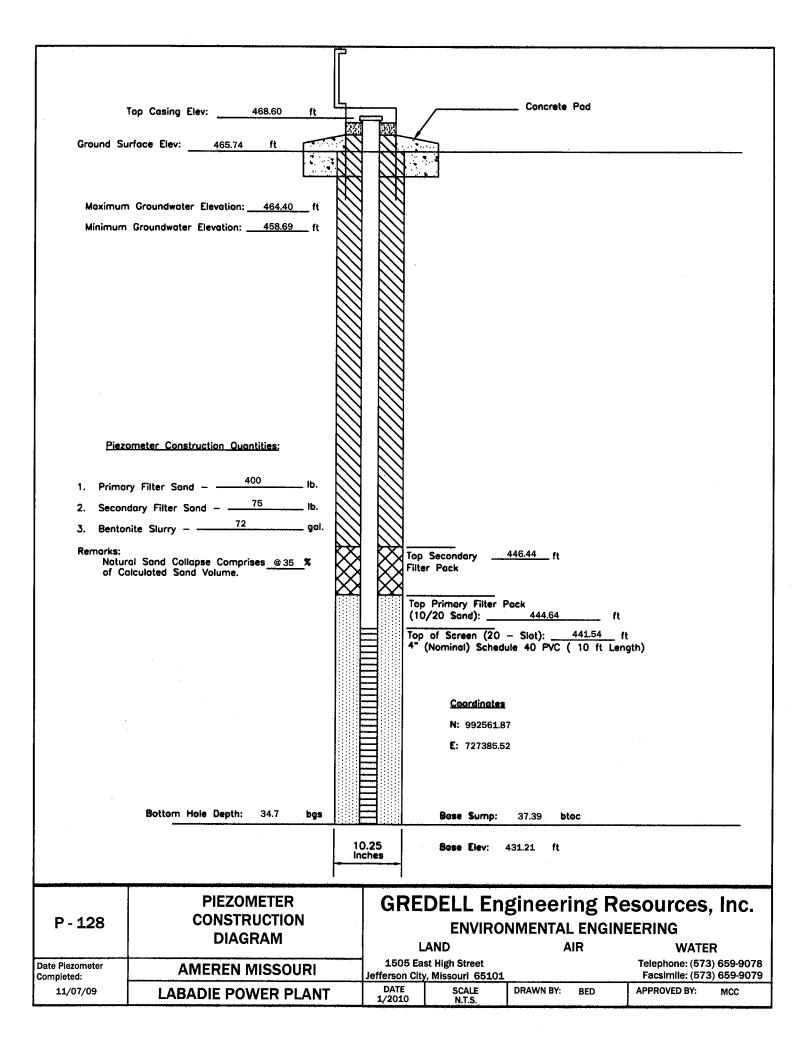


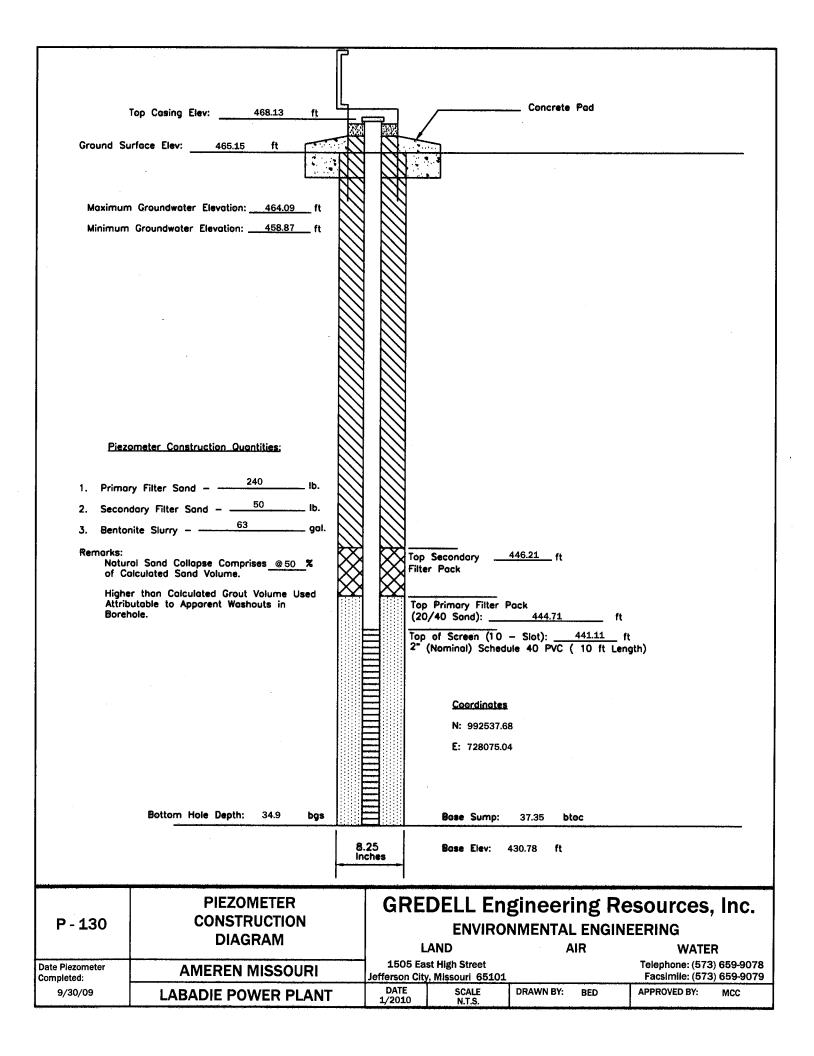


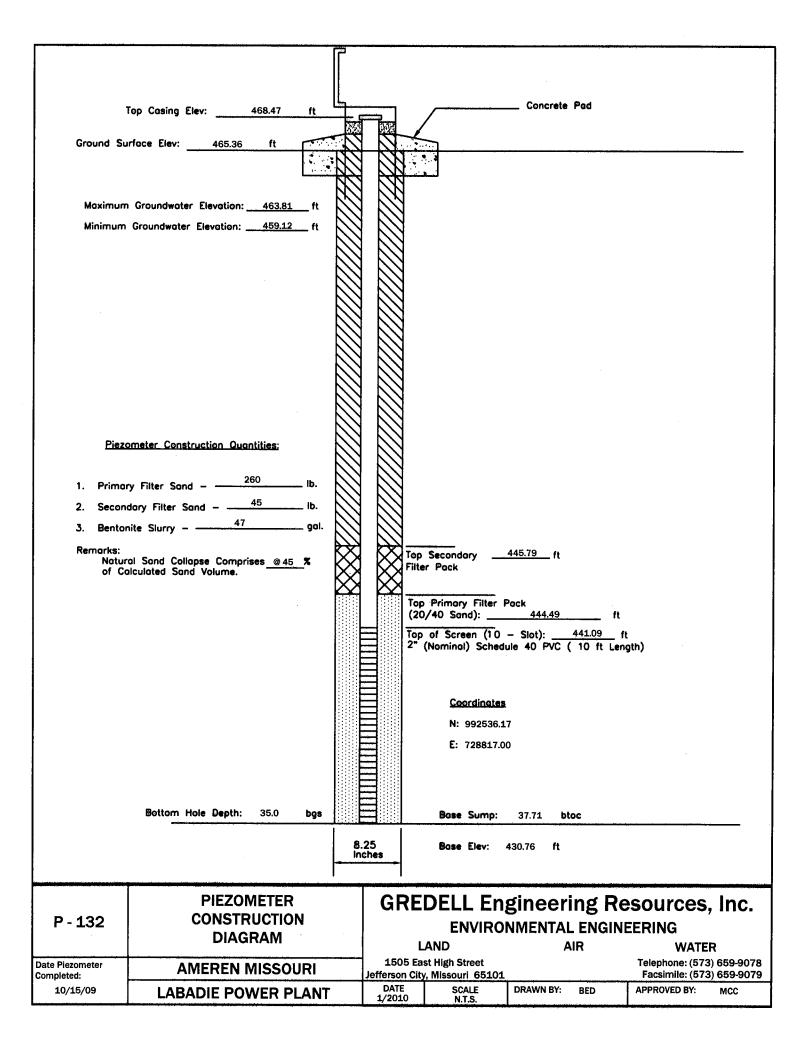


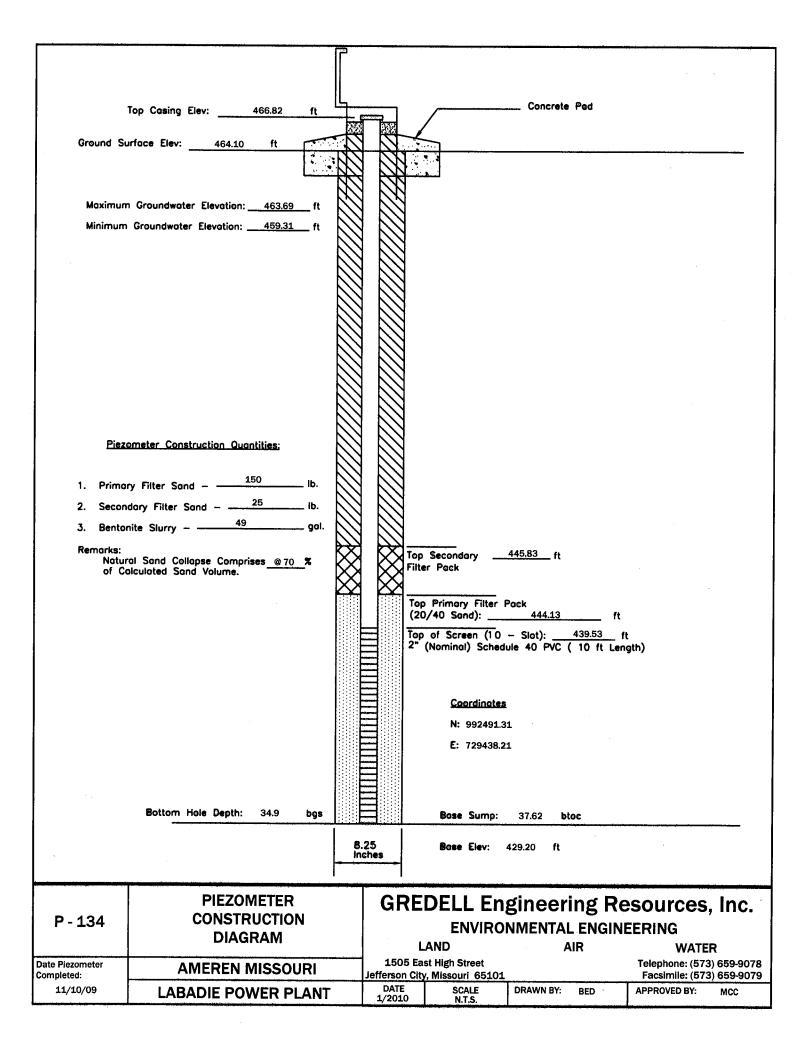


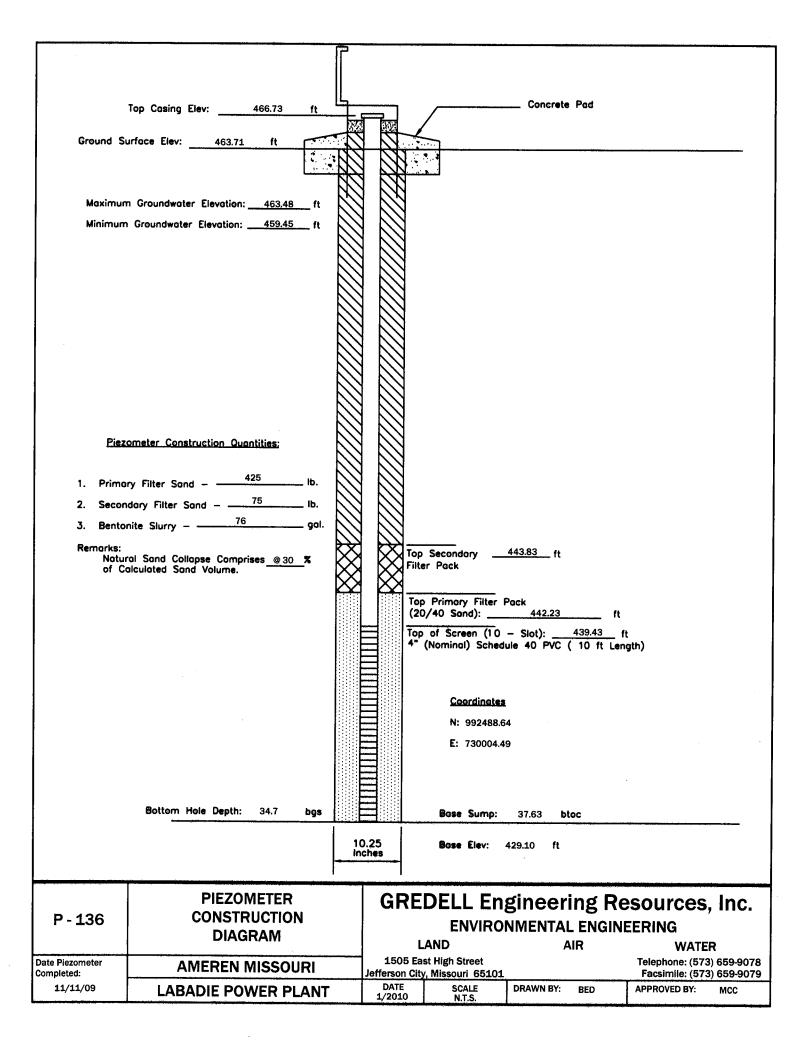


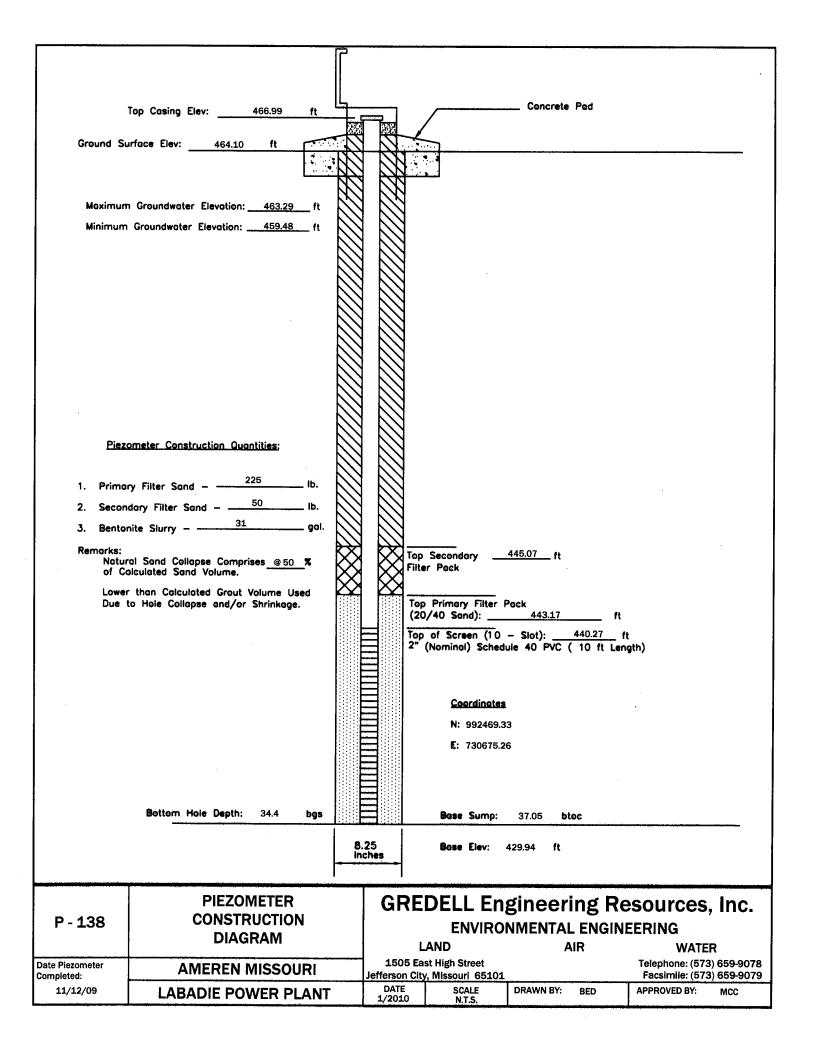


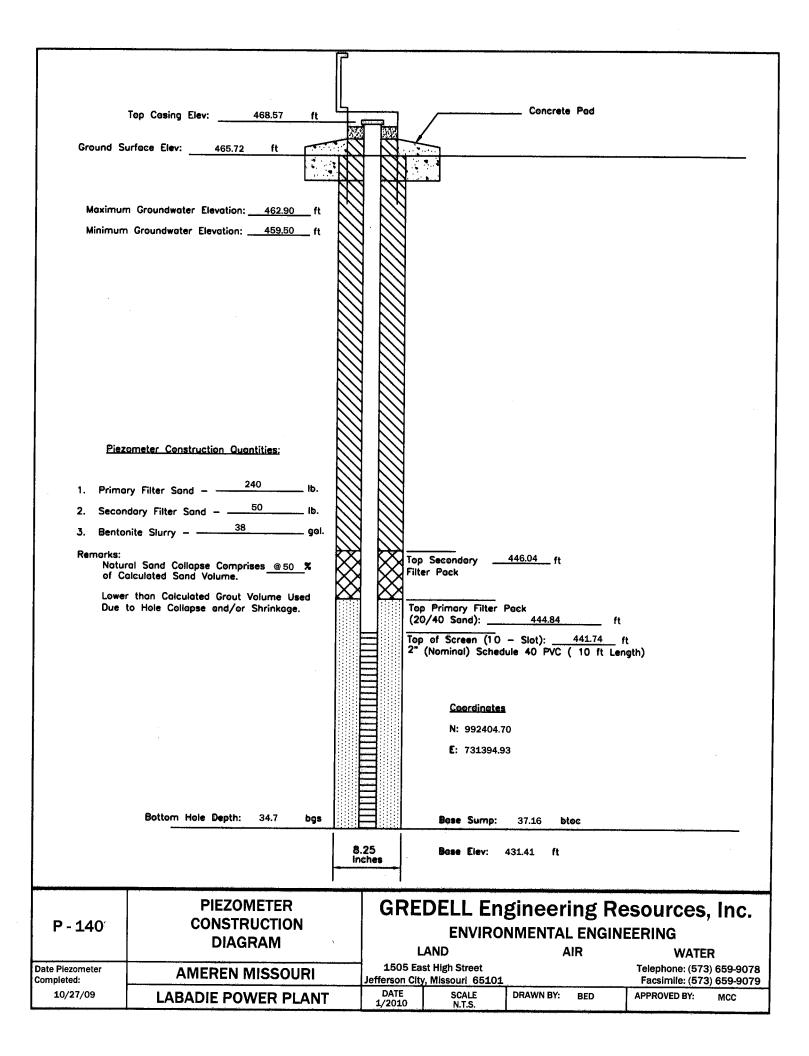


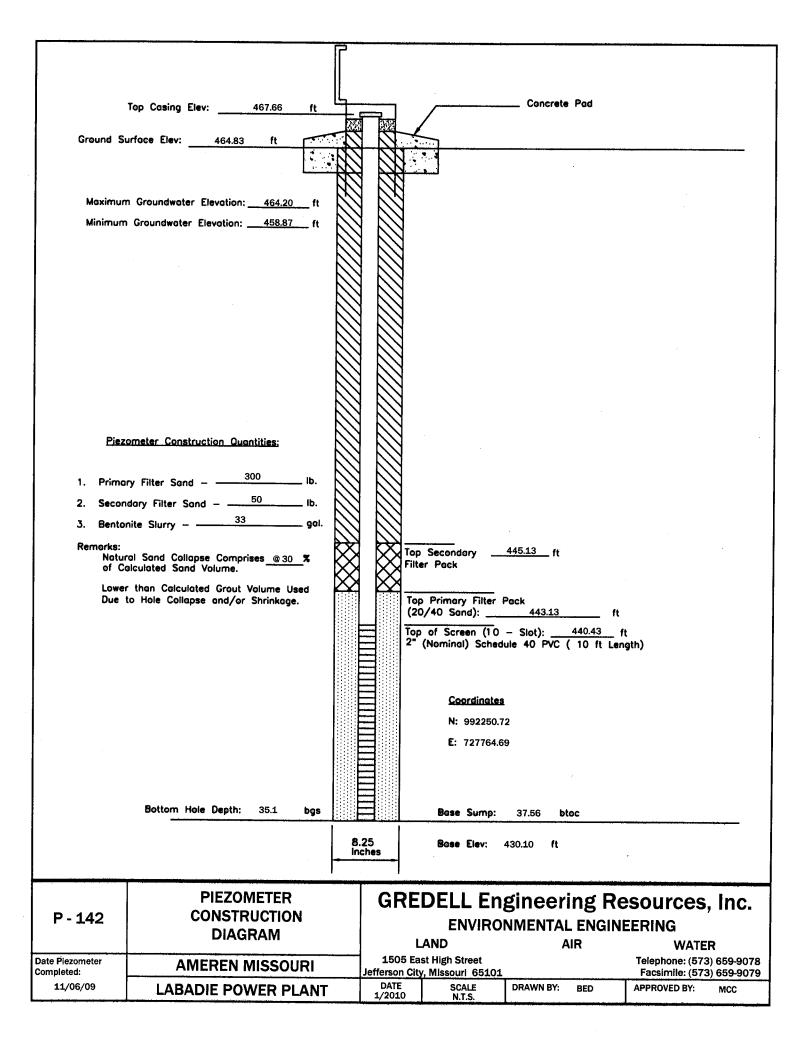


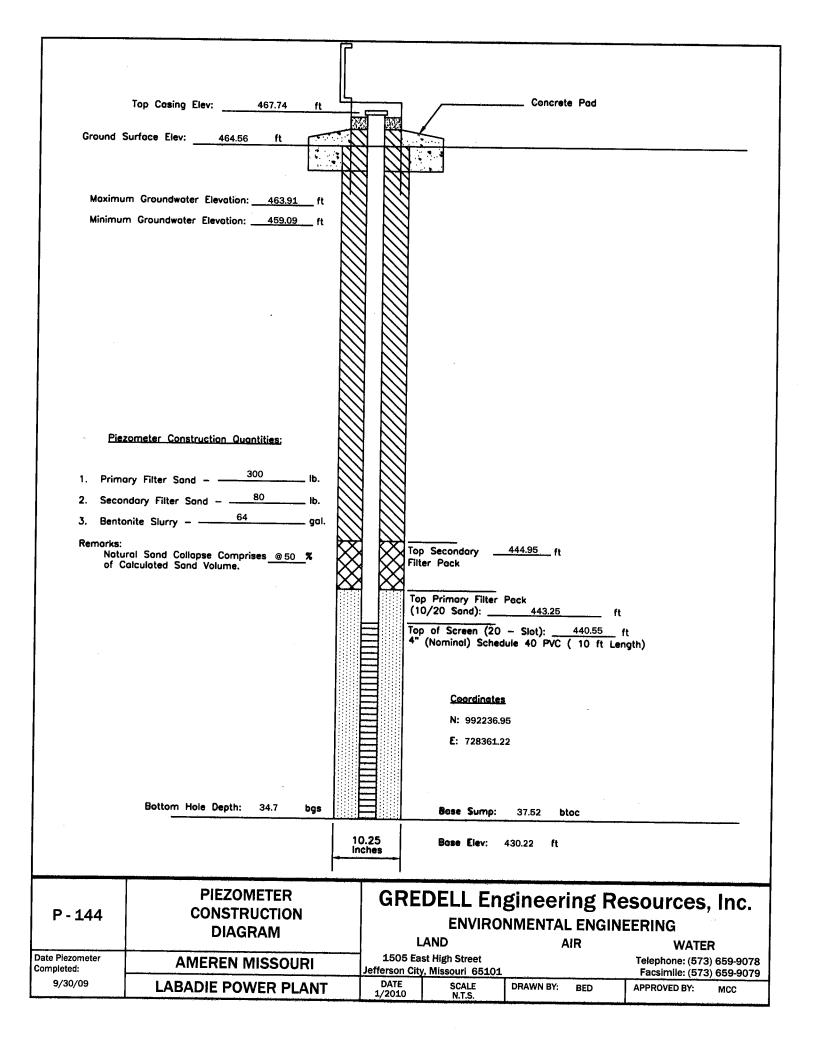


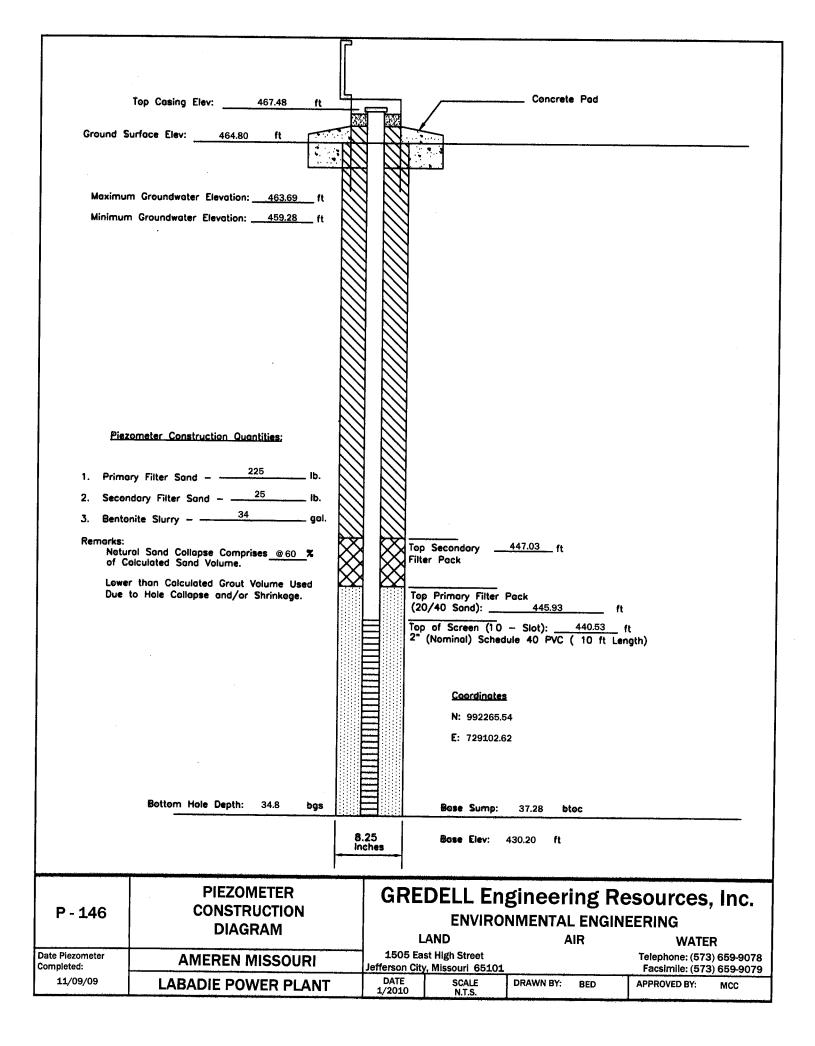


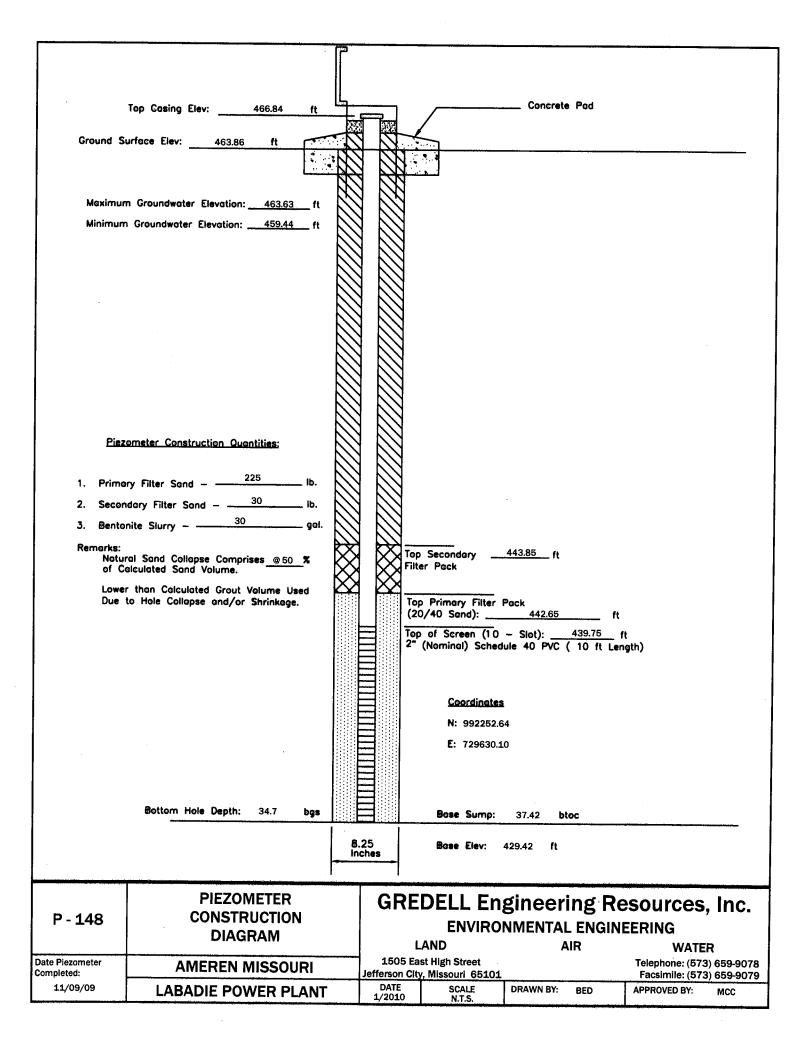


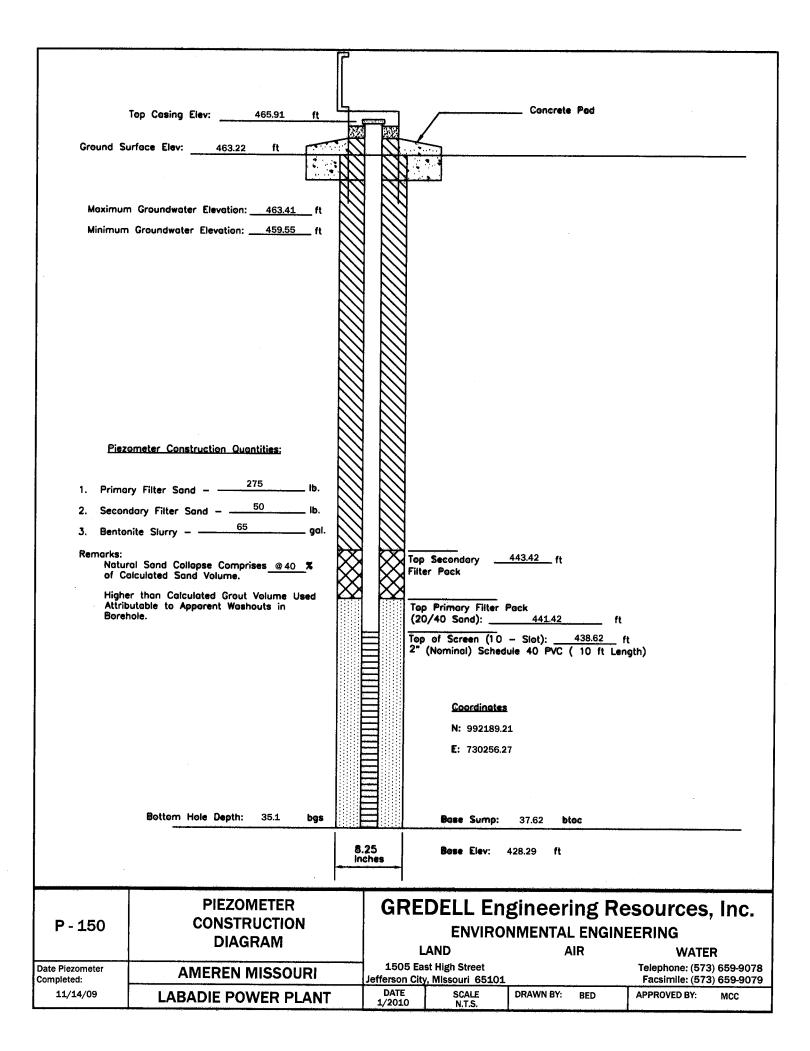


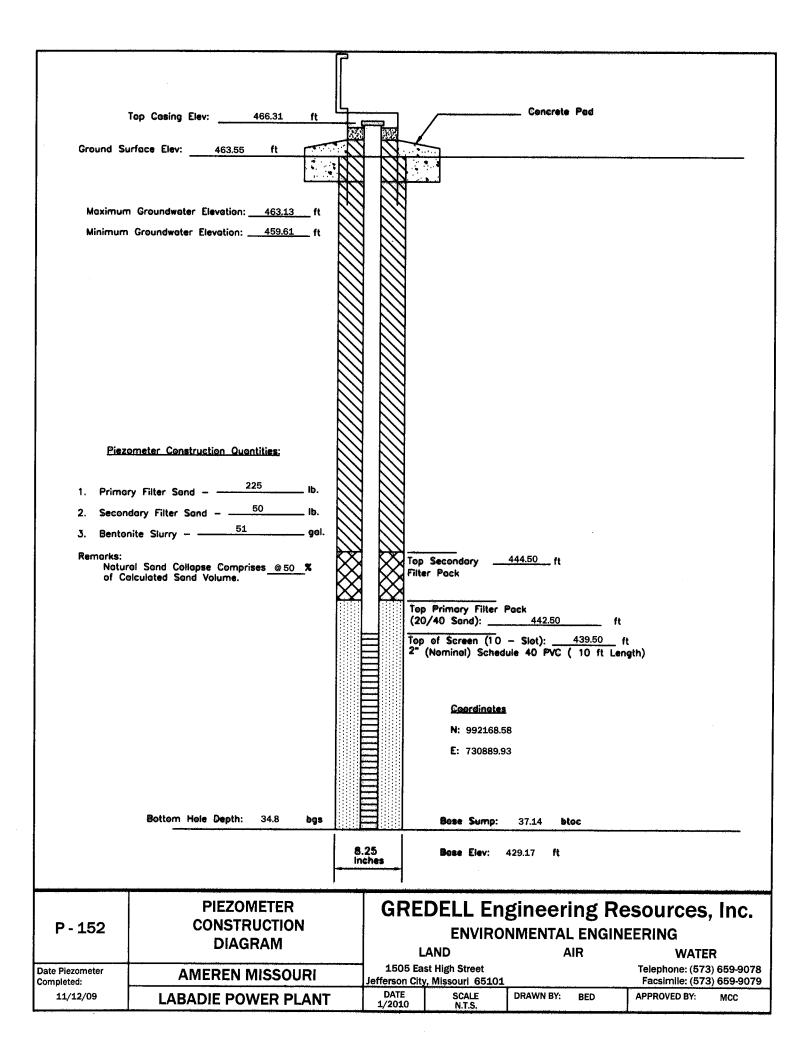


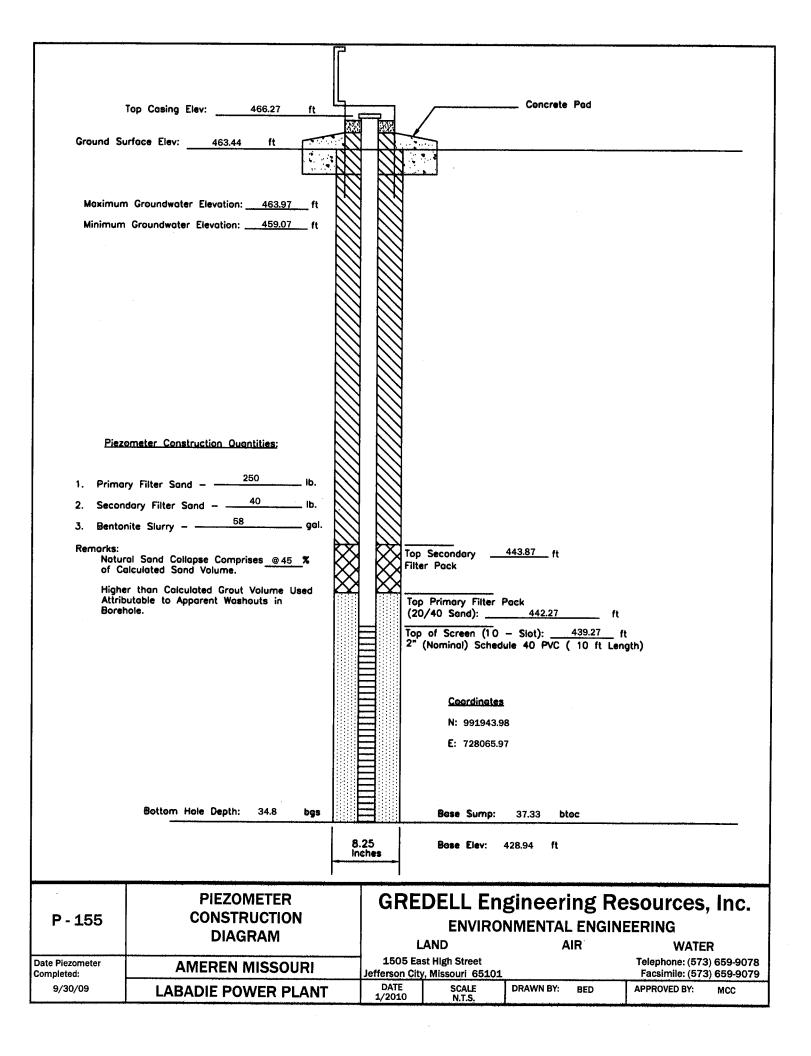


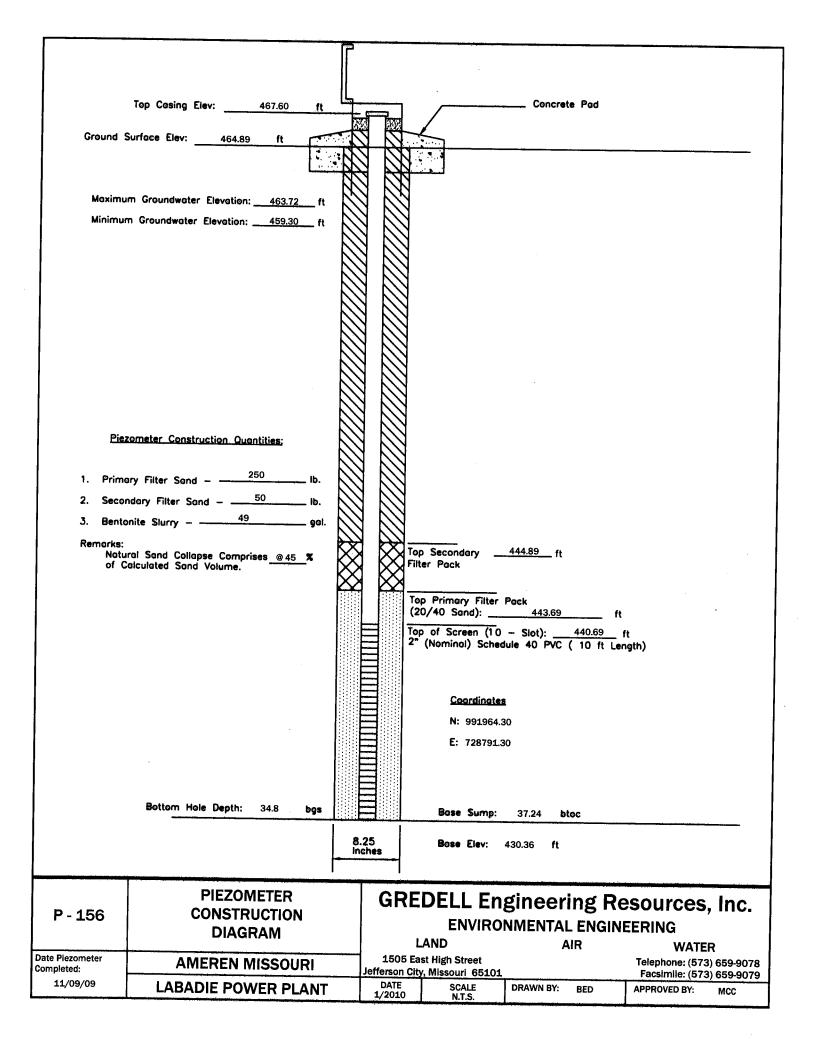


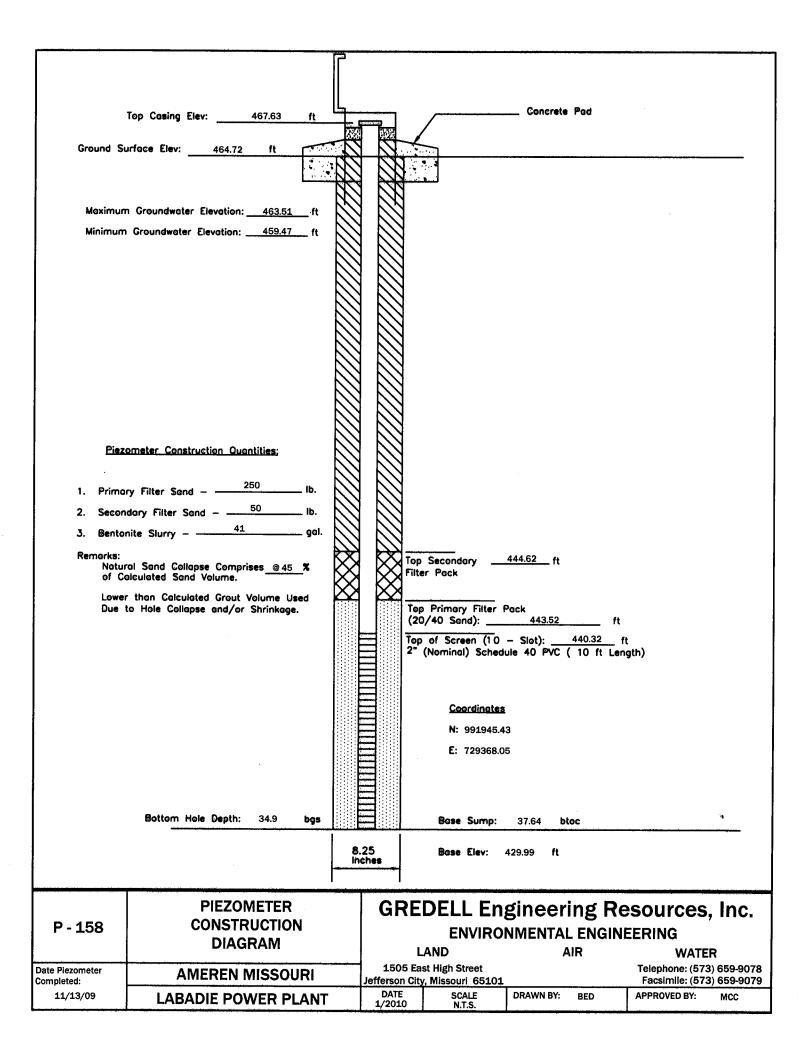


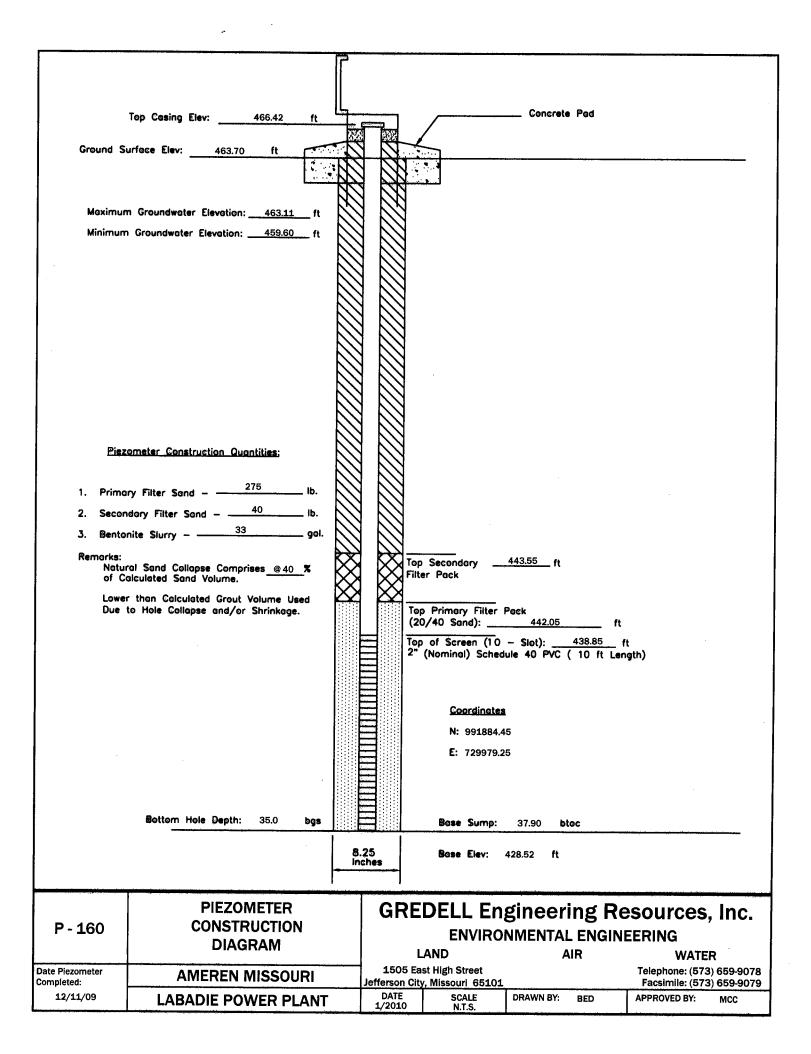


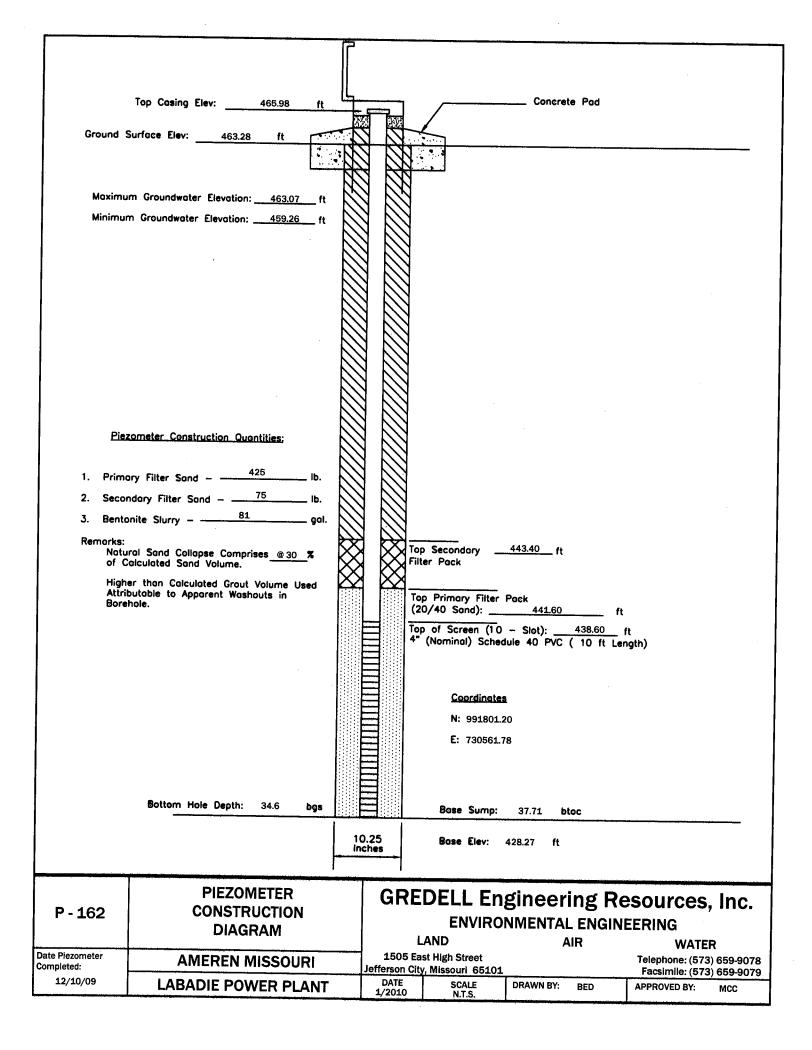


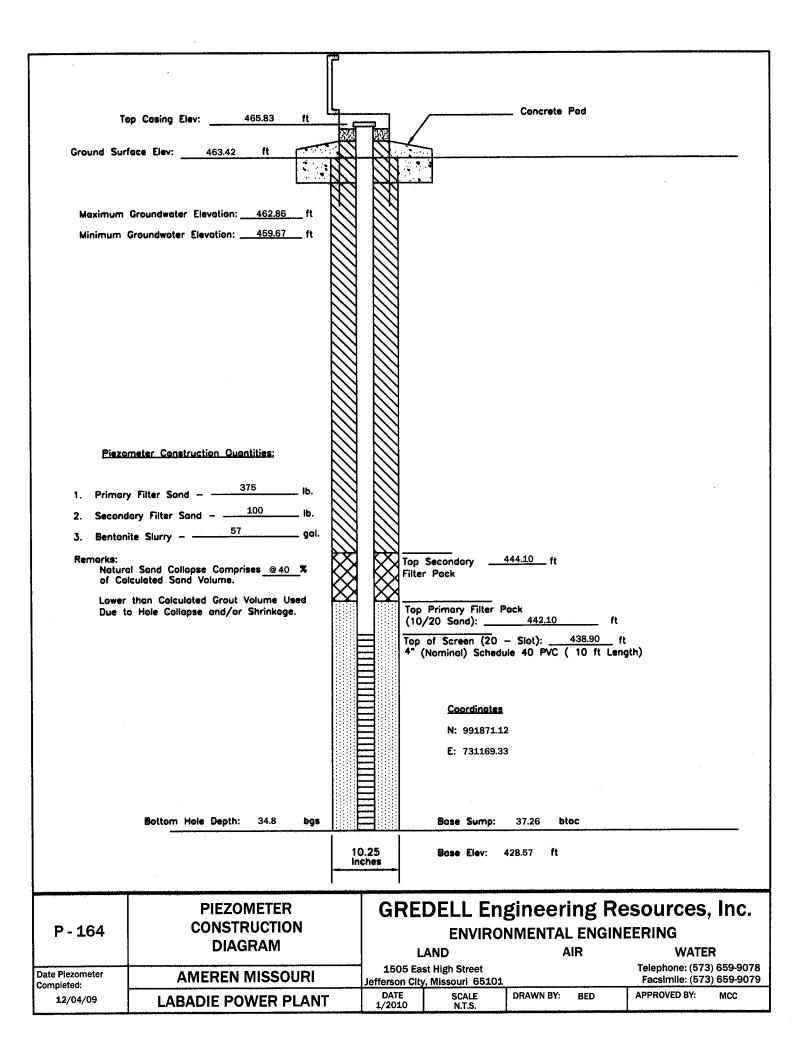


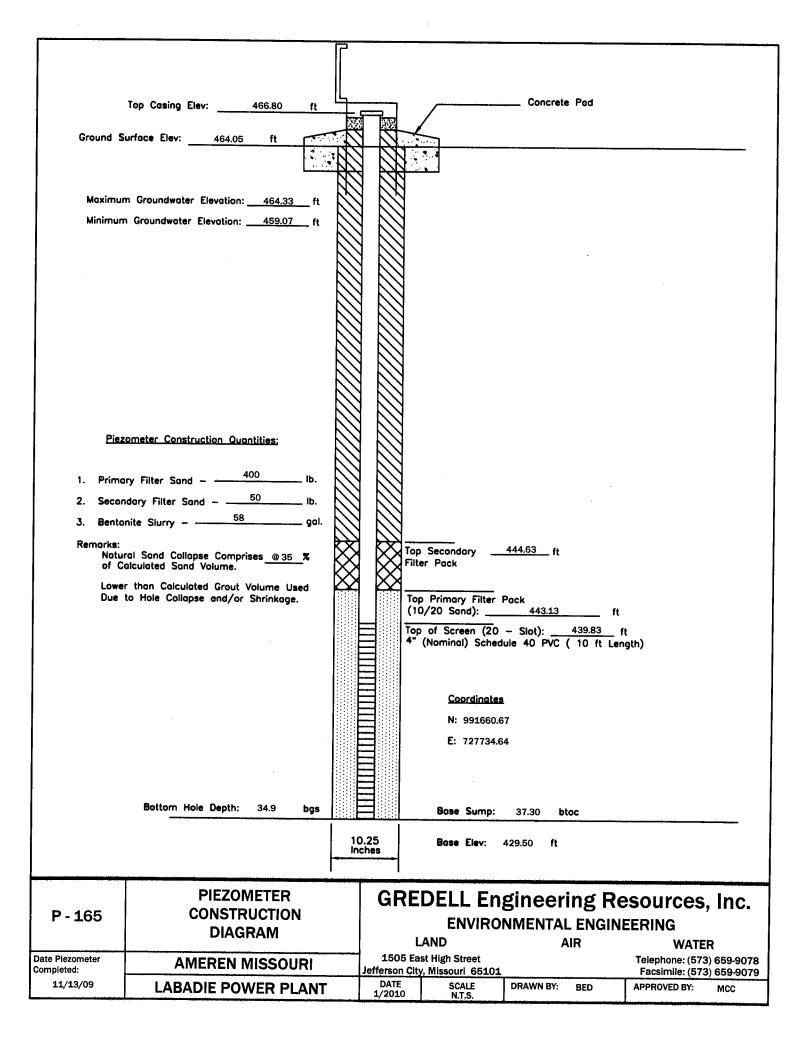


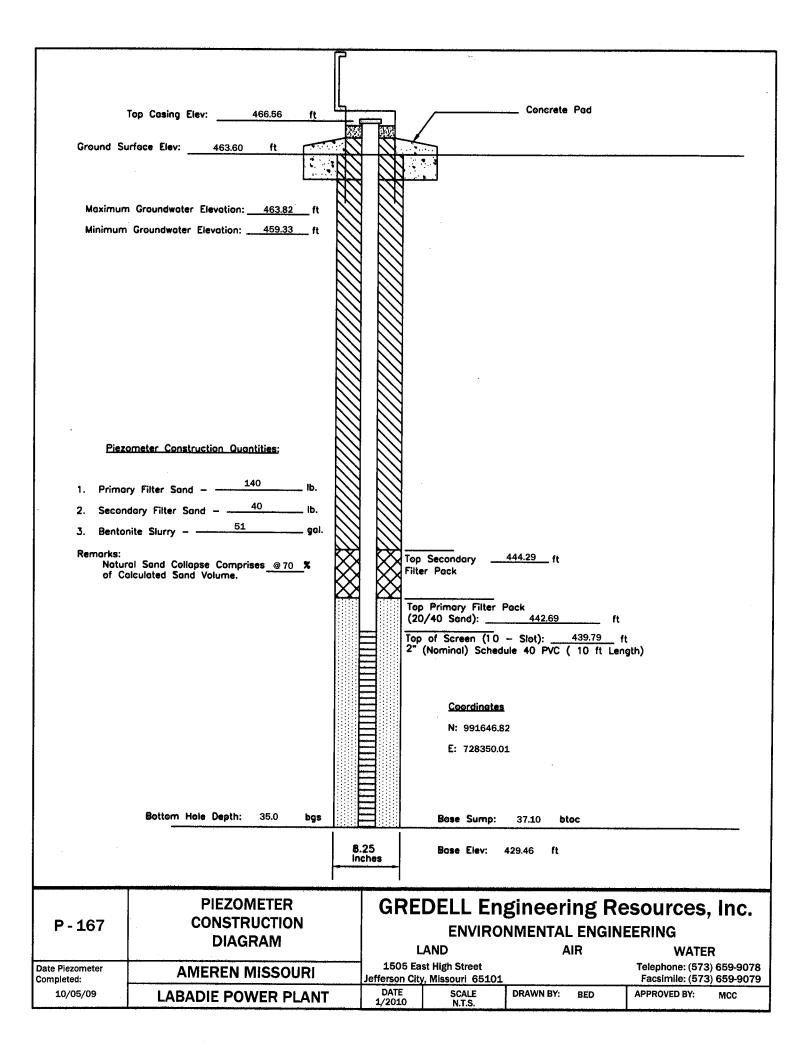


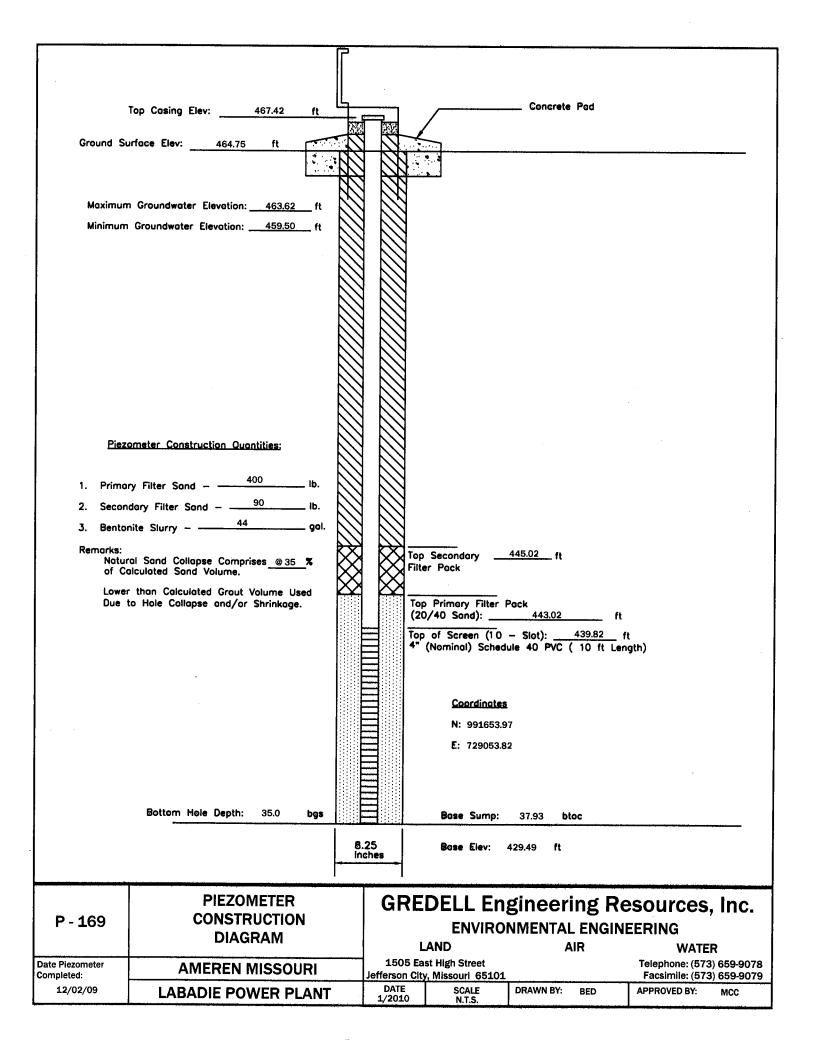


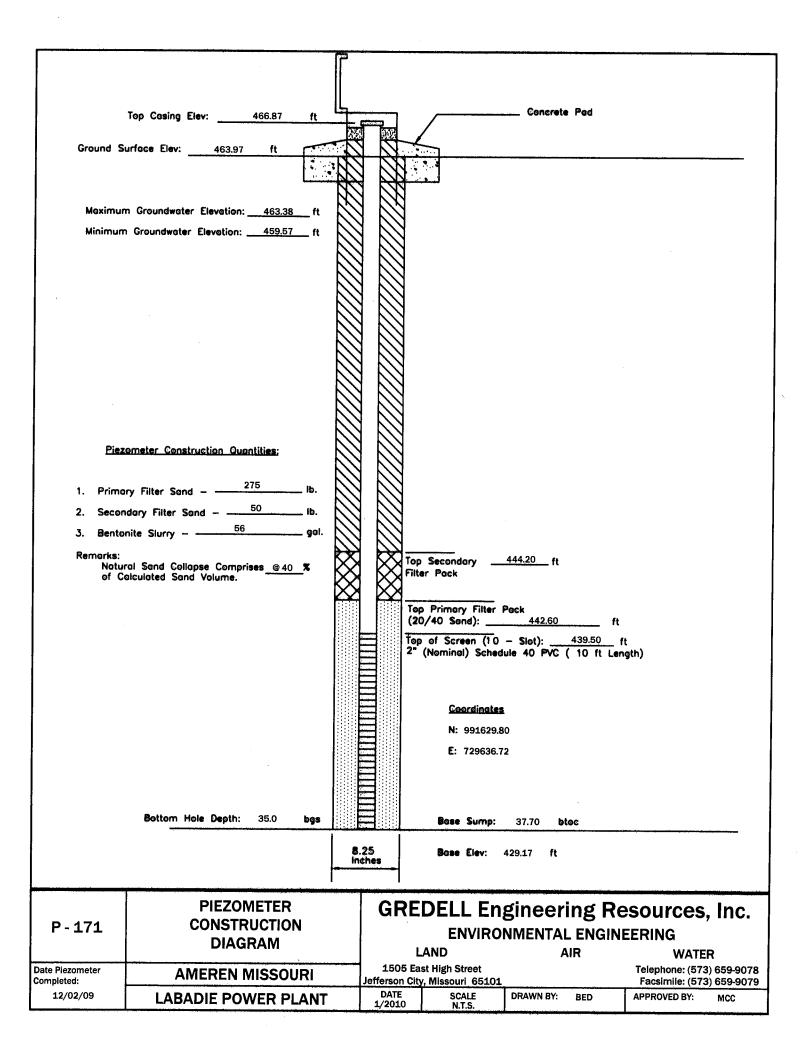


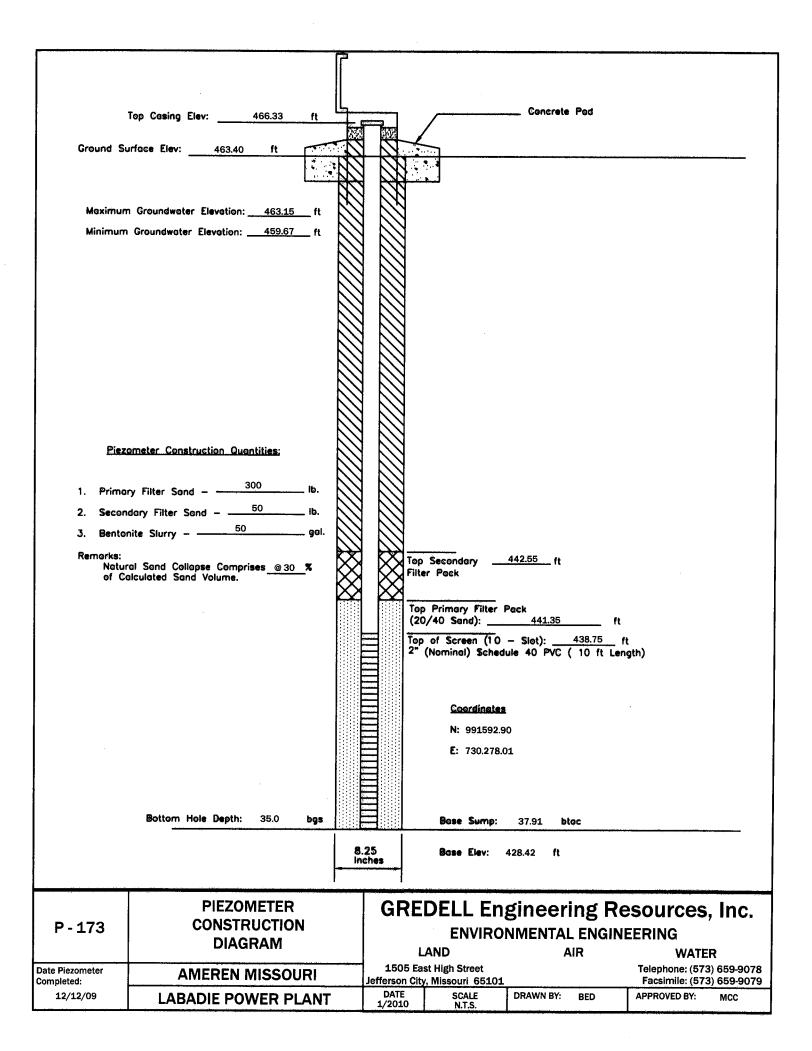


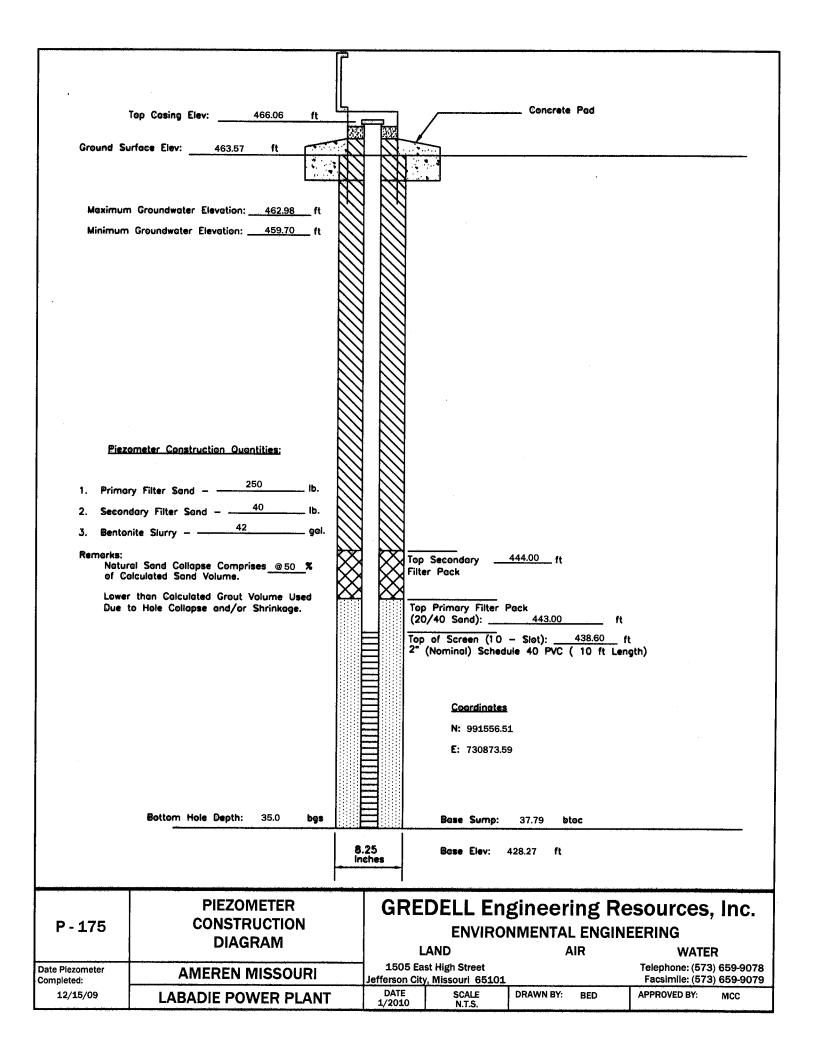


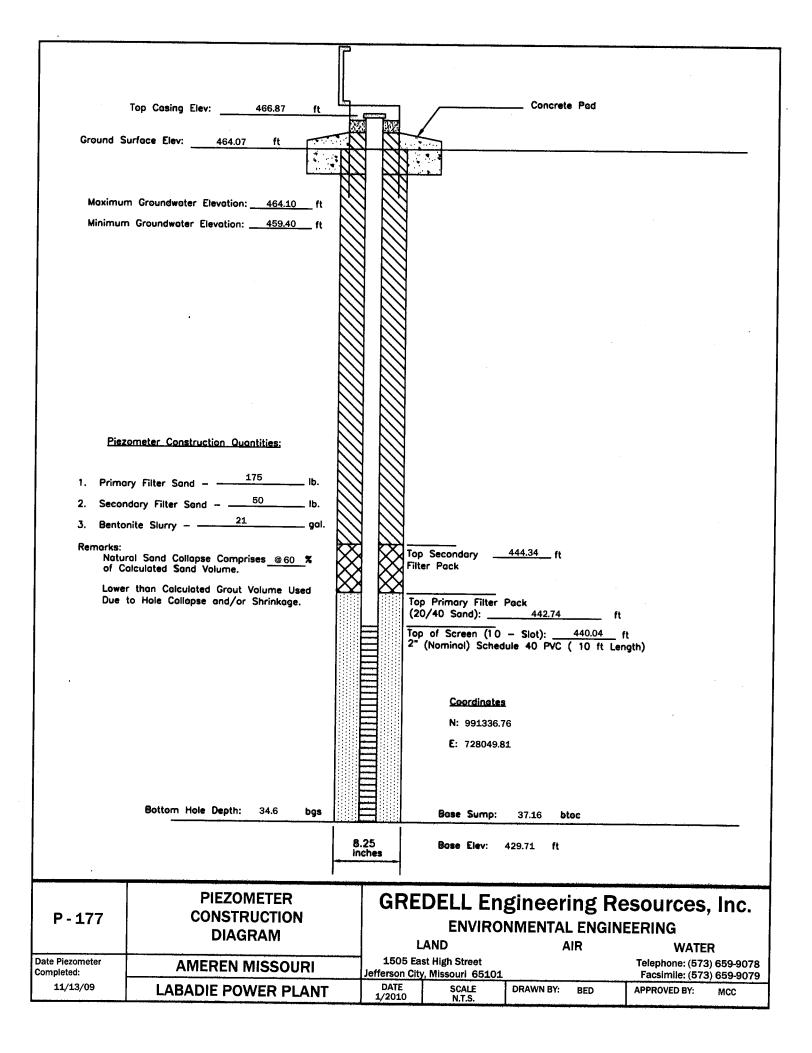


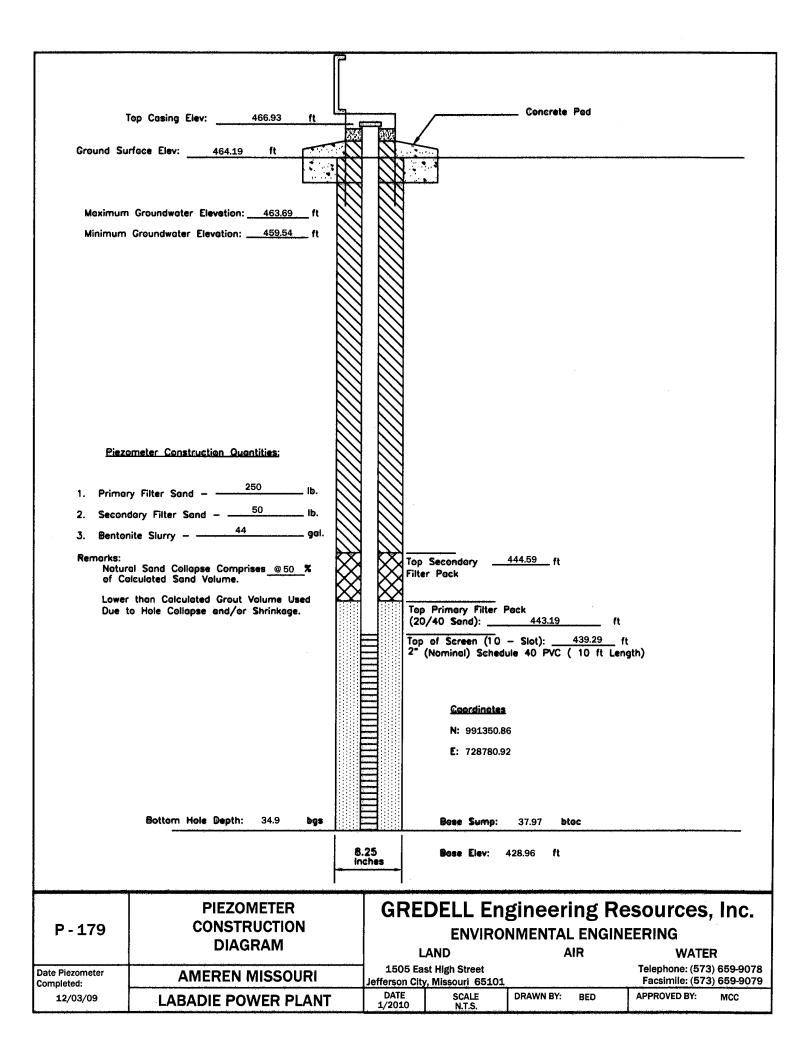


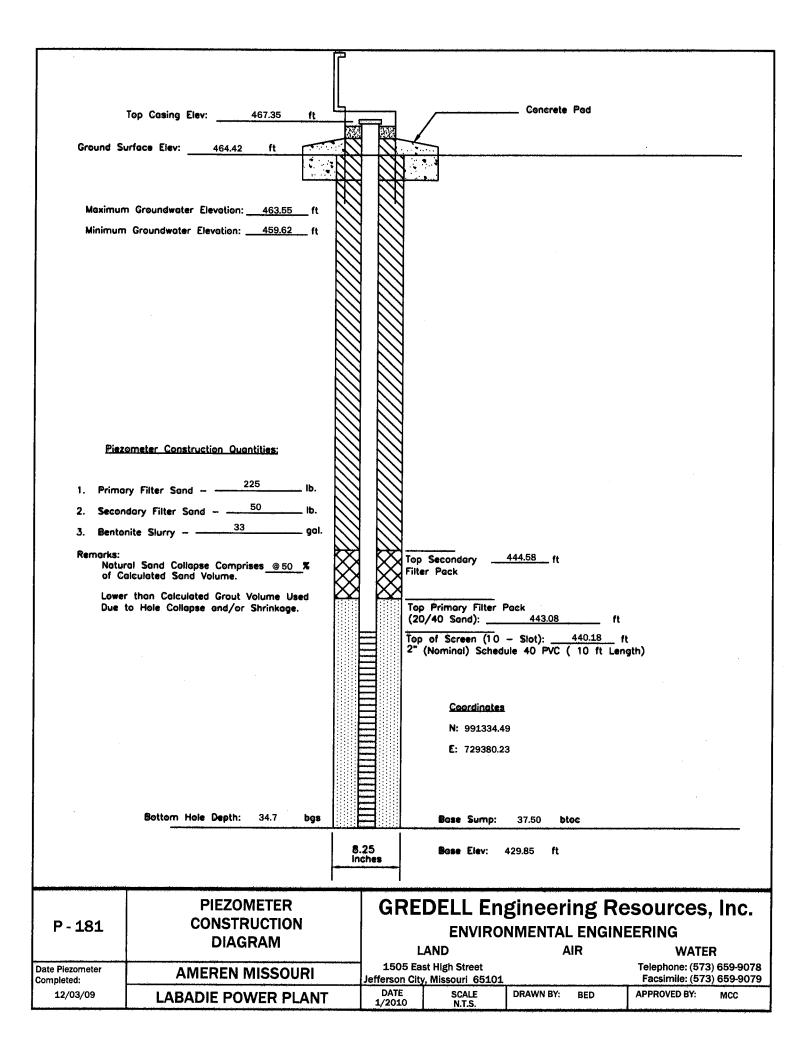


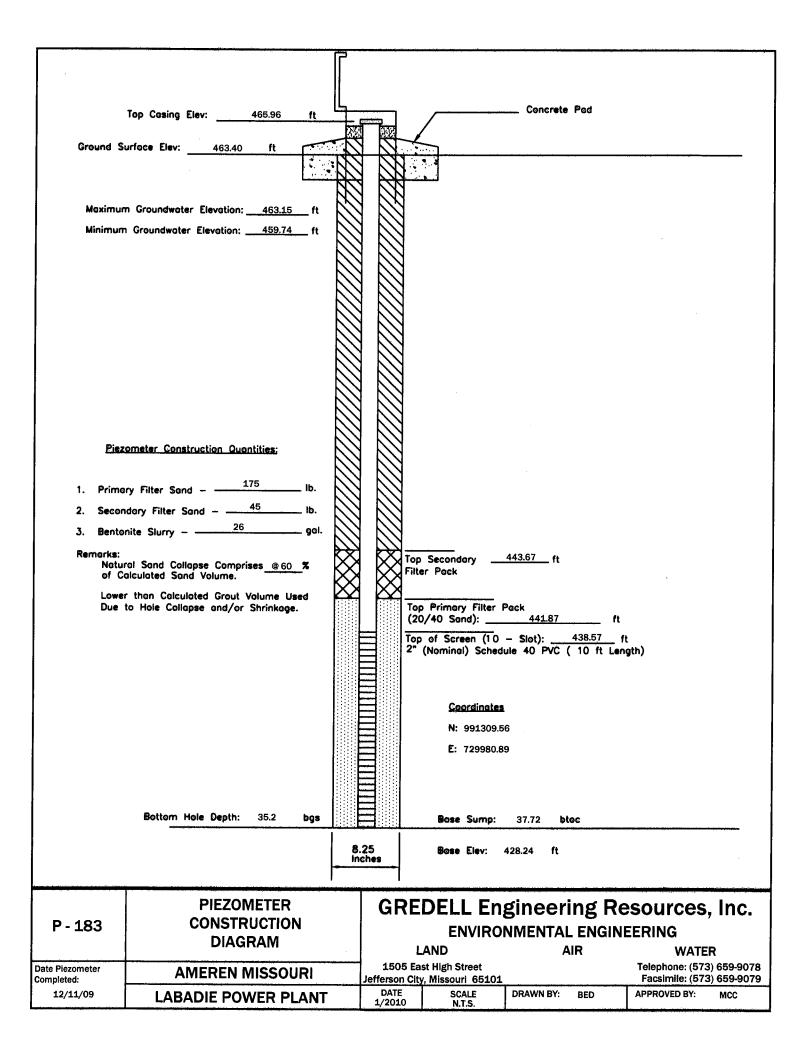


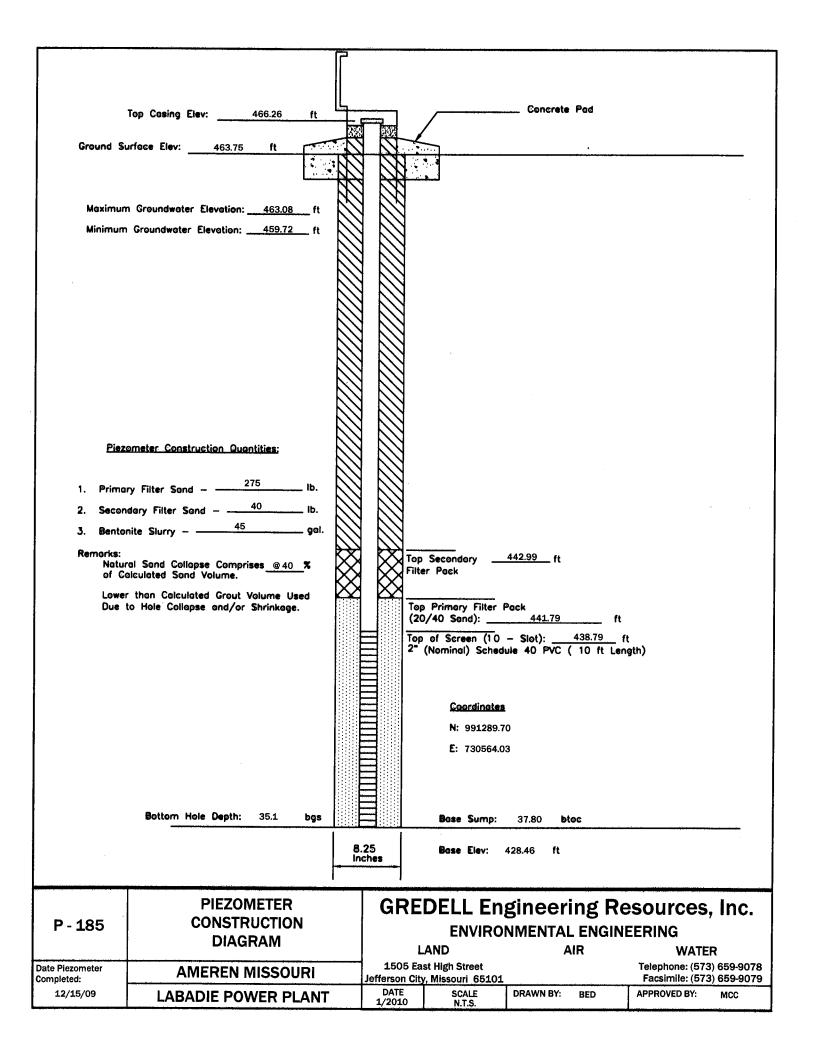


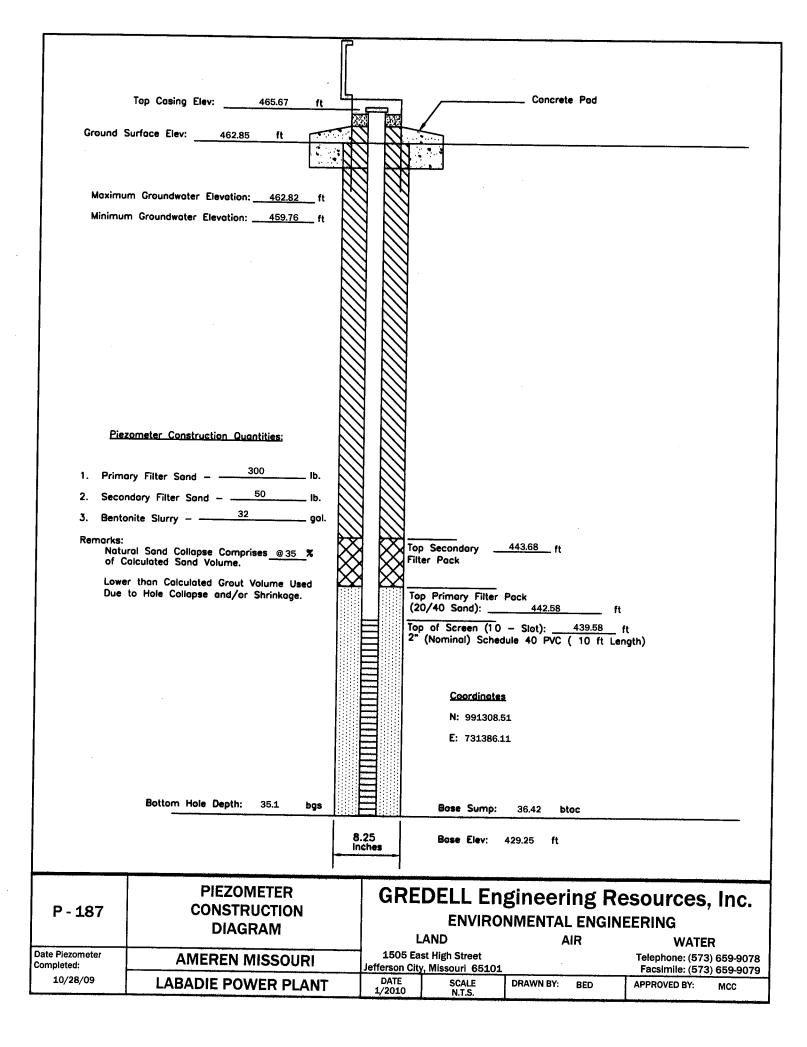


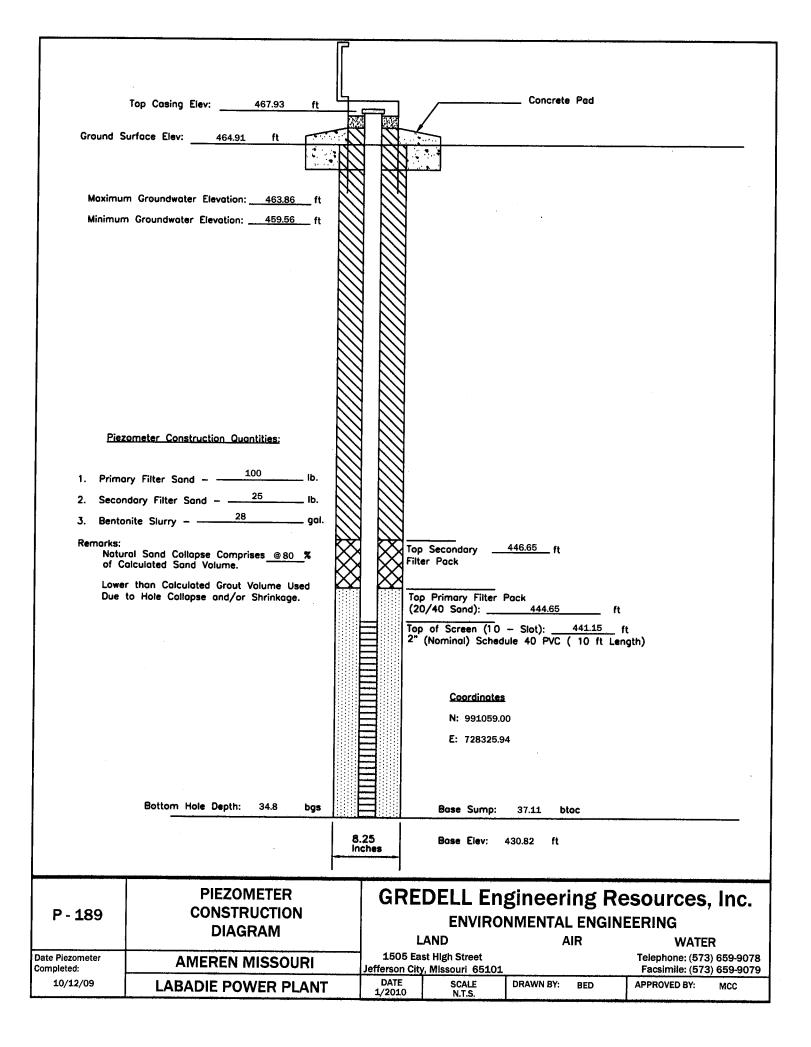


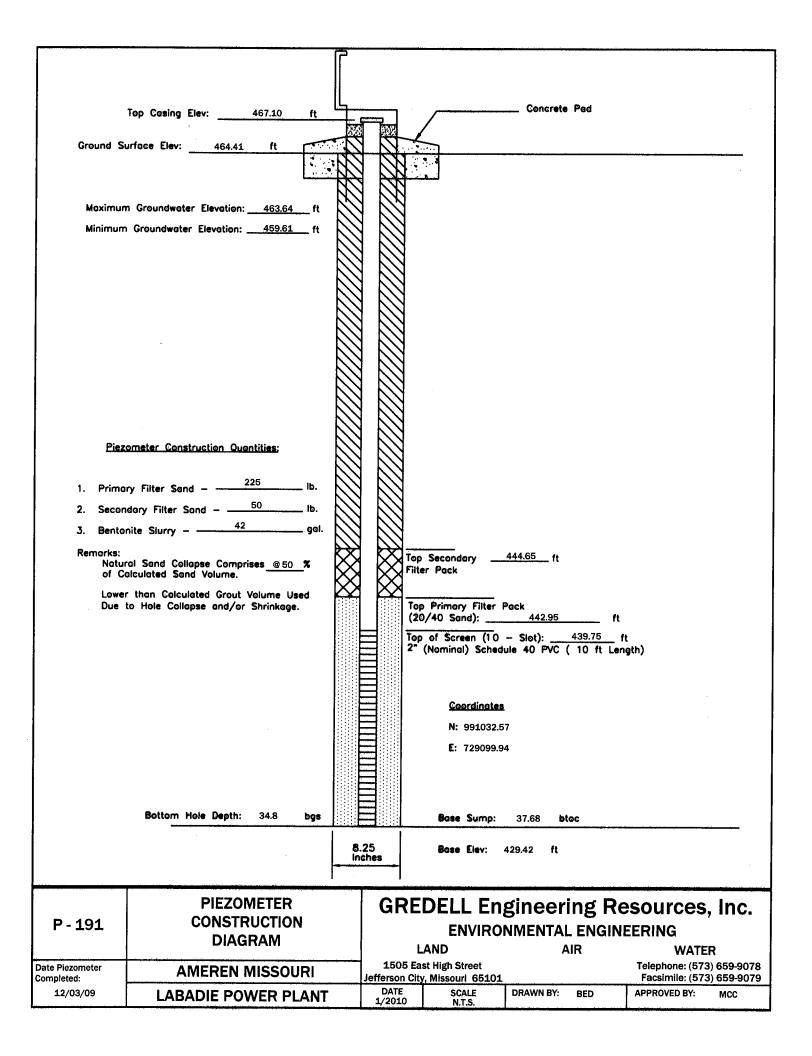


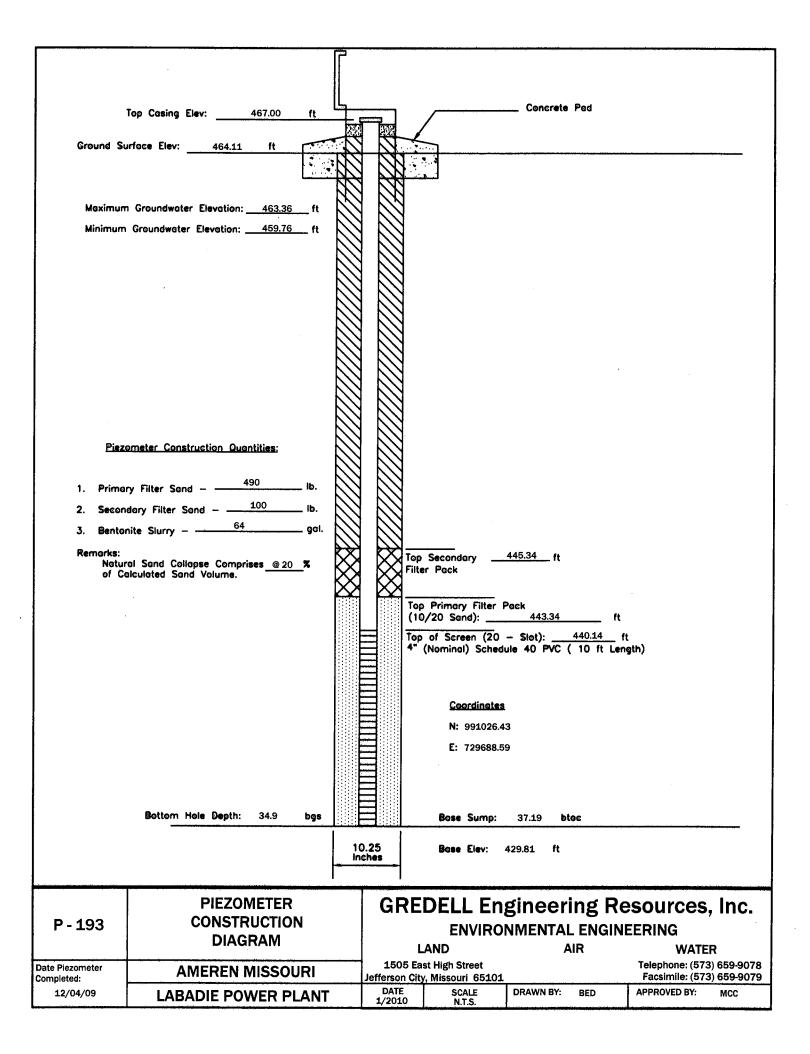


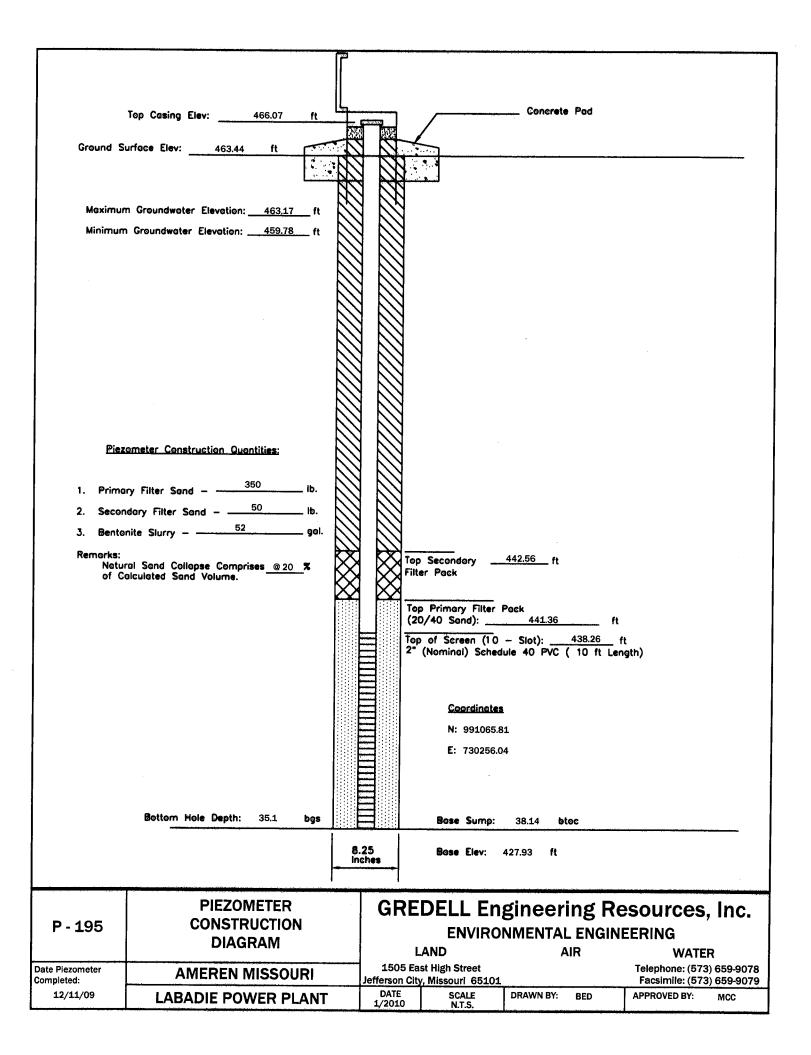


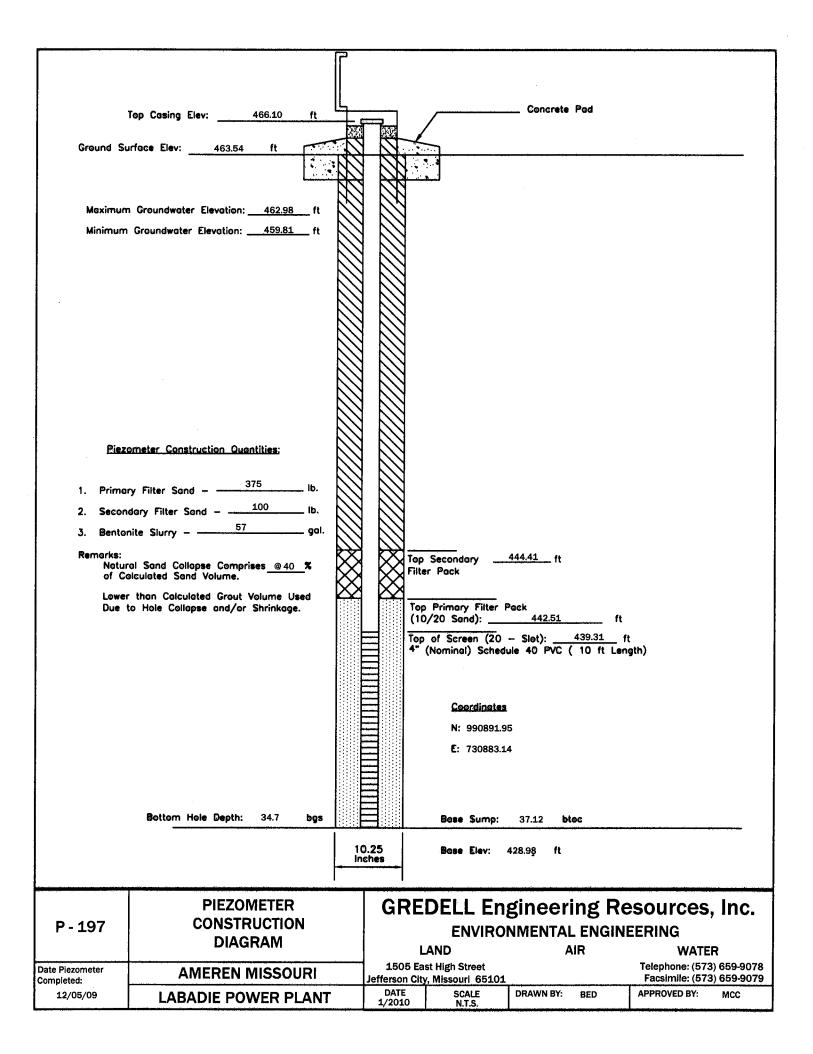


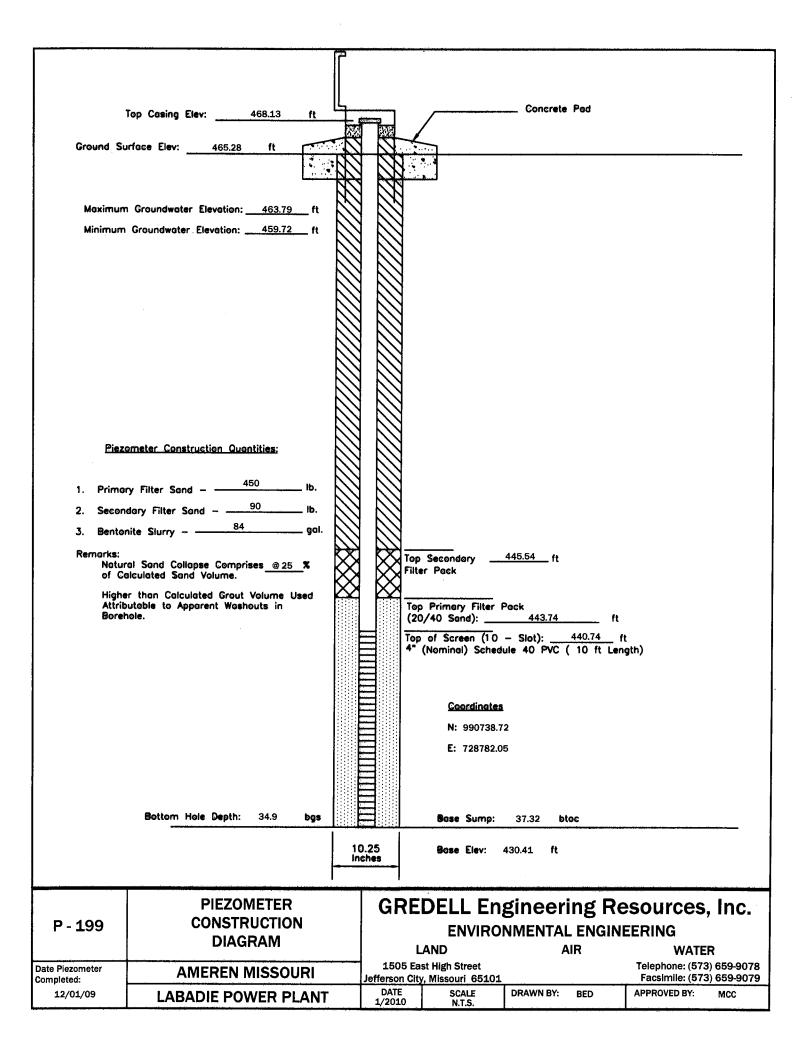


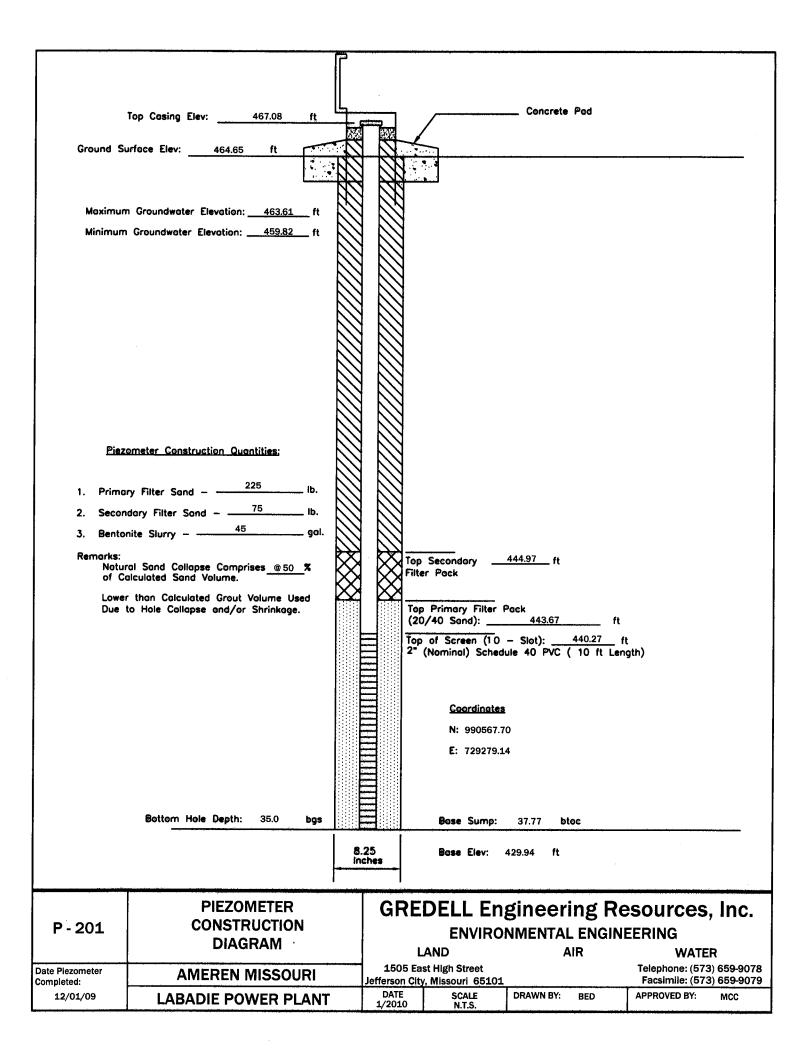












# **Appendix 6**

Survey Data

Detailed Site Investigation Proposed Utility Waste Disposal Area Ameren Labadie Power Plant

Prepared by: GREDELL Engineering Resources, Inc.

# Ameren Labadie

#### Piezometer and Boring Locations/Elevations KdG Project 080086-0005

Designation	Northing	Desting	ChoumbBlaymon	lites Martin
P-9	996108.40	726981.78	469.90	473.26
B-10	996103.24	727271.42	469.4	***
C-11	996087.44	727863.35	468.6	***
P-12	996215.71	728171.12	468.95	472.14
B-13	996065.73	728454.79	468.4	***
C-13	996064.70	728453.55	468.1	***
B-14	995811.17	726971.86	470.0	***
P-15	995802.44	727271.36	469.35	472.40
C-16	995796.01	727587.85	469.5	***
P-17	995789.75	727851.61	469.30	472.19
C-18	995781.84	728155.08	468.0	***
P-19	995768.95	728438.40	467.90	470.84
P-20	995510.59	726856.24	469.35	472.28
C-21	995508.43	727263.08	469.1	***
P-22	995503.30	727579.54	468.40	471.27
C-23	995493.86	727854.19	468.5	***
P-24	995476.21	728133.29	468.50	471.44
C-25	995479.57	728426.49	467.0	***
B-26	995220.60	726964.14	468.5	***
P-27	995206.06	727247.55	469.07	471.99
C-28	995191.80	727570.51	468.0	***
P-29	995188.03	727844.69	467.73	470.83
C-30	995181.54	728136.93	468.2	***
P-31	994921.76	726950.89	467.67	470.22
C-32	994919.82	727239.84	468.1	***
P-33	994910.34	727559,71	468.44	471.18
C-34	994906.91	727840.02	467.1	***
P-35	994886.38	728125.58	467.61	470.61
P-36	995058.28	728509.44	468.20	471.23
C-37	994633.32	726940.78	466.8	***
P-38	994618.74	727238.62	467.15	470.11
C-39	994610.37	727532.49	467.0	***
P-40	994582.15	727832.47	467.05	469.93
C-41	994571.00	728120.73	467.0	***
P-42	994538.42	728420.83	467.74	470.60
P-43	994333.02	726945.21	466.07	469.20
C-44	994339.91	727235.79	466.5	***
P-45	994324.97	727532.26	467.12	470.07
C-46	994335.16	727828.30	466.5	***
C-46A	994335.45	727834.36	466.4	***

Horizontal Datum: Missouri State Plane Coordinates - NAD 83 (Feet) Vertical Datum: NAVD 88 (Feet) Note: Ground Elevation at Piezometer is a Chiseled Square on the Concrete Pad

Ameren Labadie
Piezometer and Boring Locations/Elevations
KdG Project 080086-0005

Designation		Nasing	Commit Storation	Hps Bleenton
P-47	994320.66	728124.52	467.10	469.86
C-48	994317.23	728416.23	466.7	***
P-49	994499.84	728938.97	467.58	470.56
B-50	994279.71	729167.67	467.7	***
C-50	994279.51	729171.66	467.6	***
P-51	994463.37	729490.00	466.25	469.06
B-52	994257.04	729758.59	465.3	***
P-53	994428.21	730049.96	466.46	469.10
B-54	994252.30	730351.55	467.1	***
P-55	994395.43	730584.11	467.33	470.02
B-56	994240.10	730939.28	467.4	***
P-57	994356.77	731212.53	465.99	468.87
B-58	994038.11	726928.67	464.3	***
P-59	994039.34	727225.40	465.36	467.94
C-60	994027.11	727521.57	466.4	***
P-61	994020.22	727813.31	465.92	468.87
C-62	994016.40	728113.05	466.2	***
P-63	994004.98	728407.71	466.20	469.10
C-64	993995.34	728865.99	466.6	***
P-65	993990.81	729165.61	468.06	471.31
C-66	993980.14	729457.50	467.7	***
C-66A	993983.55	729455.30	467.6	***
P-67	993985.65	729758.28	465.52	468.28
C-68	993969.55	730078.53	466.1 461.6	***
P-69	993965.46	730346.87	465.05	467.73
C-70	993949.84	730636.69	466.0	***
P-71	993948.36	730927.90	467.42	470.70
B-72	993933.70	731225.42	467.3	***
P-73	993742.59	726924.60	467.06	469.94
C-74	993741.15	727218.57	464.6	***
P-75	993730.50	727511.13	466.12	468.75
C-76	993720.40	727809.69	465.7	***
P-77	993714.81	728102.38	465.41	468.05
C-78	993707.27	728399.78	465.3	***
P-79	993695.02	728850.48	467.01	469.84
C-79	993690.91	728845.97	466.7	***
C-80	993682.86	729155.13	466.6	***
P-81	993679.30	729444.97	467.64	470.31
C-81	993687.41	729445.36	467.3	***
C-82	993677.60	729741.30	467.5	***

Horizontal Datum: Missouri State Plane Coordinates NAD 83 (Feet) Vertical Datum: NAVD 88 (Feet) Note: Ground Elevation at Piezometer is a Chiseled Square on the Concrete Pad

## Ameren Labadie Piezometer and Boring Locations/Elevations KdG Project 080086-0005

Designation -	*forthing	Quisting	Cround Blagaton	PipelBlaghtinn S
P-83	993664.23	730089.18	464.74	467.55
C-84	993657.32	730332.48	465.1	***
P-85	993647.31	730619.20	464.41	466.75
C-86	993650.66	730924.62	465.7	***
P-87	993693.54	731420.88	466.69	469.64
P-88	993401.94	727072.92	466.25	469.13
C-89	993438.19	727504.02	465.1	***
P-90	993427.80	727804.04	465.38	468.10
C-91	993413.86	728094.56	465.1	***
C-92	993398.00	728843.81	465.6	***
B-92	993398.38	728845.92	465.7	***
P-93	993388.35	729062.32	465.91	468.82
C-94	993375,69	729434.37	466.5	***
P-95	993368.45	729725.06	467.22	469.92
C-96	993362.59	730021.06	467.9	***
P-97	993349.44	730302.43	467.05	469.67
C-98	993346.95	730622.85	465.2	***
P-99	993336.45	730887.27	464.38	467.21
B-100	993325.31	731204.95	465.7	***
C-100	993325.31	731205.45	465.7	***
B-101	993154.88	727200.58	466.0	***
P-102	993140.49	727503.68	464.29	467.27
C-103	993136.62	727785.53	464.5	***
P-104	993125.75	728085.40	465.00	467.78
C-105	993135.15	728390.05	464.7	***
P-106	993103.56	728837.82	465.11	468.10
C-106	993109.35	728836.44	464.9	***
C-107	993103.27	729135.70	465.0	***
C-107A	993103.10	729146.13	464.9	***
P-108	993084.09	729427.93	465.71	468.55
C-109	993088.06	729726.68	466.3	***
P-110	993066.85	730012.30	466.14	468.99
C-111	993063.54	730316.44	466.3	***
P-112	993051.48	730620.74	465.92	468.92
C-113	993055.00	730901.31	463.5	***
P-114	993026.22	731203.72	463.94	466.78
B-115	992864.44	727489.17	465.3	***
P-116	992841.30	727788.60	464.82	467.55
C-117	992838.23	728076.07	465.3	***
P-118	992825.03	728377.28	464.81	467.70

Horizontal Datum: Missouri State Plane Coordinates - NAD 83 (Feet) Vertical Datum: NAVD 88 (Feet) Note: Ground Elevation at Piezometer is a Chiseled Square on the Concrete Pad

### Ameren Labadie Piezometer and Boring Locations/Elevations KdG Project 080086-0005

Designation	Monthing	BRISHING	Commit Maximon	Pips Misy thou
C-119	992807.06	728831.40	465.1	***
P-120	992787.68	729145.90	464.75	467.65
C-121	992788.41	729418.06	464.1	***
P-122	992758.84	729781.01	464.74	467.71
C-123	992783.29	730008.50	464.9	***
P-124	992775.57	730303.49	464.92	467.99
C-125	992770.51	730600.29	466.0	***
P-126	992667.51	730879.77	465.77	468.83
B-127	992782.41	731193.33	463.4	***
P-128	992561.87	727385.52	465.74	468.60
C-129	992541.28	727767.11	464.1	***
P-130	992537.68	728075.04	465.15	468.13
C-131	992547.91	728365.33	465.0	***
P-132	992536.17	728817.00	465.36	468.47
C-133	992516.71	729146.50	464.6	***
P-134	992491.31	729438.21	464.10	466.82
C-135	992494.22	729732.31	463.7	***
C-135A	992494.17	729740.20	463.9	***
P-136	992488.64	730004.49	463.71	466.73
C-137	992490.70	730304.63	463.6	***
P-138	992469.33	730675.26	464.10	466.99
C-139	992467.71	730891.11	464.4	***
C-139A	992473.22	730892.04	464.5	***
P-140	992404.70	731394.93	465.72	468.57
B-141	992258.30	727479.78	466.2	***
P-142	992250.72	727764.69	464.83	467.66
C-143	992247.00	728062.44	463.9	***
P-144	992236.95	728361.22	464.56	467.74
C-145	992222.70	728823.71	465.0	***
C-145A	992218.35	728823.23	465.0	***
<b>P-146</b>	992265.54	729102.62	464.80	467.48
C-147	992208.03	729416.58	464.5	***
C-147A	992202.60	729416.37	464.5	***
P-148	992252.64	729630.10	463.86	466.84
C-149	992190.52	730004.82	463.3	***
P-150	992189.21	730256.27	463.22	465.91
C-151	992180.61	730603.47	463.0	***
P-152	992168.58	730889.93	463.55	466.31
B-153	992163.20	731176.80	463.7	***
B-154	991956.86	727759.71	465.1	***

Horizontal Datum: Missouri State Plane Coordinates - NAD 83 (Feet) Vertical Datum: NAVD 88 (Feet) Note: Ground Elevation at Piezometer is a Chiseled Square on the Concrete Pad