

Appendix II — Drill Watcher Logs

Shotpoints were given temporary field names used by the permitor and drill watcher. These field names were converted into final shotpoint names during the processing phase of the experiment. On the “Drill Watcher Log” sheet, the term “Hole #” refers to the shotpoint name used by the drill watcher. The following table lists all the shot and shotpoint names.

| Geographic Shotpoint Sequence Number | Chronologic SP Sequence Number == SEG Y Bytes 9-12 "Shot Gather Index Number" or "FFID" | Drill Watcher Shotpoint Name | New Shotpoint Name == SEG Y bytes 17-20 "SP" |
|--------------------------------------|---|------------------------------|--|
| 1 | 82 | 2A | 8020 |
| 2 | 72 | 3E | 8030 |
| 3 | 79 | 4E | 8045 |
| 4 | 70 | 4C | 8043 |
| 5 | 1 | 5H | 8050 |
| 6 | 12 | 6B | 8060 |
| 7 | 19 | 7C | 8070 |
| 8 | 58 | 8D | 8084 |
| 9 | 2 | 8E | 8085 |
| 10 | 13 | 9E | 8095 |
| 11 | 3 | 9C | 8093 |
| 12 | 14 | 10A | 8100 |
| 13 | 20 | 11A | 8110 |
| 14 | 64 | 12E | 8120 |
| 15 | 73 | 13B | 8130 |
| 16 | 83 | 14A | 8140 |
| 17 | 74 | 17A | 8170 |
| 18 | 84 | 19 | 8190 |
| 19 | 93 | 21 | 8210 |
| 20 | 68 | 23A | 8230 |
| 21 | 77 | 24 (1) | 8241 |
| 22 | 88 | 24 (2) | 8242 |
| 23 | 76 | 25 | 8250 |
| 24 | 67 | 26A | 8260 |
| 25 | 87 | 27A | 8270 |
| 26 | 85 | 28 | 8280 |
| 27 | 65 | 29A | 8290 |

| Geographic Shotpoint Sequence Number | Chronologic SP Sequence Number == SEG Y Bytes 9-12 "Shot Gather Index Number" or "FFID" | Drill Watcher Shotpoint Name | New Shotpoint Name == SEG Y bytes 17-20 "SP" |
|--------------------------------------|---|------------------------------|--|
| 28 | 4 | 31A | 8310 |
| 29 | 15 | 32A | 8320 |
| 30 | 21 | 33A | 8331 |
| 31 | 29 | 33C | 8333 |
| 32 | 48 | 34A | 8340 |
| 33 | 57 | 35B | 8350 |
| 34 | 35 | 36D | 8360 |
| 35 | 44 | 38A | 8380 |
| 36 | 53 | 39A | 8390 |
| 37 | 18 | 41C(1-east) | 8411 |
| 38 | 25 | 41C(2) | 8412 |
| 39 | 11 | 44C | 8440 |
| 40 | 54 | 45B | 8450 |
| 41 | 45 | 47F | 8470 |
| 42 | 36 | 49B | 8490 |
| 43 | 49 | 50B1 | 8501 |
| 44 | 39 | 50B2 | 8502 |
| 45 | 30 | 51B | 8510 |
| 46 | 50 | 52B | 8520 |
| 47 | 40 | 53B | 8530 |
| 48 | 22 | 54B | 8540 |
| 49 | 16 | 56A | 8560 |
| 50 | 6 | 57A | 8570 |
| 51 | 31 | 59B | 8590 |
| 52 | 56 | 62 | 8620 |
| 53 | 55 | 63A | 8631 |
| 54 | 59 | 63B | 8632 |

| Geographic Shotpoint Sequence Number | Chronologic SP Sequence Number == SEG Y Bytes 9-12 "Shot Gather Index Number" or "FFID" | Drill Watcher Shotpoint Name | New Shotpoint Name == SEG Y bytes 17-20 "SP" |
|--------------------------------------|---|------------------------------|--|
| 55 | 23 | 64A | 8641 |
| 56 | 17 | 64C | 8643 |
| 57 | 7 | 65A | 8650 |
| 58 | 32 | 66A | 8661 |
| 59 | 41 | 66D | 8664 |
| 60 | 62 | 70C | 8700 |
| 61 | 61 | 71A | 8710 |
| 62 | 8 | 72A | 8720 |
| 63 | 24 | 73A | 8730 |
| 64 | 60 | 74A | 8740 |
| 65 | 51 | 75A | 8750 |
| 66 | 42 | 76A | 8760 |
| 67 | 33 | 77A | 8770 |
| 68 | 28 | 78 | 8780 |
| 69 | 38 | 79 | 8790 |
| 70 | 47 | 82 | 8820 |
| 71 | 27 | 83A | 8830 |
| 72 | 37 | 85C | 8850 |
| 73 | 46 | 87 | 8870 |
| 74 | 52 | 93 | 8930 |

| Geographic Shotpoint Sequence Number | Chronologic SP Sequence Number == SEG Y Bytes 9-12 "Shot Gather Index Number" or "FFID" | Drill Watcher Shotpoint Name | New Shotpoint Name == SEG Y bytes 17-20 "SP" |
|--------------------------------------|---|------------------------------|--|
| 75 | 43 | 95 | 8950 |
| 76 | 34 | 99 | 8990 |
| 77 | 26 | 101 | 9110 |
| 78 | 9 | 136 | 9136 |
| 79 | 81 | 301 | 9310 |
| 80 | 90 | 303 | 9330 |
| 81 | 63 | 304 | 9340 |
| 82 | 5 | 305 | 9350 |
| 83 | 92 | 307 | 9370 |
| 84 | 10 | 306 | 9360 |
| 85 | 69 | 208 | 9280 |
| 86 | 78 | 204C4 | 9244 |
| 87 | 89 | 204C1 | 9241 |
| 88 | 66 | 206 | 9260 |
| 89 | 80 | 201 (1-north) | 9211 |
| 90 | 91 | 201 (2--south) | 9212 |
| 91 | 71 | 201C | 9213 |
| 92 | 75 | 202B1(north) | 9221 |
| 93 | 86 | 202B2(south) | 9222 |

charge size = 50
 depth = 64 ft casing = 42 ft.

CLIENT: U.S. Geological Survey/ S.C.F.C.
 PROJECT: LARSE II
 CLIENT REP: BRIAN HOFFMAN

| Date: 9-14-1999 | | Hole # 2A | | Rig # 1 | | Driller: Sam Crum | | Supervisor: BH | |
|-----------------|-------|-----------|-----------------------------------|---------|--|-------------------|--------------------------|----------------|--|
| TIME | LOG # | FOOTAGE | REMARKS | | | | LOG REFERENCE # | | |
| 9:15 | 1 | | arrive at site | | | | | | |
| 9:30 | 14 | | move rig into place | | | | 1. Crew Travel To Site | | |
| 9:39 | 16 | | water trip leave | | | | 2. Rig Up | | |
| 10:30 to | 14 | | mammuring into site | | | | 3. Reenter Hole | | |
| 10:40 | 2 | | | | | | 4. Drilling | | |
| 10:45 | 2 | | Run up | | | | 5. Pull Pipe | | |
| 10:50 | 16 | | Rotam | | | | 6. Mix Mud & Fil | | |
| 10:57 | 8 | 0-20ft | Install 1 1/2" (5") Air Hammer | | | | 7. Coring | | |
| 10:57 | 8 | 0-20ft | Install Pipe #1 + 8" drill bit | | | | 8. Install Casing/Pipe | | |
| 10:57 | 8 | 0-20ft | drilling pipe #1 | | | | 9. Cementing | | |
| 10:57 | 8 | 0-20ft | pull pipe #1 | | | | 10. Rig Down | | |
| 10:57 | 8 | 0-20ft | install drill casing | | | | 11. Move Rig To New Site | | |
| 10:57 | 8 | 0-20ft | install drill casing | | | | 12. Maintenance | | |
| 10:57 | 8 | 0-20ft | install 9 1/2" drill bit | | | | 13. Standby (Explain) | | |
| 10:57 | 8 | 0-20ft | reenter hole | | | | 14. Other (Explain) | | |
| 10:57 | 8 | 0-20ft | re-position support casing | | | | 15. Logging | | |
| 10:57 | 8 | 0-20ft | reenter hole | | | | 16. Water Trip | | |
| 10:57 | 8 | 0-20ft | drilling with 9 1/2" bit | | | | | | |
| 10:57 | 8 | 0-20ft | install pipe #2 | | | | MATERIALS USED | | |
| 10:57 | 8 | 0-20ft | drilling pipe #2 | | | | Mud _____ sacks | | |
| 10:57 | 8 | 0-20ft | pull pipe #2 | | | | LC _____ Type _____ | | |
| 10:57 | 8 | 0-20ft | pull pipe #2 | | | | * 9 inch drill bit | | |
| 10:57 | 8 | 0-20ft | Casing #2 up | | | | sacks | | |
| 10:57 | 8 | 0-20ft | Casing #2 up | | | | 5' ft drill hammer | | |
| 10:57 | 8 | 0-20ft | welding casing #1 + #2 | | | | sacks | | |
| 10:57 | 8 | 0-20ft | pull drill casing | | | | _____ sacks | | |
| 10:57 | 8 | 0-20ft | cut casing | | | | | | |
| 10:57 | 8 | 0-20ft | change drill bit to 8" s hammer | | | | | | |
| 10:57 | 8 | 0-20ft | re-enter hole | | | | | | |
| 10:57 | 8 | 0-20ft | install pipe #1 | | | | | | |
| 10:57 | 8 | 0-20ft | water table at 25 ft. | | | | Viscose _____ | | |
| 10:57 | 8 | 0-20ft | install pipe #2 | | | | Cement _____ | | |
| 10:57 | 8 | 0-20ft | drilling pipe #2 | | | | Diesel _____ | | |
| 10:57 | 8 | 0-20ft | install pipe #3 | | | | Foamer _____ | | |
| 10:57 | 8 | 0-20ft | drilling pipe #3 | | | | Detergent _____ | | |
| 10:57 | 8 | 0-20ft | install pipe #4 | | | | Other _____ | | |
| 10:57 | 8 | 0-20ft | drilling pipe #4 | | | | | | |
| 10:57 | 8 | 0-20ft | hole at full depth 70 ft. | | | | | | |
| 10:57 | 8 | 0-20ft | pull pipe #4 | | | | | | |
| 10:57 | 8 | 0-20ft | pull pipe #3 | | | | | | |
| 10:57 | 8 | 0-20ft | pull pipe #2 | | | | | | |
| 10:57 | 8 | 0-20ft | pull pipe #1 | | | | | | |
| 10:57 | 8 | 0-20ft | rig down | | | | CREW HOURS | | |
| 10:57 | 8 | 0-20ft | move rig from hole | | | | | | |
| 10:57 | 8 | 0-20ft | weld cap | | | | | | |
| 10:57 | 8 | 0-20ft | crew + rig travel to spot point 3 | | | | Driller <u>L. Sam</u> | | |
| 10:57 | 8 | 0-20ft | hole drilled to 73 ft. | | | | Helper <u>I, Bernie</u> | | |
| 10:57 | 8 | 0-20ft | casing length = 32 ft. | | | | Helper <u>I, Scott</u> | | |
| 10:57 | 8 | 0-20ft | hole cleaned to 73 ft. | | | | | | |

Footage: FROM _____ TO _____ TOTAL FOOTAGE _____
 _____ changed at _____ Size _____
 _____ changed at _____ Size _____
 _____ changed at _____ Size _____

Approved _____
 David Deis
 Revised 9/8/99 11:27 AM

hard rock, hard shale, black shale
 at 32 ft.

Charge = 100
 depth = 68 ft. casing = 44 ft.

CLIENT: U.S. Geological Survey/ S.C.E.C.
 PROJECT: LARSE II
 CLIENT REP:

| Date: 9-14-1999 | | Hole # 3E | | Rig # | Driller: Sam Crum | Supervisor: |
|-----------------|-------|-----------|---|-------|--------------------------|-------------|
| TIME | LOG # | FOOTAGE | REMARKS | | LOG REFERENCE # | |
| 12:58 | 1 | | Crew travel to site and arrives | | 1. Crew Travel To Site | |
| 1:07 | 2 | | Rig up | | 2. Rig Up | |
| 1:10 | 3 | | install drill bit - Air Hammer - 8" | | 3. Reenter Hole | |
| 1:14 | 4 | | install pipe 7 | | 4. Drilling | |
| 1:17 | 5 | | Start Drilling | | 5. Pull Pipe | |
| 1:20 | 6 | | Stop & pull pipe & Remove drill bit | | 6. Mix Mud & FB | |
| 1:24 | 7 | | Install New drill bit, 9 3/4" diameter Triamb | | 7. Coring | |
| 1:30 | 8 | | Resume drilling | | 8. Install Casing/Pipe | |
| 1:31 | 9 | | Pull pipe | | 9. Cementing | |
| 1:35 | 10 | | Change bit | | 10. Rig Down | |
| 1:37 | 11 | | Install 20' feet of casing | | 11. Move Rig To New Site | |
| 1:39 | 12 | | install 8" Air Hammer | | 12. Maintenance | |
| 1:39 | 13 | | Reenter Hole with 1st 20' segment of pipe | | 13. Standby (Explain) | |
| 1:45 | 14 | 20' | INSTALL Pipe II | | 14. Other (Explain) | |
| 1:45 | 15 | 40' | DRILL pipe II | | 15. Logging | |
| 1:55 | 16 | 60' | INSTALL pipe III | | 16. Water Trip | |
| 1:55 | 17 | | DRILL pipe III | | | |
| 2:04 | 18 | 60' | INSTALL pipe IV | | | |
| 2:08 | 19 | 75' | Drilling pipe IV | | | |
| 2:11 | 20 | | hole 20' full depth 75ft | | MATERIALS USED | |
| 2:12 | 21 | | pull pipe IV | | Mud _____ sacks | |
| 2:13 | 22 | | pull pipe III | | LC _____ Type _____ | |
| 2:14 | 23 | | pull pipe II | | 8" ^{Air} Hammer | |
| 2:16 | 24 | | pull pipe I | | _____ sacks | |
| 2:20 | 25 | | rig down | | _____ sacks | |
| 2:24 | 26 | | move rig | | Viscose _____ | |
| 2:27 | 27 | | hold camp | | Cement _____ | |
| 2:38 | 28 | | move rig + crew to new site 4E | | Diesel _____ | |
| | | | | | Foamer _____ | |
| | | | | | Detergent _____ | |
| | | | | | Other _____ | |
| | | | | | CREW HOURS | |
| | | | | | Driller 1, Sam | |
| | | | | | Helper 1, Bernie | |
| | | | | | Helper 1, Scot | |

(PM)

0

* NOTE * WATER AT APPROX 14 FT
 Thought hole was dry, upon
 inspection water was found just below
 casing

hole depth = 75 ft
 casing length = 12 ft
 cleared to = 75 ft

Footage: FROM _____ TO _____ TOTAL FOOTAGE _____
 _____ changed at _____ Size _____
 _____ changed at _____ Size _____
 _____ changed at _____ Size _____

Approved _____

David Deils

Revised 9/8/99 11:27 AM

CLIENT: U.S. Geological Survey/ S.C.E.C.
 PROJECT: LARSE II
 CLIENT REP:

644

| Date: 9/15/99 | | Hole # 4C Rig # 1 | | Driller: Sam Crum | Supervisor: LR/JS |
|---------------|-------|-------------------|---|--------------------------|-------------------|
| TIME | LOG # | FOOTAGE | REMARKS | LOG REFERENCE # | |
| 1:36 | 2 | | Rig up / Level Tough | 1. Crew Travel To Site | |
| 1:40 | 16 | | LEAVE H ₂ O | 2. Rig Up | |
| 1:43 | 5 | | INSTALL DRILL BIT - 5 1/2" dia | 3. Reenter Hole | |
| 1:43 | 8 | | INSTALL PIPE I | 4. Drilling | |
| 1:44 | 4 | | Drilling pipe I | 5. Pull Pipe / CAS-3 | |
| 1:47 | 14 | | HIT ROCK - 8-10' * | 6. Mix Mud & Fill | |
| 1:48 | 5 | | remove drill drill bit | 7. Coring | |
| 1:51 | 16 | | RETURN H ₂ O | 8. Install Casing/Pipe | |
| 1:52 | 8 | | INSTALL 10" casing for upper hole | 9. Cementing | |
| 1:54 | 8 | | INSTALL 5/8" B.P. bumper | 10. Rig Down | |
| 1:57 | 4 | | Drilling pipe I | 11. Move Rig To New Site | |
| 2:05 | 8 | | INSTALL PIPE II | 12. Maintenance | |
| 2:06 | 4 | | Drill pipe II | 13. Standby (Explain) | |
| 2:10 | 8 | | INSTALL PIPE III | 14. Other (Explain) | |
| 2:22 | 4 | | Drill pipe III | 15. Logging | |
| 2:33 | 8 | | INSTALL PIPE IV | 16. Water Trip | |
| 2:34 | 4 | | Drill pipe IV | | |
| 2:40 | 14 | | HOLE AT MAX DEPTH | | |
| 2:41 | 5 | | pull pipe IV | MATERIALS USED | |
| 2:42 | 5 | | pull pipe III | Mud _____ sacks | |
| 2:43 | 5 | | pull pipe II | LC _____ Type _____ | |
| 2:46 | 5 | | pull pipe I | _____ sacks | |
| 2:48 | 14 | | Remove drill bit | _____ sacks | |
| 2:48 | 14 | | measuring depth with a mirror * extra bit | _____ sacks | |
| 2:52 | 5 | | pull casing | _____ sacks | |
| 2:54 | 8 | | INSTALL 10" dia 12" dia drill bit | _____ sacks | |
| 2:57 | 4 | | Drill 10" bit | _____ sacks | |
| 3:05 | 14 | | 5/8" B.P. bumper (position venting hole) | _____ sacks | |
| 3:06 | 14 | | Bring out mirror | | |
| 3:04 | 4 | | Drill again (10" bit) | | |
| 3:12 | 14 | | mirror | Viscose _____ | |
| 3:13 | 4 | | Drill 10" bit | | |
| 3:16 | 8 | | install pipe I | Cement _____ | |
| 3:18 | 4 | | Drill pipe I | | |
| 3:23 | 12 | | cannot drill forward only reverse. Needs | Diesel _____ | |
| 3:24 | 12 | | valve REPLACEMENT | Foamer _____ | |
| 3:26 | 12 | | valve replacement | Detergent _____ | |
| 3:29 | 14 | | EXIT HOLE | Other _____ | |
| 7-16-99 | 12 | | Fixing rotation lever | | |
| 10:03 | 2 | | start rig engine | | |
| 10:21 | 10 | | rig down, continue maintenance | | |
| 2:45 | 14 | | leave site for meeting with Gary | CREW HOURS | |
| | | | | Driller 1/ Sam | |
| | | | | Helper 1/ DEAN | |
| | | | | Helper 1/ SCOTT | |

Footage: FROM _____ TO _____ TOTAL FOOTAGE _____
 _____ changed at _____ Size _____
 _____ changed at _____ Size _____
 _____ changed at _____ Size _____

Approved _____

David Dells
 ✱ Hole Abandoned ✱
 marked 10' at the 14'

Revised 9/8/99 11:27 AM

CLIENT: U.S. Geological Survey/ S.C.E.C.
 PROJECT: LARSE II
 CLIENT REP: ~~XXXXXXXXXX~~ LR & BH

AM - PM expected depth = 64'

| TIME | LOG # | FOOTAGE | REMARKS | LOG REFERENCE # |
|----------|-------|----------|---|---|
| | | | | 1. Crew Travel To Site |
| AM 10:25 | 8/11 | | Rig Moved 40' to the North of 4C | 2. Rig Up |
| 10:25 | 8 | | Rig Up & Leveling Rig | 3. Reenter Hole |
| 10:24 | 8/14 | | Install 12" Air Hammer Bit (app 12' long) | 4. Drilling |
| 10:38 | 4 | - 0 - | Drilling | 5. Pull Pipe |
| 10:46 | 8/14 | | Establishing top casing | 6. Mix Mud & Fill |
| 10:48 | 4 | | continue drilling | 7. Coaming |
| 10:57 | 8 | - 10 - | Install Pipe T | 8. Install Casing/Pipe |
| 10:00 | 4 | | continue drilling | 9. Cementing |
| 11:02 | 14 | | Start foam | 10. Rig Down |
| 11:22 | 16 | | Water trip | 11. Move Rig To New Site |
| 11:37 | 16 | 10-30ft. | back from water | 12. Maintenance |
| 11:38 | 4 | | drilling pipe #1 | 13. Standby (Explain) |
| 12:10 | 12 | | Maintenance - welding some metal on clamp | 14. Other (Explain) |
| 12:33 | 8 | | install pipe #2 | 15. Logging |
| 12:34 | 4 | 30-50ft. | drilling pipe #2 | 16. Water Trip |
| 13:20 | 3 | | set water off at 40' | |
| 13:25 | 8 | | pull 9" pipe | MATERIALS USED |
| 13:35 | 8 | | install casing #1 | Mud _____ sacks |
| 13:35 | 12 | | install casing #2 | LC _____ Type _____ |
| 13:48 | 8/14 | | welding 1+2 | Drill. Mud _____ |
| 13:52 | 6 | | change bit to the 8" Air Hammer | sacks _____ |
| 14:58 | 8 | 50-70' | change bit to 8" Air Hammer | Viscose _____ |
| 14:19 | 16 | | Install Pipe T | Cement _____ |
| 14:35 | 16 | | Water trip | Diesel _____ |
| 14:40 | 5 | | Return water | Foamer <u>Hydro Foam</u> |
| 14:50 | 10 | | Pull Pipe | Detergent <input checked="" type="checkbox"/> |
| 15:00 | 14 | | Rig down | Other _____ |
| | | | Put on lid & back fill hole. | CREW HOURS |
| | | | | Driller <u>1, Sam</u> |
| | | | | Helper <u>1, Bernie</u> |
| | | | | Helper <u>1, Scott</u> |

3
15-5

Footage: FROM _____ TO _____ TOTAL FOOTAGE 62
 Bit _____ changed at start Size 12 Air Hammer
 Bit _____ changed at 40-50 Size 9
 Bit _____ changed at _____ Size _____ Approved _____

Revised 21, June 1999

David Dels

~~62~~ 70

Check - 50
 depth = 64 ft.
 casing = 42 ft.

CLIENT: U.S. Geological Survey/ S.C.E.C.
 PROJECT: LARSE II
 CLIENT REP:

| Date: 9-14-1999 | | Hole # 4E | | Rig # 1 | Driller: Sam Crum | Supervisor: |
|-----------------|-------|-----------|--|---------|--|-------------|
| TIME | LOG # | FOOTAGE | REMARKS | | LOG REFERENCE # | |
| 2:45 | 1 | | crew travel to site + arrive | | 1. Crew Travel To Site | |
| 2:50 | 2 | | rig up | | 2. Rig Up | |
| 2:50 | 16 | | water trip | | 3. Reenter Hole | |
| 2:54 | 3 | | install pipe #2 | | 4. Drilling | |
| 3:00 | 4 | 0-20 ft. | drilling pipe #1 | | 5. Pull Pipe | |
| 3:07 | 16 | | back from water trip | | 6. Mix Mud & Fill | |
| 3:08 | 5 | | pull pipe #1 | | 7. Coring | |
| 3:12 | 8 | | install casing #2 20ft. | | 8. Install Casing/Pipe | |
| 3:15 | 14 | | install 5ft drilling hammer | | 9. Cementing | |
| 3:16 | 5 | | re-enter hole | | 10. Rig Down | |
| 3:16 | 6 | | install pipe #1 | | 11. Move Rig To New Site | |
| 3:17 | 4 | 0-20 ft. | drilling | | 12. Maintenance | |
| 3:19 | 8 | | stamping casing #1 | | 13. Standby (Explain) | |
| 3:20 | 3 | | re-enter hole | | 14. Other (Explain) | |
| 3:22 | 6 | | install pipe #2 | | 15. Logging | |
| 3:23 | 4 | 20-40 ft. | drilling #2 | | 16. Water Trip | |
| 3:30 | 8 | | install casing #3 pipe | | | |
| 3:36 | 4 | 40-60 ft. | drilling pipe #3 | | | |
| 3:43 | 8 | | water table at 50 ft. | | | |
| 3:54 | 8 | | install pipe #4 | | MATERIALS USED | |
| 3:59 | 4 | | drilling pipe #4 | | Mud _____ sacks | |
| 4:03 | 5 | | hole at full depth 75 ft. | | LC _____ Type _____ | |
| 4:05 | 5 | | pull pipe #1 | | _____ sacks | |
| 4:07 | 5 | | pull pipe #3 | | _____ sacks | |
| 4:08 | 5 | | pull pipe #2 | | _____ sacks | |
| 4:11 | 5 | | pull pipe #1 | | _____ sacks | |
| 4:33 | 14 | | pull original casing #1 | | _____ sacks | |
| 4:35 | 3 | | re-enter hole, cave in | | _____ sacks | |
| 4:41 | 14 | | clearing hole at cave in | | _____ sacks | |
| 4:53 | 5 | | pull pipe | | _____ sacks | |
| 5:00 | 14 | | * incomplete - need to get proper tools + casing to excavate cave in, drilling left on site overnight, well resume 9-15-99 | | Viscose used 5ft drill HAMMER through Cement bedrock | |
| 1-15-99 (Am) | 10:15 | 1 | Crew arrives at site | | Diesel | |
| | 10:25 | 14 | rig set-up | | | |
| | 10:44 | 14 | install 12" 12ft. drill hammer | | Foamer _____ | |
| | 10:51 | 3 | re-enter hole | | Detergent _____ | |
| | 10:56 | 4 | drilling case in | | Other _____ | |
| | 10:57 | 8 | install pipe #1 | | | |
| | 10:58 | 4 | drilling case in | | | |
| | 11:06 | 4 | install pipe #2 | | | |
| | 11:06 | 4 | drilling case in | | | |
| | 11:35 | 5 | pull pipe → cave in | | CREW HOURS | |
| (Pm) | 12:11 | 8 | casing #2 up | | Driller 1, Sam | |
| | 12:13 | 8 | casing #2 up | | Helper 1, Bernice | |
| | 12:15 | 14 | welding #1 + #2 casing together | | Helper 1, Scott | |
| | 12:26 | 6 | drill mud | | | |
| | 12:35 | 14 | clearing / cleaning hole | | | |

(*) Continued on Adjacent Sheet (*)

Footage: FROM _____ TO _____ TOTAL FOOTAGE _____
 _____ changed at _____ Size _____
 _____ changed at _____ Size _____
 _____ changed at _____ Size _____

Approved _____

* hard rock at 40 ft.

David Delis

Revised 9/8/99 11:27 AM

4E (cont)

CLIENT: U.S. Geological Survey/ S.C.E.C.

PROJECT: LARSE II

CLIENT REP: LR, BH, JS

| Date: 9/15/99 | | Hole # 4E (cont) Rig # 1 | | Driller: Sam Crum | Supervisor: LR, BH, JS |
|---------------|-------|--------------------------|--------------------------|--------------------------|------------------------|
| TIME | LOG # | FOOTAGE | REMARKS | LOG REFERENCE # | |
| 12:47 | 5 | | Pull Pipe III | 1. Crew Travel To Site | |
| 12:49 | 5 | | Pull Pipe III | 2. Rig Up | |
| 12:53 | 5 | | Pull Pipe II | 3. Reenter Hole | |
| 12:57 | 5 | | Pull Pipe I | 4. Drilling | |
| 1:03 | 6/14 | | Pull BIT (8" Air Hammer) | 5. Pull Pipe | |
| 1:20 | 10 | | Rig Down | 6. Mix Mud & Fill | |
| 1:15 | 11 | | Move Rig to 4C | 7. Coring | |
| | | | | 8. Install Casing/Pipe | |
| | | | | 9. Cementing | |
| | | | | 10. Rig Down | |
| | | | | 11. Move Rig To New Site | |
| | | | | 12. Maintenance | |
| | | | | 13. Standby (Explain) | |
| | | | | 14. Other (Explain) | |
| | | | | 15. Logging | |
| | | | | 16. Water Trip | |
| | | | | MATERIALS USED | |
| | | | | Mud _____ sacks | |
| | | | | LC _____ Type _____ | |
| | | | | _____ sacks | |
| | | | | _____ sacks | |
| | | | | _____ sacks | |
| | | | | Viscose _____ | |
| | | | | Cement _____ | |
| | | | | Diesel _____ | |
| | | | | Foamer _____ | |
| | | | | Detergent _____ | |
| | | | | Other _____ | |
| | | | | CREW HOURS | |
| | | | | Driller 1, Sam | |
| | | | | Helper 1, Benjie | |
| | | | | Helper 1, Scott | |

Footage: FROM 0 TO _____ TOTAL FOOTAGE _____
 _____ changed at _____ Size _____
 _____ changed at _____ Size _____
 _____ changed at _____ Size _____

Approved _____

CLIENT: U.S. Geological Survey/ S.C.E.C.

PROJECT: LARSE II

CLIENT REP: ~~Sam Crum~~ Luke

(AM) expected depth = 70'

Date: 9/24/94 Hole # 5H Rig # 1 Driller: Sam Crum Supervisor: Luke

| TIME | LOG # | FOOTAGE | REMARKS | LOG REFERENCE # |
|-------|-------|---------|---|--------------------------|
| 15:30 | 1/11 | | Crew & Rig Travel to New Site | 1. Crew Travel To Site |
| 15:55 | 2 | | Rig up & Test Rig | 2. Rig Up |
| 16:02 | 3 | | Install Bit 9 3/8 Toramb | 3. Reenter Hole |
| 16:04 | 4 | 0- | Install Pipe I | 4. Drilling |
| 16:08 | 4 | | Begin drilling | 5. Pull Pipe |
| 16:12 | 14 | | Remove Bit | 6. Mix Mud & Fill |
| 16:14 | 6 | | Install 8" Air Hammer | 7. Coring |
| 16:15 | 8 | | Install top-down drilling casing | 8. Install Casing/Pipe |
| 16:18 | 6 | | Continue drilling | 9. Cementing |
| 16:50 | 14 | | Remove Air Hammer | 10. Rig Down |
| 16:30 | 8 | | Install 9 3/8" diameter Toramb | 11. Move Rig To New Site |
| 16:34 | 4 | | Continue drilling | 12. Maintenance |
| 16:41 | 8 | 20- | Install Pipe II | 13. Standby (Explain) |
| 16:45 | 14 | | drilling 1/2" down in or a Flaming Rock | 14. Other (Explain) |
| 17:05 | 8 | | installing first 20 ft of casing | 15. Logging |
| 17:13 | 8 | | reenter hole | 16. Water Trip |
| 17:17 | 14 | | Start water (foam injecting into hole) | |
| 17:20 | 14 | | Start foam | MATERIALS USED |
| 17:22 | 8 | 40- | Install Pipe III | Mud _____ sacks |
| 17:22 | 4 | | Continue drilling | LC _____ Type _____ |
| 17:29 | 8 | 60- | Install Pipe IV | |
| 17:30 | 4 | | Continue drilling | sacks |
| 17:37 | 5 | 75- | Pull Pipe | sacks |
| 17:47 | 10 | | Rig Down | sacks |
| | | | | Viscose _____ |
| | | | | Cement _____ |
| | | | | Diesel _____ |
| | | | | Foamer Hydro Foam |
| | | | | Detergent _____ |
| | | | | Other _____ |
| | | | Completed Hole = 75' | CREW HOURS |
| | | | Cased to 20' | Driller 1, Sam |
| | | | | Helper 1, Bernie |
| | | | | Helper 1, Scott |

Footage: FROM 0 TO 75 TOTAL FOOTAGE 75

Start Bit diameter changed at 0 Size 9 3/8

BR _____ changed at _____ Size _____

Bit _____ changed at _____ Size _____

Approved _____

Revised: 21, June 1999

David Delis

75'

CLIENT: U.S. Geological Survey/ S.C.E.C.

PROJECT: LARSE II

CLIENT REP: ~~Sam Crum~~ Luke

(PM) - (AMAS) expected depth = 100'

Date: 9/24/99 Hole # 6B Rig # 1 Driller: Sam Crum Supervisor: Luke

| 5 | TIME | LOG # | FOOTAGE | REMARKS | LOG REFERENCE # |
|----|------------------|-------|---------|---------------------------------------|--------------------------|
| | 15:00 | 11 | | Rig Move to New Site | 1. Crew Travel To Site |
| | 15:05 | 2 | | Rig up & level rig | 2. Rig Up |
| 6 | 15:10 | 8 | | install Bit - 9 3/8" diameter Through | 3. Reenter Hole |
| | 15:10 | 8 | -0- | Install Pipe I | 4. Drilling |
| | 15:11 | 4 | | Begin drilling | 5. Pull Pipe |
| 7 | 15:16 | 14 | | Begin Water Injection | 6. Mix Mud & Fill |
| | 15:20 | 14 | | Remove Tri-cone | 7. Coring |
| | 15:22 | 8 | | Install 8" Air Hammer (at App 15') | 8. Install Casing/Pipe |
| | 15:23 | 4 | | continue drilling | 9. Cementing |
| 8 | | | | pull pipe | 10. Rig Down |
| | 15:30 | 5 | | Pull Pipe | 11. Move Rig To New Site |
| | 15:31 | 5 | | Install casing II | 12. Maintenance |
| | 15:40 | 14 | | casing cut at 15 ft. (Rock at 15') | 13. Standby (Explain) |
| 9 | 15:55 | 4 | | continue drilling | 14. Other (Explain) |
| | 15:58 | 8 | -20- | Install Pipe II | 15. Logging |
| | 15:58 | 34 | | continue drilling | 16. Water Trip |
| | 15:12 | 8 | -40- | Install Pipe III | |
| 10 | 15:13 | 4 | | continue drilling | MATERIALS USED |
| | 15:26 | 5 | | Pull Pipe | Mud _____ sacks |
| | 15:30 | 14 | | shut down for the night | LC _____ Type _____ |
| 11 | 8/25/ (AM) 16:44 | 4 | | Begin drilling | _____ sacks |
| | 10:42 | 8 | -80- | Install Pipe IV | _____ sacks |
| | 10:49 | 4 | | continue drilling | _____ sacks |
| | 10:50 | 8 | -80- | Install Pipe V | _____ sacks |
| | 11:01 | 4 | | continue drilling | _____ sacks |
| 12 | 11:10 | 14 | -100- | Take sample Pa | _____ sacks |
| | 11:17 | 5 | | Pull Pipe | Viscose _____ |
| | 11:26 | 14 | | Remove Bit | Cement _____ |
| 1 | 11:30 | 10 | | Rig down | Diesel _____ |
| | 11:35 | 14 | | Attach Lid | Foamer <u>hydro foam</u> |
| 2 | | 1/11 | | Leave & Rig Move to New Site | Detergent _____ |
| 3 | | | | | Other _____ |
| 4 | | | | ① completed hole = 100' | CREW HOURS |
| | | | | ② Cased to 15' | Driller <u>1, Sam</u> |
| 5 | | | | ③ Hot Rock at 15' | Helper <u>1, Bernie</u> |
| | | | | | Helper <u>1, Scott</u> |

Footage: FROM 0 TO 100 TOTAL FOOTAGE 100
 Bit ~~changed at~~ 0 Size 9 3/8"
 Bit Air Hammer changed at 15 Size 8"
 Bit _____ changed at _____ Size _____

Revised: 21, June 1999

David Dels

Approved _____

100'

CLIENT: U.S. Geological Survey/ S.C.E.C.

PROJECT: LARSE II

CLIENT REP: ~~Alan Young~~ Luke

AM-PM

Date: 9/25/99 Hole # 7C Rig # 1 Driller: Sam Crum Supervisor: Luke

| TIME | LOG # | FOOTAGE | REMARKS | LOG REFERENCE # |
|-------|-------|---------|---|--------------------------|
| 11:47 | 2 | | Rig up & leveled | 1. Crew Travel To Site |
| 11:50 | 3 | | Install Bit - 9 3/4" diameter Tri-cone | 2. Rig Up |
| 11:51 | 3 | - 0 - | Install Pipe I | 3. Reenter Hole |
| 11:57 | 4 | | Begin drilling | 4. Drilling |
| 12:11 | 5 | | Install 8" diameter Tri-cone Air Hammer | 5. Pull Pipe |
| 12:15 | 6 | | Install casing I (20') | 6. Mix Mud & Fill |
| 12:24 | 7 | - 20 - | Install Pipe II | 7. Coring |
| 12:34 | 8 | | Continue drilling | 8. Install Casing/Pipe |
| 12:36 | 8 | - 40 - | Install Pipe III | 9. Cementing |
| 12:31 | 9 | | Continue drilling | 10. Rig Down |
| 12:31 | 14 | | Start water injection & foamer | 11. Move Rig To New Site |
| 12:36 | 8 | - 60 - | Install Pipe IV | 12. Maintenance |
| 12:37 | 4 | | Continue drilling | 13. Standby (Explain) |
| 12:49 | 14 | - 80 - | Hole completed at 80' | 14. Other (Explain) |
| 12:50 | 5 | | Pull Pipe | 15. Logging |
| 12:56 | 14 | | Remove Bit | 16. Water Trip |
| 12:59 | 10 | | Rig Down | |
| 13:01 | 14 | | Attach Lid | MATERIALS USED |
| 13:05 | 1/1 | | Rig & Crew Move to New Site | Mud _____ sacks |
| | | | | LC _____ Type _____ |
| | | | | _____ sacks |
| | | | | _____ sacks |
| | | | | _____ sacks |
| | | | | Viscose _____ |
| | | | | Cement _____ |
| | | | | Diesel _____ |
| | | | | Foamer <u>Hydro Foam</u> |
| | | | | Detergent _____ |
| | | | | Other _____ |
| | | | Ⓢ Hole completed = 80' | |
| | | | Ⓢ used to 20' | CREW HOURS |
| | | | | Driller <u>1, Sam</u> |
| | | | | Helper <u>1, Bernie</u> |
| | | | | Helper <u>1, Scott</u> |

(PA)

Footage: FROM 0 TO 80 TOTAL FOOTAGE 80

(Start) Bit diameter Tri-cone changed at 20 Size 9 3/4"
Bit Air Hammer changed at 20 Size 8"

Revised: 21, June 1999

David Deis

Approved _____

80'

CLIENT: U.S. Geological Survey/ S.C.E.C.

PROJECT: LARSE II

CLIENT REP: ~~Alan York~~ Luke

(PM)

expected Depth = 100'

| Date: 9/25 | | Hole # 8D Rig # 1 | | Driller: Sam Crum | Supervisor: Luke |
|------------|-------|-------------------|--|--------------------------|------------------|
| TIME | LOG # | FOOTAGE | REMARKS | LOG REFERENCE # | |
| 13:18 | 2 | | Rig up & leveled. | 1. Crew Travel To Site | |
| 13:20 | 3 | | Install Bit - 9 1/2" diameter Tricone | 2. Rig Up | |
| 13:24 | 4 | - 0 - | Install Pipe I | 3. Reenter Hole | |
| 13:25 | 4 | | Begin Drilling | 4. Drilling | |
| 13:28 | 14 | | Remove Bit | 5. Pull Pipe | |
| 13:39 | 8 | | Install New Bit (8" Air Hammer) | 6. Mix Mud & Fill | |
| 13:41 | 8 | | Install Casing I | 7. Casing | |
| 13:46 | 12 | | Install Casing II New Casing (top level) (Industry) | 8. Install Casing/Pipe | |
| 14:01 | 8 | - 20 - | Install Pipe II | 9. Cementing | |
| 14:02 | 4 | | Continue drilling | 10. Rig Down | |
| 14:09 | 9 | - 40 - | Install Casing III | 11. Move Rig To New Site | |
| 14:10 | 4 | | Continue drilling | 12. Maintenance | |
| 14:14 | 14 | | Start water & foamer injection. | 13. Standby (Explain) | |
| 14:14 | 8 | - 60 - | Install Pipe III | 14. Other (Explain) | |
| 14:20 | 4 | | continue drilling | 15. Logging | |
| 14:26 | 8 | - 80 - | Install Pipe IV | 16. Water Trip | |
| 14:27 | 4 | | Continue drilling. | | |
| 14:35 | 14 | - 100 - | Hole completed at 100' | MATERIALS USED | |
| 14:39 | 5 | | Pull Pipe & Remove Bit. | Mud _____ sacks | |
| 14:49 | 10 | | Rig Down | LC _____ Type _____ | |
| 14:55 | 14 | | Attach Lid. | _____ sacks | |
| 14:57 | 11 | | Crew & Rig Move to new site. | _____ sacks | |
| 14:59 | 16 | | Leave on Water Trip. | _____ sacks | |
| | | | | Viscose _____ | |
| | | | | Cement _____ | |
| | | | | Diesel _____ | |
| | | | | Foamer <u>Hydro Seal</u> | |
| | | | | Detergent _____ | |
| | | | | Other _____ | |
| | | | Ⓢ Hole completed = 100' | CREW HOURS | |
| | | | Ⓢ Cased to 20' | Driller: <u>Sam</u> | |
| | | | | Helper: <u>Bonnie</u> | |
| | | | | Helper: <u>Scott</u> | |

Footage: FROM _____ TO _____ TOTAL FOOTAGE _____

Bit ~~discontinued~~ changed at _____ Size 9 1/2"

Bit Air Hammer changed at _____ Size 8"

Bit _____ changed at _____ Size _____

Approved _____

Revised: 21, June 1999

David Delta

100'

CLIENT: U.S. Geological Survey/ S.C.E.C.
 PROJECT: LARSE II
 CLIENT REP: ~~Alan Yano~~ Luke

(PM) expected depth = 70'

| Date: 9/25/99 | | Hole # BE | | Rig # 1 | Driller: Sam Crum | Supervisor: Luke |
|--------------------------|-------|-----------|-----------------------------------|---------|-------------------|----------------------------|
| TIME | LOG # | FOOTAGE | REMARKS | | | LOG REFERENCE # |
| 15:11 | 2 | | Rig up & leveled | | | 1. Crew Travel To Site |
| 15:12 | 3 | | Install Bit 9 3/8" diameter Trumb | | | 2. Rig Up |
| 15:13 | 3 | - 0 - | Install Pipe I | | | 3. Reenter Hole |
| 15:14 | 4 | | Begin Drilling | | | 4. Drilling |
| 15:22 | 14 | | Remove Bit | | | 5. Pull Pipe |
| 15:25 | 8 | | Install casing I (20) | | | 6. Mix Mud & Fill |
| 15:28 | 8 | | Install 8" Air Hammer | | | 7. Coring |
| 15:36 | 4 | - 20 - | Install Pipe II | | | 8. Install Casing/Pipe |
| 15:36 | 4 | | Continue drilling | | | 9. Cementing |
| 15:41 | 4 | - 40 - | Install Pipe III | | | 10. Rig Down |
| 15:41 | 4 | | Continue drilling | | | 11. Move Rig To New Site |
| 15:50 | 4 | - 60 - | Install Pipe IV | | | 12. Maintenance |
| 15:50 | 4 | | Continue drilling | | | 13. Standby (Explain) |
| 15:56 | 14 | - (65) - | Hole complete at 75' | | | 14. Other (Explain) |
| 15:57 | 5 | | Pull Pipe | | | 15. Logging |
| 16:06 | 10 | | Rig down | | | 16. Water Trip |
| | | | | | | MATERIALS USED |
| 16:18 | 14 | | Attach Lid | | | Mud _____ sacks |
| 16:19 | 11 | | Crew & Rig Move to New Site | | | LC _____ Type _____ |
| | | | | | | _____ sacks |
| | | | | | | _____ sacks |
| | | | | | | _____ sacks |
| | | | | | | Viscose _____ |
| | | | | | | Cement _____ |
| | | | | | | Diesel _____ |
| | | | | | | Foamer Hydramax |
| | | | | | | Detergent _____ |
| | | | | | | Other _____ |
| | | | | | | CREW HOURS |
| Ⓢ Completed Hole = 75' | | | | | | Driller 1, Sam |
| Ⓢ Rased to 20' | | | | | | Helper 1, Bernie |
| Ⓢ Drilled Dry / Hole dry | | | | | | Helper 1, Scott |

Footage: FROM 0 TO 75 TOTAL FOOTAGE 75'
 Bit ~~9 3/8" Trumb~~ changed at 0 Size 9 3/8"
 Bit ~~Air Hammer~~ changed at 20 Size 8"
 Bit _____ changed at _____ Size _____
 Revised: 21, June 1999
 Approved _____
 David Deis

75'

CLIENT: U.S. Geological Survey/ S.C.E.C.
 PROJECT: LARSE II
 CLIENT REP: Luke Reussert

(AM)

expected depth = 70'

| Date: 9/26/99 | | Hole # 9C | | Rig # 1 | Driller: Sam Crum | Supervisor: Luke |
|---------------|-------|-----------|--|---------|-------------------|--------------------------|
| TIME | LOG # | FOOTAGE | REMARKS | | | LOG REFERENCE # |
| 9:30 | 1 | | Crew & Rig Move to New site | | | 1. Crew Travel To Site |
| 9:40 | 2 | | Rig Up & Level. | | | 2. Rig Up |
| 9:40 | 16 | | Lease water TPA | | | 3. Reenter Hole |
| 9:44 | 9 | | Install Bit - 9 3/8" diameter Trumbull | | | 4. Drilling |
| 9:44 | 8 | 0 | Install Pipe I | | | 5. Pull Pipe |
| 9:47 | 4 | | Begin drilling | | | 6. Mix Mud & Fill |
| 10:01 | 8 | | Install casing 2 (10') | | | 7. Coring |
| 10:03 | 14 | | cut casing | | | 8. Install Casing Port |
| 10:06 | 2 | | Install New Bit - 5" Airhammer | | | 9. Cementing |
| 10:10 | 4 | | Continue Drilling | | | 10. Rig Down |
| 10:14 | 8 | 20 | Install Pipe II | | | 11. Move Rig To New Site |
| 10:18 | 4 | | Drill | | | 12. Maintenance |
| 10:23 | 8 | 40 | Install Pipe III | | | 13. Standby (Explain) |
| 10:23 | 4 | | Drill | | | 14. Other (Explain) |
| 10:30 | 8 | 60 | Install Pipe IV | | | 15. Logging |
| 10:31 | 4 | | Drill | | | 16. Water Trip |
| 10:36 | 14 | | Hole completed at 80' | | | |
| 10:37 | 5 | | Pull Pipe | | | MATERIALS USED |
| 10:44 | 10 | | Rig down | | | Mud _____ sacks |
| 10:50 | 14 | | Attach lid | | | L.C. _____ Type _____ |
| 10:55 | 11 | | Rig & Crew Travel to New Site. | | | _____ sacks |
| | | | | | | _____ sacks |
| | | | | | | _____ sacks |
| | | | | | | Viscose _____ |
| | | | | | | Cement _____ |
| | | | | | | Diesel _____ |
| | | | | | | Foamer _____ |
| | | | | | | Detergent _____ |
| | | | | | | Other _____ |
| | | | completed hole = 80' | | | CREW HOURS |
| | | | Cased to 10' | | | Driller 1, Sam |
| | | | Drilled Dry / Hole dry | | | Helper 1, Bernie |
| | | | | | | Helper 1, Scott. |

Footage: FROM 0' TO 80' TOTAL FOOTAGE 80'
 Start Drum & Air Hammer changed at 10 Size 8
 changed at _____ Size _____
 changed at _____ Size _____

Approved _____
 David Della
 Revised 9/8/99 11:27 AM

180'

CLIENT: U.S. Geological Survey/ S.C.E.C.

PROJECT: LARSE II

CLIENT REP: ~~Alvin Long~~ Luke

(PM)

expected depth - 180'

| TIME | LOG # | FOOTAGE | REMARKS | LOG REFERENCE # |
|--|-------|---------|------------------------------|--------------------------|
| Date: 9/25/99 Hole # 9E Rig # 1 Driller: Sam Crum Supervisor: Luke | | | | |
| 16:27 | 2 | | Rig up & leveled | 1. Crew Travel To Site |
| 16:32 | 16 | | Return water Trip. | 2. Rig Up |
| 16:32 | 8 | | Install 1st - 7 1/2" Trench | 3. Reenter Hole |
| 16:33 | 8 | 0 | Install Pipe I | 4. Drilling |
| 16:34 | 4 | | Begin Drilling | 5. Pull Pipe |
| 16:39 | 14 | | Put Back at 10' | 6. Mix Mud & Fill |
| 16:39 | 8 | | change Bit for 8" Air Hammer | 7. Coring |
| 16:45 | 8 | | Install casing (10') | 8. Install Casing/Pipe |
| 16:47 | 4 | | Continue Drilling | 9. Cementing |
| 16:55 | 8 | 20 | Install Pipe II | 10. Rig Down |
| 16:50 | 4 | | Drill | 11. Move Rig To New Site |
| 17:00 | 8 | 40 | Install Pipe III | 12. Maintenance |
| 17:04 | 4 | | Drill | 13. Standby (Explain) |
| 17:05 | 8 | | Water & Foam Injection Begin | 14. Other (Explain) |
| 17:08 | 4 | 60 | Install Pipe IV | 15. Logging |
| 17:17 | 8 | | Drill | 16. Water Trip |
| 17:16 | 4 | 80 | Install Pipe V | |
| 17:24 | 8 | 100 | Drill | MATERIALS USED |
| 17:24 | 4 | | Install Pipe VI | Mud _____ sacks |
| 17:31 | 8 | 120 | Drill | LC _____ Type _____ |
| 17:34 | 4 | | Install Pipe VII | |
| 17:42 | 8 | 140 | Drill | _____ sacks |
| 17:43 | 4 | | Install Pipe VIII | _____ sacks |
| 17:49 | 8 | 160 | Drill | _____ sacks |
| 17:50 | 4 | | Install Pipe IX | _____ sacks |
| 18:00 | 14 | 180 | Hole completed at 180' | _____ sacks |
| 18:00 | 5 | | Pull Pipe | |
| 18:29 | 14 | | Attach Lid | Viscose _____ |
| 1 Crew & Rig Travel to New site | | | | |
| 2 _____ | | | | |
| 3 _____ | | | | |
| 4 _____ | | | | |
| 5 _____ | | | | |
| CREW HOURS | | | | |
| Driller: 1) Sam | | | | |
| Helper: 1) Bernie | | | | |
| Helper: 1) Scott | | | | |

Footage: FROM 0 TO 180 TOTAL FOOTAGE 180

Bit ~~Triumph~~ changed at 0 Size 9 3/8
 Bit Air Hammer changed at 10 Size 8
 Bit changed at _____ Size _____

Revised: 21, June 1999

David Della

Approved _____

180'

CLIENT: U.S. Geological Survey/ S.C.E.C.
 PROJECT: LARSE II
 CLIENT REP: ~~Alvin~~ Luke Rausser

(AM)

expected depth = 80'

| Date: 9/26/99 | | Hole # 10A | | Rig # 1 | Driller: Sam Crum | Supervisor: Luke |
|---------------|-------|------------|-----------------------------|---------|--------------------------|------------------|
| TIME | LOG # | FOOTAGE | REMARKS | | LOG REFERENCE # | |
| 11:15 | 1 | | Rig up. | | 1. Crew Travel To Site | |
| 11:26 | 2 | 0 | Install Tricone & Pipe I | | 2. Rig Up | |
| 11:31 | 3 | | Begin drilling | | 3. Reenter Hole | |
| 11:33 | 4 | 20 | Install Pipe II | | 4. Drilling | |
| 11:35 | 5 | | Drill | | 5. Pull Pipe | |
| 11:30 | 6 | | Pull Pipe & Bit | | 6. Mix Mud & Fill | |
| 11:31 | 7 | | Install 5' Air Hammer | | 7. Coring | |
| 11:33 | 8 | | Install casing (24") | | 8. Install Casing/Pipe | |
| 11:37 | 9 | | Drill | | 9. Cementing | |
| 11:45 | 10 | 40 | Install Pipe III | | 10. Rig Down | |
| 11:46 | 11 | | Drill | | 11. Move Rig To New Site | |
| 11:52 | 12 | 60 | Install Pipe IV | | 12. Maintenance | |
| 11:52 | 13 | | Kill | | 13. Standby (Explain) | |
| 11:58 | 14 | 80 | Hole completed at 80' | | 14. Other (Explain) | |
| 11:59 | 15 | | Pull Pipe & Bit | | 15. Logging | |
| 12:08 | 16 | | Rig Down | | 16. Water Trip | |
| 12:10 | 17 | | Attach Lid | | MATERIALS USED | |
| 12:12 | 18 | | Move Rig & Crew to New Site | | Mud _____ sacks | |
| | | | | | LC _____ Type _____ | |
| | | | | | _____ sacks | |
| | | | | | _____ sacks | |
| | | | | | Viscose _____ | |
| | | | | | Cement _____ | |
| | | | | | Diesel _____ | |
| | | | | | Foamer _____ | |
| | | | | | Detergent _____ | |
| | | | | | Other _____ | |
| | | | ① completed hole = 80' | | CREW HOURS | |
| | | | ② Cased to 24" | | Driller 1, Sam | |
| | | | ③ Drilled dry & Hole Dry | | Helper 1, Scott | |
| | | | | | Helper 1, Banne | |

Footage: FROM 0' TO 80' TOTAL FOOTAGE 80'
 Bit Tricone changed at 0' Size 9 3/4"
 Bit Air Hammer changed at 20' Size 8"
 Bit _____ changed at _____ Size _____

Revised: 21, June 1999

Approved _____

David Dels

(80')

Start

CLIENT: U.S. Geological Survey/ S.C.E.C.
 PROJECT: LARSE II
 CLIENT REP: Lake Rausser

(PM)

expected depth = 70'

| Date: 9/26/99 | | Hole # 11A | | Rig # 1 | Driller: Sam Crum | Supervisor: Luke |
|---------------|-------|------------|-------------------------------------|---------|-------------------|--------------------------|
| TIME | LOG # | FOOTAGE | REMARKS | | | LOG REFERENCE # |
| 12:33 | 2 | | Rig up & level | | | 1. Crew Travel To Site |
| 12:35 | 3 | | Install Bit - 9 3/8" Tricone | | | 2. Rig Up |
| 12:35 | 2 | - 0 - | Install Pipe I | | | 3. Reenter Hole |
| 12:37 | 4 | | Drill - using small amount of water | | | 4. Drilling |
| 12:44 | 8 | | Install casing (15-20) | | | 5. Pull Pipe |
| 12:52 | 8 | | Install 2" Air Hammer | | | 6. Mix Mud & Fill |
| 12:53 | 4 | | Drill | | | 7. Coring |
| 12:59 | 3 | - 20 - | Install Pipe II | | | 8. Install Casing Pipe |
| 13:00 | 4 | | Drill | | | 9. Cementing |
| 13:04 | 12 | | Abandon (top lead bushing replaced) | | | 10. Rig Down |
| 13:21 | 3 | | Install Pipe III | | | 11. Move Rig To New Site |
| 13:22 | 4 | | Drill | | | 12. Maintenance |
| 13:29 | 3 | - 60 - | Install Pipe III | | | 13. Standby (Explain) |
| 13:30 | 4 | | Drill | | | 14. Other (Explain) |
| 13:32 | 14 | - 80 - | Hole completed at 80' | | | 15. Logging |
| 13:38 | 5 | | Pull Pipe | | | 16. Water Trip |
| 13:42 | 10 | | Rig Down | | | |
| 13:58 | 14 | | Attach Lid | | | MATERIALS USED |
| | 11 | | Move rig to 2CR (see Truck & Wood) | | | Mud _____ sacks |
| | | | | | | LC _____ Type _____ |
| | | | | | | _____ sacks |
| | | | | | | _____ sacks |
| | | | | | | _____ sacks |
| | | | | | | Viscose _____ |
| | | | | | | Cement _____ |
| | | | | | | Diesel _____ |
| | | | | | | Foamer _____ |
| | | | | | | Detergent _____ |
| | | | | | | Other _____ |
| | | | ① Completed hole = 80' | | | CREW HOURS |
| | | | ② Cased to 20' | | | Driller 1, Sam |
| | | | ③ Hole dry | | | Helper 1, Bernie |
| | | | ④ Drilled almost dry | | | Helper 1, Scott |

Footage: FROM 0 TO 80 TOTAL FOOTAGE 80
 changed at 0 Size 9 3/8"
 changed at 20 Size 8"
 changed at _____ Size _____

Approved _____

David Deits
 (80')

CLIENT: U.S. Geological Survey/ S.C.E.C.
 PROJECT: LARSE II
 CLIENT REP: ~~Alan Wong~~ Lake Reusser

Date: 10/21/99 Hole # 12E Rig # 1 Driller: Sam Crum Supervisor: Luke

PM
 Sam:
 Call
 Arrive
 at
 11:00

| TIME | LOG # | FOOTAGE | REMARKS | LOG REFERENCE # |
|-------|-------|---------|---------------------------------|--------------------------|
| | | | | 1. Crew Travel To Site |
| 14:00 | 11 | | Move Rig to New Site | 2. Rig Up |
| 14:20 | 2 | | Rig up | 3. Reenter Hole |
| 14:24 | 3 | | Install Bit & Air Hammer | 4. Drilling |
| 14:30 | 5 | 0 | Install Pipe I | 5. Pull Pipe |
| 14:38 | 4 | | Drill | 6. Mix Mud & Fill |
| 14:42 | 3 | 20 | Install Pipe II | 7. Casing |
| 14:43 | 4 | | Drill | 8. Install Casing/Pipe |
| 14:51 | 3 | 40 | Install Pipe III | 9. Cementing |
| 14:52 | 4 | | Drill | 10. Rig Down |
| 14:58 | 14 | 60 | Stop drilling to Install casing | 11. Move Rig To New Site |
| 15:15 | 8 | | Install casing I | 12. Maintenance |
| | 8 | | Install casing II | 13. Standby (Explain) |
| | 14 | | Install I + II together | 14. Other (Explain) |
| 16:37 | 10 | | Rig | 15. Logging |
| | | | | 16. Water Trip |
| | | | | MATERIALS USED |
| | | | | Mud _____ sacks |
| | | | | LC _____ Type _____ |
| | | | | _____ sacks |
| | | | | _____ sacks |
| | | | | _____ sacks |
| | | | | Viscose _____ |
| | | | | Cement _____ |
| | | | | Diesel _____ |
| | | | | Foamer _____ |
| | | | | Detergent _____ |
| | | | | Other _____ |
| | | | | CREW HOURS |
| | | | | Driller: L. Sam |
| | | | | Helper: L. Bernie |
| | | | | Helper: L. Jeff |

Footage: FROM 0 TO 70 TOTAL FOOTAGE 70

Bit _____ changed at _____ Size _____
 Bit _____ changed at _____ Size _____
 Bit _____ changed at _____ Size _____

Approved _____

CLIENT: U.S. Geological Survey/ S.C.E.C.
 PROJECT: LARSE II
 CLIENT REP: Alan Yong

| Date: 10.21.99 | | Hole # 12B | Rig # 1 | Driller: Sam Crum | Supervisor: [Signature] |
|----------------|-------|------------|---------|--------------------------|-------------------------|
| TIME | LOG # | FOOTAGE | REMARKS | LOG REFERENCE # | |
| 5 | | | | 1. Crew Travel To Site | |
| 6 | | | | 2. Rig Up | |
| 7 | | | | 3. Reenter Hole | |
| 8 | | | | 4. Drilling | |
| 9 | | | | 5. Pull Pipe | |
| 10 | | | | 6. Mix Mud & Fill | |
| 11 | | | | 7. Coring | |
| 12 | | | | 8. Install Casing/Pipe | |
| 1 | | | | 9. Cementing | |
| 2 | | | | 10. Rig Down | |
| 3 | | | | 11. Move Rig To New Site | |
| 4 | | | | 12. Maintenance | |
| 5 | | | | 13. Standby (Explain) | |
| 6 | | | | 14. Other (Explain) | |
| 7 | | | | 15. Logging | |
| 8 | | | | 16. Water Trip | |
| 9 | 1 | | H2O OK | | |
| 10 | 2 | 12 ft. | #1 pipe | | |
| 11 | 3 | | | | |
| 12 | 4 | | | | |
| 1 | 5 | | | | |
| 2 | 6 | | | | |
| 3 | 7 | | | | |
| 4 | 8 | | | | |
| 5 | 9 | | | | |
| 6 | 10 | | | | |
| 7 | 11 | | | | |
| 8 | 12 | | | | |
| 9 | 13 | | | | |
| 10 | 14 | | | | |
| 11 | 15 | | | | |
| 12 | 16 | | | | |
| 1 | 17 | | | | |
| 2 | 18 | | | | |
| 3 | 19 | | | | |
| 4 | 20 | | | | |
| 5 | 21 | | | | |
| 6 | 22 | | | | |
| 7 | 23 | | | | |
| 8 | 24 | | | | |
| 9 | 25 | | | | |
| 10 | 26 | | | | |
| 11 | 27 | | | | |
| 12 | 28 | | | | |
| 1 | 29 | | | | |
| 2 | 30 | | | | |
| 3 | 31 | | | | |
| 4 | 32 | | | | |
| 5 | 33 | | | | |
| 6 | 34 | | | | |
| 7 | 35 | | | | |
| 8 | 36 | | | | |
| 9 | 37 | | | | |
| 10 | 38 | | | | |
| 11 | 39 | | | | |
| 12 | 40 | | | | |
| 1 | 41 | | | | |
| 2 | 42 | | | | |
| 3 | 43 | | | | |
| 4 | 44 | | | | |
| 5 | 45 | | | | |
| 6 | 46 | | | | |
| 7 | 47 | | | | |
| 8 | 48 | | | | |
| 9 | 49 | | | | |
| 10 | 50 | | | | |
| 11 | 51 | | | | |
| 12 | 52 | | | | |
| 1 | 53 | | | | |
| 2 | 54 | | | | |
| 3 | 55 | | | | |
| 4 | 56 | | | | |
| 5 | 57 | | | | |
| 6 | 58 | | | | |
| 7 | 59 | | | | |
| 8 | 60 | | | | |
| 9 | 61 | | | | |
| 10 | 62 | | | | |
| 11 | 63 | | | | |
| 12 | 64 | | | | |
| 1 | 65 | | | | |
| 2 | 66 | | | | |
| 3 | 67 | | | | |
| 4 | 68 | | | | |
| 5 | 69 | | | | |
| 6 | 70 | | | | |
| 7 | 71 | | | | |
| 8 | 72 | | | | |
| 9 | 73 | | | | |
| 10 | 74 | | | | |
| 11 | 75 | | | | |
| 12 | 76 | | | | |
| 1 | 77 | | | | |
| 2 | 78 | | | | |
| 3 | 79 | | | | |
| 4 | 80 | | | | |
| 5 | 81 | | | | |
| 6 | 82 | | | | |
| 7 | 83 | | | | |
| 8 | 84 | | | | |
| 9 | 85 | | | | |
| 10 | 86 | | | | |
| 11 | 87 | | | | |
| 12 | 88 | | | | |
| 1 | 89 | | | | |
| 2 | 90 | | | | |
| 3 | 91 | | | | |
| 4 | 92 | | | | |
| 5 | 93 | | | | |
| 6 | 94 | | | | |
| 7 | 95 | | | | |
| 8 | 96 | | | | |
| 9 | 97 | | | | |
| 10 | 98 | | | | |
| 11 | 99 | | | | |
| 12 | 100 | | | | |

Footage: FROM 5 TO 60 TOTAL FOOTAGE 60
 Bit _____ changed at _____ Size _____
 Bit _____ changed at _____ Size _____
 Bit _____ changed at _____ Size _____
 Approved _____
 Revised: 21, June 1999 David Dells

CLIENT: U.S. Geological Survey/ S.C.E.C.
 PROJECT: LARSE II
 CLIENT REP: Alan Yong

| Date: 10.21.99 | | Hole # MA | | Rig # 1 | Driller: Sam Crum | Supervisor: <i>[Signature]</i> |
|----------------|--------------|-----------|----------------------|---------|-------------------|---|
| TIME | LOG # | FOOTAGE | REMARKS | | LOG REFERENCE # | |
| 5 | | | | | | |
| 6 | | | | | | 1. Crew Travel To Site 2. Rig Up 3. Reenter Hole 4. Drilling 5. Pull Pipe 6. Mix Mud & Fill 7. Coring 8. Install Casing/Pipe 9. Cementing 10. Rig Down 11. Move Rig To New Site 12. Maintenance 13. Standby (Explain) 14. Other (Explain) 15. Logging 16. Water Trip |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | MATERIALS USED |
| | 1 2 | | | | | Mud _____ sacks |
| | 3 4 | | | | | LC _____ Type _____ |
| 11 | 12:00 | 66' | INSTALL CASING - 60' | | | _____ sacks |
| | | | * WATER @ 60 FT * | | | _____ sacks |
| 12 | 1:14 4:29 | 80' | Max Depth | | | _____ sacks |
| 1 | | | Actual Depth 75' | | | Viscose _____ |
| 2 | | | CASING DEPTH 60' | | | Cement _____ |
| 3 | | | | | | Diesel _____ |
| 4 | | | | | | Foamer _____ |
| 5 | | | | | | Detergent _____ |
| | | | | | | Other _____ |
| | | | | | | CREW HOURS |
| | | | | | | Driller / _____ |
| | | | | | | Helper / _____ |
| | | | | | | Helper / _____ |

Footage: FROM _____ TO _____ TOTAL FOOTAGE _____
 Bit _____ changed at _____ Size _____
 Bit _____ changed at _____ Size _____
 Bit _____ changed at _____ Size _____ Approved _____

hole = 64 ft
 casing = 42 ft.

CLIENT: U.S. Geological Survey/ S.C.E.C.
 PROJECT: LARSE II
 CLIENT REP: Alan Yong

| Date: 10-12-99 | | Hole # 17A | | Rig # | Driller: Sam Crum | Supervisor: |
|---------------------|-------|------------|-------------------------|-------|--------------------------|-------------|
| TIME | LOG # | FOOTAGE | REMARKS | | LOG REFERENCE # | |
| 12:25 | 1 | | arrive | | | |
| 12:29 | 2 | | rig up | | 1. Crew Travel To Site | |
| 12:40 | 3 | | install pipe #1 | | 2. Rig Up | |
| 12:45 | 4 | 0-20ft | drill pipe #1 | | 3. Reenter Hole | |
| 1:00 | 4 | 20-40ft | install pipe #2 | | 4. Drilling | |
| 1:01 | 4 | | drill pipe #2 | | 5. Pull Pipe | |
| 1:06 | 5 | | install pipe #3 | | 6. Mix Mud & Fill | |
| 1:08 | 5 | 40-60ft | drill pipe #3 | | 7. Coring | |
| 1:11 | 5 | | pull pipe | | 8. Install Casing/Pipe | |
| 1:16 | 6 | | install casing #1 | | 9. Cementing | |
| 1:17 | 6 | | install casing #2 | | 10. Rig Down | |
| 1:27 | 6 | | install casing #3 | | 11. Move Rig To New Site | |
| 1:42 | 14 | | clean hole | | 12. Maintenance | |
| 2:20 | 10 | | rig down | | 13. Standby (Explain) | |
| 2:21 | 14 | | weld cap hole | | 14. Other (Explain) | |
| 2:34 | 3 | | re-enter hole add 20ft. | | 15. Logging | |
| 2:55 | 11 | | move rig | | 16. Water Trip | |
| MATERIALS USED | | | | | | |
| Mud _____ sacks | | | | | | |
| LC _____ Type _____ | | | | | | |
| _____ sacks | | | | | | |
| _____ sacks | | | | | | |
| _____ sacks | | | | | | |
| Viscose _____ | | | | | | |
| Cement _____ | | | | | | |
| Diesel _____ | | | | | | |
| Foamer _____ | | | | | | |
| Detergent _____ | | | | | | |
| Other _____ | | | | | | |
| CREW HOURS | | | | | | |
| Driller _____ | | | | | | |
| Helper _____ | | | | | | |
| Helper _____ | | | | | | |

Footage: FROM _____ TO _____ TOTAL FOOTAGE _____

Bit _____ changed at _____ Size _____
 Bit _____ changed at _____ Size _____
 Bit _____ changed at _____ Size _____

Approved _____

Revised: 21, June 1999

David Dells

* actual hole = 64
 v actual casing = 42

CLIENT: U.S Geological Survey/ S.C.E.C.

PROJECT: LARSE II

CLIENT REP: Luke

expected depth = 61'

Date: 10/16/99 Hole # 19 Rig # 1 Driller: Sam Crum Supervisor:

AM

PM

| TIME | LOG # | FOOTAGE | REMARKS | LOG REFERENCE # |
|-------|-------|---------|-------------------------------------|--------------------------|
| 12:30 | 1 | | Move Rig to Portland Ave | 1. Crew Travel To Site |
| 12:50 | 2 | | Rig up | 2. Rig Up |
| 12:51 | 3 | | Install Bit - 9/8 diameter Turcotte | 3. Reenter Hole |
| 12:52 | 4 | 0 | Install Pipe I | 4. Drilling |
| 12:53 | 5 | | Gain Casing | 5. Pull Pipe |
| 12:58 | 6 | | Install 8" Air Hammer | 6. Mix Mud & Fill |
| 12:59 | 7 | | Drill | 7. Coring |
| 13:00 | 8 | 20 | Install Pipe II | 8. Install Casing/Pipe |
| 13:00 | 9 | | Drill | 9. Cementing |
| 13:09 | 10 | 40 | Install Pipe III | 10. Rig Down |
| 13:12 | 11 | 63 | Ball Pipe | 11. Move Rig To New Site |
| 13:39 | 12 | | Install casing I | 12. Maintenance |
| 13:45 | 13 | | Install casing II | 13. Standby (Explain) |
| 13:45 | 14 | | Welding I = II | 14. Other (Explain) |
| 13:50 | 15 | | Install casing III | 15. Logging |
| 14:00 | 16 | | Weld II = III | 16. Water Trip |
| | | | | MATERIALS USED |
| | | | | Mud _____ sacks |
| | | | | LC _____ Type _____ |
| | | | | _____ sacks |
| | | | | _____ sacks |
| | | | | _____ sacks |
| | | | | Viscose _____ |
| | | | | Cement _____ |
| | | | | Diesel _____ |
| | | | | Foamer _____ |
| | | | | Detergent _____ |
| | | | | Other _____ |
| | | | | CREW HOURS |
| | | | | Driller / _____ |
| | | | | Helper / _____ |
| | | | | Helper / _____ |

completed hole = 63'
60' casing

Footage: FROM _____ ' TO _____ ' TOTAL FOOTAGE _____ '
changed at _____ ' Size _____ '
changed at _____ ' Size _____ '
changed at _____ ' Size _____ ' Approved _____

David Deis

Revised 9/8/99 11:27 AM

CLIENT: U.S. Geological Survey/ S.C.E.C.

PROJECT: LARSE II

CLIENT REP:

expected depth => 62'

A.M.

| Date: 10/16/99 | | Hole # 21 | | Rig # 1 | | Driller: Sam Crum | | Supervisor: Luke | |
|----------------|-------|-----------|------------------------------------|---------|--|-------------------|--------------------------|------------------|--|
| TIME | LOG # | FOOTAGE | REMARKS | | | | LOG REFERENCE # | | |
| 10:30 | 1 | | Move to Northridge Middle School | | | | 1. Crew Travel To Site | | |
| 10:35 | 2 | | Rig up | | | | 2. Rig Up | | |
| 10:37 | 3 | | Install Bit | | | | 3. Reenter Hole | | |
| 10:39 | 4 | 0- | Install Pipe I | | | | 4. Drilling | | |
| 10:40 | 4 | | Drill | | | | 5. Pull Pipe | | |
| 10:50 | 5 | 20- | Install Pipe II | | | | 6. Mix Mud & Fill | | |
| 10:56 | 4 | | Drill | | | | 7. Coring | | |
| 11:00 | 6 | 40- | Install Pipe III | | | | 8. Install Casing/Pipe | | |
| | | | | | | | 9. Cementing | | |
| 11:05 | 14 | 63 | Hole completed at 63' (Pipe + Bit) | | | | 10. Rig Down | | |
| 11:07 | 5 | | Pull Pipe | | | | 11. Move Rig To New Site | | |
| 11:15 | 7 | | Install casing I | | | | 12. Maintenance | | |
| 11:20 | 8 | | Install casing II | | | | 13. Standby (Explain) | | |
| 11:22 | 14 | | welding I & II together | | | | 14. Other (Explain) | | |
| 11:30 | 8 | | Install casing III | | | | 15. Logging | | |
| 11:40 | 14 | | Welding II & III together | | | | 16. Water Trip | | |
| 11:45 | 3 | | Reenter hole / clean hole | | | | MATERIALS USED | | |
| | | | | | | | Mud _____ sacks | | |
| | | | | | | | LC _____ Type _____ | | |
| | | | | | | | _____ sacks | | |
| | | | | | | | _____ sacks | | |
| | | | | | | | _____ sacks | | |
| | | | | | | | Viscose _____ | | |
| | | | | | | | Cement _____ | | |
| | | | | | | | Diesel _____ | | |
| | | | | | | | Foamer _____ | | |
| | | | | | | | Detergent _____ | | |
| | | | | | | | Other _____ | | |
| | | | * 63' - completed hole | | | | CREW HOURS | | |
| | | | * 60' casing | | | | Driller 1, Sam | | |
| | | | | | | | Helper 1, Bernie | | |
| | | | | | | | Helper 1, Aaron | | |

Footage FROM 0 TO 63 TOTAL FOOTAGE 63

changed at _____ Size _____

changed at _____ Size _____

changed at _____ Size _____

Approved _____

David Delis

Revised 9/8/99 11:27 AM

CLIENT: U.S. Geological Survey/ S.C.E.C.
 PROJECT: LARSE II
 CLIENT REP:

| Date: 10/13 | | Hole # 23A | | Rig # 1 | Driller: Sam Crum | Supervisor: JS |
|-------------|-------|------------|--------------------------------|---------|-------------------|-----------------------------|
| TIME | LOG # | FOOTAGE | REMARKS | | | LOG REFERENCE # |
| 9:50 | 1/16 | | ARRIVE / MAKE TRIP LOGS | | | |
| 10:00 | 2 | | | | | 1. Crew Travel To Site |
| 10:05 | 8 | | INSTALL PIPE 1 - BIT (TRICONE) | | | 2. Rig Up |
| 10:05 | 16 | | RETURN | | | 3. Reenter Hole |
| 10:08 | 4 | | START | | | 4. Drilling |
| 10:10 | 3 | 20' | INSTALL PIPE 2 | | | 5. Pull Pipe |
| | 4 | | | | | 6. Mix Mud & Fill |
| 10:15 | 8 | 40' | INSTALL PIPE 3 | | | 7. Coring |
| 10:20 | 16 | | | | | 8. Install Casing/Pipe |
| 10:24 | 5 | 60' | PULL PIPS 1-4 - BIT | | | 9. Cementing |
| 10:36 | 8 | | INSTALL CASING 1 | | | 10. Rig Down |
| 10:41 | 8 | | INSTALL CASING 2 | | | 11. Move Rig To New Site |
| | 14 | | WIPED | | | 12. Maintenance |
| 10:55 | 8 | | INSTALL CASING 3 | | | 13. Standby (Explain) |
| | 14 | | WIPED | | | 14. Other (Explain) |
| 11:10 | 3 | | | | | 15. Logging |
| 11:11 | 4 | | PULL PIPS 1, 2, 3 | | | 16. Water Trip |
| 11:17 | 4 | 62' | MAX DEPTH | | | |
| 11:16 | 5 | 60' | LEFT HOLE | | | |
| 11:16 | | | | | | MATERIALS USED |
| 11:21 | 16 | | | | | Mud _____ sacks |
| 11:40 | 17 | | | | | LC _____ Type _____ |
| | | | | | | _____ sacks |
| | | | | | | _____ sacks |
| | | | | | | _____ sacks |
| | | | | | | Viscose _____ |
| | | | | | | Cement _____ |
| | | | | | | Diesel _____ |
| | | | | | | Foamer _____ |
| | | | | | | Detergent _____ |
| | | | | | | Other _____ |
| | | | | | | CREW HOURS |
| | | | | | | Driller ¹ , SAM |
| | | | | | | Helper ¹ , BEDME |
| | | | | | | Helper ¹ , SLUTT |

Footage: FROM _____ TO _____ TOTAL FOOTAGE _____
 _____ changed at _____ Size _____
 _____ changed at _____ Size _____
 _____ changed at _____ Size _____

Approved _____

David Delis

Revised 9/8/99 11:27 AM

10-12-99 Hole# 24

| | | |
|------|----|-----------------------|
| 3:55 | 1 | arrive at site |
| 3:57 | 2 | rig up |
| 4:00 | 8 | install pipe #1 |
| 4:01 | 4 | 0-20ft drill pipe #2 |
| 4:05 | 8 | install pipe #2 |
| 4:05 | 4 | 20-40ft drill pipe #2 |
| 4:07 | 8 | install pipe #3 |
| 4:08 | 4 | 40-60ft drill pipe #3 |
| 4:10 | 5 | pull pipe |
| 4:22 | 8 | install casing #1 |
| 4:23 | 8 | install casing #2 |
| 4:34 | 8 | install casing #3 |
| 4:50 | 14 | Clean hole |
| 4:58 | 5 | remove pipe |
| 5:05 | 14 | Weld + cap hole |
| 5:12 | 10 | rig down |
| 5:15 | 11 | move rig |

* actual depth = 80ft

* actual casing = 60ft

CLIENT: U.S. Geological Survey/ S.C.E.C.
 PROJECT: LARSE II
 CLIENT REP:

expected depth = 64'

M/AM
 20' Long
 24"
 C.
 1000

| Date: 10/17/98 | | Hole # 24 west | Rig # 1 | Driller: Sam Crum | Supervisor: Luke |
|----------------|-------|----------------|-----------------------------------|------------------------------|------------------|
| TIME | LOG # | FOOTAGE | REMARKS | LOG REFERENCE # | |
| 8:00 | 11 | | Moved to 24 from 25 | 1. Crew Travel To Site | |
| 8:15 | 12 | | Maintenance | 2. Rig Up | |
| 12:20 | 2 | | Rig up | 3. Reenter Hole | |
| 12:31 | 4 | | Install 8" Air Hammer | 4. Drilling | |
| 12:35 | 12 | | Maintenance | 5. Pull Pipe | |
| | | | | 6. Mix Mud & Fill | |
| | | | | 7. Coring | |
| | | | | 8. Install Casing/Pipe | |
| | | | | 9. Cementing | |
| | | | | 10. Rig Down | |
| | | | | 11. Move Rig To New Site | |
| | | | | 12. Maintenance | |
| | | | | 13. Standby (Explain) | |
| | | | | 14. Other (Explain) | |
| | | | | 15. Logging | |
| | | | | 16. Water Trip | |
| MATERIALS USED | | | | | |
| | | | | Mud _____ sacks | |
| | | | | LC _____ Type _____ | |
| 14:30 | 14 | | Clean Hole | _____ sacks | |
| 14:47 | 5 | | Pull Pipe | _____ sacks | |
| 14:53 | 10 | | Rig Down | _____ sacks | |
| 15:02 | 14 | | Casing cut Flush & Lid. Attached, | _____ sacks | |
| | | | | Viscose _____ | |
| | | | | Cement _____ | |
| | | | | Diesel _____ | |
| | | | | Foamer _____ | |
| | | | | Detergent _____ | |
| | | | completed Hole = 70' | Other _____ | |
| | | | cased to 60' | | |
| CREW HOURS | | | | | |
| | | | | Driller <u>L. Sam</u> | |
| | | | | Helper <u>L. Parvile</u> | |
| | | | | Helper <u>2, [Signature]</u> | |

Footage: FROM 0 TO 70 TOTAL FOOTAGE 70
 _____ changed at _____ Size _____
 _____ changed at _____ Size _____
 _____ changed at _____ Size _____

Approved _____
 Revised 9/8/99 11:27 AM

David Dells
 170

hole = 80 ft
 casing = 60 ft.

CLIENT: U.S. Geological Survey/ S.C.E.C.
 PROJECT: LARSE II
 CLIENT REP: Alan Yong

| Date: 10-12-99 | | Hole # 25 | | Rig # 1 | Driller: Sam Crum | Supervisor: |
|-----------------------|-------|-----------|------------------------|---------|--------------------------|-------------|
| TIME | LOG # | FOOTAGE | REMARKS | | LOG REFERENCE # | |
| 4:30 | 1 | | arrive | | 1. Crew Travel To Site | |
| 9:35 | 2 | | rig up | | 2. Rig Up | |
| 9:45 | 3 | 0-20ft | install pipe #1 | | 3. Reenter Hole | |
| 9:47 | 4 | | drill pipe #1 | | 4. Drilling | |
| 9:52 | 5 | 20-40ft | install pipe #2 | | 5. Pull Pipe | |
| 9:55 | 6 | | drill pipe #2 | | 6. Mix Mud & Fill | |
| 10:02 | 7 | 40-60ft | install pipe #3 | | 7. Coring | |
| 10:15 | 8 | | drill pipe #3 | | 8. Install Casing/Pipe | |
| 10:24 | 9 | 60-80ft | install pipe #4 | | 9. Cementing | |
| 10:24 | 4 | | drill pipe #4 | | 10. Rig Down | |
| 10:32 | 5 | | pull all pipes | | 11. Move Rig To New Site | |
| 10:58 | 6 | | install casing #1 | | 12. Maintenance | |
| 10:58 | 8 | | install casing #2 | | 13. Standby (Explain) | |
| 10:58 | 8 | | install casing #3 | | 14. Other (Explain) | |
| 11:05 | 8 | | install casing #4 | | 15. Logging | |
| 11:27 | 3 | | re-enter hole to clean | | 16. Water Trip | |
| 11:43 | 10 | | rig down | | | |
| 11:50 | 11 | | exit hole move rig | | | |
| MATERIALS USED | | | | | | |
| Mud _____ sacks | | | | | | |
| LC _____ Type _____ | | | | | | |
| _____ sacks | | | | | | |
| _____ sacks | | | | | | |
| _____ sacks | | | | | | |
| Viscose _____ | | | | | | |
| Cement _____ | | | | | | |
| Diesel _____ | | | | | | |
| Foamer _____ | | | | | | |
| Detergent _____ | | | | | | |
| Other _____ | | | | | | |
| CREW HOURS | | | | | | |
| Driller _____ / _____ | | | | | | |
| Helper _____ / _____ | | | | | | |
| Helper _____ / _____ | | | | | | |

Footage: FROM _____ TO _____ TOTAL FOOTAGE _____
 Bit _____ changed at _____ Size _____
 Bit _____ changed at _____ Size _____
 Bit _____ changed at _____ Size _____
 Approved _____

Revised: 21, June 1999
 David Delis
 *actual depth = 82 ft.
 v actual casing = 40 ft.

CLIENT: U.S. Geological Survey/ S.C.E.C.
 PROJECT: LARSE II
 CLIENT REP: Luke Reuser

expected depth => 63'

AM

| TIME | LOG # | FOOTAGE | REMARKS | LOG REFERENCE # |
|----------------|------------|---------|--|--------------------------|
| Date: 10/16/99 | Hole # 26A | Rig # 1 | Driller: Sam Crum | Supervisor: Luke |
| 6:30 | 1 | | Move to Graceland Hills HS. | 1. Crew Travel To Site |
| 7:24 | 2 | | Rig up | 2. Rig Up |
| 7:25 | 3 | - 0- | Install bit (1 1/2" Diameter Turbodrill) | 3. Reenter Hole |
| 7:27 | 4 | | Install Pipe I. | 4. Drilling |
| 7:30 | 4 | | Begin Drilling | 5. Pull Pipe |
| 7:40 | 8 | - 20- | Install Pipe II. | 6. Mix Mud & Fill |
| 7:40 | 4 | | Drill | 7. Coring |
| 7:40 | 8.5 | 40- | Pull PPE | 8. Install Casing/Pipe |
| 7:52 | 8 | | Install Air Hammer | 9. Cementing |
| 7:54 | 5 | | Install casing I | 10. Rig Down |
| 8:00 | 2 | | Install casing II | 11. Move Rig To New Site |
| 8:02 | 14 | | Install casing III | 12. Maintenance |
| 8:08 | 5 | | Install casing Pipe III | 13. Standby (Explain) |
| 8:28 | 4 | | Drill | 14. Other (Explain) |
| 8:36 | 8 | - 60- | Install Pipe IV | 15. Logging |
| 8:37 | 6 | | Drill | 16. Water Trip |
| 8:37 | 5 | | Pull Pipe | |
| 8:45 | 8 | 60 | Completed hole | MATERIALS USED |
| 9:15 | 8 | | Install casing III | Mud _____ sacks |
| | | | | LC _____ Type _____ |
| 9:45 | | | Inject drill rig | _____ sacks |
| 9:52 | | | check holes and look in lid | _____ sacks |
| | | | | _____ sacks |
| | | | | Viscose _____ |
| | | | | Cement _____ |
| | | | | Diesel _____ |
| | | | | Foamer _____ |
| | | | | Detergent _____ |
| | | | | Other _____ |
| | | | 65' completed hole | CREW HOURS |
| | | | used to 60' | Driller 1, Sam |
| | | | water + detergent used | Helper 1, [Signature] |
| | | | | Helper 1, Aaron |

Date Rec 2:55 - 1601

Footage: FROM 0 TO 65 TOTAL FOOTAGE 65
 changed at _____ Size _____
 changed at _____ Size _____
 changed at _____ Size _____

Approved _____

David Dels

Revised 9/5/98 11:27 AM

CLIENT: U.S. Geological Survey/ S.C.E.C.
 PROJECT: LARSE II
 CLIENT REP:

65'

Date: 10/13 Hole # 29A Rig # 1 Driller: Sam Crum Supervisor: JS

| TIME | LOG # | FOOTAGE | REMARKS | LOG REFERENCE # |
|------|-------|---------|--------------------------|--------------------------|
| 2:00 | 1 | | | |
| 2:50 | 1 | | | |
| 3:06 | 8 | | INSTALL 5" 5/2 | 1. Crew Travel To Site |
| 3:07 | 8 | | INSTALL 5" 5/2 | 2. Rig Up |
| 3:08 | 8 | | LEAVE TO RETURN SUBRRAN | 3. Reenter Hole |
| 3:08 | 8 | | AND BOBCAT TO WORKHOUSE | 4. Drilling |
| | | | NO SANDS | 5. Pull Pipe |
| | | | | 6. Mix Mud & Fill |
| 3:43 | 8 | 8-10' | INSTALL CASING I | 7. Coring |
| 3:50 | 8 | | INSTALL CASING II | 8. Install Casing/Pipe |
| 4:05 | 8 | | INSTALL CASING III | 9. Cementing |
| 4:32 | 8 | | REENTER R.T. DOWN TO 60" | 10. Rig Down |
| 4:40 | 8 | | INSTALL PIPE III | 11. Move Rig To New Site |
| 4:42 | 8 | ~70' | REACH MAX DEPTH | 12. Maintenance |
| 4:53 | 8 | | | 13. Standby (Explain) |
| 4:58 | 8 | | EXIT HOLE | 14. Other (Explain) |
| 4:56 | 10 | | | 15. Logging |
| | | | 70' 35' CASING | 16. Water Trip |
| | | | | MATERIALS USED |
| | | | | Mud _____ sacks |
| | | | | LC _____ Type _____ |
| | | | | _____ sacks |
| | | | | _____ sacks |
| | | | | _____ sacks |
| | | | | Viscose _____ |
| | | | | Cement _____ |
| | | | | Diesel _____ |
| | | | | Foamer _____ |
| | | | | Detergent _____ |
| | | | | Other _____ |
| | | | | CREW HOURS |
| | | | | Driller 1/1 Sam |
| | | | | Helper 1/1 Bob |
| | | | | Helper 1/1 Alan |

Footage: FROM _____ TO _____ TOTAL FOOTAGE _____
 _____ changed at _____ Size _____
 _____ changed at _____ Size _____
 _____ changed at _____ Size _____

Approved _____

hole = 100ft
Casing = 65

CLIENT: U.S. Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: Alan Yong

| Date: 10-7-99 | | Hole # 31A | | Rig # | Driller: Sam Crum | Supervisor: |
|---------------|-------|------------|------------------------------------|-------|--------------------------|-------------|
| TIME | LOG # | FOOTAGE | REMARKS | | LOG REFERENCE # | |
| 4:45 | 1 | | arrive on site | | 1. Crew Travel To Site | |
| 4:45 | 2 | | rig up | | 2. Rig Up | |
| 4:55 | 3 | | install pipe #1 using tri-cone bit | | 3. Reenter Hole | |
| 4:56 | 4 | 0-20ft | drill pipe #1 | | 4. Drilling | |
| 5:00 | 5 | | install pipe #2 | | 5. Pull Pipe | |
| 5:05 | 6 | 20-40ft | drill pipe #2 | | 6. Mix Mud & Fill | |
| 5:08 | 7 | | install pipe #3 | | 7. Coring | |
| 5:10 | 8 | 40-60ft | drill pipe #3 | | 8. Install Casing/Pipe | |
| 5:13 | 9 | | install pipe #4 | | 9. Cementing | |
| 5:14 | 10 | 60-80ft | drill pipe #4 | | 10. Rig Down | |
| 5:21 | 11 | | install pipe #5 | | 11. Move Rig To New Site | |
| 5:22 | 12 | 80-100ft | drill pipe #5 | | 12. Maintenance | |
| 5:29 | 13 | | pull pipe #5 | | 13. Standby (Explain) | |
| 5:30 | 14 | | pull pipe #4 | | 14. Other (Explain) | |
| 5:40 | 15 | | pull pipe #3 | | 15. Logging | |
| 5:41 | 16 | | pull pipe #2 | | 16. Water Trip | |
| 5:41 | 17 | | rig down | | | |
| 5:50 | 18 | | move rig | | | |
| | | | | | MATERIALS USED | |
| | | | | | Mud _____ sacks | |
| | | | | | LC _____ Type _____ | |
| | | | | | _____ sacks | |
| | | | | | _____ sacks | |
| | | | | | _____ sacks | |
| | | | | | Viscose _____ | |
| | | | | | Cement _____ | |
| | | | | | Diesel _____ | |
| | | | | | Foamer _____ | |
| | | | | | Detergent _____ | |
| | | | | | Other _____ | |
| | | | | | CREW HOURS | |
| | | | | | Driller _____ / _____ | |
| | | | | | Helper _____ / _____ | |
| | | | | | Helper _____ / _____ | |

Footage: FROM _____ TO _____ TOTAL FOOTAGE _____
 Bit _____ changed at _____ Size _____
 Bit _____ changed at _____ Size _____
 Bit _____ changed at _____ Size _____

Approved _____

CLIENT: U.S. Geological Survey/ S.C.E.C.
 PROJECT: LARSE II
 CLIENT REP:

| Date: 10/13 | | Hole # 32A ₂ | | Rig # 1 | Driller: Sam Crum | Supervisor: JS |
|-------------|-------|-------------------------|---------------------|---------|--------------------------|----------------|
| TIME | LOG # | FOOTAGE | REMARKS | | LOG REFERENCE # | |
| 3:20 | 1 | | | | 1. Crew Travel To Site | |
| 3:30 | 2 | | | | 2. Rig Up | |
| 3:38 | 3 | 0 | INSTALL BIT + PIPES | | 3. Reenter Hole | |
| 3:38 | 4 | 20 | INSTALL BIT + PIPES | | 4. Drilling | |
| 3:44 | 5 | 40 | INSTALL PIPE IN | | 5. Pull Pipe | |
| 3:53 | 6 | 65 | INSTALL PIPE IN | | 6. Mix Mud & Fill | |
| 4:00 | 7 | | INSTALL PIPE IN | | 7. Coring | |
| 4:01 | 8 | | INSTALL PIPE IN | | 8. Install Casing/Pipe | |
| 4:01 | 9 | | INSTALL PIPE IN | | 9. Cementing | |
| 4:01 | 10 | | INSTALL PIPE IN | | 10. Rig Down | |
| 4:01 | 11 | | INSTALL PIPE IN | | 11. Move Rig To New Site | |
| 4:01 | 12 | | INSTALL PIPE IN | | 12. Maintenance | |
| 4:01 | 13 | | INSTALL PIPE IN | | 13. Standby (Explain) | |
| 4:01 | 14 | | INSTALL PIPE IN | | 14. Other (Explain) | |
| 4:01 | 15 | | INSTALL PIPE IN | | 15. Logging | |
| 4:01 | 16 | | INSTALL PIPE IN | | 16. Water Trip | |
| 5:00 | 17 | | INSTALL PIPE IN | | | |
| 5:00 | 18 | | INSTALL PIPE IN | | | |
| 5:00 | 19 | | INSTALL PIPE IN | | | |
| 5:00 | 20 | | INSTALL PIPE IN | | | |
| 5:00 | 21 | | INSTALL PIPE IN | | | |
| 5:00 | 22 | | INSTALL PIPE IN | | | |
| 5:00 | 23 | | INSTALL PIPE IN | | | |
| 5:00 | 24 | | INSTALL PIPE IN | | | |
| 5:00 | 25 | | INSTALL PIPE IN | | | |
| 5:00 | 26 | | INSTALL PIPE IN | | | |
| 5:00 | 27 | | INSTALL PIPE IN | | | |
| 5:00 | 28 | | INSTALL PIPE IN | | | |
| 5:00 | 29 | | INSTALL PIPE IN | | | |
| 5:00 | 30 | | INSTALL PIPE IN | | | |
| 5:00 | 31 | | INSTALL PIPE IN | | | |
| 5:00 | 32 | | INSTALL PIPE IN | | | |
| 5:00 | 33 | | INSTALL PIPE IN | | | |
| 5:00 | 34 | | INSTALL PIPE IN | | | |
| 5:00 | 35 | | INSTALL PIPE IN | | | |
| 5:00 | 36 | | INSTALL PIPE IN | | | |
| 5:00 | 37 | | INSTALL PIPE IN | | | |
| 5:00 | 38 | | INSTALL PIPE IN | | | |
| 5:00 | 39 | | INSTALL PIPE IN | | | |
| 5:00 | 40 | | INSTALL PIPE IN | | | |
| 5:00 | 41 | | INSTALL PIPE IN | | | |
| 5:00 | 42 | | INSTALL PIPE IN | | | |
| 5:00 | 43 | | INSTALL PIPE IN | | | |
| 5:00 | 44 | | INSTALL PIPE IN | | | |
| 5:00 | 45 | | INSTALL PIPE IN | | | |
| 5:00 | 46 | | INSTALL PIPE IN | | | |
| 5:00 | 47 | | INSTALL PIPE IN | | | |
| 5:00 | 48 | | INSTALL PIPE IN | | | |
| 5:00 | 49 | | INSTALL PIPE IN | | | |
| 5:00 | 50 | | INSTALL PIPE IN | | | |
| 5:00 | 51 | | INSTALL PIPE IN | | | |
| 5:00 | 52 | | INSTALL PIPE IN | | | |
| 5:00 | 53 | | INSTALL PIPE IN | | | |
| 5:00 | 54 | | INSTALL PIPE IN | | | |
| 5:00 | 55 | | INSTALL PIPE IN | | | |
| 5:00 | 56 | | INSTALL PIPE IN | | | |
| 5:00 | 57 | | INSTALL PIPE IN | | | |
| 5:00 | 58 | | INSTALL PIPE IN | | | |
| 5:00 | 59 | | INSTALL PIPE IN | | | |
| 5:00 | 60 | | INSTALL PIPE IN | | | |
| 5:00 | 61 | | INSTALL PIPE IN | | | |
| 5:00 | 62 | | INSTALL PIPE IN | | | |
| 5:00 | 63 | | INSTALL PIPE IN | | | |
| 5:00 | 64 | | INSTALL PIPE IN | | | |
| 5:00 | 65 | | INSTALL PIPE IN | | | |
| 5:00 | 66 | | INSTALL PIPE IN | | | |
| 5:00 | 67 | | INSTALL PIPE IN | | | |
| 5:00 | 68 | | INSTALL PIPE IN | | | |
| 5:00 | 69 | | INSTALL PIPE IN | | | |
| 5:00 | 70 | | INSTALL PIPE IN | | | |
| 5:00 | 71 | | INSTALL PIPE IN | | | |
| 5:00 | 72 | | INSTALL PIPE IN | | | |
| 5:00 | 73 | | INSTALL PIPE IN | | | |
| 5:00 | 74 | | INSTALL PIPE IN | | | |
| 5:00 | 75 | | INSTALL PIPE IN | | | |
| 5:00 | 76 | | INSTALL PIPE IN | | | |
| 5:00 | 77 | | INSTALL PIPE IN | | | |
| 5:00 | 78 | | INSTALL PIPE IN | | | |
| 5:00 | 79 | | INSTALL PIPE IN | | | |
| 5:00 | 80 | | INSTALL PIPE IN | | | |
| 5:00 | 81 | | INSTALL PIPE IN | | | |
| 5:00 | 82 | | INSTALL PIPE IN | | | |
| 5:00 | 83 | | INSTALL PIPE IN | | | |
| 5:00 | 84 | | INSTALL PIPE IN | | | |
| 5:00 | 85 | | INSTALL PIPE IN | | | |
| 5:00 | 86 | | INSTALL PIPE IN | | | |
| 5:00 | 87 | | INSTALL PIPE IN | | | |
| 5:00 | 88 | | INSTALL PIPE IN | | | |
| 5:00 | 89 | | INSTALL PIPE IN | | | |
| 5:00 | 90 | | INSTALL PIPE IN | | | |
| 5:00 | 91 | | INSTALL PIPE IN | | | |
| 5:00 | 92 | | INSTALL PIPE IN | | | |
| 5:00 | 93 | | INSTALL PIPE IN | | | |
| 5:00 | 94 | | INSTALL PIPE IN | | | |
| 5:00 | 95 | | INSTALL PIPE IN | | | |
| 5:00 | 96 | | INSTALL PIPE IN | | | |
| 5:00 | 97 | | INSTALL PIPE IN | | | |
| 5:00 | 98 | | INSTALL PIPE IN | | | |
| 5:00 | 99 | | INSTALL PIPE IN | | | |
| 5:00 | 100 | | INSTALL PIPE IN | | | |

Footage: FROM _____ ' TO _____ ' TOTAL FOOTAGE _____ '
 _____ changed at _____ ' Size _____ '
 _____ changed at _____ ' Size _____ '
 _____ changed at _____ ' Size _____ '
 Approved _____
 David Delis Revised 9/8/99 11:27 AM

CLIENT: U.S. Geological Survey/ S.C.E.C.
 PROJECT: LARSE II
 CLIENT REP: Alan Yong

VLS

| Date: 10/19/99 | | Hole # 34 | | Rig # 1 | | Driller: Sam Crum | | Supervisor: JS | |
|----------------|-------|-----------|---|---------|--|-------------------|--------------------------|----------------|--|
| TIME | LOG # | FOOTAGE | REMARKS | | | | LOG REFERENCE # | | |
| 9:10 | 1 | | | | | | | | |
| 9:16 | 2 | | | | | | 1. Crew Travel To Site | | |
| 9:20 | 3 | | fixing pump | | | | 2. Rig Up | | |
| 10:20 | 4 | | Install pipe I | | | | 3. Reenter Hole | | |
| 10:25 | 5 | | | | | | 4. Drilling | | |
| 10:32 | 6 | | EXIT HOLE | | | | 5. Pull Pipe | | |
| 10:35 | 7 | | INSTALL CASING I | | | | 6. Mix Mud & Fill | | |
| 10:43 | 8 | | | | | | 7. Coring | | |
| 10:45 | 9 | 20' | INSTALL PIPE II | | | | 8. Install Casing/Pipe | | |
| 10:50 | 10 | | | | | | 9. Cementing | | |
| 11:00 | 11 | | INSTALL BIT BAR / LOGGING | | | | 10. Rig Down | | |
| 11:25 | 12 | | INSTALL CASING II (+ welding bit) | | | | 11. Move Rig To New Site | | |
| 11:41 | 13 | 40' | | | | | 12. Maintenance | | |
| 11:45 | 14 | | INSTALL PIPE III | | | | 13. Standby (Explain) | | |
| 12:00 | 15 | 60' | INSTALL PIPE IV | | | | 14. Other (Explain) | | |
| 12:14 | 16 | | INSTALL PIPE V | | | | 15. Logging | | |
| 12:25 | 17 | 80' | INSTALL PIPE VI | | | | 16. Water Trip | | |
| 12:38 | 18 | 100' | MAX DEPTH | | | | MATERIALS USED | | |
| 12:43 | 19 | | Pul | | | | Mud _____ sacks | | |
| 12:56 | 20 | | RIG UP AGAIN DUE TO COLLAPSE OF HOLE AROUND 60' | | | | LC _____ Type _____ | | |
| | 21 | | | | | | _____ sacks | | |
| 1:13 | 22 | | LOG OUT HOLE | | | | _____ sacks | | |
| 1:23 | 23 | | INSTALL CASE III | | | | _____ sacks | | |
| 1:43 | 24 | | LOG OUT HOLE | | | | _____ sacks | | |
| 1:50 | 25 | | EXIT HOLE | | | | Viscose _____ | | |
| 1:55 | 26 | | | | | | Cement _____ | | |
| 2:02 | 27 | | | | | | Diesel _____ | | |
| | | | NOTE - GAS TO HOLE DO NOT KNOW WHAT KIND BUT POSSIBLY METHANE | | | | Foamer _____ | | |
| | | | | | | | Detergent _____ | | |
| | | | | | | | Other _____ | | |
| | | | | | | | CREW HOURS | | |
| | | | | | | | Driller 1 / _____ | | |
| | | | | | | | Helper 1 / _____ | | |
| | | | | | | | Helper 1 / _____ | | |

Footage: FROM _____ TO _____ TOTAL FOOTAGE _____

Bit _____ changed at _____ Size _____

Bit _____ changed at _____ Size _____

Bit _____ changed at _____ Size _____

Approved _____

CLIENT: U.S. Geological Survey/ S.C.E.C.
 PROJECT: LARSE II
 CLIENT REP: Alan Yong

70' - 80'

| Date: 10/10 | | Hole # 36A | | Rig # 1 | Driller: Sam Crum | Supervisor: <u>CS</u> |
|-----------------|--------------|------------|----------------------|---------|-------------------|--------------------------|
| TIME | LOG # | FOOTAGE | REMARKS | | | LOG REFERENCE # |
| 8:15 | 1 | | | | | |
| 8:30 | 1 | | | | | |
| 9:15 | 16 | | LOGS | | | 1. Crew Travel To Site |
| 10:35 | 2 | | DOWN | | | 2. Rig Up |
| 10:40 | 8 | 0' | INSTALL BIT TRICON | | | 3. Reenter Hole |
| 10:41 | 6 | | INSTALL PIPE T | | | 4. Drilling |
| 10:43 | 4 | | | | | 5. Pull Pipe |
| 10:50 | 8 | | INSTALL CASING 5' | | | 6. Mix Mud & Fill |
| 10:55 | | | TAPES OUT CASING | | | 7. Coring |
| 10:00 | 2 | | INSTALL 1/2" BIT | | | 8. Install Casing/Pipe |
| | 4 | | | | | 9. Cementing |
| 11:10 | 8 | | INSTALL TRICON BIT | | | 10. Rig Down |
| 11:14 | 8 | | INSTALL UPPER CASING | | | 11. Move Rig To New Site |
| | 4 | | | | | 12. Maintenance |
| 11:27 | 8 | 20' | INSTALL BIT | | | 13. Standby (Explain) |
| | 4 | | | | | 14. Other (Explain) |
| 11:30 | 8 | 70' | INSTALL PIPE 12 | | | 15. Logging |
| | 4 | | | | | 16. Water Trip |
| 11:45 | 8 | 60' | INSTALL PIPE 12 | | | |
| | 4 | | | | | |
| | | | LEAVE TO GET | | | MATERIALS USED |
| | | | PARTS FOR SAM | | | Mud _____ sacks |
| 1:45 | 8 | | CASING 4 INSTALLED | | | LC _____ Type _____ |
| 2:15 | 10 | | | | | _____ sacks |
| | | | | | | _____ sacks |
| | | | 100' HOLE - DRY | | | _____ sacks |
| | | | 80' HOLE CASING | | | Viscose _____ |
| | | | | | | Cement _____ |
| | | | | | | Diesel _____ |
| | | | | | | Foamer _____ |
| | | | | | | Detergent _____ |
| | | | | | | Other _____ |
| | | | | | | CREW HOURS |
| | | | | | | Driller / _____ |
| | | | | | | Helper / _____ |
| | | | | | | Helper / _____ |

Footage: FROM _____ TO _____ TOTAL FOOTAGE _____
 Bit _____ changed at _____ Size _____
 Bit _____ changed at _____ Size _____
 Bit _____ changed at _____ Size _____

Approved _____

CLIENT: U.S. Geological Survey/ S.C.E.C.
 PROJECT: LARSE II
 CLIENT REP: Alan Yong

140'

| Date: | Hole # | Rig # | Driller: | Supervisor: |
|-------|--------|---------|--------------------------|--------------------------|
| 2/19 | 36C | 1 | Sam Crum | JR |
| TIME | LOG # | FOOTAGE | REMARKS | LOG REFERENCE # |
| 2:12 | 1 | | | 1. Crew Travel To Site |
| 2:18 | 2 | | | 2. Rig Up |
| 2:19 | 16 | | LEAVE | 3. Reenter Hole |
| 2:57 | 16 | | RETURN | 4. Drilling |
| 3:05 | 28/17 | 0 | INSTALL PIPE I | 5. Pull Pipe |
| 3:12 | 5 | | + take out bit | 6. Mix Mud & Fill |
| 3:18 | 8 | | INSTALL CASING I | 7. Coring |
| 3:22 | 8 | 20' | INSTALL PIPE II | 8. Install Casing/Pipe |
| 3:31 | 8 | 40' | INSTALL PIPE III | 9. Cementing |
| 3:38 | 4 | | | 10. Rig Down |
| 3:44 | 8 | 60' | INSTALL PIPE IV | 11. Move Rig To New Site |
| 3:54 | 4 | | | 12. Maintenance |
| 3:57 | 8 | 80' | INSTALL PIPE V | 13. Standby (Explain) |
| | 4 | | | 14. Other (Explain) |
| 4:05 | 2 | 100' | INSTALL PIPE VI | 15. Logging |
| 4:17 | 8 | 120' | INSTALL PIPE VII | 16. Water Trip |
| 4:22 | 4 | | | |
| 4:30 | 5 | 140' | REACH MAX DEPTH | MATERIALS USED |
| 4:50 | | | CLEAN UP | Mud _____ sacks |
| 5:07 | 10 | | | LC _____ Type _____ |
| 5:15 | 11 | | | _____ sacks |
| | | | NOTE: MUD CONTAINS COB | _____ sacks |
| | | | FLAMMABLE | _____ sacks |
| | | | WELL HAS LID BUT NO LOCK | _____ sacks |
| | | | WELL WELDED - HAZARDOUS | _____ sacks |
| | | | | Viscose _____ |
| | | | | Cement _____ |
| | | | | Diesel _____ |
| | | | | Foamer _____ |
| | | | | Detergent _____ |
| | | | | Other _____ |
| | | | | CREW HOURS |
| | | | | Driller 1, SAM |
| | | | | Helper 1, JEROME |
| | | | | Helper 1, SLAT |

Footage: FROM _____ TO _____ TOTAL FOOTAGE _____
 Bit _____ changed at _____ Size _____
 Bit _____ changed at _____ Size _____
 Bit _____ changed at _____ Size _____

Approved _____

CLIENT: U.S. Geological Survey/ S.C.E.C.

PROJECT: LARSE II

CLIENT REP: Alan Yong

70'
PART PARK

| Date: 10/10 | | Hole # 32A Rig # 1 | | Driller: Sam Crum | Supervisor: |
|-------------|-------|--------------------|--------------------------------|--------------------------|-------------|
| TIME | LOG # | FOOTAGE | REMARKS | LOG REFERENCE # | |
| 8:15 | 1 | | | 1. Crew Travel To Site | |
| 7:15 | 2 | | | 2. Rig Up | |
| 3:23 | 4/8 | | INSTALL BE DEPT + DRILL | 3. Reenter Hole | |
| 3:30 | | | LEAVE TO GET SAM FIELD | 4. Drilling | |
| | | | 2 SUZUKERS BARS | 5. Pull Pipe | |
| | | | | 6. Mix Mud & Fill | |
| | | | | 7. Coring | |
| 3:25 | | | RETURN - ON THE PIPE | 8. Install Casing/Pipe | |
| | 4 | | | 9. Cementing | |
| 4:05 | 5 | | | 10. Rig Down | |
| 4:09 | 8 | | INSTALL 60' CASING | 11. Move Rig To New Site | |
| | | | | 12. Maintenance | |
| 4:35 | | | TALK TO SECURITY GUARD | 13. Standby (Explain) | |
| 4:38 | 17 | | TAKE OUT LARGE 8" LOWER CASING | 14. Other (Explain) | |
| | | | | 15. Logging | |
| 4:43 | 3 | | RE-ENTERED + CLEAN CUT | 16. Water Trip | |
| 4:47 | 8 | 60' | INSTALL PIPE IN | | |
| | 4 | | | | |
| 5:00 | | 80' | MAX DEPTH AROUND 80' | MATERIALS USED | |
| 5:02 | 5 | | | Mud _____ sacks | |
| 5:10 | 10 | | | LC _____ Type _____ | |
| | | | | _____ sacks | |
| | | | | _____ sacks | |
| | | | | _____ sacks | |
| | | | | Viscose _____ | |
| | | | | Cement _____ | |
| | | | | Diesel _____ | |
| | | | | Foamer _____ | |
| | | | | Detergent _____ | |
| | | | | Other _____ | |
| | | | | CREW HOURS | |
| | | | | Driller _____ / _____ | |
| | | | | Helper _____ / _____ | |
| | | | | Helper _____ / _____ | |

Footage: FROM _____ TO _____ TOTAL FOOTAGE _____

Bit _____ changed at _____ Size _____

Bit _____ changed at _____ Size _____

Bit _____ changed at _____ Size _____

Approved _____

CLIENT: U.S. Geological Survey/ S.C.E.C.
 PROJECT: LARSE II
 CLIENT REP: Alan Yong

(West)

| Date: 10-11-99 | | Hole # 41C-1 Rig # 1 | | Driller: Sam Crum | Supervisor: |
|----------------|-------|----------------------|------------------------|--------------------------|-------------|
| TIME | LOG # | FOOTAGE | REMARKS | LOG REFERENCE # | |
| 9:25 | 1 | | crew arrives | 1. Crew Travel To Site | |
| 9:30 | 2 | | rig up | 2. Rig Up | |
| 9:50 | 3 | | install pipe #1 | 3. Reenter Hole | |
| 9:56 | 4 | 0-20ft | drilling pipe #2 | 4. Drilling | |
| 10:05 | 5 | | install pipe #2 | 5. Pull Pipe | |
| 10:07 | 6 | 20-40ft | drilling pipe #2 | 6. Mix Mud & Fill | |
| 10:30 | 7 | | install casing #1 | 7. Coring | |
| 10:43 | 8 | | re-enter hole to drill | 8. Install Casing/Pipe | |
| 10:44 | 9 | | re-install pipe #2 | 9. Cementing | |
| 10:46 | 10 | | drilling | 10. Rig Down | |
| 10:57 | 11 | | install pipe #3 | 11. Move Rig To New Site | |
| 10:59 | 12 | 40-60ft | drilling pipe #3 | 12. Maintenance | |
| 11:04 | 13 | | install pipe #4 | 13. Standby (Explain) | |
| 11:05 | 14 | 60-80ft | drill pipe #4 | 14. Other (Explain) | |
| 11:20 | 15 | | pull pipe #4 | 15. Logging | |
| 11:21 | 16 | | pull pipe #3 | 16. Water Trip | |
| 11:22 | 17 | | pull pipe #2 | | |
| 11:25 | 18 | | pull pipe #1 | | |
| 11:29 | 19 | | rig down | MATERIALS USED | |
| 11:31 | 20 | | weld + cap hole | Mud _____ sacks | |
| 11:41 | 21 | | exit hole, move rig | LC _____ Type _____ | |
| | | | | _____ sacks | |
| | | | | _____ sacks | |
| | | | | _____ sacks | |
| | | | | Viscose _____ | |
| | | | | Cement _____ | |
| | | | | Diesel _____ | |
| | | | | Foamer _____ | |
| | | | | Detergent _____ | |
| | | | | Other _____ | |
| | | | | CREW HOURS | |
| | | | | Driller 1, SAM | |
| | | | | Helper 1, Bernie | |
| | | | | Helper 1, Scott | |

Footage: FROM _____ TO _____ TOTAL FOOTAGE _____
 Bit _____ changed at _____ Size _____
 Bit _____ changed at _____ Size _____
 Bit _____ changed at _____ Size _____
 Approved _____

Revised: 21, June 1999 David Delis

* actual depth = 80 ft
 * actual casing = 25 ft.

CLIENT: U.S. Geological Survey/ S.C.E.C.
 PROJECT: LARSE II
 CLIENT REP: Alan Yong

(east)

| Date: 10-11-99 | | Hole # 41C-2 Rig # | | Driller: Sam Crum | Supervisor: |
|----------------|-------|--------------------|-----------------------|--------------------------|-------------|
| TIME | LOG # | FOOTAGE | REMARKS | LOG REFERENCE # | |
| 11:45 | 1 | | Arrive at site | | |
| 11:53 | 2 | | Rig up | 1. Crew Travel To Site | |
| 11:55 | 3 | | Install pipe #1 | 2. Rig Up | |
| 12:00 | 4 | 0-30 ft | Drill pipe #1 | 3. Reenter Hole | |
| 12:11 | 5 | | Install casing #1 | 4. Drilling | |
| 12:18 | 6 | | Re-enter hole | 5. Pull Pipe | |
| 12:19 | 7 | | Install pipe #2 | 6. Mix Mud & Fill | |
| 12:20 | 8 | 20-40 ft | Drill pipe #2 | 7. Coring | |
| 12:27 | 9 | | Install pipe #3 | 8. Install Casing/Pipe | |
| 12:28 | 10 | 40-60 ft. | Drill pipe #3 | 9. Cementing | |
| 12:33 | 11 | | Install pipe #4 | 10. Rig Down | |
| 12:34 | 12 | 60-80 ft | Drill pipe #4 | 11. Move Rig To New Site | |
| 12:45 | 13 | | hole cleared to 80 ft | 12. Maintenance | |
| 12:45 | 14 | | pull pipe #4 | 13. Standby (Explain) | |
| 12:46 | 15 | | pull pipe #3 | 14. Other (Explain) | |
| 12:47 | 16 | | pull pipe #2 | 15. Logging | |
| 12:48 | 17 | | pull pipe #1 | 16. Water Trip | |
| 12:59 | 18 | | exit hole | | |
| 1:01 | 19 | | rig down | | |
| 1:07 | 20 | | Weld + cap hole | MATERIALS USED | |
| 1:24 | 21 | | move rig | Mud _____ sacks | |
| | | | | LC _____ Type _____ | |
| | | | | _____ sacks | |
| | | | | _____ sacks | |
| | | | | _____ sacks | |
| | | | | Viscose _____ | |
| | | | | Cement _____ | |
| | | | | Diesel _____ | |
| | | | | Foamer _____ | |
| | | | | Detergent _____ | |
| | | | | Other _____ | |
| | | | | CREW HOURS | |
| | | | | Driller _____ | |
| | | | | Helper _____ | |
| | | | | Helper _____ | |

Footage: FROM _____ TO _____ TOTAL FOOTAGE _____

Bit _____ changed at _____ Size _____

Bit _____ changed at _____ Size _____

BR _____ changed at _____ Size _____

Approved _____

Revised: 21, June 1999

David Deis

* actual depth = 80 ft.
 * actual casing =

hole = 70 ft
casing = 46 ft.

CLIENT: U.S. Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: Alan Yong

| Date: 10-11-99 | | Hole # 47F Rig # 1 | | Driller: Sam Crum | Supervisor: |
|----------------|-------|--------------------|--------------------|--------------------------|-------------|
| TIME | LOG # | FOOTAGE | REMARKS | LOG REFERENCE # | |
| 1 | 2:35 | | arrive | | |
| 2 | 2:40 | | rig up | | |
| 3 | 2:45 | | install pipe #1 | 1. Crew Travel To Site | |
| 4 | 2:50 | 0-20ft | drill pipe #1 | 2. Rig Up | |
| 5 | 2:55 | | install pipe #2 | 3. Reenter Hole | |
| 6 | 2:57 | 20-40ft | drill pipe #2 | 4. Drilling | |
| 7 | 3:02 | | install pipe #3 | 5. Pull Pipe | |
| 8 | 3:07 | 40-60ft | drill pipe #3 | 6. Mix Mud & Fill | |
| 9 | 3:11 | | install pipe #4 | 7. Coring | |
| 10 | 3:19 | 60-80ft | drill pipe #4 | 8. Install Casing/Pipe | |
| 11 | 3:23 | | install casing #1 | 9. Cementing | |
| 12 | 3:35 | | install casing #2 | 10. Rig Down | |
| 13 | 3:47 | | install casing #3 | 11. Move Rig To New Site | |
| 14 | 4:07 | | clear hole to 80ft | 12. Maintenance | |
| 15 | 4:08 | | pull pipe #4 | 13. Standby (Explain) | |
| 16 | 4:09 | | pull pipe #3 | 14. Other (Explain) | |
| 17 | 4:10 | | pull pipe #2 | 15. Logging | |
| 18 | 4:14 | | pull pipe #1 | 16. Water Trip | |
| 19 | 4:17 | | rig down | | |
| 20 | 4:21 | | exit hole | MATERIALS USED | |
| 21 | 4:31 | | weld + cap hole | Mud _____ sacks | |
| 22 | | | move rig | LC _____ Type _____ | |
| 23 | | | | _____ sacks | |
| 24 | | | | _____ sacks | |
| 25 | | | | _____ sacks | |
| 26 | | | | Viscose _____ | |
| 27 | | | | Cement _____ | |
| 28 | | | | Diesel _____ | |
| 29 | | | | Foamer _____ | |
| 30 | | | | Detergent _____ | |
| 31 | | | | Other _____ | |
| 32 | | | | | |
| 33 | | | | | |
| 34 | | | | | |
| 35 | | | | | |
| 36 | | | | | |
| 37 | | | | | |
| 38 | | | | | |
| 39 | | | | | |
| 40 | | | | | |
| 41 | | | | | |
| 42 | | | | | |
| 43 | | | | | |
| 44 | | | | | |
| 45 | | | | | |
| 46 | | | | | |
| 47 | | | | | |
| 48 | | | | | |
| 49 | | | | | |
| 50 | | | | | |

Footage: FROM _____ TO _____ TOTAL FOOTAGE _____
 Bit _____ changed at _____ Size _____
 Bit _____ changed at _____ Size _____
 Bit _____ changed at _____ Size _____

Approved _____

Revised: 21, June 1999

* actual depth = 80 ft.
* actual casing = 60 ft.

hole depth = 70 ft.
 casing = 46 ft.

CLIENT: U.S. Geological Survey/ S.C.E.C.
 PROJECT: LARSE II
 CLIENT REP: David Delis

| Date: 9-27-99 | | Hole # 50B | | Rig # | Driller: Sam Crum | Supervisor: |
|---------------|-------|------------|--|-------|--------------------------|-------------|
| TIME | LOG # | FOOTAGE | REMARKS | | LOG REFERENCE # | |
| 5:35 | 1 | | arrive to site | | 1. Crew Travel To Site | |
| 5:39 | 2 | | rig up | | 2. Rig Up | |
| 5:44 | 3 | | install pipe #1 | | 3. Reenter Hole | |
| 5:44 | 4 | 0-20ft | drilling pipe #1 | | 4. Drilling | |
| 5:51 | 5 | | mistakenly placed | | 5. Pull Pipe | |
| 5:51 | 6 | | change bit from 9/16 tri-car to 5/8 hammer | | 6. Mix Mud & Fill | |
| 5:54 | 7 | 5-54 ft | install casing #1 | | 7. Coring | |
| 5:56 | 8 | | re-enter hole | | 8. Install Casing/Pipe | |
| 5:59 | 9 | | install pipe #2 | | 9. Cementing | |
| 6:00 | 10 | 20-40ft | drilling pipe #2 | | 10. Rig Down | |
| 6:05 | 11 | | install pipe #3 | | 11. Move Rig To New Site | |
| 6:07 | 12 | 40-60ft | drilling pipe #3 | | 12. Maintenance | |
| 6:12 | 13 | | install pipe #4 | | 13. Standby (Explain) | |
| 6:13 | 14 | 60-70ft | drilling pipe #4 | | 14. Other (Explain) | |
| 6:23 | 15 | | pull pipe #4 | | 15. Logging | |
| 6:26 | 16 | | pull pipe #3 | | 16. Water Trip | |
| 6:27 | 17 | | pull pipe #2 | | | |
| 6:28 | 18 | | pull pipe #1 | | | |
| 6:35 | 19 | | rig down | | MATERIALS USED | |
| 6:40 | 20 | | weld + cap hole | | Mud _____ sacks | |
| 6:45 | 21 | | exit hole - move rig | | LC _____ Type _____ | |
| | | | | | _____ sacks | |
| | | | | | _____ sacks | |
| | | | | | _____ sacks | |
| | | | | | Viscose _____ | |
| | | | | | Cement _____ | |
| | | | | | Diesel _____ | |
| | | | | | Foamer _____ | |
| | | | | | Detergent _____ | |
| | | | | | Other _____ | |
| | | | | | CREW HOURS | |
| | | | | | Driller 1, SAM | |
| | | | | | Helper 1, Bernice | |
| | | | | | Helper 1, Scott | |

Footage: FROM _____ TO _____ TOTAL FOOTAGE _____
 Bit _____ changed at _____ Size _____
 Bit _____ changed at _____ Size _____
 Bit _____ changed at _____ Size _____

Revised: 21, June 1999
 * actual hole = 75 ft.
 * actual casing = 70 ft.

Approved _____
 * hard rock at 12 ft.

hole depth = 70 ft.
 casing = 46 ft. Alternate hole

CLIENT: U.S. Geological Survey/ S.C.E.C.
 PROJECT: LARSE II
 CLIENT REP: David Dells

Date: 9-27-99 Hole # 50B Rig # 1 : Driller: Sam Crum Supervisor: BH.

| TIME | LOG # | FOOTAGE | REMARKS | LOG REFERENCE # |
|------|-------|----------|----------------------|--------------------------|
| 4:00 | 1 | | crd truck to site | |
| 4:05 | 2 | | rig up | 1. Crew Travel To Site |
| 4:09 | 3 | | drilling | 2. Rig Up |
| 4:10 | 4 | 0-20ft. | drill pipe #1 | 3. Reenter Hole |
| 4:15 | 5 | | install drill casing | 4. Drilling |
| 4:17 | 6 | | install 5ft hammer | 5. Pull Pipe |
| 4:18 | 7 | | drill pipe #2 | 6. Mix Mud & Fill |
| 4:20 | 8 | | install pipe #2 | 7. Coring |
| 4:25 | 9 | 20-40ft. | drill pipe #2 | 8. Install Casing/Pipe |
| 4:30 | 10 | | install pipe #2 | 9. Cementing |
| 4:35 | 11 | 40-60ft. | drill pipe #3 | 10. Rig Down |
| 4:38 | 12 | | install pipe #3 | 11. Move Rig To New Site |
| 4:53 | 13 | 60-80ft | drill pipe #4 | 12. Maintenance |
| 4:55 | 14 | | install pipe #4 | 13. Standby (Explain) |
| 5:05 | 15 | | pull pipe #4 | 14. Other (Explain) |
| 5:06 | 16 | | pull pipe #3 | 15. Logging |
| 5:07 | 17 | | pull pipe #2 | 16. Water Trip |
| 5:09 | 18 | | pull pipe #1 | |
| 5:16 | 19 | | fix hole | |
| 5:20 | 20 | | cap hole | |
| 6:25 | 21 | | exit hole / move rig | |
| | | | | MATERIALS USED |
| | | | | Mud _____ sacks |
| | | | | LC _____ Type _____ |
| | | | | _____ sacks |
| | | | | _____ sacks |
| | | | | Viscose _____ |
| | | | | Cement _____ |
| | | | | Diesel _____ |
| | | | | Foamer _____ |
| | | | | Detergent _____ |
| | | | | Other _____ |
| | | | | CREW HOURS |
| | | | | Driller / _____ |
| | | | | Helper / _____ |
| | | | | Helper / _____ |

Footage: FROM _____ TO _____ TOTAL FOOTAGE _____
 Bit _____ changed at _____ Size _____
 Bit _____ changed at _____ Size _____
 Bit _____ changed at _____ Size _____

Revised: 21, June 1999

* actual drill = 75 ft.
 * actual casing = 20 ft.

Approved _____

David Dells

hole = 80ft
casing = 52A

CLIENT: U.S. Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: David Delis

| Date: 9-28-1999 | | Hole # 54 | | Rig # | Driller: Sam Crum | Supervisor: BH |
|-----------------|-------|-----------|---------------------------|-------|--------------------------|----------------|
| TIME | LOG # | FOOTAGE | REMARKS | | LOG REFERENCE # | |
| 9:30 | 1 | | travel from SOB to 54 | | | |
| 9:42 | 2 | | Arrive at 54 | | 1. Crew Travel To Site | |
| 9:42 | 2 | | rig up | | 2. Rig Up | |
| 9:56 | 3 | | with 9 1/8 tri-cone bit | | 3. Reenter Hole | |
| 9:59 | 4 | 0-20ft | install pipe #1 | | 4. Drilling | |
| 10:12 | 5 | | drilling pipe #1 | | 5. Pull Pipe | |
| 10:15 | 6 | | install casing #1 | | 6. Mix Mud & Fill | |
| 10:15 | 6 | | change bit to 5 ft hammer | | 7. Coring | |
| 10:28 | 7 | | re-enter hole | | 8. Install Casing/Pipe | |
| 10:30 | 8 | 20-40ft | install pipe #2 | | 9. Cementing | |
| 10:37 | 9 | | drilling pipe #2 | | 10. Rig Down | |
| 10:56 | 10 | 40-60ft | install pipe #3 | | 11. Move Rig To New Site | |
| 11:01 | 11 | | drilling pipe #3 | | 12. Maintenance | |
| 11:03 | 12 | | install pipe #4 | | 13. Standby (Explain) | |
| 11:05 | 13 | 60-80ft | drilling pipe #4 | | 14. Other (Explain) | |
| 11:05 | 13 | | pull pipe #4 | | 15. Logging | |
| 11:05 | 13 | | pull pipe #3 | | 16. Water Trip | |
| 11:10 | 14 | | pull pipe #2 | | | |
| 11:15 | 15 | | rig down | | MATERIALS USED | |
| 11:20 | 16 | | weird + cap hole | | Mud _____ sacks | |
| 11:40 | 17 | | exit hole | | LC _____ Type _____ | |
| 11:40 | 17 | | move rig to new site | | _____ sacks | |
| | | | | | _____ sacks | |
| | | | | | _____ sacks | |
| | | | | | Viscose _____ | |
| | | | | | Cement _____ | |
| | | | | | Diesel _____ | |
| | | | | | Foamer _____ | |
| | | | | | Detergent _____ | |
| | | | | | Other _____ | |
| | | | | | CREW HOURS | |
| | | | | | Driller 1, Sam | |
| | | | | | Helper 1, Bernie | |
| | | | | | Helper 1, Scott | |

Footage: FROM _____ TO _____ TOTAL FOOTAGE _____
 Bit 9 1/8 changed at 20 Size _____
 Bit 5 foot hammer changed at _____ Size _____
 Bit _____ changed at _____ Size _____

Revised: 21, June 1999

David Delis

Approved _____

* actual hole depth = 80ft.
* actual casing = 20ft.

Hole = 100ft.
Casing = 65ft.

CLIENT: U.S. Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: David Delis

| Date: 9-28-1999 | | Hole # 56 | | Rig # 1 | Driller: Sam Crum | Supervisor: DH |
|-----------------|-------|-----------|-------------------------------|---------|--------------------------|----------------|
| TIME | LOG # | FOOTAGE | REMARKS | | LOG REFERENCE # | |
| 11:33 | 1 | | arrive at site 56 | | | |
| 11:34 | 2 | | rig up | | | |
| 11:38 | 3 | | install pipe #1 | | 1. Crew Travel To Site | |
| 11:40 | 4 | 0-20ft. | drilling #1 | | 2. Rig Up | |
| 11:52 | 8 | | install casing #1 | | 3. Reenter Hole | |
| 11:53 | 14 | | change drill bit to SA hammer | | 4. Drilling | |
| 11:56 | 3 | | reenter hole | | 5. Pull Pipe | |
| 12:00 | 2 | | install pipe #2 | | 6. Mix Mud & Fill | |
| 12:01 | 4 | 20-40ft | drilling pipe #2 | | 7. Coring | |
| 12:02 | 2 | | install pipe #3 | | 8. Install Casing/Pipe | |
| 12:03 | 4 | 40-60ft | drilling #3 | | 9. Cementing | |
| 12:15 | 6 | | install pipe #4 | | 10. Rig Down | |
| 12:16 | 4 | 60-80ft. | drilling pipe #4 | | 11. Move Rig To New Site | |
| 12:23 | 8 | | install pipe #5 | | 12. Maintenance | |
| 12:24 | 4 | 80-100ft | drill #5 | | 13. Standby (Explain) | |
| 12:35 | 3 | | pull pipe #5 | | 14. Other (Explain) | |
| 12:36 | 5 | | pull pipe #4 | | 15. Logging | |
| 12:38 | 5 | | pull pipe #3 | | 16. Water Trip | |
| 12:40 | 5 | | drill pipe #2 | | | |
| 12:42 | 5 | | pull pipe #1 | | MATERIALS USED | |
| 12:47 | 10 | | go for water | | Mud _____ sacks | |
| 12:47 | 10 | | rig down | | LC _____ Type _____ | |
| 12:50 | 14 | | weight + cap hole | | _____ sacks | |
| 1:06 | 11 | | exit hole / move rig | | _____ sacks | |
| | | | | | _____ sacks | |
| | | | | | Viscose _____ | |
| | | | | | Cement _____ | |
| | | | | | Diesel _____ | |
| | | | | | Foamer _____ | |
| | | | | | Detergent _____ | |
| | | | | | Other _____ | |
| | | | | | CREW HOURS | |
| | | | | | Driller _____ | |
| | | | | | Helper _____ | |
| | | | | | Helper _____ | |

Footage: FROM _____ TO _____ TOTAL FOOTAGE _____
 Bit 9/16 changed at 20 Size _____
 Bit SA hammer changed at _____ Size _____
 Bit _____ changed at _____ Size _____

Revised: 21, June 1999

* actual hole = 100ft.
* actual casing = 19ft.

Approved _____

hole = 80ft
casing = 52 ft.

CLIENT: U.S. Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: David Delis

| Date: 9-28-1999 | | Hole # 57 | | Rig # 1 | Driller: Sam Crum | Supervisor: BH |
|-----------------|-------|-----------|-----------------------------|---------|--------------------------|----------------|
| TIME | LOG # | FOOTAGE | REMARKS | | LOG REFERENCE # | |
| 1:15 | 1 | | crew arrive | | 1. Crew Travel To Site | |
| 1:16 | 2 | | rig up | | 2. Rig Up | |
| 2:58 | 10 | | return water tria | | 3. Reenter Hole | |
| 3:00 | 6 | | install casing #2 | | 4. Drilling | |
| 3:02 | 4 | 0-20ft. | drilling #1 | | 5. Pull Pipe | |
| 3:12 | 8 | | install casing #3 | | 6. Mix Mud & Fill | |
| 3:14 | 14 | | change bit to 5ft hammer | | 7. Coring | |
| 3:15 | 3 | | re-enter hole | | 8. Install Casing/Pipe | |
| 3:17 | 8 | | install pipe #2 | | 9. Cementing | |
| 3:18 | 4 | 20-40ft. | drilling pipe #2 | | 10. Rig Down | |
| 3:22 | 8 | | install pipe #3 | | 11. Move Rig To New Site | |
| 3:23 | 4 | 40-60ft. | drilling pipe #3 | | 12. Maintenance | |
| 3:27 | 8 | | install #4 | | 13. Standby (Explain) | |
| 3:28 | 4 | 60-80ft. | drilling #1 | | 14. Other (Explain) | |
| 3:40 | 5 | | pull pipe #4 | | 15. Logging | |
| 3:41 | 5 | | pull pipe #3 | | 16. Water Trip | |
| 3:43 | 5 | | pull pipe #2 | | | |
| 3:45 | 5 | | pull pipe #1 | | | |
| 3:55 | 10 | | rig down * need more casing | | | |
| 4:06 | 11 | | move rig to next site | | | |
| | | | | | MATERIALS USED | |
| | | | | | Mud _____ sacks | |
| | | | | | LC _____ Type _____ | |
| | | | | | _____ sacks | |
| | | | | | _____ sacks | |
| | | | | | _____ sacks | |
| | | | | | Viscose _____ | |
| | | | | | Cement _____ | |
| | | | | | Diesel _____ | |
| | | | | | Foamer _____ | |
| | | | | | Detergent _____ | |
| | | | | | Other _____ | |
| | | | | | CREW HOURS | |
| | | | | | Driller / _____ | |
| | | | | | Helper / _____ | |
| | | | | | Helper / _____ | |

Footage: FROM _____ ' TO _____ ' TOTAL FOOTAGE _____'
 Bit 9 1/2 changed at 20' Size _____"
 Bit 5 ft. changed at _____' Size _____"
 Bit _____ changed at _____' Size _____"

Approved _____

CLIENT: U.S. Geological Survey/ S.C.E.C.
 PROJECT: LARSE II
 CLIENT REP: Alan Yong

| Date: 10-6-99 | | Hole # | Rig # | Driller: Sam Crum | Supervisor: |
|----------------|-------|---------|---|-------------------|---|
| TIME | LOG # | FOOTAGE | REMARKS | | LOG REFERENCE # |
| | | 602 | hole cleared = 100ft hole to well = 40ft | | 1. Crew Travel To Site 2. Rig Up 3. Reenter Hole 4. Drilling 5. Pull Pipe 6. Measure P's |
| | | | | | 7. Coring 8. Install Casing/Pipe 9. Cementing 10. Rig Down 11. Move Rig To New Site 12. Maintenance 13. Standby (Explain) 14. Other (Explain) 15. Logging 16. Water Trip |
| 10-7-99 57A | 9:40 | 1 | arrive to site | | |
| | 9:50 | 2 | rig up | | |
| | 10:05 | 8 | install casing #2 to #1 | | |
| | 10:10 | 14 | weld #1 + #2 together | | |
| | 10:20 | 6 | install casing #3 | | |
| | 10:30 | 14 | weld #2 + #3 together | | |
| | 10:35 | 8 | install casing #4 | | |
| | 11:00 | 14 | weld casing 4 + 3 together | | |
| | 11:25 | 14 | clean hole | | |
| | 11:50 | 14 | hole cleared to 90 ft | | |
| | 11:55 | 3 | pull all pipe from hole | | |
| | 12:00 | 10 | rig down | | |
| | 12:07 | 14 | weld + cap hole | | MATERIALS USED |
| | 12:15 | 11 | move rig | | Mud _____ sacks |
| | | | | | LC _____ Type _____ |
| | | | | | _____ sacks |
| | | | | | _____ sacks |
| | | | | | _____ sacks |
| | | | | | Viscose _____ |
| | | | | | Cement _____ |
| | | | | | Diesel _____ |
| | | | | | Foamer _____ |
| | | | | | Detergent _____ |
| | | | | | Other _____ |
| | | | | | CREW HOURS |
| | | | | | Driller _____ / _____ |
| | | | | | Helper _____ / _____ |
| | | | | | Helper _____ / _____ |

Footage: FROM _____ TO _____ TOTAL FOOTAGE _____

Bit _____ changed at _____ Size _____

Bit _____ changed at _____ Size _____

Bit _____ changed at _____ Size _____

Approved _____

hole = 10 ft.
Casing = 46 ft.

CLIENT: U.S. Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: David Delis

| Date: 9-29-1999 | | Hole # 70C | | Rig # 1 | Driller: Sam Crum | Supervisor: BH |
|---------------------|-------|------------|-------------------------------|---------|--------------------------|----------------|
| TIME | LOG # | FOOTAGE | REMARKS | | LOG REFERENCE # | |
| 1:40 | 1 | | arrive at 70C | | | |
| 1:41 | 2 | | rig up | | 1. Crew Travel To Site | |
| 1:45 | 3 | | install pipe #2 + 5 ft hammer | | 2. Rig Up | |
| 1:46 | 4 | 0-20ft | drill #1 | | 3. Reenter Hole | |
| 1:53 | 5 | | install support casing #1 | | 4. Drilling | |
| 1:57 | 6 | | re-enter hole | | 5. Pull Pipe | |
| 2:00 | 7 | 20-40ft | install pipe #2 | | 6. Mix Mud & Fill | |
| 2:01 | 8 | | drill pipe #3 | | 7. Coring | |
| 2:09 | 9 | | install pipe #3 | | 8. Install Casing/Pipe | |
| 2:10 | 10 | 40-60ft | drill pipe #3 | | 9. Cementing | |
| 2:14 | 11 | | install pipe #4 | | 10. Rig Down | |
| 2:13 | 12 | 60-80ft | drill pipe #4 | | 11. Move Rig To New Site | |
| 2:20 | 13 | | pull pipe #4 | | 12. Maintenance | |
| 2:26 | 14 | | pull pipe #3 | | 13. Standby (Explain) | |
| 2:27 | 15 | | pull pipe #2 | | 14. Other (Explain) | |
| 2:30 | 16 | | pull pipe #1 | | 15. Logging | |
| 2:37 | 17 | | rig down | | 16. Water Trip | |
| 2:40 | 18 | | weld + cap hole | | | |
| 2:46 | 19 | | exit hole / move rig | | | |
| MATERIALS USED | | | | | | |
| Mud _____ sacks | | | | | | |
| LC _____ Type _____ | | | | | | |
| _____ sacks | | | | | | |
| _____ sacks | | | | | | |
| _____ sacks | | | | | | |
| Viscose _____ | | | | | | |
| Cement _____ | | | | | | |
| Diesel _____ | | | | | | |
| Foamer _____ | | | | | | |
| Detergent _____ | | | | | | |
| Other _____ | | | | | | |
| CREW HOURS | | | | | | |
| Driller 1, Sam | | | | | | |
| Helper 1, Bernia | | | | | | |
| Helper 1, Scott | | | | | | |

Footage: FROM _____ TO _____ TOTAL FOOTAGE _____

Bit _____ changed at _____ Size _____

Bit _____ changed at _____ Size _____

Bit _____ changed at _____ Size _____

Approved _____

Revised: 21, June 1999

David Delis

* actual depth = 80 ft
* actual casing = 10 ft.

Hole = 62 ft
Casing = 40 ft.

CLIENT: U.S. Geological Survey/ S.C.E.C.
PROJECT: LARSE II
CLIENT REP: David Delis

| Date: | | Hole # 72A Rig # 1 | | Driller: Sam Crum | Supervisor: BH |
|-------|-------|--------------------|------------------------------|--------------------------|----------------|
| TIME | LOG # | FOOTAGE | REMARKS | LOG REFERENCE # | |
| 1:30 | 1 | | arrive at site | | |
| 1:39 | 2 | | rig up | 1. Crew Travel To Site | |
| 1:40 | 3 | | using 9 7/8 tri-cone bit | 2. Rig Up | |
| 1:42 | 4 | | install casing #1 | 3. Reenter Hole | |
| 1:43 | 5 | 0-20 ft | drilling #1 | 4. Drilling | |
| 1:48 | 6 | | install support casing | 5. Pull Pipe | |
| 1:52 | 7 | 20-40 ft | install casing #2 | 6. Mix Mud & Fill | |
| 1:52 | 8 | | drilling #2 | 7. Coring | |
| 1:55 | 9 | 40-60 ft | install casing #3 | 8. Install Casing/Pipe | |
| 1:56 | 10 | | drill #3 | 9. Cementing | |
| 1:58 | 11 | 60-80 ft | install #4 | 10. Rig Down | |
| 1:59 | 12 | | drill #4 | 11. Move Rig To New Site | |
| 2:02 | 13 | | pull #1 | 12. Maintenance | |
| 2:05 | 14 | | pull #2 | 13. Standby (Explain) | |
| 2:10 | 15 | | pull #3 | 14. Other (Explain) | |
| 2:11 | 16 | | drill #1 | 15. Logging | |
| 2:12 | 17 | | install casing #1 | 16. Water Trip | |
| 2:16 | 18 | | casing #2 up | | |
| 2:18 | 19 | | weld #1 + #2 together | | |
| 2:25 | 20 | | casing #3 up | MATERIALS USED | |
| 2:35 | 21 | | weld casing #2 + #3 together | Mud _____ sacks | |
| 2:49 | 22 | | stamping casing to depth | LC _____ Type _____ | |
| 2:57 | 23 | | re-enter to clear hole | _____ sacks | |
| 1:04 | 24 | | hole cleaned to full depth | _____ sacks | |
| 1:14 | 25 | | rig down | _____ sacks | |
| 1:15 | 26 | | weld + cap hole | Viscose _____ | |
| 1:23 | 27 | | exit hole - move rig | Cement _____ | |
| | | | | Diesel _____ | |
| | | | | Foamer _____ | |
| | | | | Detergent _____ | |
| | | | | Other _____ | |
| | | | | CREW HOURS | |
| | | | | Driller / _____ | |
| | | | | Helper / _____ | |
| | | | | Helper / _____ | |

Footage: FROM _____ ' TO _____ ' TOTAL FOOTAGE _____

Bit _____ changed at _____ Size _____
 Bit _____ changed at _____ Size _____
 Bit _____ changed at _____ Size _____

Approved _____

Revised: 21, June 1999

* actual depth = 64 ft.
 * actual casing = 62 ft.

hole = 80 ft
 casing = 52 ft

CLIENT: U.S. Geological Survey/ S.C.E.C.
 PROJECT: LARSE II
 CLIENT REP: David Delis

| Date: 9-29-1999 | | Hole # 85C Rig # 1 | | Driller: Sam Crum | Supervisor: |
|-----------------|-------|--------------------|----------------------------------|--------------------------|-------------|
| TIME | LOG # | FOOTAGE | REMARKS | LOG REFERENCE # | |
| 4:29 | 1 | | arrive at site | | |
| 4:30 | 2 | | rig up. | 1. Crew Travel To Site | |
| 4:35 | 3 | | install pipe #1 + 1 1/4 tr. cone | 2. Rig Up | |
| 4:36 | 4 | 0-20 ft. | drilling pipe #1 | 3. Reenter Hole | |
| 4:40 | 5 | | install support casing | 4. Drilling | |
| 4:42 | 6 | | re-enter hole | 5. Pull Pipe | |
| 4:43 | 7 | | install pipe #2 | 6. Mix Mud & Fill | |
| 4:44 | 8 | 20-40 ft | drill pipe #2 | 7. Coring | |
| 4:55 | 9 | | install pipe #3 | 8. Install Casing/Pipe | |
| 4:56 | 10 | 40-60 ft | drill pipe #3 | 9. Cementing | |
| 5:00 | 11 | | install pipe #4 | 10. Rig Down | |
| 5:01 | 12 | 60-80 ft | drill pipe #4 | 11. Move Rig To New Site | |
| 5:09 | 13 | | pull pipe #4 | 12. Maintenance | |
| 5:11 | 14 | | pull pipe #3 | 13. Standby (Explain) | |
| 5:12 | 15 | | pull pipe #2 | 14. Other (Explain) | |
| 5:21 | 16 | | pull pipe #1 | 15. Logging | |
| | | | | 16. Water Trip | |
| | | | | MATERIALS USED | |
| | | | | Mud _____ sacks | |
| | | | | LC _____ Type _____ | |
| | | | | _____ sacks | |
| | | | | _____ sacks | |
| | | | | _____ sacks | |
| | | | | Viscose _____ | |
| | | | | Cement _____ | |
| | | | | Diesel _____ | |
| | | | | Foamer _____ | |
| | | | | Detergent _____ | |
| | | | | Other _____ | |
| | | | | CREW HOURS | |
| | | | | Driller _____ | |
| | | | | Helper _____ | |
| | | | | Helper _____ | |

Footage: FROM _____ TO _____ TOTAL FOOTAGE _____

Bit _____ changed at _____ Size _____

Bit _____ changed at _____ Size _____

Bit _____ changed at _____ Size _____

Approved _____

Revised: 21, June 1999

*actual depth = 83 ft.
 *actual casing = 80 ft.

CLIENT: U.S. Geological Survey/ S.C.E.C.
 PROJECT: LARSE II
 CLIENT REP:

14614

| Date: 9/30 | | Hole # 136A | | Rig # 1 | Driller: Sam Crum | Supervisor: JS |
|------------|-------|-------------|---|---------|-------------------|--------------------------|
| TIME | LOG # | FOOTAGE | REMARKS | | LOG REFERENCE # | |
| 5:35 | 1 | | | | | |
| 5:39 | 2 | | | | | 1. Crew Travel To Site |
| 5:46 | 4 | | | | | 2. Rig Up |
| 5:46 | 6 | | | | | 3. Reenter Hole |
| | | | Pipe I | | | 4. Drilling |
| | | | ~ 3 ft casing used | | | 5. Pull Pipe |
| 5:57 | 7 | 20' | | | | 6. Mix Mud & Fill |
| | 4 | | Install pipe II | | | 7. Coring |
| | | | pipe II | | | 8. Install Casing/Pipe |
| 6:18 | 8 | 40' | | | | 9. Cementing |
| 6:27 | 9 | | Install pipe III | | | 10. Rig Down |
| 6:53 | 14 | | pipe III | | | 11. Move Rig To New Site |
| | | | STOP Drilling for the day | | | 12. Maintenance |
| 10:05 | 1 | | | | | 13. Standby (Explain) |
| 10:35 | 4 | | | | | 14. Other (Explain) |
| 10:35 | 8 | 60' | | | | 15. Logging |
| 10:39 | 4 | | Install pipe IV | | | 16. Water Trip |
| 11:11 | 8 | 80' | | | | |
| 11:13 | 4 | | Install pipe V | | | |
| 11:46 | 8 | 100' | | | | |
| 11:48 | 4 | | Install pipe VI | | | |
| 12:30 | 8 | 120' | | | | MATERIALS USED |
| 12:32 | 4 | | Install pipe VII | | | Mud _____ sacks |
| 12:50 | 14 | 140' | | | | LC _____ Type _____ |
| 1:00 | 16 | | Final drilling - capturing water sample / cleaning hole | | | |
| 1:03 | 5 | | LEAVE | | | |
| 1:18 | | | Exit hole | | | _____ sacks |
| 1:14 | 10 | | | | | _____ sacks |
| 1:16 | 11 | | Make to 136A ₂ | | | _____ sacks |
| | | | | | | Viscose _____ |
| | | | | | | Cement _____ |
| | | | | | | Diesel _____ |
| | | | | | | Foamer _____ |
| | | | | | | Detergent _____ |
| | | | | | | Other _____ |
| | | | | | | CREW HOURS |
| | | | | | | Driller 1 / Sam |
| | | | | | | Helper 1 / B. S. L. E. |
| | | | | | | Helper 1 / S. G. T. |

Footage: FROM _____ TO _____ TOTAL FOOTAGE _____
 _____ changed at _____ Size _____
 _____ changed at _____ Size _____
 _____ changed at _____ Size _____

Approved _____

David Delis

Revised 9/8/99 11:27 AM

CLIENT: U.S. Geological Survey/ S.C.E.C.
 PROJECT: LARSE II
 CLIENT REP:

expected depth → 88'

PM

.19
 .19
 .23

| TIME | LOG # | FOOTAGE | REMARKS | LOG REFERENCE # |
|------|-------|---------|---------|---------------------------|
| | | | | 1. Crew Travel To Site |
| | | | | 2. Rig Up |
| | | | | 3. Reenter Hole |
| | | | | 4. Drilling |
| | | | | 5. Pull Pipe |
| | | | | 6. Mix Mud & Fill |
| | | | | 7. Coring |
| | | | | 8. Install Casing/Pipe |
| | | | | 9. Cementing |
| | | | | 10. Rig Down |
| | | | | 11. Move Rig To New Site |
| | | | | 12. Maintenance |
| | | | | 13. Standby (Explain) |
| | | | | 14. Other (Explain) |
| | | | | 15. Logging |
| | | | | 16. Water Trip |
| | | | | MATERIALS USED |
| | | | | Mud _____ sacks |
| | | | | LC _____ Type _____ |
| | | | | _____ sacks |
| | | | | _____ sacks |
| | | | | _____ sacks |
| | | | | Viscose _____ |
| | | | | Cement _____ |
| | | | | Diesel _____ |
| | | | | Foamer _____ |
| | | | | Detergent _____ |
| | | | | Other _____ |
| | | | | CREW HOURS |
| | | | | Driller: <u>1, Sam</u> |
| | | | | Helper 1: <u>Benjamin</u> |
| | | | | Helper 2: <u>Jeff</u> |

10/18

Footage: FROM _____ TO _____ TOTAL FOOTAGE _____
 _____ changed at _____ Size _____
 _____ changed at _____ Size _____
 _____ changed at _____ Size _____

Approved _____

David Deits

Revised 9/8/99 11:27 AM

SP is ~~at~~ North of the Spillway in Hansen Dam.
 (N10°E)

CLIENT: U.S. Geological Survey/ S.C.E.C.
 PROJECT: LARSE II
 CLIENT REP: Luke Reusser

expected depth => 95' - 100'

(PM)

| Date: 10/22/99 | | Hole # 201 (South) | | Rig # ↑ | Driller: Sam Crum | Supervisor: Luke |
|----------------|-------|--------------------|-----------------------|---------|--------------------------|------------------|
| TIME | LOG # | FOOTAGE | REMARKS | | LOG REFERENCE # | |
| 16:01 | 2 | | Run up | | 1. Crew Travel To Site | |
| 16:04 | 3 | — 0 — | Install 8" Air Hammer | | 2. Rig Up | |
| 16:09 | 3 | | Install Pipe | | 3. Reenter Hole | |
| 16:12 | 4 | | Drill | | 4. Drilling | |
| | | | | | 5. Pull Pipe | |
| | | | | | 6. Mix Mud & Fill | |
| | | | | | 7. Coring | |
| | | | | | 8. Install Casing/Pipe | |
| | | | | | 9. Cementing | |
| | | | | | 10. Rig Down | |
| | | | | | 11. Move Rig To New Site | |
| | | | | | 12. Maintenance | |
| | | | | | 13. Standby (Explain) | |
| | | | | | 14. Other (Explain) | |
| | | | | | 15. Logging | |
| | | | | | 16. Water Trip | |
| MATERIALS USED | | | | | | |
| | | | | | Mud _____ sacks | |
| | | | | | LC _____ Type _____ | |
| | | | | | _____ sacks | |
| | | | | | _____ sacks | |
| | | | | | _____ sacks | |
| | | | | | Viscose _____ | |
| | | | | | Cement _____ | |
| | | | | | Diesel _____ | |
| | | | | | Foamer _____ | |
| | | | | | Detergent _____ | |
| | | | | | Other _____ | |
| | | ⊕ | 100' - completed hole | | | |
| | | ⊕ | 100' casing | | | |
| | | ⊕ | wet at. | | | |
| CREW HOURS | | | | | | |
| | | | | | Driller _____ | |
| | | | | | Helper _____ | |
| | | | | | Helper _____ | |

Footage: FROM _____ ' TO _____ ' TOTAL FOOTAGE _____
 _____ changed at _____ ' Size _____
 _____ changed at _____ ' Size _____
 _____ changed at _____ ' Size _____

Approved _____

CLIENT: U.S. Geological Survey/ S.C.E.C.
 PROJECT: LARSE II
 CLIENT REP:

| Date: 2/18 10/18 | | Hole # 201C | | Rig # 1 | Driller: Sam Crum | Supervisor: |
|-----------------------------|-------|-------------|----------------------|---------|--------------------------|-------------|
| TIME | LOG # | FOOTAGE | REMARKS | | LOG REFERENCE # | |
| 11:30 | 1 | | | | | |
| 11:04 | 2 | | | | | |
| 12:03 | R | 0' | INSTALL BIT + PIPE I | | 1. Crew Travel To Site | |
| 12:10 | L | | | | 2. Rig Up | |
| 12:20 | S | 20' | INSTALL PIPE II | | 3. Reenter Hole | |
| | L | | | | 4. Drilling | |
| 12:30 | R | 40' | INSTALL PIPE III | | 5. Pull Pipe | |
| | L | | | | 6. Mix Mud & Fill | |
| 12:44 | S | 60' | INSTALL PIPE IV | | 7. Coring | |
| | L | | | | 8. Install Casing/Pipe | |
| 1:00 | S | | | | 9. Cementing | |
| | L | | | | 10. Rig Down | |
| | | | | | 11. Move Rig To New Site | |
| | | | | | 12. Maintenance | |
| | | | | | 13. Standby (Explain) | |
| | | | | | 14. Other (Explain) | |
| | | | | | 15. Logging | |
| | | | | | 16. Water Trip | |
| MATERIALS USED | | | | | | |
| | | | | | Mud _____ sacks | |
| | | | | | LC _____ Type _____ | |
| | | | | | _____ sacks | |
| | | | | | _____ sacks | |
| | | | | | _____ sacks | |
| | | | | | Viscose _____ | |
| | | | | | Cement _____ | |
| | | | | | Diesel _____ | |
| | | | | | Foamer _____ | |
| | | | | | Detergent _____ | |
| | | | | | Other _____ | |
| CREW HOURS | | | | | | |
| | | | | | Driller <u>1</u> / _____ | |
| | | | | | Helper <u>1</u> / _____ | |
| | | | | | Helper <u>1</u> / _____ | |

Footage: FROM _____' TO _____' TOTAL FOOTAGE _____'
 _____ changed at _____' Size _____"
 _____ changed at _____' Size _____"
 _____ changed at _____' Size _____"

Approved _____

David Deils

Revised 9/8/99 11:27 AM

CLIENT: U.S. Geological Survey/ S.C.E.C.
 PROJECT: LARSE II
 CLIENT REP: Luke Rousset

expected depth => 80'

(AM)

| Date: 10/22/99 | | Hole # 202B (sub) Rig # 1 | | Driller: Sam Crum | Supervisor: Luke |
|----------------|-------|---------------------------|---|--------------------------|------------------|
| TIME | LOG # | FOOTAGE | REMARKS | LOG REFERENCE # | |
| 9:30 | 11 | | Move Rig to South Hole | 1. Crew Travel To Site | |
| 9:40 | 2 | | Rig up | 2. Rig Up | |
| 9:42 | 3 | | Install 8" Air Hammer | 3. Reenter Hole | |
| 9:45 | 4 | 0 | Install Pipe I | 4. Drilling | |
| 9:45 | 5 | | Drill | 5. Pull Pipe | |
| 9:54 | 6 | 20 | Install Pipe II | 6. Mix Mud & Fill | |
| 9:55 | 4 | | Drill | 7. Coring | |
| 10:01 | 5 | 40 | Install Pipe III | 8. Install Casing/Pipe | |
| 10:02 | 4 | | Drill | 9. Cementing | |
| 10:11 | 6 | 60 | Install Pipe IV | 10. Rig Down | |
| 10:12 | 4 | | Drill | 11. Move Rig To New Site | |
| 10:18 | 7 | 80 | Install Pipe V Hole completed at 80' | 12. Maintenance | |
| 10:20 | 1 | | Maintenance on the Top Head drive | 13. Standby (Explain) | |
| 10:50 | 10 | | Rig Down | 14. Other (Explain) | |
| | | | | 15. Logging | |
| | | | | 16. Water Trip | |
| MATERIALS USED | | | | | |
| | | | | Mud _____ sacks | |
| | | | | LC _____ Type _____ | |
| | | | | _____ sacks | |
| | | | | _____ sacks | |
| | | | | _____ sacks | |
| | | | | Viscose _____ | |
| | | | | Cement _____ | |
| | | | | Diesel _____ | |
| | | | | Foamer _____ | |
| | | | | Detergent _____ | |
| | | | | Other _____ | |
| | | | Ⓢ completed hole => 80' | | |
| | | | Ⓢ Water Water seeping in Bottom | CREW HOURS | |
| | | | Ⓢ Not cased | Driller 1, Sam | |
| | | | | Helper 1, Bernie | |
| | | | | Helper 1, Jeff | |

Footage: FROM 0 TO 80 TOTAL FOOTAGE 80

changed at _____ Size _____
 changed at _____ Size _____
 changed at _____ Size _____

Approved _____

- steel collar remained on the night of shooting

David Delis

Revised 9/8/99 11:27 AM

80

CLIENT: U.S. Geological Survey/ S.C. E.C.

PROJECT: LARSE II

CLIENT REP: Luke + Jonathan

expected depth = 82'

AM/AM

Date: 10/21/10 Hole # 2028 Rig # 1 Driller: Sam Crum Supervisor: Luke + Jonathan

(PM)

| TIME | LOG # | FOOTAGE | REMARKS | LOG REFERENCE # |
|-------|-------|---------|------------------------------|--------------------------|
| 18:10 | 16 | | Leave - water trip | 1. Crew Travel To Site |
| 18:15 | 11 | | Move Rig to New Site | 2. Rig Up |
| 18:30 | 2 | | Rig up | 3. Reenter Hole |
| 18:32 | 4 | | Drill | 4. Drilling |
| 18:40 | | | Hole completed at 80' | 5. Pull Pipe |
| 18:42 | 5 | | Pull Pipe | 6. Mix Mud & Fill |
| | | | Leave until tomorrow (10/22) | 7. Coring |
| | | | | 8. Install Casing/Pipe |
| | | | | 9. Cementing |
| | | | | 10. Rig Down |
| | | | | 11. Move Rig To New Site |
| | | | | 12. Maintenance |
| | | | | 13. Standby (Explain) |
| | | | | 14. Other (Explain) |
| | | | | 15. Logging |
| | | | | 16. Water Trip |

10/22 (AM)

| | | | | |
|------|----|--|-----------|--|
| 9:31 | 10 | | Rig down. | |
|------|----|--|-----------|--|

MATERIALS USED

Mud _____ sacks

LC _____ Type _____

_____ sacks

_____ sacks

_____ sacks

Viscose _____

Cement _____

Diesel _____

Foamer _____

Detergent _____

Other _____

CREW HOURS

Driller: L, Sam

Helper: L, Bonnie

Helper: L, Jeff

Footage: FROM 0' TO 82' TOTAL FOOTAGE 82'

changed at _____ Size _____
changed at _____ Size _____
changed at _____ Size _____

Approved _____

- hole is not cased, the steel collar can be taken out when the hole is loaded & about to be shot.

David Deits

82

Revised 8/8/99 11:27 AM

CLIENT: U.S. Geological Survey/ S.C.E.C.
 PROJECT: LARSE II
 CLIENT REP: Alan Yong

64' ~~CASE~~

| Date: 9/9 | | Hole # 204 C2 Rig # 1 | | Driller: Sam Crum | Supervisor: JS |
|-----------|-------|-----------------------|---|--------------------------|----------------|
| TIME | LOG # | FOOTAGE | REMARKS | LOG REFERENCE # | |
| 12:47 | 1 | | | | |
| 12:50 | 2 | | | | |
| 12:53 | 8 | | INSTALL DRILL BIT 2 1/2" 9 1/2' torque | 1. Crew Travel To Site | |
| 12:26 | 8 | 0 | INSTALL PIPE I | 2. Rig Up | |
| 1:08 | 4 | | START | 3. Reenter Hole | |
| 1:18 | 8 | 20' | INSTALL PIPE II | 4. Drilling | |
| 1:19 | 4 | | DRILL | 5. Pull Pipe | |
| 1:21 | 14 | | START FOAM | 6. Mix Mud & Fit | |
| 1:28 | 8 | 40' | INSTALL PIPE III | 7. Coring | |
| 1:24 | 4 | | DRILL | 8. Install Casing/Pipe | |
| 1:26 | | | HIT WATER TABLE ~ 55' (SRH) | 9. Cementing | |
| 1:29 | 8 | 60' | INSTALL PIPE IV | 10. Rig Down | |
| 1:29 | 4 | | DRILL | 11. Move Rig To New Site | |
| 1:39 | 14 | 70' | Drilling levels at 70' | 12. Maintenance | |
| 1:36 | 5 | | R.I.I. PIPE | 13. Standby (Explain) | |
| 1:46 | | | TAKE OUT DRILL BIT | 14. Other (Explain) | |
| 1:47 | 8 | | INSTALL CASING PUSHER | 15. Logging | |
| 1:48 | 8-3 | | CASING I UP (Leaving casing for 204 C1) | 16. Water Trip | |
| 1:51 | 14 | | WELDING | | |
| 1:58 | 8 | | CASING II UP | MATERIALS USED | |
| 2:00 | 14 | | WELDING I + II | Mud _____ sacks | |
| 2:08 | 8 | | CASING III UP | LC _____ Type _____ | |
| 2:09 | 14 | | WELDING III + II | _____ sacks | |
| 2:19 | 8 | | CASING IV UP | _____ sacks | |
| 2:20 | 14 | | WELDING III + IV | _____ sacks | |
| 2:30 | 14 | | CASING @ Full Depth | _____ sacks | |
| 2:40 | 14 | | TAKE OUT CASING PUSHER | _____ sacks | |
| 2:41 | 5/14 | | CLEAN HOLE | _____ sacks | |
| 2:56 | 14 | | EXIT HOLE | | |
| 3:00 | 10 | | | Viscose _____ | |
| 3:03 | 11 | | MOVE TO 204 C3 | Cement _____ | |
| 3:06 | 14 | | CAP HOLE | Diesel _____ | |
| | | | | Foamer _____ | |
| | | | Unlabeled to 70' | Detergent _____ | |
| | | | Cased to 70' | Other _____ | |
| | | | Hole cleaned to 65' | | |
| | | | | CREW HOURS | |
| | | | | Driller _____ / _____ | |
| | | | | Helper _____ / _____ | |
| | | | | Helper _____ / _____ | |

Footage: FROM 0 TO 70 TOTAL FOOTAGE

Bit _____ changed at _____ Size _____
 Bit _____ changed at _____ Size _____
 Bit _____ changed at _____ Size _____

70' casing
 Hole cleaned to 65'

Approved _____

CLIENT: U.S Geological Survey/ S.C.E.C.

PROJECT: LARSE II

CLIENT REP: Luke Reusser +
Brian Hollman.

92'

| TIME | LOG # | FOOTAGE | REMARKS | LOG REFERENCE # |
|---------|-------|---------|---|--------------------------|
| 8:40 AM | 1 | | Setting up Site | 1. Crew Travel To Site |
| 8:41 | 2 | | Rig up | 2. Rig Up |
| 8:44 | 3 | | Install Bit - 2 1/2" 930" Diamond Turcomb | 3. Reenter Hole |
| 8:47 | 4 | | Install Pipe #1 | 4. Drilling |
| 8:49 | 4 | | Start drilling. | 5. Pull Pipe |
| 8:55 | 14 | | Start Guide | 6. Mix Mud & Fill |
| 9:00 | 8 | 20' | Install Pipe II | 7. Coring |
| 9:00 | 4 | | Drill | 8. Install Casing/Pipe |
| 9:03 | 8 | 40' | Install Pipe III | 9. Cementing |
| 9:04 | 4 | | Drill | 10. Rig Down |
| 9:06 | | | Hit water table ~ 60' | 11. Move Rig To New Site |
| 9:08 | 8 | 60' | Install Pipe III | 12. Maintenance |
| 9:08 | 4 | | Drill | 13. Standby (Explain) |
| 9:23 | 2 | 80' | Install Pipe IV | 14. Other (Explain) |
| 9:24 | 4 | | Drill | 15. Logging |
| 9:33 | 14 | 100' | Drilling Stop - Lost at ~ 100' | 16. Water Trip |
| 9:34 | 5 | | Pull Pipe | |
| 9:40 | 14 | | Remove Drill Bit | |
| 9:46 | 8/14 | | Install Casing Pusher. | MATERIALS USED |
| 9:49 | 14 | | welding casing I | Mud _____ sacks |
| 9:57 | 8 | | Casing I up & installed | LC _____ Type _____ |
| 9:59 | 8 | | Casing II up & installed | _____ sacks |
| 10:01 | 14 | | welding I + II together | _____ sacks |
| 10:17 | 8 | | Casing III up | _____ sacks |
| 10:19 | 14 | | welding I + III together | _____ sacks |
| 10:40 | 2 | | Casing IV up | _____ sacks |
| 10:45 | 14 | | welding III + IV together. | _____ sacks |
| 10:58 | 14 | | Stamping 80' of pipe casing | _____ sacks |
| 11:01 | 14 | | Casing IV up | Viscose _____ |
| 11:11 | 14 | | Welding IV + V together | Cement _____ |
| 11:25 | 14 | | Stamping 100' of pipe casing | Diesel _____ |
| 11:30 | 14 | | Walk in at 85', cut casing, clean hole | Foamer _____ |
| 12:02 | 14-3 | | Clean hole / center hole | Detergent _____ |
| 12:14 | 16 | | Water trip | Other _____ |
| 12:33 | 14 | | Continue to clean hole | |
| 12:50 | 3 | | pull 100' of drill pipe. | |
| 1:03 | 10 | | Rig down | |
| 1:11 | 14 | | Wash off drill rig | |
| 1:14 | 14 | | weld and cap drill hole | |
| 1:30 | 14 | | exit hole 204C4 | |
| | | | | CREW HOURS |
| | | | | Driller <u>1. Sam</u> |
| | | | | Helper <u>1. Bernie</u> |
| | | | | Helper <u>1. Seth</u> |

Footage: FROM 0 ' TO 100 ' TOTAL FOOTAGE 100 '
 _____ changed at _____ Size _____
 _____ changed at _____ Size _____
 _____ changed at _____ Size _____

Approved _____

go 8ft if dry
 * hole = 72ft casing = 72ft

CLIENT: U.S. Geological Survey/ S.C.E.C.
 PROJECT: LARSE II
 CLIENT REP: BRIAN HOFFMAN

| TIME | LOG # | FOOTAGE | REMARKS | LOG REFERENCE # |
|-----------------|------------|---------|--|--------------------------|
| Date: 9-13-1996 | Hole # 206 | Rig # 1 | Driller: Sam Crum | Supervisor: BH |
| 1:30 | 14 | | Arrive at #206 to pick up rig | |
| 2:00 | 16 | | water trip | 1. Crew Travel To Site |
| 2:45 | 1 | | Crew travel to site, 206, arrive | 2. Rig Up |
| 2:47 | 2 | | Rig up | 3. Reenter Hole |
| 2:56 | 4 | 0-20ft | drilling pipe #1 | 4. Drilling |
| 3:05 | 8 | | install support casing | 5. Pull Pipe |
| 3:11 | 8 | | install casing #2 pipe | 6. Mix Mud & Fill |
| 3:12 | 4 | 20-40ft | drilling pipe #2 | 7. Coring |
| 3:17 | 8 | | install jumbo pipe #3 | 8. Install Casing/Pipe |
| 3:18 | 4 | 40-60ft | drilling pipe #3 | 9. Cementing |
| 3:20 | 8 | | install pipe #4 | 10. Rig Down |
| 3:20 | 4 | 60-80ft | drilling pipe #4 - hold | 11. Move Rig To New Site |
| 3:24 | 5 | | pull pipe, closed hole at 60ft. | 12. Maintenance |
| 3:27 | 8 | | re-install pipe #4 | 13. Standby (Explain) |
| 3:28 | 4 | 60-80ft | drilling pipe #4, hole at full depth 80ft. | 14. Other (Explain) |
| 3:36 | 5 | | pull pipe #4 | 15. Logging |
| 3:37 | 5 | | pull pipe #3 | 16. Water Trip |
| 3:39 | 5 | | pull pipe #2 | |
| 3:41 | 9 | | pull pipe #1 + remove drill bit | |
| 3:45 | 8 | | install casing pusher | MATERIALS USED |
| * | * | | hit water at 45ft. | Mud _____ sacks |
| 3:50 | 14 | | welding | LC _____ Type _____ |
| 3:53 | 8 | | casing #1 up | 9 7/8 drill bit |
| 3:53 | 8 | | install casing #2 | 20ft drill pipe |
| 3:54 | 14 | | welding | _____ sacks |
| 3:59 | 8 | | casing #2 up | Viscose _____ |
| 4:02 | 14 | | welding casing #1 + #2 together | Cement _____ |
| 4:15 | 8 | | casing #3 up | Diesel _____ |
| 4:16 | 14 | | welding casing #2 + #3 together | Foamer Quik-Gel |
| 4:33 | 8 | | casing #4 up | Detergent hydro |
| 4:39 | 14 | | welding casing #3 + #4 together | Other _____ |
| 4:48 | 14 | | bound casing #4 | |
| 4:55 | 14 | | Maintenance | |
| 5:14 | 3 | | re-enter hole / cleaning hole | CREW HOURS |
| 5:30 | 5 | | pull cleaning pipe | Driller: L, Sam |
| 5:40 | 10 | | Rig down | Helper: L, Bernie |
| 5:54 | 14 | | welding cap on hole | Helper: L, Scott |
| 6:02 | 14 | | hole finished, exit hole | |
| | | | # hole drilled to 80' | |
| | | | # hole cased to (75') | |
| | | | # hole cemented to (80') | |

Footage: FROM 0 TO 80' TOTAL FOOTAGE 80ft
 changed at _____ Size _____
 changed at _____ Size _____
 changed at _____ Size _____

Approved _____

CLIENT: U.S. Geological Survey/ S.C.E.C.
 PROJECT: LARSE II
 CLIENT REP: David Delis

729

| Date: <u>9-27-99</u> | | Hole # <u>709</u> | | Rig # | Driller: <u>Sam Crum</u> | Supervisor: | |
|----------------------|-------|-------------------|----------------------|--|--------------------------|--------------------------|--|
| TIME | LOG # | FOOTAGE | REMARKS | | | LOG REFERENCE # | |
| 5 | | | Hd 720 1177 Sam Crum | | | 1. Crew Travel To Site | |
| 6 | | | | | | 2. Rig Up | |
| 7 | | | | | | 3. Reenter Hole | |
| 8 | | | | | | 4. Drilling | |
| 9 | | | | | | 5. Pull Pipe | |
| 10 | | | | | | 6. Mix Mud & Fill | |
| 11 | | | | | | 7. Coring | |
| 12 | | | | | | 8. Install Casing/Pipe | |
| | | | | | | 9. Cementing | |
| | | | | | | 10. Rig Down | |
| | | | | | | 11. Move Rig To New Site | |
| | | | | | | 12. Maintenance | |
| | | | | | | 13. Standby (Explain) | |
| | | | | | | 14. Other (Explain) | |
| | | | | | | 15. Logging | |
| | | | | | | 16. Water Trip | |
| 10 | 9:43 | 1 | Same clay | | | MATERIALS USED | |
| | 10:05 | 2/8 | 15 | Silty/very fine brown color pumping H ₂ O @ 100 | | | |
| | 10:30 | 4 | 20ft | color change @ 20ft "yellowish grey" clay | | | Mud _____ sacks |
| | 10:37 | 4 | 40ft | Same - clay | | | |
| | 10:58 | 4 | 60ft | Same - clay | | | LC _____ Type _____ |
| 11 | 11:07 | 4/14/15 | 75ft | Same - clay cleaning out well | | | |
| | 11:20 | 5/8 | | installing casing | | | _____ sacks |
| | 11:40 | 8 | 40ft | | | | |
| | 11:40 | 8 | 60ft | | | | _____ sacks |
| 12 | 12:05 | 8 | 75ft | increased 8" well | | | |
| | 12:15 | 3/5 | | cleaning out well w 8" bit | | | _____ sacks |
| | 12:57 | 12 | | | | | |
| 1 | 12:45 | 10 | | | | | Viscose _____ |
| | | | | | | | Cement _____ |
| 2 | | | | | | | Diesel _____ |
| | | | | | | | Foamer <input checked="" type="checkbox"/> _____ |
| 3 | | | | | | | Detergent _____ |
| | | | | | | | Other _____ |
| 4 | | | | | | | CREW HOURS |
| | | | | | | | Driller <u>1</u> |
| | | | | | | | Helper <u>1</u> |
| 5 | | | | | | | Helper <u>1</u> |

Footage: FROM _____ ' TO _____ ' TOTAL FOOTAGE 80

Bit 10" changed at 75' Size 8

Bit _____ changed at _____ Size _____

Bit _____ changed at _____ Size _____

Approved _____

CLIENT: U.S. Geological Survey/ S.C.E.C.

PROJECT: LARSE II

CLIENT REP: Luke

AM

| Date: 10/20/99 | | Hole # 301 | | Rig # 1 | Driller: Sam Crum | Supervisor: Luke |
|----------------|-------|------------|-----------------------|---------|--------------------------|------------------|
| TIME | LOG # | FOOTAGE | REMARKS | | LOG REFERENCE # | |
| | | | | | 1. Crew Travel To Site | |
| | | | | | 2. Rig Up | |
| | | | | | 3. Reenter Hole | |
| | | | | | 4. Drilling | |
| | | | | | 5. Pull Pipe | |
| | | | | | 6. Mix Mud & Fill | |
| | | | | | 7. Coring | |
| 14:45 | 14 | 80 | Hole completed at 80' | | 8. Install Casing/Pipe | |
| 16:00 | 14 | 80 | Cased to 80' | | 9. Cementing | |
| 16:01 | 3 | | Reenter + Clean Hole | | 10. Rig Down | |
| 16:21 | 5 | | Fill Pipe | | 11. Move Rig To New Site | |
| | | | | | 12. Maintenance | |
| | | | | | 13. Standby (Explain) | |
| | | | | | 14. Other (Explain) | |
| | | | | | 15. Logging | |
| | | | | | 16. Water Trip | |
| | | | | | | MATERIALS USED |
| | | | | | Mud _____ sacks | |
| | | | | | LC _____ Type _____ | |
| | | | | | _____ sacks | |
| | | | | | _____ sacks | |
| | | | | | _____ sacks | |
| | | | | | Viscose _____ | |
| | | | | | Cement _____ | |
| | | | | | Diesel _____ | |
| | | | | | Foamer _____ | |
| | | | | | Detergent _____ | |
| | | | | | Other _____ | |
| | | | Hole completed to 80' | | CREW HOURS | |
| | | | Cased to 80' | | Driller 1, Sam | |
| | | | | | Helper 1, Bonnie | |
| | | | | | Helper 1, Jeff | |

Footage: FROM 0 TO 80 TOTAL FOOTAGE 80
 _____ changed at _____ Size _____
 _____ changed at _____ Size _____
 _____ changed at _____ Size _____

Approved _____
 Revised 9/8/99 11:27 AM

David Deits
 80

CLIENT: U.S. Geological Survey/ S.C.E.C.
 PROJECT: LARSE II
 CLIENT REP: Alan Yong

| Date: <u>10.20.99</u> | | Hole # <u>303</u> | | Rig # <u>1</u> | Driller: <u>Sam Crum</u> | Supervisor: <u>Alan</u> |
|-----------------------|-----------|-------------------|---------|----------------|--------------------------|-------------------------|
| TIME | LOG # | FOOTAGE | REMARKS | | LOG REFERENCE # | |
| 5 | | | | | 1. Crew Travel To Site | |
| | | | | | 2. Rig Up | |
| 6 | | | | | 3. Reenter Hole | |
| | | | | | 4. Drilling | |
| | | | | | 5. Pull Pipe | |
| | | | | | 6. Mix Mud & Fill | |
| 7 | <u>00</u> | <u>1</u> | | | 7. Coring | |
| | | | | | 8. Install Casing/Pipe | |
| | | | | | 9. Cementing | |
| 8 | | | | | 10. Rig Down | |
| | | | | | 11. Move Rig To New Site | |
| | | | | | 12. Maintenance | |
| | | | | | 13. Standby (Explain) | |
| | | | | | 14. Other (Explain) | |
| 9 | | | | | 15. Logging | |
| | | | | | 16. Water Trip | |
| 10 | <u>10</u> | <u>11</u> | | | MATERIALS USED | |
| | | | | | Mud _____ sacks | |
| | | | | | LC _____ Type _____ | |
| 11 | | | | | _____ sacks | |
| | | | | | _____ sacks | |
| 12 | | | | | _____ sacks | |
| | | | | | _____ sacks | |
| 1 | | | | | Viscose _____ | |
| | | | | | Cement _____ | |
| 2 | | | | | Diesel _____ | |
| | | | | | Foamer _____ | |
| 3 | | | | | Detergent _____ | |
| | | | | | Other _____ | |
| 4 | | | | | CREW HOURS | |
| | | | | | Driller ___/___ | |
| 5 | | | | | Helper ___/___ | |
| | | | | | Helper ___/___ | |

No Samples

I arrived late due to traffic
on 20 hrs work-day !!!
Yahhhhh !!!

H₂O @ 100'

total casing 100'
Depth 100'

Footage: FROM 0 TO 100 TOTAL FOOTAGE 100
 Bit _____ changed at _____ Size _____
 Bit _____ changed at _____ Size _____
 Bit _____ changed at _____ Size _____
 Approved _____

CLIENT: U.S. Geological Survey/ S.C.E.C.

PROJECT: LARSE II

CLIENT REP: Alan Yong

hole #2 *new hole

| Date: 10-6-99 | | Hole # 305* | | Rig # 1 | Driller: Sam Crum | Supervisor: BH |
|---------------|-------|-------------|------------------|---------|--------------------------|----------------|
| TIME | LOG # | FOOTAGE | REMARKS | | LOG REFERENCE # | |
| 9:55 | 3 | | re-enter hole | | | |
| 10:15 | 3 | | install pipe #2 | | 1. Crew Travel To Site | |
| 10:16 | 4 | 20-40 ft | drilling #2 | | 2. Rig Up | |
| 10:37 | 3 | | install pipe #3 | | 3. Reenter Hole | |
| 10:40 | 4 | 40-60 ft | drilling pipe #3 | | 4. Drilling | |
| 10:53 | 3 | | install pipe #4 | | 5. Pull Pipe | |
| 10:54 | 4 | 60-80 ft | drilling pipe #4 | | 6. Mix Mud & Fill | |
| 11:06 | 3 | | install pipe #5 | | 7. Coring | |
| 11:07 | 4 | 80-100 ft | drill pipe #5 | | 8. Install Casing/Pipe | |
| 11:20 | 3 | | install pipe #6 | | 9. Cementing | |
| 11:21 | 4 | 100-120 ft | drill pipe #6 | | 10. Rig Down | |
| 11:30 | 3 | | install pipe #7 | | 11. Move Rig To New Site | |
| 11:37 | 4 | 120-140 ft | drill pipe #7 | | 12. Maintenance | |
| 12:01 | 5 | | pull pipe #7 | | 13. Standby (Explain) | |
| 12:02 | 5 | | pull pipe #6 | | 14. Other (Explain) | |
| 12:02 | 5 | | pull pipe #5 | | 15. Logging | |
| 12:04 | 5 | | pull pipe #4 | | 16. Water Trip | |
| 12:05 | 5 | | pull pipe #3 | | | |
| 12:07 | 5 | | pull pipe #2 | | | |
| 12:08 | 5 | | pull pipe #1 | | | |
| 12:20 | 10 | | rig down | | MATERIALS USED | |
| 12:45 | 14 | | weld cap hole | | Mud _____ sacks | |
| 1:01 | 11 | | make rig | | LC _____ Type _____ | |
| | | | 805 311-0321 | | _____ sacks | |
| | | | Martin | | _____ sacks | |
| | | | Woodward | | _____ sacks | |
| | | | | | Viscose _____ | |
| | | | | | Cement _____ | |
| | | | | | Diesel _____ | |
| | | | | | Foamer _____ | |
| | | | | | Detergent _____ | |
| | | | | | Other _____ | |
| | | | | | CREW HOURS | |
| | | | | | Driller _____ | |
| | | | | | Helper _____ | |
| | | | | | Helper _____ | |

Footage: FROM _____ TO _____ TOTAL FOOTAGE _____

Bit _____ changed at _____ Size _____

Bit _____ changed at _____ Size _____

Bit _____ changed at _____ Size _____

Approved _____

Revised: 21, June 1999

* actual depth = 140 David Deits

* actual casing = 30ft

CLIENT: U.S. Geological Survey/ S.C.E.C.
 PROJECT: LARSE II
 CLIENT REP:

170

| Date: 10/15 | | Hole # 30S | | Rig # 1 | Driller: Sam Crum | Supervisor: JS |
|-------------|-------|------------|--|---------|--------------------------|----------------|
| TIME | LOG # | FOOTAGE | REMARKS | | LOG REFERENCE # | |
| 10:35 | 1 | | | | | |
| 10:40 | 2 | | | | 1. Crew Travel To Site | |
| 10:40 | 10 | | LEAVE | | 2. Rig Up | |
| 10:45 | | | Install bit | | 3. Reenter Hole | |
| 10:50 | 2 | | Install casing I | | 4. Drilling | |
| 11:00 | | | LEAVE FOR SUPPLIES | | 5. Pull Pipe | |
| 11:45 | 14 | 30-40' | 70' Deep - problem hole using inserts due to large amount of silt change bit - 12" heavier 10' log installed 8' casing at top | | 6. Mix Mud & Fill | |
| 12:15 | 14 | | TAKE OUT 10' bit | | 7. Coring | |
| 12:17 | 8/15 | | Install new bit, take out pipe I | | 8. Install Casing/Pipe | |
| 12:22 | 8 | | Install casing II | | 9. Cementing | |
| 12:23 | 8 | | Install casing II / cut @ 30' | | 10. Rig Down | |
| 12:54 | 8 | | Install pipe II & log bit | | 11. Move Rig To New Site | |
| 12:55 | 8 | | Install pipe III | | 12. Maintenance | |
| 12:58 | 4 | | (pulling core in) | | 13. Standby (Explain) | |
| 1:06 | 5 | | | | 14. Other (Explain) | |
| 1:09 | 8 | | REMOVE TAKE OUT TOP 8' with casing | | 15. Logging | |
| 1:10 | 9 | | Add Quick Gel | | 16. Water Trip | |
| 1:18 | 3 | | | | MATERIALS USED | |
| 1:20 | 6 | | INSTALL PIPE I, II, III | | Mud _____ sacks | |
| 1:21 | 4 | | Drilling pipe III | | LC _____ Type _____ | |
| 1:36 | 8 | 60' | Install pipe IV | | _____ sacks | |
| 1:34 | 4 | 80' | Install pipe V | | _____ sacks | |
| 2:09 | 8 | 100' | Install pipe VI | | _____ sacks | |
| 2:22 | 8 | 120' | Install pipe VII | | Viscose _____ | |
| 2:43 | 5 | 140' | MAX Depth / pull pipe | | Cement _____ | |
| 2:54 | 10 | | Ext hole | | Diesel _____ | |
| 3:00 | 10 | | | | Foamer _____ | |
| 3:04 | 11 | | MOVE TO 30S2 | | Detergent _____ | |
| | | | | | Other _____ | |
| | | | | | CREW HOURS | |
| | | | | | Driller 1, Sam | |
| | | | | | Helper 1, SCOT | |
| | | | | | Helper 1, GLEN | |

Footage: FROM _____ TO _____ TOTAL FOOTAGE _____
 _____ changed at _____ Size _____
 _____ changed at _____ Size _____
 _____ changed at _____ Size _____

Approved _____

David Dels

Revised 9/8/99 11:27 AM

10

CLIENT: U.S. GEOLOGICAL SURVEY, S.C.E.C.
 PROJECT: LARSE II
 CLIENT REP:

| Date: <u>10/3</u> | | Hole # <u>3052</u> Rig # <u>1</u> | | Driller: <u>Sam Crum</u> | Supervisor: <u>JS</u> |
|-----------------------|-------|-----------------------------------|--|--------------------------|--------------------------|
| TIME | LOG # | FOOTAGE | REMARKS | | LOG REFERENCE # |
| 3:05 | 1 | | | | |
| 3:07 | 2 | | | | 1. Crew Travel To Site |
| 3:12 | 4 | | drill 10' bit | | 2. Rig Up |
| 3:18 | 8 | | Install 8' large casing for upper hole | | 3. Reenter Hole |
| 3:25 | 8 | 10' | Install Pipe I | | 4. Drilling |
| | 14 | | problem w/ pipe water / holden | | 5. Pull Pipe |
| 3:36 | 14 | | | | 6. Mix Mud & Fill |
| 3:34 | 15 | | TACKLE OUT 10' BIT | | 7. Coring |
| 4:02 | 8 | | Install large casing I 30' | | 8. Install Casing/Pipe |
| 4:33 | 9 | | use quartz gc! | | 9. Cementing |
| 4:36 | 3 | | | | 10. Rig Down |
| | | | | | 11. Move Rig To New Site |
| | | | | | 12. Maintenance |
| | | | | | 13. Standby (Explain) |
| | | | | | 14. Other (Explain) |
| | | | | | 15. Logging |
| | | | | | 16. Water Trip |
| MATERIALS USED | | | | | |
| Mud _____ sacks | | | | | |
| LC _____ Type _____ | | | | | |
| _____ sacks | | | | | |
| _____ sacks | | | | | |
| _____ sacks | | | | | |
| Viscose _____ | | | | | |
| Cement _____ | | | | | |
| Diesel _____ | | | | | |
| Foamer _____ | | | | | |
| Detergent _____ | | | | | |
| Other _____ | | | | | |
| CREW HOURS | | | | | |
| Driller _____ / _____ | | | | | |
| Helper _____ / _____ | | | | | |
| Helper _____ / _____ | | | | | |

10-6

Footage: FROM _____ TO _____ TOTAL FOOTAGE _____
 _____ changed at _____ Size _____
 _____ changed at _____ Size _____
 _____ changed at _____ Size _____

Approved _____

David Delis

Revised 9/8/99 11:27 AM