



**Robert Stanley**

04/15/02 01:24 PM

To: Kevin Merryman/DOT/StateIA, Terry Love/DOT/StateIA, Wayne Sunday/DOT/StateIA, curtis.monk@FHWA.dot.gov, Gary Novey/DOT/StateIA, mlustig@gsinetwork.com, prossbac@hdrinc.com, Ahmad Abu-Hawash/DOT/StateIA, Daniel Calvert/DOT/StateIA, John Heggen/DOT/StateIA

cc: Daniel Ohman/DOT/StateIA@StateIA, Tony

Gustafson/DOT/StateIA@StateIA

Subject: I-235 WDM 42nd St Bridge CSL Testing

Some time after mid-morning this morning, I received a FAX from Mike Lustig from GSI about the Crosshole Sonic Log (CSL) testing that they completed earlier this morning on the 42nd St Osterberg Cell drilled shaft. Mike's note reads as follows:

"Attached are compressive strength test results for breaks made this morning. Also find six (6) CSL logs for shaft that was logged this morning. Generally, CSL looks good. There appears to be a "soft bottom" condition in pairs 1-2 and 1-4. Review of individual records indicates decrease in velocity of 500 to 1000 fps which is on order of 10 percent which is the accuracy of the method. I would not foresee a problem with the shaft based on the results."

The strength tests on two 4-day old concrete cylinders were both 2650 psi.

The info that Mike sent in does not tell me where CSL tubes 1, 2, 3, and 4 are situated, but I would guess North, East, South, and West respectively, or something similar to that. From the CSL testing, we at this time don't know precisely what, if anything, the CSL results which Mike refers to as indicating a "soft bottom condition" mean, reflect about the concrete, etc. I probably at this time agree with Mike, though, that the "soft bottom condition" is not a controlling factor, but it does make me wonder since the bottom portion of the shaft is where we have designed for side friction in the shale for supporting the loads.

There are a few things to consider here. From the CSL testing, we don't conclusively know that there is a problem near the bottom of the shaft. If there is a problem, remember that after Soils Design drilled the specific shaft location at the beginning of construction, we lengthened this shaft by about 3 meters so that it had end bearing on what appeared to be harder shale than what was present at design bearing level. Thus, we should have significantly more length in the shale for side friction support than was in its original design length. And, I don't know that there is much we can do to check the bottom portion of the shaft (by coring, etc), anyway, since the O-Cell is in the shaft above the level of the possible problem.

I think what I would recommend now is to go ahead with the O-Cell test and see what it gives us, but in reviewing the O-Cell results, we need to remember what the CSL testing to date has revealed. Load Test. Inc. should be made aware of our initial CSL test results so that they can tie any interpretation from this into any analysis, etc that they do (Mike, please send a copy of our final report to them). Also, I would suggest that we do another round of CSL testing after the O-Cell test, providing this is feasible and the O-Cell testing does not render the CSL tubes untestable below the level of the O-Cell. Could Load Test give us input on that? If it is feasible, then I would think that the additional CSL testing would need to be done before the O-Cell unit is grouted after its testing is finished.

I talked to both Terry Love and Dan Calvert about these test results around noon today. I briefly discussed some of my initial thoughts as outlined above, and my opinion on whether the second drilled shaft could be started early this afternoon (the contractor as always is in a super big hurry). I told both Terry and Dan that in my opinion, the second shaft could probably be started, but one thing we may have learned from this CSL testing on the first shaft is that we probably need to take additional steps to ensure that the bottom of the shaft is cleaned as good as we can get it before pouring concrete. Specifically what I mean by this is another air lift cleaning after the rebar cage is put in the hole. Such a cleaning was not possible with the first shaft because of the O-Cell, but I think this additional air lift cleaning should be done with the second shaft. I also told Terry and Dan that they probably needed to check with others (John Heggen, Wayne Sunday, and/or others) an approval to proceed with the second shaft, just to follow proper and necessary protocol or chain-of-command procedures (I did not want to short circuit any of this type of thing).

If there are any questions, differences of opinions, other recommended actions, etc, with anything I have said above, please let me know. I also want to thank Curtis Monk for his input on this matter this morning before I finished this e-mail. Please keep me informed with developments with the drilled shafts on these bridges. Thank you.



**Geotechnical  
Services Inc.**

2853 99th Street • Des Moines (Urbandale), IA 50322-3858

## *Fax Cover Sheet*

DATE: *MONDAY APRIL 15, 2002*

TIME:

TO: *ROBERT STANLEY, P.E.*  
*I.D.O.T.*

PHONE:

FAX: *515-239-1873*

FROM: *MICHAEL LUSTIG*  
GSI, Des Moines

PHONE: (515) 270-6542

FAX: (515) 270-1911

RE: *42nd STREET WDM DRILLED SHAFT*

Number of pages including cover sheet: *8*

### Message:

*Bob,*

*Attached are compressive strength test results for breaks made this morning. Also find six (6) CSL logs for shaft that was logged this morning. Generally, CSL looks good. There appears to be a "soft bottom" condition in pairs 1-2 and 1-4. Review of individual records indicates decrease in velocity of 500 to 1000 Sps which is on order of 10 percent which is the accuracy of the method. I would not foresee a problem with the shaft based on these results.*

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Location of Pour:  
42ND ST BRIDGE

Page: 1 OF 1

|                                   |                               |                              |                              |
|-----------------------------------|-------------------------------|------------------------------|------------------------------|
| Supplier:                         | Mix Type:                     | Truck No:                    | Ticket No:                   |
| Time Loaded:                      | Time Arrived:                 | Time Tested:                 | Revisions:                   |
| C.Y. This Load:                   | C.Y. Cumulative:              | Water (lbs):                 | Cement (lbs):                |
| Cement Add. (lbs):                | Fine Agg. (lbs):              | Admixture Type/Amount (oz.): | Admixture Type/Amount (oz.): |
| Water Added Before Test (gal):    | Water Added After Test (gal): | Unit Weight (pcf):           | Yield:                       |
| Slump (in.):                      | Air Content (%):              | Concrete Temp. (F):          | Ambient Temp. (F):           |
| Remarks:                          |                               |                              |                              |
| Tested By: CYLINDERS MADE BY IDOT |                               |                              |                              |

| SPECIFICATIONS |             | Slump (in.): | Air Content (%): | Strength (psi): |            |                  |                  |        |               |                   |                     |                |                         |                  |
|----------------|-------------|--------------|------------------|-----------------|------------|------------------|------------------|--------|---------------|-------------------|---------------------|----------------|-------------------------|------------------|
| 4,000          |             |              |                  |                 |            |                  |                  |        |               |                   |                     |                |                         |                  |
| TEST NUMBER    | LAB. NUMBER | DATE CAST    | DATE RECEIVED    | DATE TESTED     | AGE (days) | TYPE OF SPECIMEN | DIMENSIONS (in.) |        | WEIGHT (lbs.) | UNIT WEIGHT (pcf) | FAILURE LOAD (lbs.) | AREA (sq. in.) | COMP/FLX STRENGTH (psi) | TYPE OF FRACTURE |
|                |             |              |                  |                 |            |                  | WIDTH            | HEIGHT |               |                   |                     |                |                         |                  |
| 1              | 132A        | 4/11/02      |                  | 4/15/02         | 4          | CYL              | 6.00             | 12.00  | 28.20         | 143.6             | 75,000              | 28.27          | 2,650                   | MSh              |
| 1              | 132B        | 4/11/02      |                  |                 | 4          | CYL              | 6.00             | 12.00  | 28.10         | 143.1             | 75,000              | 28.27          | 2,650                   | MSH              |
| 1              | 132C        | 4/11/02      |                  |                 | HOLD       | CYL              | 6.00             | 12.00  |               |                   |                     | 28.27          |                         |                  |
| 1              | 132D        | 4/11/02      |                  |                 | HOLD       | CYL              | 6.00             | 12.00  |               |                   |                     | 28.27          |                         |                  |
| 1              | 132E        | 4/11/02      |                  |                 | HOLD       | CYL              | 6.00             | 12.00  |               |                   |                     | 28.27          |                         |                  |
| 1              | 132F        | 4/11/02      |                  |                 | HOLD       | CYL              | 6.00             | 12.00  |               |                   |                     | 28.27          |                         |                  |

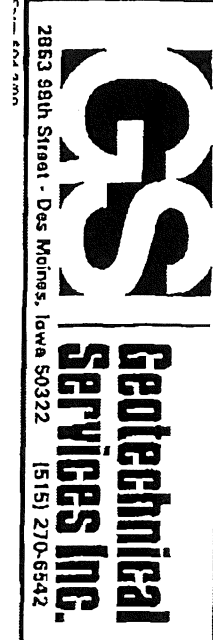
This test report may not be copied or reprinted without written consent of GSI.  
 Test results are valid for the referenced concrete samples, concrete batch(es) and test methods only.  
 No representation is made as to the physical properties of other concrete batches or other samples or the quality of the completed project.  
 TYPE OF FRACTURE: Cn = Comp Sp = Core and Split, Cs = Core and Shear, Sh = Shear, Cl = Columnar, On = Other, M = Modulus, A = Aggregate  
 ASTM Test Methods: Slump - C143, Air Content - C231, Unit Weight/Yield - C139, Compressive Strength - C39, Flexural Strength - C79

Copies To: \_\_\_\_\_ Reviewed By: *John L. Hester*

Project: IDOT WORK ORDER #1

Location: DES MOINES, IA

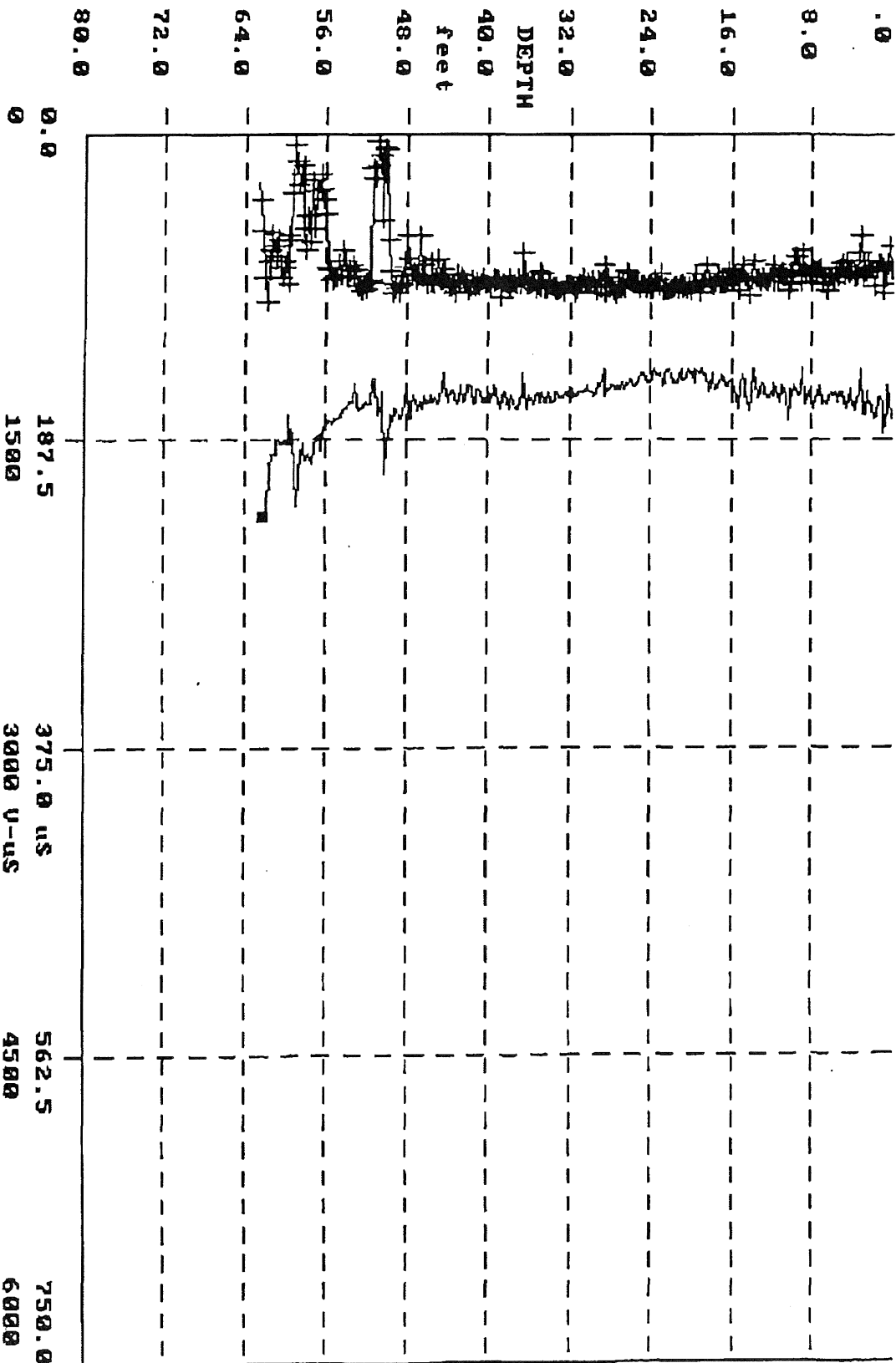
Job No: 006051 Date Issued: APRIL 15, 2002



# CONCRETE TEST REPORT

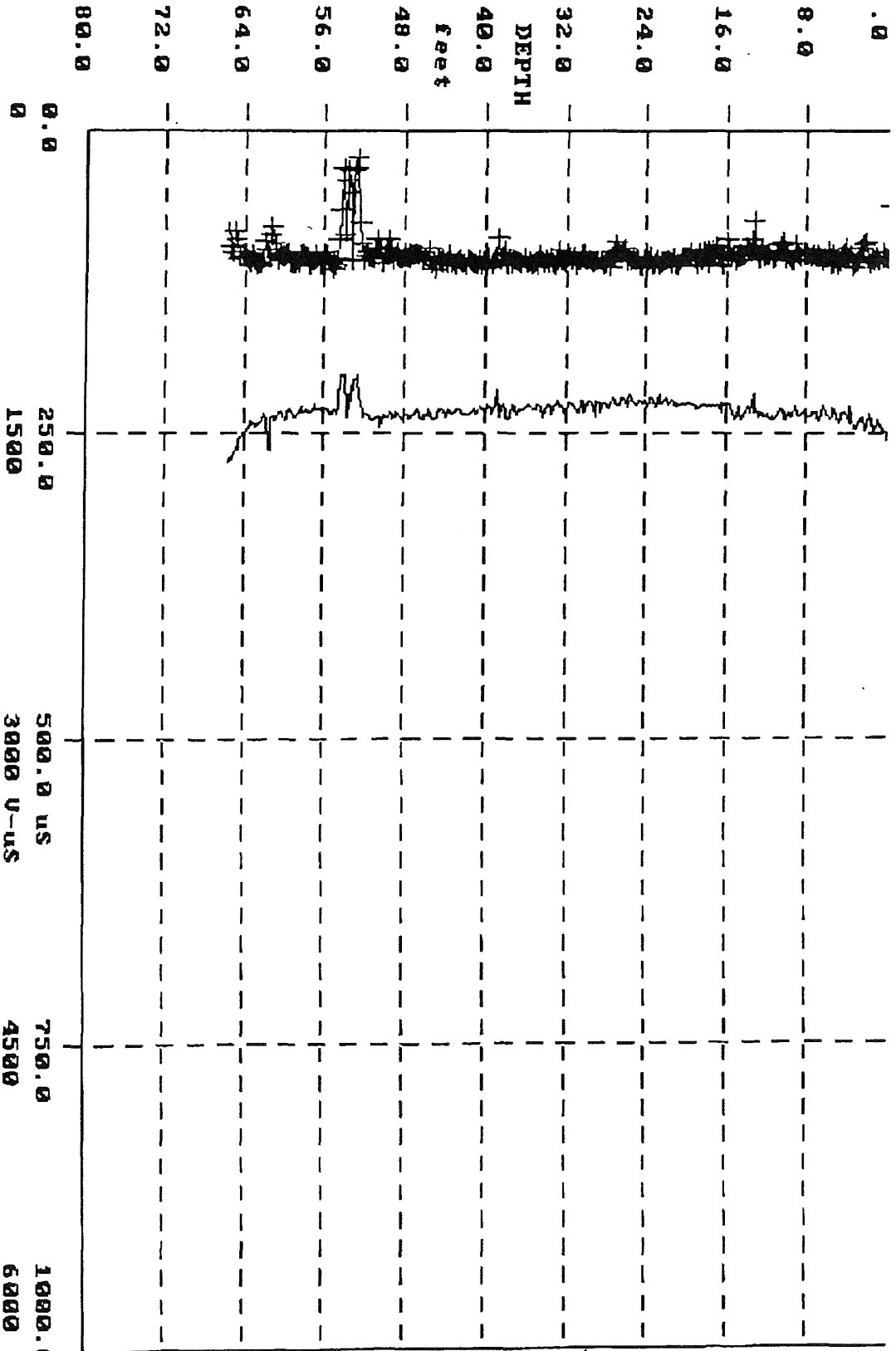
JOB: I-235 42nd LOG: 42cpws12.pl2  
TUBE PAIR: 1 - 2, CH. 1, SP. = 29.0 in  
DEPTH vs. THRESHOLD

THRESHOLDS: 1.5\* PKuse FIG.  
RECORD: 335 DEPTH: 0.00 ft  
It = 176 uS Vpl = 1600 mU  
Esig = 735 uS Ense = 3 uS



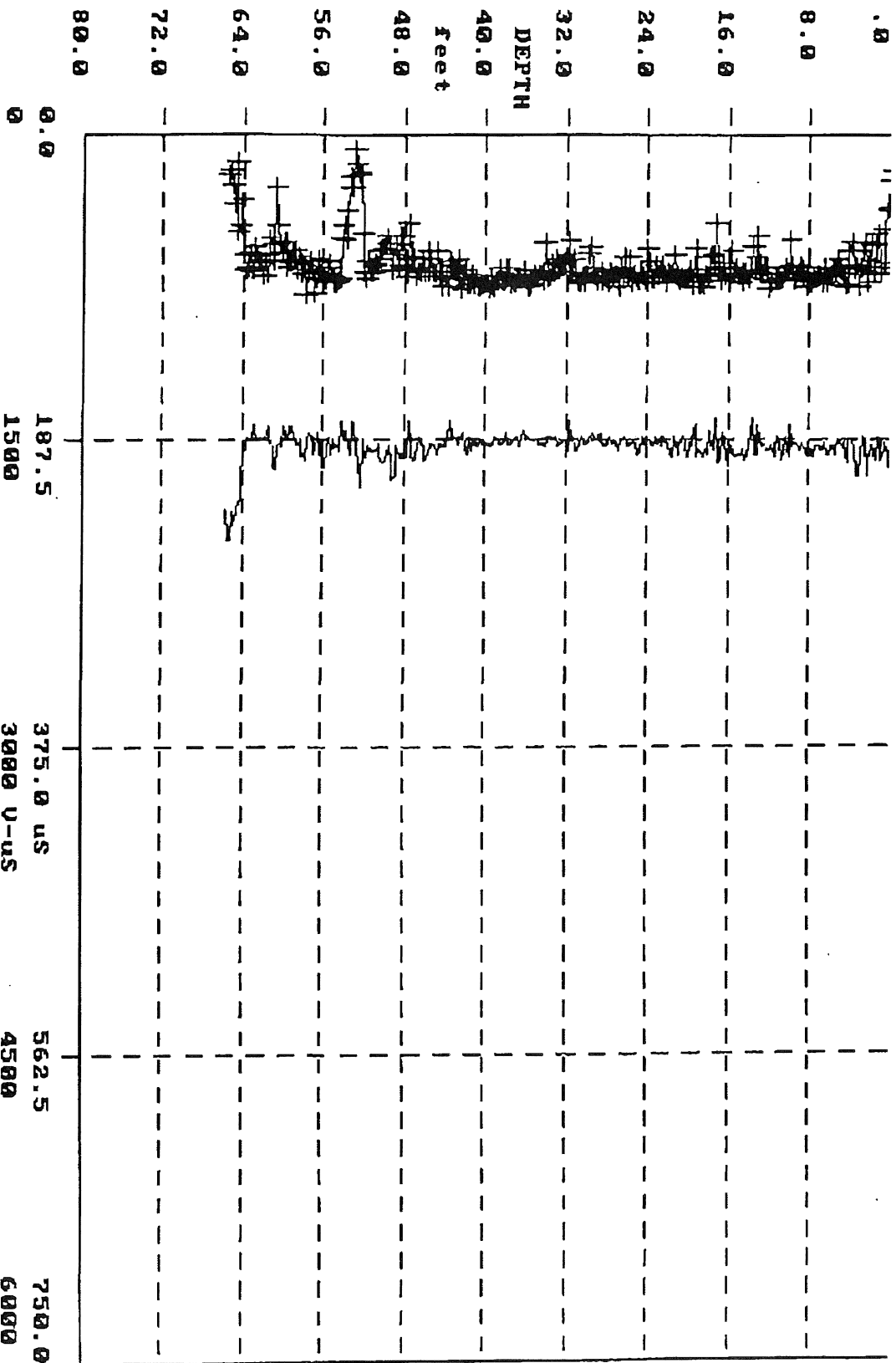
JOB: I-235 42nd LOG: 42cpws13.p12  
TUBE PAIR: 1 - 3, CH. 1, SP. = 38.0 in  
DEPTH vs. THRESHOLD

THRESHOLDS: 1.5\* PKnse FIG.  
RECORD: 351 DEPTH: 0.00 ft  
Tt = 260 us Up1 = -1376 mU  
Esig = 642 us Ense = 3 uis



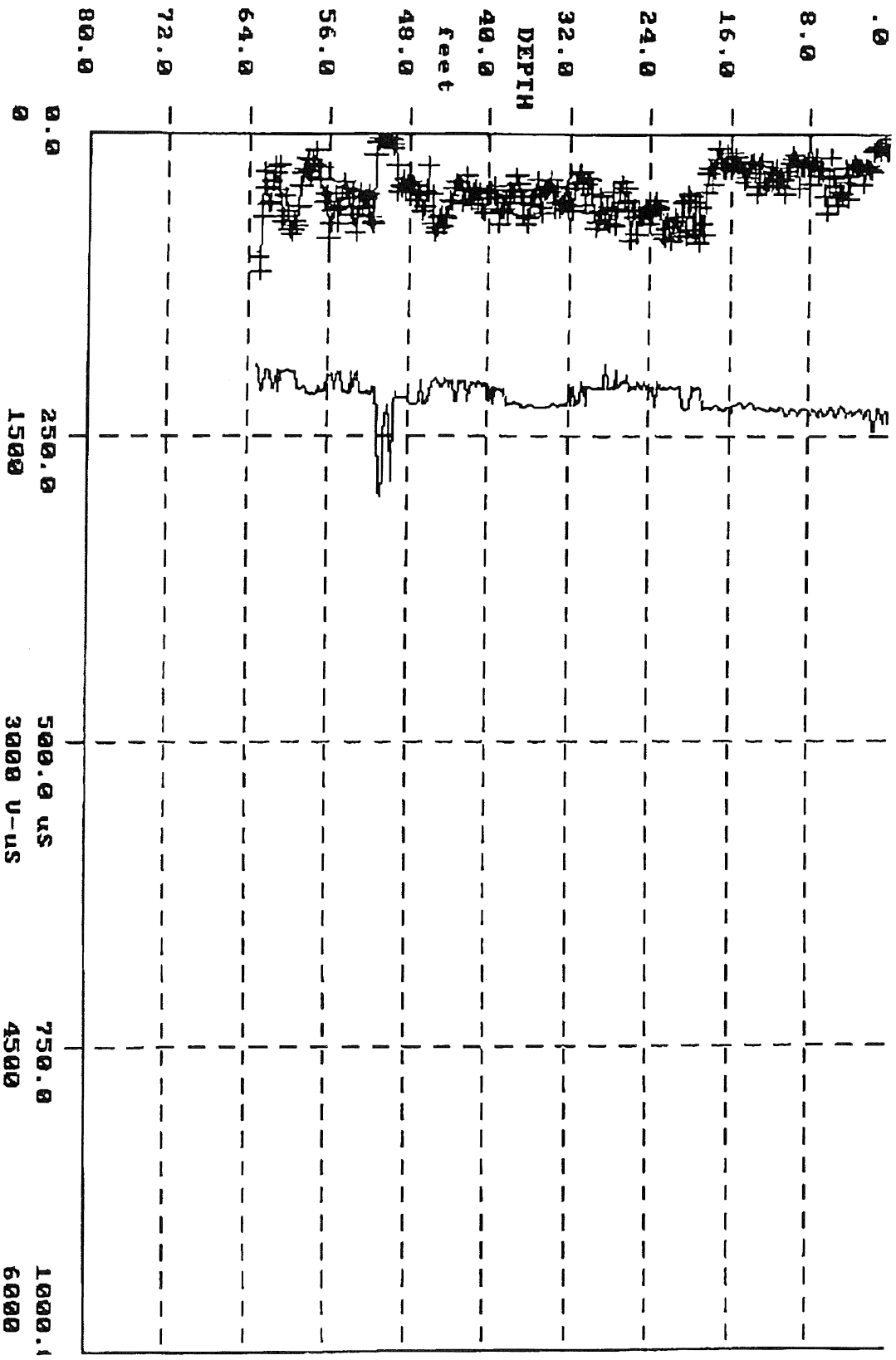
JOB: I-235 42nd LOC: 42cpw14.p12  
TUBE PAIR: 1 - 4.CH. 1, SP.= 27.0 in  
DEPTH vs. THRESHOLD  
DEPTH vs. TOT. ENERGY + + + + +

THRESHOLDS: 1.5\* PKuse FIG.  
RECORD: 351 DEPTH: 0.00 ft  
Tt = 214 us Vp1 = 508 mV  
Esig = 228 uV Ense = 1 uV



JOB: I-235 42nd LOC: 42cprw523.p12  
 TUBE PAIR: 2 - 3, CH. 1, SP. = 31.0 in  
 DEPTH vs. THRESHOLD

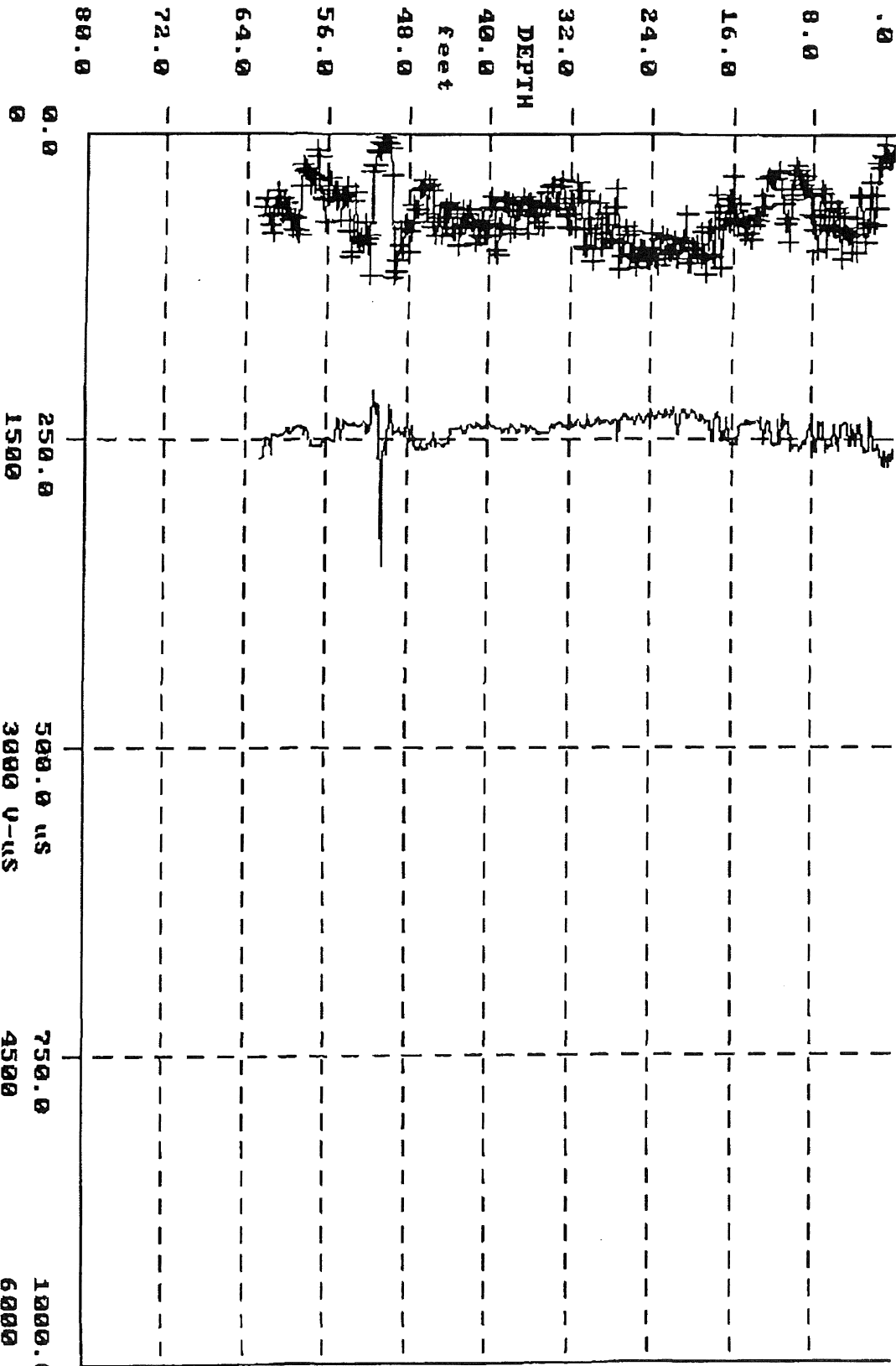
THRESHOLDS: 1.5\* PKnse FIG.  
 RECORD: 338 DEPTH: 0.00 ft  
 It = 254 uS Up1 = 348 mV  
 Esig = 21 uS Ense = 1 uS





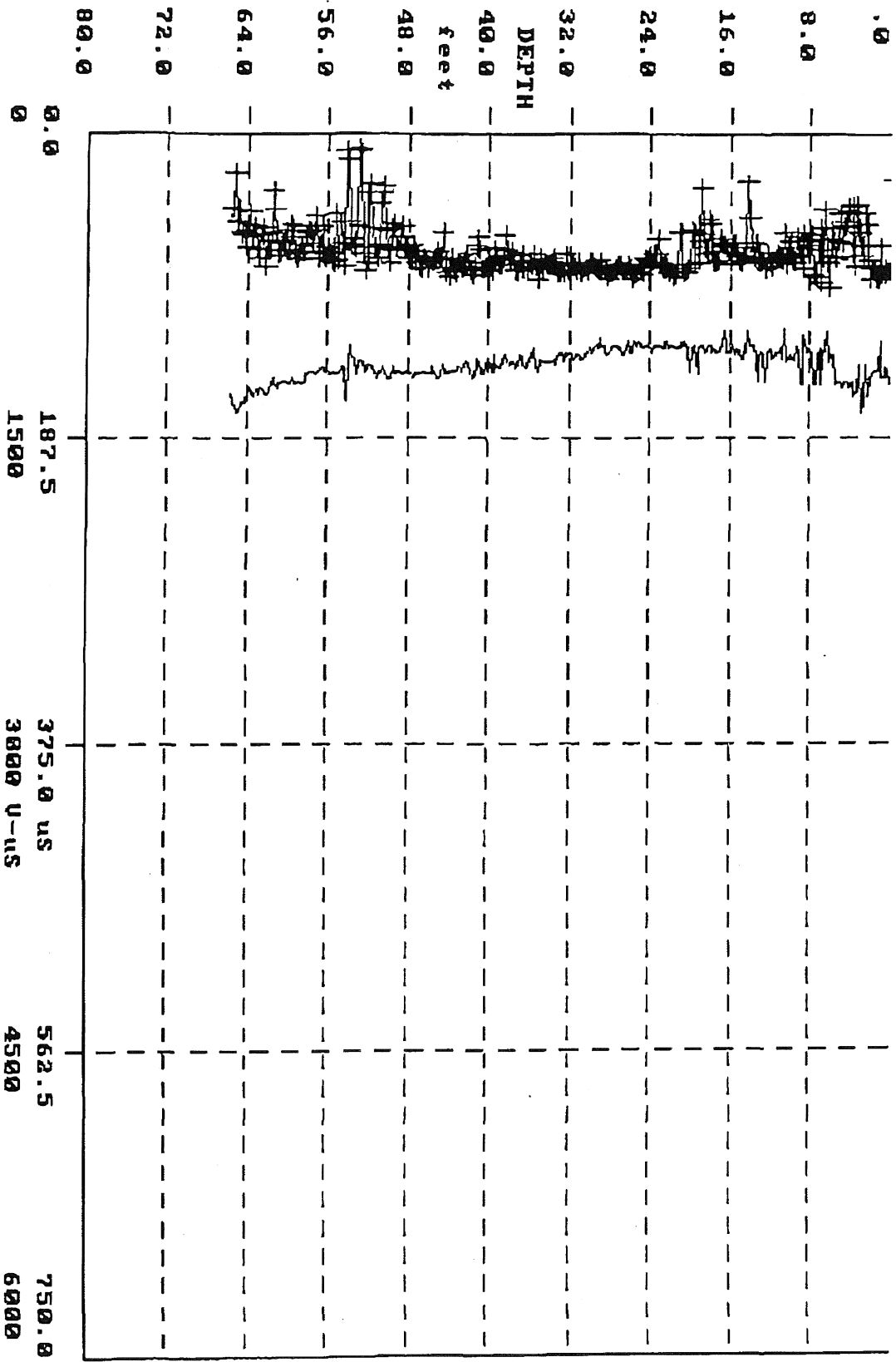
JOB: I-235 42nd LOG: 42cpw524.p12  
TUBE PAIR: 2 - 4, CH. 1, SP. = 38.0 in  
DEPTH vs. THRESHOLD

THRESHOLDS: 1.5\* PKnse FIG.  
RECORD: 334 DEPTH: 0.00 ft  
Tt = 276 us Up1 = -646 mV  
Esig = 121 uS Ense = 1 uS



JOB: I-235 42nd LOG: 42cpxw534.p12  
TUBE PAIR: 3 - 4, CH. 1, SP. = 22.0 in  
DEPTH vs. THRESHOLD

THRESHOLDS: 1.5\* PKuse FIG.  
RECORD: 351 DEPTH: 0.00 ft  
Tt = 158 us Vp1 = -428 mV  
Esig = 673 uS Ense = 0.00 uS



**REPORT ON DRILLED SHAFT  
LOAD TESTING (OSTERBERG METHOD)**

**Test Shaft #1 - 42nd Street / I-235 Overpass  
Des Moines, IA (LT-8756-1)**

**Prepared for: Longfellow Drilling, Inc.  
RR 1 Box 123  
Clearfield, IA 50840**

**Attention: Mr. Mike Kemery**

**PROJECT NUMBER: LT-8756-1, April 24, 2002**

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