

NAVY PUBLIC WORKS CENTER



ENVIRONMENTAL DEPARTMENT

Underground Storage Tank Removal
and
Site Assessment and Remediation Division

SUMMARY REPORT

**PRELIMINARY SITE CHARACTERIZATION USING
THE
SITE CHARACTERIZATION AND ANALYSIS
PENETROMETER SYSTEM (SCAPS)
IR SITES 3, 5, 7B, 13, AREA 37 FUEL FARM
and Miscellaneous FUEL PIPELINE SITES
Naval Air Station, Alameda
Alameda, California**

Document Control No. SCAPS-97016

July 7, 1997

Prepared By:

**Robert Stettler
Environmental Department
Code 980**



DEPARTMENT OF THE NAVY

NAVY PUBLIC WORKS CENTER

BOX 388113

2730 MCKEAN ST STE 1

SAN DIEGO, CA 92136-5294

5090

980/264

Ser **009245**

JUL 10 1997

From: Commanding Officer, Navy Public Works Center, San Diego
To: Commanding Officer, Engineering Field Activity, West, San Bruno, CA

Subj: SCAPS PRELIMINARY SITE CHARACTERIZATION FINAL REPORT

Encl: (1) Final Report

1. Enclosure (1) is the final report of a preliminary site characterization using the Site Characterization and Analysis Penetrometer System (SCAPS) at Naval Air Station Alameda in Alameda, California. The SCAPS was used to conduct subsurface screening of petroleum contaminants at 8 sites. The final report, which includes SCAPS data profiles, results of field operations, conclusions and recommendations, is submitted for your review.

2. Should you have any questions regarding this matter please contact Mr. Robert Stettler at (619) 556-9421.

A handwritten signature in black ink, appearing to read "A. Cozakos".

A. COZAKOS

By direction

Site Characterization and Analysis Penetrometer System (SCAPS)

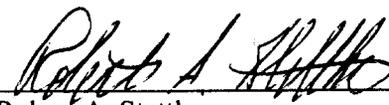
SCAPS investigation performed for: Environmental Field Activity, West
Base/Activity: Naval Air Station Alameda, Alameda, CA
SCAPS field investigation: 11/20/96 through 12/13/96
Document Control Number: SCAPS-9700?

In accordance with the Project Management Plan between the Navy Public Works Center, San Diego Environmental Department (PWCSO) and the Environmental Field Activity, West (EFA West), PWCSO has prepared this Site Characterization and Analysis Penetrometer System (SCAPS) summary report. The SCAPS investigation was conducted at IR Sites 3, 5, 7B and 13, Area 37 Fuel Farm, "Fire Station" pipeline site, "Sea Plane Lagoon" pipeline site, and "Water Towers" pipeline site at Naval Air Station Alameda (NAS Alameda) in Alameda, California. The SCAPS investigation was performed in accordance with the "Work Plan, Preliminary Site Characterization using the Site Characterization and Analysis Penetrometer System, Naval Air Station Alameda, IR Site 3, IR Site 13, IR Site 7B, Area 37 Fuel Farm and Miscellaneous Fuel Pipelines" dated November 14, 1996, prepared by PWCSO. It should be noted that the work performed at IR Site 5 was requested by Naval Facilities Engineering Service Center (NFESC) personnel following completion of the referenced Work Plan, and is therefore not discussed in the Work Plan.

The SCAPS field exploration took place from November 20 through December 13, 1996. A total of 229 pushes comprising 119 laser induced fluorescence (LIF) pushes (11 encountered shallow refusal), 77 non-instrumented dummy pushes, 30 sampling pushes and 5 grout pushes were advanced at the site. A total of 21 discrete soil samples and 7 ground water samples were obtained (2 sample pushes failed to recover a usable sample). Included herein is a report for the sites referenced above which includes a brief discussion of results, site plans and cross sections depicting SCAPS push locations with the maximum significant fluorescence intensities recorded at each push location (Figures 3 through 13), and tables summarizing fluorescence data and analytical results. SCAPS data profiles are provided in Appendix A and laboratory reports are provided in Appendix B.

In summary, SCAPS fluorescence data indicates the presence of petroleum hydrocarbons, commonly referred to as petroleum, oil and lubricants (POLs) at IR Sites 3, 5, 7b and 13, Fuel Farm 37, and near underground fuel pipelines located near the Fire Station and near the intersection of Fifth Street and Avenue "D". The extent of impact is discussed in the following report.

If you have any questions or comments regarding this summary report, please contact Robert Stettler at (619) 556-9421.


Robert A. Stettler
Project Manager


Rod Soule
PWC SCAPS Project Coordinator
C.E.G. 1467 (CA)

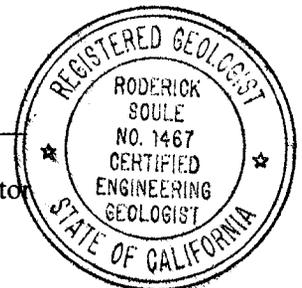


Table of Contents

1.0 INTRODUCTION	1
1.1 SCOPE OF WORK.....	1
2.0 SITE BACKGROUND	1
2.1 LOCATION AND HISTORY.....	1
2.2 SUBSURFACE SETTING.....	1
3.0 SCAPS TECHNOLOGY DESCRIPTION	2
3.1 INTRODUCTION TO SCAPS TECHNOLOGY.....	2
3.2 SOIL CLASSIFICATION LOGS	2
3.3 LIF LOGS	2
4.0 SITE INVESTIGATION.....	3
4.1 SCAPS LIF PUSHES.....	3
4.2 SOIL SAMPLING	3
4.3 LABORATORY ANALYSIS.....	4
4.4 SITE SURVEY	4
5.0 IR SITE 3 AND IR SITE 7B.....	4
5.1 BACKGROUND	4
5.2 SITE SOILS.....	5
5.3 SITE HYDROGEOLOGY	5
5.4 SUMMARY OF SCAPS FLUORESCENCE DATA AND SOIL SAMPLING RESULTS.....	6
5.5 CONCLUSIONS	14
5.6 RECOMMENDATIONS	15
6.0 AREA 37 FUEL FARM.....	15
6.1 BACKGROUND	15
6.2 SITE SOILS.....	16
6.3 SITE HYDROGEOLOGY	16
6.4 SUMMARY OF SCAPS FLUORESCENCE DATA AND SOIL SAMPLING RESULTS.....	16
6.5 CONCLUSIONS	20
6.6 RECOMMENDATIONS	20
7.0 IR SITE 13.....	21
7.1 BACKGROUND	21
7.2 SITE SOILS.....	21
7.3 SITE HYDROGEOLOGY	22
7.4 SUMMARY OF SCAPS FLUORESCENCE DATA AND SOIL SAMPLING RESULTS.....	22
7.5 CONCLUSIONS	25
7.6 RECOMMENDATIONS	25
8.0 WATER TOWERS PIPELINE AREA	25
8.1 BACKGROUND	25
8.2 SITE SOILS.....	26
8.3 SITE HYDROGEOLOGY	26
8.4 SUMMARY OF SCAPS FLUORESCENCE DATA AND SOIL SAMPLING RESULTS.....	26
8.5 CONCLUSIONS	28
8.6 RECOMMENDATIONS	29
9.0 SEA PLANE LAGOON PIPELINE AREA.....	29
9.1 BACKGROUND	29
9.2 SITE SOILS.....	29

9.3 SITE HYDROGEOLOGY	29
9.4 SUMMARY OF SCAPS FLUORESCENCE DATA AND SOIL SAMPLING RESULTS	30
9.5 CONCLUSIONS	32
9.6 RECOMMENDATIONS	32
10.0 FIRE STATION PIPELINE AREA	32
10.1 BACKGROUND	32
10.2 SITE SOILS	32
10.3 SITE HYDROGEOLOGY	33
10.4 SUMMARY OF SCAPS FLUORESCENCE DATA AND SOIL SAMPLING RESULTS	33
10.5 CONCLUSIONS	35
10.6 RECOMMENDATIONS	36
11.0 IR SITE 5.....	36
11.1 BACKGROUND	36
11.2 SITE SOILS	36
11.3 SITE HYDROGEOLOGY	37
11.4 SUMMARY OF SCAPS FLUORESCENCE DATA AND SOIL SAMPLING RESULTS	37
11.5 CONCLUSIONS	41
11.6 RECOMMENDATIONS	41
12.0 REFERENCES.....	42

TABLE 1	Summary of Fluorescence Data and Soil Analytical Results - IR Site 3
TABLE 2	Summary of Fluorescence Data and Soil Analytical Results - IR Site 7B
TABLE 3	Summary of Fluorescence Data and Soil Analytical Results - Area 37 Fuel Farm
TABLE 4	Summary of Fluorescence Data and Soil Analytical Results - IR Site 13
TABLE 5	Summary of Fluorescence Data and Soil Analytical Results - Water Towers Pipeline Area
TABLE 6	Summary of Fluorescence Data and Soil Analytical Results - Sea Plane Lagoon Pipeline Area
TABLE 7	Summary of Fluorescence Data and Soil Analytical Results - Fire Station Pipeline Area
TABLE 8	Summary of Fluorescence Data and Soil Analytical Results - IR Site 5

FIGURE 1	Location Map
FIGURE 2	NAS Alameda Base Map
FIGURE 3	Site Plan - IR Sites 3 and 7B
FIGURE 4	Cross Sections - IR Site 3 and IR Site 7B
FIGURE 5	Site Plan - Area 37 Fuel Farm
FIGURE 6	Cross Sections - Area 37 Fuel Farm
FIGURE 7	Site Plan - IR Site 13
FIGURE 8	Cross Sections - IR Site 13
FIGURE 9	Site Plan - Water Towers Pipeline Area
FIGURE 10	Cross Sections - Water Towers Pipeline Area
FIGURE 11	Site Plan - Sea Plane Lagoon Pipeline Area
FIGURE 12	Site Plan - Fire Station Pipeline Area and IR Site 5
FIGURE 13	Cross Sections - Fire Station Pipeline Area and IR Site 5
FIGURE 14	Soil Classification Chart

APPENDIX A	SCAPS Data
APPENDIX B	Laboratory Data

1.0 INTRODUCTION

1.1 *Scope of Work*

The purpose of this SCAPS investigation was to perform a site assessment for petroleum hydrocarbons at IR Sites 3, 5, 7B and 13, Area 37 Fuel Farm and in the area of underground pipelines located near the Fire Station, the northwest corner of the Sea Plane Lagoon and the Water Tanks near the intersection of Fifth Street and Avenue "D". The scope of work included preparation of a work plan, health and safety plan, spill contingency plan, and quality control project plan; field investigation including the pushing of 119 SCAPS laser induced fluorescence pushes; collection and analysis of 21 confirmation soil samples and 7 ground-water samples; analysis of field and laboratory data; and preparation of this final report. Delineation of petroleum hydrocarbon impact was limited to areas suitable for access with the SCAPS truck.

2.0 SITE BACKGROUND

2.1 *Location and History*

Naval Air Station Alameda is located at the western end of Alameda Island near the northwestern corner of Alameda County, California (Figure 1). Alameda Island is located at the eastern edge of San Francisco Bay adjacent to the City of Oakland. The base is bordered on the north by the Oakland Inner Harbor, on the east by the City of Alameda, and on the west and south by San Francisco Bay. The base is approximately 2 miles long and 1 mile wide, and occupies 2,634 acres. Most of NAS Alameda is located on reclaimed land created by placement of fill material over submerged Holocene Bay Mud interspersed with numerous drainage channels and sloughs (PRC, 1995).

Prior to 1930, at least two large industrial facilities (a borax processing plant and an oil refinery) were located on lands now occupied by NAS Alameda. The oil refinery was located near the southeastern corner of NAS Alameda. This area is now referred to as IR Site 13 (see Figure 2). The U.S. Army acquired the NAS site from the City of Alameda in 1930 and began construction on the site in 1931. In 1936, the U.S. Navy acquired the site from the Army and began building the air station in response to the military buildup in Europe prior to World War II. The construction involved filling a considerable area between the Oakland Inner Harbor and Alameda Island. After the United States entered World War II in 1941, more land was acquired adjacent to the air station. Following the war, NAS Alameda returned to its original primary mission of providing facilities and support for fleet aviation activities (PRC, 1995).

2.2 *Subsurface Setting*

The following paragraph is excerpted from the report "1995 Base Realignment and Closure Cleanup Plan - Revision 01" prepared by PRC Environmental Management, Inc. dated March, 1995.

Alameda Island is at the base of a gently westward-sloping plain that extends from the Oakland-Berkeley hills on the east to the shore of the San Francisco Bay. Originally a peninsula, Alameda Island was detached from the mainland in 1902 when a channel was cut linking San Leandro Bay with the San Francisco Bay. The northern portion of Alameda Island was formerly tidelands, marshlands, and sloughs adjacent to the historical San Antonio Channel, now known as the Oakland Inner Harbor. Most of the land that is now NAS Alameda was originally under water.

NAS Alameda is underlain by approximately 300 feet of unconsolidated sediments, which are in turn underlain by Franciscan Formation bedrock. The unconsolidated sediments consist of terrestrial, estuarine, marine and eolian deposits of sand, silt and clay. These deposits are primarily sands. These natural deposits are locally overlain by man-made fills (PRC, 1995).

Ground water is very shallow (less than 10 feet below ground surface) at NAS Alameda. The ground water is in hydraulic communication with San Francisco Bay and is influenced by tidal fluctuations in the bay (PRC, 1995).

3.0 SCAPS TECHNOLOGY DESCRIPTION

3.1 *Introduction to SCAPS Technology*

The SCAPS is currently used as a method to screen for the presence of petroleum hydrocarbons, commonly referred to as petroleum, oil and lubricants (POLs). SCAPS uses ultraviolet light generated from a laser to induce the polynuclear aromatic hydrocarbons (PAHs) contained in petroleum products to fluoresce. The process is called laser induced fluorescence (LIF). A detailed discussion of SCAPS technology is provided in the work plan.

The SCAPS technology is based on traditional Cone Penetrometer Test (CPT) technology which has been successfully employed to characterize subsurface geologic conditions. The CPT consists of a 20-ton truck, with an attached hydraulic ram capable of pushing one-meter long threaded rods and an instrumented probe into the subsurface. SCAPS uses LIF via the push-rod and probe fiber optic cable system to detect relative subsurface soil POL concentrations. SCAPS provides measurements of POLs to depths of up to 150 feet with a vertical resolution of approximately 2 inches as the probe is pushed into the ground at a rate of 3 feet per minute.

At each SCAPS push location five real-time continuous logs relative to depth are produced on a computer printout, referred to herein as the SCAPS data profile. Data points displayed on the logs are collected and integrated over 5 centimeter (\approx 2 inch) intervals. The five logs produced are as follows:

- o Cone Pressure (tons/square foot)
- o Sleeve Friction (tons/square foot)
- o Soil Classification (an integer value from 1 to 12)
- o Wavelength at peak (nanometers [nm])
- o Raw fluorescence (i.e. fluorescence intensity, counts)

3.2 *Soil Classification Logs*

The first three logs above (cone pressure, sleeve resistance, and soil classification) provide data to evaluate soil type and strength. The SCAPS soil classification log indicating a numerical soil type is generated from a computer algorithm relating probe tip pressure and sleeve friction. This numerical value is an integer value from 1 to 12. A CPT soil classification chart (Figure 14) relates these integer values to typical soil classification nomenclature.

3.3 *LIF Logs*

The two LIF logs on the SCAPS data profile include fluorescence intensity and peak wavelength. POL-induced fluorescence intensity is indicative of POL concentration in the soil. Relative POL-induced fluorescence intensities can be used to evaluate relative POL concentrations across the site (typically, the

higher the POL-induced fluorescence intensity, the higher the POL concentration in the soil). The wavelength peak and its spectrum can aid in determining POL type. A summary of SCAPS fluorescence data is provided in Tables 1 through 8, "Summary of Fluorescence Data and Soil Analytical Results". The locations of the SCAPS pushes are shown on the site plans (Figures 3, 6, 8, 10, 12 and 14).

Natural soil constituents also fluoresce and contribute to background soil fluorescence ("background noise") on the logs. A fluorescence intensity peak (signal), which extends above the background fluorescence on the log, indicates the presence of a POL or increased concentration of fluorescing soil constituents. Many POLs fluoresce at a lower peak wavelength than naturally occurring soils, thus, a common fluorescence signature indicating the presence of POL compounds is an increase in fluorescence intensity coupled with a decrease in the peak wavelength observed. A POL-induced peak is inferred based on wavelength and its occurrence in an expected soil horizon which is consistent with POL migration patterns in the subsurface. A non-POL-induced peak is inferred based on wavelength and occurrence inconsistent with POL migration patterns.

Surface fluorescence peaks are common and usually due to the presence of fluorescing asphalt, plant matter, organics, and/or deposition of atmosphere-derived PAH-rich combustion by-products; for example, from smog and vehicle exhaust, on surface soils. Surface fluorescence intervals inferred not to be related to the site POL release are not included on the site plan or fluorescence summary table.

4.0 SITE INVESTIGATION

4.1 SCAPS LIF Pushes

The SCAPS LIF and soil sampling pushes were performed on November 20 through 25, 1996 and on December 2 through 13, 1996. A total of 119 LIF pushes plus 30 sampling pushes were advanced at the various sites to a maximum depth of 53.1 feet bgs. A total of 21 discrete soil samples and 7 discrete ground-water samples (2 sample pushes failed to recover a usable sample) were collected at the 8 referenced sites. Site maps including push locations and sample locations are presented in Figures 3, 5, 7, 9, 11 and 12. Cross sections depicting impacted soil zones, as well as the pertinent fluorescence intensity logs, are presented in Figures 4, 6, 8, 10 and 13.

The SCAPS rod-probe assembly was decontaminated as the rods were withdrawn from the hole at the end of each push. The rods and probe pass through a cleaning manifold into which hot pressurized water is injected in order to decontaminate the rod-probe assembly. The rinsate water is continuously drawn from the cleaning manifold by a vacuum into a 55-gallon drum secured to the SCAPS truck. Once filled, this drum was drained into one of several other drums for subsequent disposal by NAS Alameda personnel. A total of seven 55-gallon drums were generated during the SCAPS investigation. These drums were stored at IR Site 13 near the northeast corner of Building 397.

All SCAPS LIF push holes were destroyed by pumping a cement-bentonite mixture through a small tube in the rod-probe assembly as the rod-probe assembly was withdrawn from the hole, so as to grout the push hole from bottom to top in accordance with standard guidelines.

4.2 Soil Sampling

Six confirmation soil samples were collected at IR Site 3, two soil samples were collected at IR Site 7B, six soil samples were collected at Area 37 Fuel Farm, one soil sample was collected at the "Water Towers" pipeline site, one soil sample was collected at the "Fire Station" pipeline site, one soil sample was collected at the "Sea Plane Lagoon" pipeline site and four soil samples were collected at IR Site 5.

Soil samples were taken for the purpose of confirming the SCAPS data, either by verifying POL impact in zones of increased fluorescence or by confirming the absence of POL impact in areas of "background" fluorescence. Soil samples were taken at selected depths within one lateral foot of the LIF push of interest. Samples were obtained using a commercial sampler attachment with the SCAPS CPT system.

Rinsate water generated during the SCAPS rod-probe decontamination procedures was disposed of as described in Section 4.1. The soil sampler assembly was decontaminated with a detergent solution as described in the work plan. This soapy water was also disposed of as described in Section 4.1. Soil sampling push holes were destroyed by reentering the sample hole to the full depth with a grouting rod-probe attachment and then pumping a cement-bentonite mixture through a small tube in the rod-probe assembly as the rod-probe assembly was withdrawn from the hole, grouting the push hole from bottom to top in accordance with standard guidelines.

4.3 Laboratory Analysis

Soil samples collected at all sites other than IR Site 5 were analyzed by PWCSO's certified (in California) environmental laboratory for Total Petroleum Hydrocarbons (TPH) using EPA method 8015 modified. The results were quantified as gasoline, diesel and/or JP-5 depending on the contaminant of concern at the site where the sample was collected. Chromatograms for all TPH analyses, along with various laboratory standards, are included with the laboratory reports in Appendix B. The samples collected at IR Site 5 were tested by PWCSO's environmental laboratory for Semivolatile Organic Compounds (SVOC's) by EPA method 8270 and Volatile Organic Compounds (VOC's) by EPA method 8240. Laboratory data sheets are presented in Appendix B. Analytical results are summarized in Tables 1 through 8. Partial analytical results are also provided on the site plans and cross sections (Figures 3 through 13) and on each SCAPS data profile of push locations where samples were obtained.

4.4 Site Survey

The SCAPS push holes and selected site landmarks were surveyed using a global positioning system (GPS). The GPS unit used was a Trimble Pathfinder Pro XL receiver/processor and Trimble ProBeacon differential receiver capable of providing sub-meter accuracy. To ensure suitable accuracy, the GPS survey was timed to coincide with an optimal number of satellite transmitters being visible above the horizon. Elevations surveyed with the GPS system are generally poor. However, topography across the individual sites is very flat, with maximum relief estimated to be less than 2 feet. For this reason, the cross sections presented in this report depict all pushes at the same relative elevation.

5.0 IR SITE 3 AND IR SITE 7B

5.1 Background

IR Site 3 is an abandoned, underground fuel storage area located in the southeastern portion of NAS Alameda (see Figure 2). Five, 10,000 gallon underground storage tanks previously used to store AVGAS are located beneath a static aircraft display placed on an "island" at the intersection of Atlantic Avenue and 9th Street (refer to Figure 3). Evidence of leakage from these tanks was discovered in 1975 and 1978. A total of up to 365,000 gallons of AVGAS is estimated to have been released. By 1987, all five tanks had been drained, cleaned and filled with water. The tanks were subsequently destroyed and buried in place at some unknown date (PRC, 1996).

Several investigations of the contamination at IR Site 3 have been performed previously by a number of consulting firms. Contamination of both soil and groundwater was confirmed by these investigations.

Contaminants detected at this site include motor oil, solvents and metals, in addition to AVGAS. The purpose of the SCAPS investigation at IR site was to delineate the extent of AVGAS impact. An additional goal was to provide LIF and lithologic data requested by Professor Kent Udell of the University of California, Berkeley in support of the University's intrinsic bioremediation feasibility study. The University specifically requested SCAPS pushes at 12 locations. Pushes could not be placed at two of the locations due to lack of access for the SCAPS CPT truck. Pushes were placed as closely as possible to the other 10 specified locations.

At the time of the SCAPS field investigation a vapor extraction remedial system was observed at IR Site 3. The system was not operating at that time. Operational data for this system were not provided for this report.

IR Site 7B was reportedly used by the Navy Exchange as a service station during an unknown time period in the past. During a site inspection by representatives of Canonie in 1988 piping was observed which suggested the presence of underground storage tanks near the northeastern corner of Building 162, which occupies a portion of IR Site 7B. Prior to closure of NAS Alameda, Building 162 was used as a maintenance shop for ship components (PRC, 1996). Two tanks, apparently used for waste oil storage, were subsequently removed near the northeastern corner of Building 162. The purpose of the SCAPS investigation at IR Site 7B was to evaluate the potential presence of waste oil contamination, as well as AVGAS contamination from the nearby IR Site 3 spill, in the vicinity of the northeastern corner of Building 162.

The area encompassed by these 2 sites is generally quite flat with total relief estimated to be less than 2 feet. Most of the area is paved, except for the static display area referenced above (see Figure 3), which is landscaped with grass. An automatic sprinkler system is used to irrigate this area.

5.2 Site Soils

Based on the SCAPS soil classification logs generated during the field investigation, the subsurface materials encountered at IR Sites 3 and 7B consist of interbedded silts, sands and clays. The logs also indicate that stratigraphy is relatively uniform and consistent across the site. The various soil layers also appear to dip slightly to the northwest. Visual observations of the soil samples collected at this site generally confirm the soil types described in the soil classification logs.

Hard materials, such as pavement and rock can cause damage to the probe sensors. To avoid such damage, selected intervals of several pushes (IR3-01, IR3-5 through IR3-17, IR3-19 through IR3-23, IR3-31 through IR3-33 and B162-01) were pre-pushed with a "dummy" probe which did not contain soil classification or LIF sensors. After an appropriate depth was reached, the instrumented probe was pushed into the same hole until the target depth or refusal was reached. As a result of pushing the instrumented sensor into an existing hole and not into undisturbed soil, the soil classification log for the pre-pushed interval is not representative of actual soil types. The pre-pushed interval is noted on both Tables 1 and 2, and on the SCAPS data profiles for these pushes. The LIF data remains unaffected by pre-pushing procedures.

5.3 Site Hydrogeology

The current SCAPS system does not directly measure groundwater conditions. Previous measurements in monitoring wells indicate the depth to groundwater is approximately 5 to 6 feet bgs at IR Site 3. The ground-water gradient is expected to be westward towards the Sea Plane Lagoon (i.e., San Francisco Bay).

5.4 *Summary of SCAPS Fluorescence Data and Soil Sampling Results*

The following Tables 1 and 2 summarize SCAPS fluorescence data, soil and ground-water sample analytical results at IR Site 3 and IR Site 7B, respectively. Further discussion of the lettered entries in the "Comments" column of Tables 1 and 2 is provided immediately following the tables.

Table 1
Summary of Fluorescence Data and Analytical Results
IR Site 3 - NAS Alameda

Push ID	Date	Max Depth (prepused interval)	Max Fluorescence ¹ (counts), depth	Significant Fluorescence Intervals	Sample Results Depth, Concentration (soil=mg/kg) (water=ug/l) ²	Comments ³
IR3-01	11/20/96	20.0' (0' to 2.4')	242,878 @ 6.3'	4.7' to 6.5'	-	POL impact. (a) (b)
IR3-02	11/20/96	22.0'	257,433 @ 5.6'	4.9' to 5.9'	-	POL impact. (a) (b)
IR3-03	11/20/96	21.2'	279,096 @ 5.4'	4.9' to 5.9'	-	POL impact. (a) (b)
IR3-04	11/20/96	21.4'	60,293 @ 6.7'	4.9' to 7.1'	-	POL impact. (a)
IR3-05	11/21/96	22.1' (0' to 2')	277,582 @ 6.1'	5.7' to 7.1'	-	POL impact. (a) (b)
IR3-06	11/21/96	22.2' (0' to 2')	123,852' @ 6.5'	4.9' to 6.9'	Water @ 6.5' B=36 T=5.9 E=47 X=42 Water @ 11.5' B<0.5 T=2.5 E=14 X=15	POL impact. (a) (k)
IR3-07	11/21/96	22.1' (0' to 2')	8,439 @ 11.8'	-	-	Background.
IR3-08	11/21/96	22.3' (0' to 2')	21,975 @ 7.3'	6.6' to 7.5' ?	-	Potential POL impact. (e)
IR3-09	11/21/96	22.3' (0' to 2')	13,234 @ 10.8'	-	-	Background.
IR3-10	11/21/96	21.1' (0' to 2')	29,669 @ 10.5'	-	Soil @ 10.5' TPHg<10	Background. (d) (e)
IR3-11	11/21/96	22.2' (0' to 2')	89,733 @ 6.5'	4.9' to 5.1' ? 6.3' to 6.9'	Soil @ 6.5' TPHgro=315 Water @ 11.5' TPHgro=5,300 B<0.5 T=4.4 E=7.7 X=1.9	Potential POL impact. POL impact. (a) (c) (k)

Table 1
Summary of Fluorescence Data and Analytical Results
IR Site 3 - NAS Alameda

Push ID	Date	Max Depth (prepunched interval)	Max Fluorescence ¹ (counts), depth	Significant Fluorescence ¹ Intervals	Sample Results Depth, Concentration (soil=mg/kg) (water=ug/l) ²	Comments ³
IR3-12	11/21/96	22.2' (0' to 2')	267,530 @ 5.7'	5.0' to 6.6'	Water @ 12.5' B=1,300 T=36 E=1,800 X=4,200	POL impact. (a) (b) (k)
IR3-13	11/21/96	21.7' (0' to 2')	4,129 @ 10.2'	-	-	Background.
IR3-14	11/21/96	21.4' (0' to 2')	4,922 @ 10.1'	-	-	Background.
IR3-15	11/21/96	21.6' (0' to 2')	19,797 @ 3.5'	[2.4' to 4.0']	Soil @ 3.4' TPHd<10	Background.. (d)
IR3-16	11/21/96	21.6' (0' to 2')	7,957 @ 5.9'	-	-	Background.
IR3-17	11/21/96	21.8' (0' to 2')	22,817 @ 6.7'	[6.3' to 7.4']	Soil @ 7.5' TPHg<10	Background. (d)
IR3-18	11/22/96	22.2'	10,329 @ 5.5'	-	-	Background.
IR3-19	11/22/96	22.1' (0' to 2')	64,144 @ 1.3'	[1.0' to 1.7']	Soil @ 2.0' TPHg<10 TPHd<10	Background. (d)
IR3-20	11/22/96	22.3' (0' to 2.5')	13,588 @ 5.4'	-	-	Background.
IR3-21	11/22/96	21.9' (0' to 3')	17,054 @ 6.9'	[5.1' to 7.5']	Soil @ 7.5' TPHg<10	Background. (d)
IR3-22	11/22/96	22.3' (0' to 2')	274,397 @ 6.1'	4.6' to 6.4'	-	POL impact. (a) (b)
IR3-23	11/24/96	22.2' (0' to 3')	109,798 @ 5.1'	4.6' to 5.5'	-	POL impact. (a) (i)
IR3-24	11/25/96	22.2'	6,587 @ 10.0'	-	-	Background.
IR3-25	11/25/96	22.2'	5,067 @ 7.4'	-	-	Background.
IR3-26	11/25/96	22.2'	89,630 @ 7.0'	6.5' to 7.2' ?	-	Potential POL impact. (j)
IR3-27	11/25/96	22.3'	24,885 @ 8.1'	-	-	Background. (d)

Table 1
Summary of Fluorescence Data and Analytical Results
IR Site 3 - NAS Alameda

Push ID	Date	Max Depth (prepused interval)	Max Fluorescence ¹ (counts), depth	Significant Fluorescence Intervals	Sample Results Depth, Concen- tration (soil=mg/kg) (water=ug/l) ²	Comments ³
IR3-28	11/25/96	21.6'	18,058 @ 5.8'	-	-	Background. (d)
IR3-29	11/25/96	21.6'	10,852 @ 5.9'	-	-	Background. (d)
IR3-30	11/25/96	22.2'	10,246 @ 9.4'	-	-	Background.
IR3-31	12/7/96	17.6' (0' to 3')	123,315 @ 5.0'	3.2' to 5.5'	-	POL impact. (a)
IR3-32	12/11/96	22.2' (0' to 2')	191,614 @ 6.4'	6.2' to 6.6'	-	POL impact. (a) (e)
IR3-33	12/11/96	19.3' (0' to 2')	103,219 @ 6.1'	5.1' to 6.3'	-	POL impact. (a)
IR3-34	12/12/96	22.2'	7,202 @ 13.2'	-	-	Background.
IR3-35	12/12/96	22.3'	8,069 @ 11.2'	-	-	Background.
IR3-36	12/12/96	19.0'	220,878 @ 5.7'	5.3' to 6.0'	-	POL impact. (a) (b)
IR3-37	12/12/96	21.3'	7,423 @ 1.5'	[1.3' to 1.6']	-	Background. (d)
IR3-38	12/12/96	19.8'	5,721 @ 15.8'	[15.8' to 17.3']	-	Background. (d)

note:

- Surface fluorescence intervals attributed to naturally occurring fluorescing soil constituents or atmospheric-derived deposition of PAH-rich combustion by-products are not reported. Bold significant fluorescent intervals indicate POL impact, "?" indicates potential POL impact, brackets indicate non-POL fluorescence.
- TPHg = Total Petroleum Hydrocarbons as gasoline (DHS Method) - "gro" indicates gasoline range organics, with chromatographic pattern not consistent with gasoline.
 TPHd = Total Petroleum Hydrocarbons as diesel (DHS Method) - "dro" indicates diesel range organics, with chromatographic pattern not consistent with diesel.
 TPHjp5 = Total Petroleum Hydrocarbons as JP-5 (DHS Method)
 BTEX = Benzene, Toluene, Ethylbenzene, Xylenes
 ² = No concentration reported above laboratory detection limit of ** mg/kg
- Refer to summary of SCAPS data in immediately following Table 2 for description of lettered entries under "Comments".
- For pushes with inferred potential fluorescence, or had a soil sample collected, the maximum fluorescence listed in the table is for the potential POL fluorescence interval, or the interval associated with the sample. Higher fluorescence levels which may appear on the log are interpreted as background.

Table 2
Summary of Fluorescence Data and Analytical Results
IR Site 7B - NAS Alameda

Push ID	Date	Max Depth (prepushed interval)	Max Fluorescence ¹ (counts), depth	Significant Fluorescence Intervals	Sample Results Depth, Concentration (soil=mg/kg) (water=ug/l) ²	Comments ³
B162-01	12/5/96	22.2' (0' to 3')	14,572 @ 6.2'		Water @ 6.5' B<0.5 T=13 E<0.5 X=34 Water @ 10.5' B=2.9 T=0.8 E<0.5 X<1.5	Potential POL impact. (g) (k)
B162-02	12/9/96	21.0'	70,082 @ 5.8'		Soil @ 6' TPHg=300 (gro)	POL impact. (a) (f)
B162-03	12/9/96	22.5'	201,788 @ 5.8'		Soil @ 6' TPHg=510 (gro)	POL impact. (a) (b) (f)
B162-04	12/9/96	22.2'	53,369 @ 5.2'		-	Potential POL impact. (d) (h)

note:

- Surface fluorescence intervals attributed to naturally occurring fluorescing soil constituents or atmospheric-derived deposition of PAH-rich combustion by-products are not reported. Bold significant fluorescent intervals indicate POL impact, "?" indicates potential POL impact, brackets indicate non-POL fluorescence.
- TPHg = Total Petroleum Hydrocarbons as gasoline (DHS Method) - "gro" indicates gasoline range organics, with chromatographic pattern not consistent with gasoline.
 TPHd = Total Petroleum Hydrocarbons as diesel (DHS Method) - "dro" indicates diesel range organics, with chromatographic pattern not consistent with diesel.
 TPHjp5 = Total Petroleum Hydrocarbons as JP-5 (DHS Method)
 BTEX = Benzene, Toluene, Ethylbenzene, Xylenes
 < ** = No concentration reported above laboratory detection limit of ** mg/kg
- Refer to summary of SCAPS data in immediately following Table 2 for description of lettered entries under "Comments".
- For pushes with inferred potential fluorescence, or had a soil sample collected, the maximum fluorescence listed in the table is for the potential POL fluorescence interval, or the interval associated with the sample. Higher fluorescence levels which may appear on the log are interpreted as background.

- (a) Fluorescence inferred to be a result of POL impact was observed at SCAPS push locations IR3-01 through IR3-06, IR3-11, IR3-12, IR3-22, IR3-23, IR3-31 through IR3-33, IR3-36, B162-02 and B162-03. At each of these locations, an increase in fluorescence intensity coupled with a decrease in peak fluorescence wavelength was interpreted to represent POL impact. The Site Plan (Figure 3) indicates a generalized zone where POL fluorescence above 20,000 counts may be expected. This is meant to serve as an indication of the area of greatest POL impact. The vertical extent of inferred POL impact is shown in cross-sections A-A' and B-B' (refer to Figures 4a and 4b).

The fluorescence response of the inferred POL impacted intervals was in general very consistent and typical of POL impacted soils. In particular, the intervals of POL impact were marked by increased fluorescence intensity and a very consistent peak wavelength in the range of 447 to 464 nm throughout the impacted zone. The exceptions to this pattern were pushes IR3-12, B162-02 and B162-03 which had peak wavelengths in the range of 480 to 501 nm. This may be an indication of a different, "heavier" product, or it may be related to fractionation/weathering of the product. Additionally, the bottom of all the inferred POL impacted intervals were consistently found at depths very close to the anticipated depth of the water table (5.5' to 7.1' bgs), as would be expected for a plume of light non-aqueous phase liquid (LNAPL).

- (b) The highest fluorescence intensities observed at IR Site 3 were in pushes IR3-01, IR3-03 and IR3-22, which all had maximum intensities between 270,000 and 280,000 counts. These peak intensities were observed at depths of 6.1', 5.4' and 6.1' bgs, respectively. These depths correspond closely to the anticipated depth to the water table:

Fluorescence intensities above 200,000 counts can be indicative of free product. In addition to pushes IR3-01, IR3-03 and IR3-22, intensities above 200,000 counts were also observed in pushes IR3-02, IR3-05, IR3-12, IR3-36 and B162-03. Free product may be present in the vicinity of these pushes. The Site Plan (Figure 3) indicates the generalized zone where POL fluorescence above 200,000 counts may be expected. This is meant to serve as an indication of the potential presence of free product. It should be noted that the vertical interval over which intensities greater than 200,000 counts was observed was thin in all of these pushes, ranging from 0.1' to 0.7' in thickness.

- (c) A total of six soil samples were collected at IR Site 3. One of these samples was collected adjacent to push IR3-11 at a depth of 6.5'. This push displayed the typical response noted above with a maximum fluorescence intensity of 89,733 and a corresponding wavelength of 459 nm at a depth of 6.5'. The analytical results for this sample, by EPA Method 8015 modified, indicate 315 mg/kg TPH(gro). This result confirms the LIF data.

The "gro" note in the result is an abbreviation for "gasoline range organic". This was used by the laboratory to indicate the sample was quantified as gasoline, but displayed a chromatographic signature inconsistent with gasoline. This is expected for AVGAS, which is compositionally different from gasoline.

- (d) The remaining five soil samples were collected adjacent to pushes IR3-10, IR3-15, IR3-17, IR3-19 and IR3-21. Each of these pushes displayed intervals of elevated fluorescence intensity coupled with decreases in peak wavelength. However, these intervals were not consistent with the typical pattern noted above. These intervals occurred at depths significantly above or below the water table, and/or the peak wavelength did not fall in the typical 447 to 464 nm range. For these reasons they were suspected of representing elevated background fluorescence. These

samples were analyzed for TPH as gasoline and/or diesel and in all cases were below the detection limit of 10 mg/kg. These results confirm the LIF data.

The four samples from pushes IR3-15, IR3-17, IR3-19 and IR3-21 all had peak wavelengths well outside the 447 to 464 nm range observed in the inferred POL impacted zones at this site. More specifically, pushes IR3-15 and IR3-19 displayed very distinctive spectra in the zones of interest with a very sharp peak at 411 nm. This spectral pattern is commonly associated with sea shell fragments. When these samples were collected they were noted to contain shell fragments, and no hydrocarbon odor. Other samples collected at some of the other NAS Alameda sites with similar spectra also were noted to contain shell fragments. Intervals of increased fluorescence intensity with peak wavelengths in the 408 to 411 nm range are therefore interpreted as shell fragments.

The samples from IR3-17 and IR3-21 were both collected from intervals displaying peak wavelengths of 524 nanometers. These samples were noted to contain natural organic plant material including roots, and no hydrocarbon odor. Samples collected at some of the other NAS Alameda sites with similar spectra also were noted to contain plant material. Intervals of increased fluorescence intensity with peak wavelengths in the 525 to 535 nm range are therefore generally interpreted as plant material.

- (e) The distribution of contamination indicated by the LIF data indicates the contamination has migrated from the former storage tanks primarily to the west-northwest. This is consistent with the assumed ground-water gradient. However, there is also some indication of significant migration along a northeast-southwest trend. The northernmost push displaying a zone of inferred POL impact is IR3-32 (191,614 counts @ 6.4'). It is interesting to note that there are two pushes south of this push, IR3-08 and IR3-10, with much lower fluorescence intensities (21,975 counts @ 7.3' and 29,669 counts @ 10.5', respectively). The zone of elevated fluorescence in push IR3-08 is somewhat deeper (0.8 to 0.9') than seen in the adjacent pushes and the peak wavelength is just slightly higher (468 nm). Based on this data, this zone is interpreted as potential POL impact. The zone of elevated fluorescence in push IR3-10 is significantly deeper (2.0' to 2.1') than seen in the adjacent pushes and a sample collected adjacent to the zone of interest yielded a TPH result below the detection limit of 10 mg/kg. Based on this data, this zone is interpreted as elevated background fluorescence.

The zone of elevated fluorescence in push IR3-32 occurs at depths very similar to those observed in the other POL impacted pushes to the south. The peak wavelength is generally similar as well, but the spectra are somewhat inconsistent over the interval. In particular, the spectrum @ 6.2' bgs is much broader with relatively high intensity extending into higher wavelengths. This suggests the possible presence of another, "heavier" petroleum product. This, together with the lack of inferred POL impact in pushes IR3-08 and IR3-10, suggest that the POL impact observed in push IR3-32 could be caused by a separate POL release unrelated to the AVGAS plume seen to the south. Alternatively, it may represent migration of the AVGAS plume via a narrow, high permeability pathway such as utility trench backfill.

- (f) Pushes B162-02 and B162-03 displayed fluorescence responses indicative of AVGAS contamination (70,082 counts @ 5.8' and 201,788 counts @ 5.8', respectively). It should be noted that the peak wavelength of these pushes is relatively high compared to the IR Site 3 pushes. The higher peak wavelength observed in push B162-02 (approximately 500 nm) appears to possibly be the result of mixing with waste oil contamination. The peak wavelength observed in push B162-03 is only slightly higher than the IR Site 3 pushes (approximately 480 nm). This

may represent a somewhat lesser influence of waste oil, or it may be related to decomposition/fractionation of the AVGAS. In general, the IR Site 3 pushes also tend to have somewhat higher peak wavelengths at the perimeter of the AVGAS plume. The vertical extent of the POL impacted zones in these two pushes are shown in cross section C-C' (see Figure 4c).

Soil samples were collected adjacent to pushes B162-02 and B162-03, both @ 6' bgs. Both samples were analyzed for TPH as gasoline by EPA method 8015 modified. These samples yielded 300 mg/kg and 510 mg/kg, respectively. Both were reported as "gro" (refer to note c above). These results confirm the LIF data.

Additionally, push B162-02 is closer to center of the inferred AVGAS plume than push B162-03, yet it has a substantially lower fluorescence intensity. This implies the potential presence of a preferred path of migration near push B162-03, such as a utility trench, as noted above for push IR3-32.

- (g) Push B162-01 displayed a zone of slightly elevated fluorescence (14,572 counts @ 6.2') which is interpreted as potential POL impact. The peak wavelength is similar to push B162-03, indicating this response, if it is in fact due to POL impact, may be dominated by AVGAS.
- (h) Push B162-04 displayed a zone of elevated fluorescence intensity (53,369 @ 5.2') with a relatively high peak wavelength of 522 nm. This wavelength is not consistent with fluorescence due to AVGAS. However, it is consistent with waste oil contamination, as well as with plant material as seen in pushes IR3-17 and IR3-21 (see note c above). This zone is interpreted as potential POL impact.
- (i) Push IR3-23 was located near the eastern end of the site, just north of the former AVGAS storage tanks. This push displayed a zone of elevated fluorescence intensity (109,798 counts @ 5.1') with peak wavelengths, spectra and depths which correspond very closely with the inferred POL impacted zones seen in the other IR Site 3 pushes. This zone is therefore also interpreted as POL impact. However, all of the pushes adjacent to this push displayed background fluorescence only. This POL impact appears to represent a localized plume of contamination separate from the larger plume found to the west.
- (j) Push IR3-26 was placed within the area where the former AVGAS storage tanks were located. This push displayed a zone of elevated fluorescence intensity (89,630 counts @ 7.0'), the peak wavelength for this zone is relatively high, approximately 480 nm. This zone is interpreted as potential POL impact.
- (k) 6 ground-water samples were collected adjacent to pushes IR3-06, IR3-11, IR3-12 and B162-01. The screened interval of the water sampling tool was placed near the bottom of the POL impacted interval in order to sample from the uppermost part of the aquifer. In only two cases, IR3-06 and B162-01, was a suitable volume of water obtained from this shallow horizon, due to the low permeability of the soils typically encountered at these depths. A second attempt to collect a sample was made for each of these locations at a depth corresponding to the shallowest occurrence of a relatively sandy layer as shown on the corresponding soil classification log. Samples were obtained for all four locations at this deeper interval. All samples were analyzed for BTEX compounds by EPA method 8020. Additionally, the deep interval at push location IR3-11 produced water more rapidly than the other locations, allowing for more sample to be collected. This additional sample volume was used to test for TPH. The TPH concentration for this sample was 5,300 ug/l (gro).

The highest levels of BTEX were measured in the sample collected adjacent to push IR3-12 at a depth of 12.5' bgs. A small amount of free product was collected at this location after two 40 ml VOA vials had been filled with water. This push also displayed the highest fluorescence intensity of these six pushes. For this groundwater sample: benzene=1,300 ug/l, toluene=36 ug/l, ethylbenzene=1,800 ug/l and total xylenes=4,200 ug/l.

All six samples had detectable levels of at least two of the BTEX compounds. In general, the higher the fluorescence intensity observed at a location the higher the BTEX concentrations in the corresponding groundwater sample, although this was not strictly the case for each individual compound. At pushes IR3-06 and B162-01, the sample collected at the shallower depth had higher BTEX concentrations, with one exception. At B162-01 benzene for the shallow sample was below the detection limit of 0.5 ug/l, while the deeper sample had a benzene concentration of 2.9 ug/l. Refer to Table 1 and the laboratory report in Appendix B for complete results of these analyses. The results are also shown on the Site Plan (Figure 3) and the cross-sections where appropriate (Figures 4a, b & c).

5.5 *Conclusions*

- Site soils consist of interbedded silt and sand with lesser amounts of clay. Stratigraphy is relatively uniform across the site. Bedding appears to dip slightly to the northwest.
- The depth to groundwater was not measured at the time of the SCAPS investigation. Previous measurements by consultants in several existing monitoring wells indicate the depth to groundwater is approximately 5 to 6 feet bgs. Ground-water flow is assumed to be to the west toward San Francisco Bay.
- POL impact was found over a large area west to northwest of the former underground AVGAS storage tanks. The estimated areal extent of this plume is depicted on the Site Plan (Figure 3). The estimated vertical extent is depicted on cross sections A-A', B-B' and C-C' (Figures 4a, b and c).
- The large plume also has two relatively small, narrow lobes which extend to the north and south at the eastern end of the plume. These may be indicative of migration along preferential pathways of relatively high permeability material such as utility trench backfill. The northern lobe may alternatively represent a separate plume.
- The four pushes placed near Building 162 did not show definitive evidence of waste oil contamination. Potential indications of relatively low concentrations of waste oil contamination were noted in these pushes. This suggests that waste oil impact, if any, is of limited extent.
- Pushes IR3-01, IR3-02, IR3-03, IR3-05, IR3-12, IR3-22 and IR3-36 had fluorescence intensities above 200,000 counts, which may be indicative of the presence of free product. The estimated areal extent of fluorescence intensities above 200,000 counts is depicted on Figure 3.
- The depth of the intervals of inferred POL fluorescence are virtually identical to the estimated depth to the water table. This is consistent with the behavior of light, non-aqueous phase liquids.

- Push IR3-23 displayed an interval of inferred POL fluorescence which appears to identify a second small, localized plume, east of the larger plume and just north of the former AVGAS storage tanks.
- Pushes exhibiting no POL fluorescence appear to effectively define the extent of POL impacted soils, except for the areas adjacent to the two lobes.
- 8 soil samples were collected and analyzed for TPH as gasoline and/or diesel. The results of these laboratory analyses confirm the LIF data.
- 6 ground-water samples were collected at four locations and analyzed for BTEX compounds. One sample was also analyzed for TPH as gasoline. The relative concentrations of BTEX compounds are generally correlative with the relative maximum fluorescence intensities of the corresponding LIF pushes

5.6 *Recommendations*

Data from this investigation provides good definition of the horizontal and vertical extent of AVGAS contamination over the majority of IR Site 3. This data, and data from previous investigations should be combined and analyzed together to develop remedial alternatives and recommendations for the site. Data and findings from the treatability studies being performed by UC Berkeley should also be considered.

Based on the data in this report there is some uncertainty of the extent of contamination in the vicinity of pushes IR3-23, IR3-32 and B162-03. Additionally, the data from pushes near Building 162 only indicate the potential presence of waste oil contamination in a limited area close to the northeast corner of Building 162. If the data from previous investigations does not include locations near these pushes, additional, limited SCAPS LIF data and/or soil samples should be collected near them to better define the extent of contamination in those 3 areas. Two to four LIF pushes and/or soil samples in each area should be adequate. Prior to performing additional work in these areas, the presence of utility trenches in the vicinity of pushes IR3-32 and B162-03 should be evaluated and their depth and location documented as precisely as possible. In planning additional work near these two pushes, the potential migration of AVGAS contamination through such trenches should be accounted for in determining the location of any additional LIF pushes/soil samples.

6.0 **AREA 37 FUEL FARM**

6.1 *Background*

The Area 37 Fuel Farm consisted of a number of aboveground and underground storage tanks and associated piping and dispensing facilities. Based on visual observations made during the SCAPS investigation, at least some of the underground storage tanks had been placed in concrete lined vaults. During the previous removal of tanks and piping at this site a number of confirmation soil and ground-water samples indicated the presence of TPH, TRPH, lead and BTEX compounds. The location of these samples were not provided to PWCSO. The purpose of the SCAPS investigation was to delineate the presence of POL contamination throughout the Area 37 Fuel Farm and immediate vicinity.

The Fuel Farm proper consists of the fenced area shown in Figure 5. The area included in this SCAPS investigation extends to the west to the rip-rap sea wall, to the north just beyond the southern wall of

Building 14, and to the south and east to a set of train tracks running from the northeast to the southwest. This area is flat with total relief estimated to be 2 feet or less. Approximately half of the area is paved, and half unpaved. The unpaved areas consist primarily of the area between 5th Street and the Fuel Farm perimeter fence, and the area between the above referenced train tracks and the Fuel Farm perimeter fence. The unpaved areas are mostly bare dirt, with some irrigated lawn areas at the southeastern corner of the area.

6.2 Site Soils

Based on the SCAPS soil classification logs generated during the field investigation, the subsurface materials encountered at the Area 37 Fuel Farm consist of interbedded sand, silt and clay and locally relatively small amounts of gravel and/or organic rich soil. In general, the stratigraphy is not continuous between each push. The exception to this is the central portion of the site where fairly continuous layering is apparent. This layering consists of a layer of sand which extends from the surface to depths of approximately 5 to 7 feet bgs. The sand layer is underlain by a silt layer, which is in turn underlain by a clay layer. The clay layer is generally found in most pushes at the site with the bottom of this layer occurring at depths of approximately 10 to 11 feet bgs. Below the clay layer are thin interbeds of silt, sand and clay which were observed in all pushes to the maximum depth of penetration. See cross sections A-A', B-B', C-C' and D-D' (Figures 6a, b and c) for a graphic depiction of the generalized stratigraphy.

To maximize the penetration depth without damaging the probe sensors, certain selected intervals of some pushes were pre-pushed with a "dummy" probe which did not contain soil classification or LIF sensors. After an appropriate depth was reached, the instrumented probe was then pushed into the same hole until the target depth or refusal was reached. As a result of pushing the instrumented sensor into an existing hole and not into undisturbed soil, the soil classification log for the pre-pushed interval is not representative of actual soil types. The pre-pushed depth, where present, is noted on both Table 3 "Summary of Fluorescence Data and Soil Analytical Results" and the SCAPS data profile for that push. The LIF data remains unaffected by pre-pushing procedures.

6.3 Site Hydrogeology

The current SCAPS system does not directly measure groundwater conditions. As with all areas at NAS Alameda the depth to ground water is estimated to be approximately 5 to 7 feet bgs. Ground-water flow at the Area 37 Fuel Farm is expected to be westward towards San Francisco Bay,

6.4 Summary of SCAPS Fluorescence Data and Soil Sampling Results

The following Table 3 summarizes SCAPS fluorescence data and soil sample analytical results at the Area 37 Fuel Farm. Further discussion of the lettered entries in the "Comments" column of Table 3 is provided immediately below the table.

Table 3
Summary of Fluorescence Data and Analytical Results
Area 37 Fuel Farm - NAS Alameda

Push ID	Date	Max Depth (prepushed interval)	Max Fluorescence ¹ (counts), depth	Significant Fluorescence Intervals	Sample Results Depth, Concen- tration (soil=mg/kg) (water=ug/l) ²	Comments ³
FF37-01	11/22/96	20.4' (0' - 2')	6,797 @ 11.1'	-	-	Background. (e)
FF37-02	11/22/96	22.2' (0' - 2')	26,924 @ 0.9'	-	-	Background. (e)
FF37-03	11/22/96	21.4' (0' - 3')	144,188 @ 8.0'	7.6' to 8.3'	Soil @ 7.5' TPHg<10 TPHdro=2,900	POL impact. (a) (c)
FF37-04	11/22/96	20.6' (0' - 1')	10,120 @ 8.1'	-	-	Background. (e)
FF37-05	11/22/96	22.2'	7,544 @ 11.1'	[6.6' to 13.0']	Soil @ 10.2' TPHd<10	Background. (d)
FF37-06	11/22/96	20.2'	8,339 @ 12.1'	[6.1' to 6.7'] [8.4' to 14.0']	Soil @ 6.7' TPHd<10	Background. (d) Background.
FF37-07	11/22/96	21.9'	7,040 @ 10.9'	[4.6' to 6.0'] [9.0' to 14.0']	Soil @ 6.0' TPHd<10	Background. (d) Background.
FF37-08	11/22/96	20.7'	5,594 @ 12.7'	-	-	Background.
FF37-09	11/22/96	22.3'	64,324 @ 7.1'	6.5' to 7.5'	Soil @ 7.2' TPHg=390(gro) TPHd=100(dro)	POL impact. (a) (c)
FF37-10	10/23/96	20.3'	6,689 @ 10.2'	-	-	Background.
FF37-11	10/23/96	20.3'	5,370 @ 11.2'	-	-	Background.
FF37-12	10/23/96	20.7' (0' to 2')	8,528 @ 10.8'	-	-	Background.
FF37-13	10/23/96	18.3'	7,007 @ 11.4'	-	-	Background.
FF37-14	10/23/96	19.9'	7,277 @ 9.8'	-	-	Background.
FF37-15	10/23/96	20.8' (0' to 2')	280,970 @ 5.9'	3.1' to 6.9'	Soil @ 6.0' TPHg=850(gro) TPHd=140(dro)	POL impact. (a) (b) (c)
FF37-16	10/23/96	20.3' (0' to 2')	7,998 @ 10.3'	-	-	Background.
FF37-17	10/23/96	21.5' (0' to 2')	11,738 @ 8.4'	[6.3' to 13.3']	-	Background. (e)

Table 3
Summary of Fluorescence Data and Analytical Results
Area 37 Fuel Farm - NAS Alameda

Push ID	Date	Max Depth (prepushed interval)	Max Fluorescence ¹ (counts), depth	Significant Fluorescence Intervals	Sample Results Depth, Concentration (soil=mg/kg) (water=ug/l) ²	Comments ³
FF37-18	10/23/96	20.8'	7,478 @ 8.1'	-	-	Background.
FF37-19	10/23/96	21.2'	5,884 @ 10.4'	-	-	Background. (a)
FF37-20	11/24/96	22.1' (0' to 5')	39,075 @ 5.8'	5.5' to 6.1' [6.9' to 11.6']	-	POL impact. (a) Background.
FF37-21	11/24/96	19.4' (0' to 5')	5,675 @ 9.5'	-	-	Background.
FF37-22	12/7/96	22.2'	4,823 @ 11.5'	-	-	Background.
FF37-23	12/7/96	7.5' - refusal	939 @ 3.7'	-	-	Background.
FF37-24	12/7/96	19.3' (0' to 5')	2,876 @ 12.7'	-	-	Background.
FF37-25	12/11/96	19.0' (0' to 4')	5,848 @ 9.7'	-	-	Background.
FF37-26	12/11/96	19.2' (0' to 2')	9,443 @ 11.4'	-	-	Background.
FF37-27	12/11/96	21.9' (0' to 1')	29,610 @ 11.8'	[7.6' to 14.7']	-	Background. (e)
FF37-28	12/11/96	19.3'	6,126 @ 9.3'	-	-	Background. (a)
FF37-29	12/11/96	18.7'	13,728 @ 6.6'	6.4' to 6.7' ? [8.0' to 13.1']	-	Potential POL impact. (a) Background.

note:

- Surface fluorescence intervals attributed to naturally occurring fluorescing soil constituents or atmospheric-derived deposition of PAH-rich combustion by-products are not reported. Bold significant fluorescent intervals indicate POL impact, "?" indicates potential POL impact, brackets indicate non-POL fluorescence.
- TPHg = Total Petroleum Hydrocarbons as gasoline (DHS Method) - "gro" indicates gasoline range organics, with chromatographic pattern not consistent with gasoline.
 TPHd = Total Petroleum Hydrocarbons as diesel (DHS Method) - "dro" indicates diesel range organics, with chromatographic pattern not consistent with diesel.
 TPHjp5 = Total Petroleum Hydrocarbons as JP-5 (DHS Method)
 BTEX = Benzene, Toluene, Ethylbenzene, Xylenes
 < ** = No concentration reported above laboratory detection limit of ** mg/kg
- Refer to summary of SCAPS data in immediately following Table 2 for description of lettered entries under "Comments".
- For pushes with inferred potential fluorescence, or had a soil sample collected, the maximum fluorescence listed in the table is for the potential POL fluorescence interval, or the interval associated with the sample. Higher fluorescence levels which may appear on the log are interpreted as background.

- (a) Fluorescence inferred to be a result of POL impact was observed in SCAPS pushes FF37-03, FF37-09, FF37-15 and FF37-20 at Fuel Farm 37. At each of these locations, an increase in fluorescence intensity coupled with a shift in peak fluorescence wavelength was interpreted to represent POL impact. The location of these pushes, and all other pushes at Fuel Farm 37, are shown on the Site Plan, Figure 5.

Figure 5 also indicates the generalized zone where POL fluorescence above 20,000 counts may be expected. This is meant to serve as an indication of the area of greatest POL impact. As this figure shows, except for push FF37-03, each of the pushes with inferred POL impact is isolated, with all adjacent pushes showing only background fluorescence. Because there are no adjacent pushes with POL fluorescence, the lateral extent of contamination is uncertain, although the adjacent pushes with background fluorescence do establish the maximum potential lateral extent.

In the case of push FF37-03, one adjacent push, FF37-29 includes a thin zone of slightly elevated fluorescence which is interpreted as potential POL impact. Additionally, there is a narrow area trending southwest-northeast between pushes FF37-03 and FF37-20 where a continuous plume may exist. This narrow area is bounded to the north and south by pushes FF37-28 and FF37-19, respectively, which both display only background fluorescence.

The vertical distribution of POL fluorescence in pushes FF37-03 and FF37-15 is illustrated in cross sections A-A', B-B', C-C' and D-D' (see Figures 6a, b and c).

- (b) Fluorescence intensities above 200,000 counts can be indicative of the presence of free product. The only push with intensities above 200,000 counts is FF37-15 (280,970 counts @ 5.9'). Free product may be present in the vicinity of this push. It should be noted that POL fluorescence intensities above 200,000 counts occur in a relatively thin zone from 5.8 to 6.6' bgs.
- (c) Soil samples were collected adjacent to pushes FF37-03 (144,188 counts @ 8.0'), FF37-09 (64,324 counts @ 7.1') and FF37-15 (280,970 counts @ 5.9') at depths corresponding to their respective zones of inferred POL fluorescence. All three of these samples were tested for TPH as both gasoline and diesel. The sample from push FF37-03 was taken from a depth of 7.5 feet bgs and had TPHg < 10 mg/kg and TPHd = 2,900(dro) mg/kg. The sample from push FF37-09 was taken from a depth of 7.2 feet bgs and had TPHg = 390(gro) mg/kg and TPHd = 100(dro) mg/kg. The sample from push FF37-15 was taken from a depth of 6.0 feet bgs and had TPHg = 850(gro) mg/kg and TPHd = 140(dro) mg/kg. These results confirm the LIF data.

These laboratory results also indicate at least two products account for the inferred POL impact observed at these locations. This is based on the fact that the sample from FF37-03 had "diesel range" and no "gasoline range" contamination, while the contamination in the samples from FF37-09 and FF37-15 included both diesel and gasoline range components. Examination of the chromatograms for these analyses further confirms that at least two different products are represented in these samples. This is an additional indication that the contamination is not continuous between push FF37-03 and pushes FF37-09 and FF37-15.

- (d) Three additional soil samples were collected Fuel Farm 37 adjacent to pushes FF37-05 (7,544 counts @ 11.1'), FF37-06 (8,013 counts @ 6.5') and FF37-07 (2,221 counts @ 5.7'). All of these samples had zones of slightly elevated fluorescence intensity coupled with a decrease in the peak wavelength. However, the zone of interest in push FF37-05 had a peak wavelength much higher than typically associated with POL impact (495 nm), although this wavelength can be associated with waste oil and similar, relatively "heavy" hydrocarbons. The peak wavelength

for the zone of interest in push FF37-07 had a peak wavelength of 411 nm with the characteristic sharp peak in the spectra commonly associated with sea shells. For these reasons, these two zones of elevated fluorescence intensity were interpreted as background. Both samples associated with these zones were noted to have no hydrocarbon odor. Analysis for TPH as diesel yielded results below the detection limit of 10 mg/kg for these samples. These results confirm the LIF data.

The zone of interest in push FF37-06 had a peak wavelength consistent with POL impact, but the low intensity suggested this zone represented background fluorescence. This sample was also noted to have no hydrocarbon odor, and the TPH analysis as diesel also yielded a result below the detection limit of 10 mg/kg. This result confirms the LIF data.

- (e) Of the remaining pushes at Fuel Farm 37, only 5 (FF37-01, FF37-02, FF37-04, FF37-17 and F37-27) had fluorescence intensities above 10,000 counts. Intensities below 10,000 counts are routinely associated with background. The other five pushes listed above all had peak wavelengths of approximately 490 to 524 nm associated with their zones of elevated fluorescence, which are typically indicative of background. For these reasons all of these pushes are interpreted as background.

6.5 Conclusions

- Site soils consist primarily of interbedded sand, silt and clay. Some pushes also had relatively small amounts of organic material and/or gravels. In the center portion of the site some degree of continuity of the stratigraphy was observed. Continuity was lacking in the pushes located in the southern portion of the site and the extreme northern part of the site.
- Previous work by consultants including measurements of water levels in monitoring wells at other sites at NAS Alameda, and the proximity of the San Francisco Bay indicate ground water can be expected at shallow depths of approximately 5 to 7 feet bgs.
- Fluorescence interpreted as POL impact was observed in four push locations at Fuel Farm 37. None of these four pushes were adjacent each other. This indicates that these pushes may represent four separate, localized zones of POL contamination. A potential exception to this may be pushes FF37-03 and FF37-20. There is a narrow zone between these two pushes, bounded to the north and south by two pushes with only background fluorescence, where a continuous plume may be present. The areal extent of POL impact indicated by the LIF data is displayed in Figure 5. Because all of the pushes adjacent to these four pushes displayed background fluorescence, the areal extent of the POL impacted soils are clearly of relatively limited extent, although somewhat uncertain due to the scarcity of areally continuous data.
- Six soil samples collected at the site confirm the LIF data for the six pushes associated with the samples. The laboratory results indicate at least two different types of POL contamination. This fact lends additional support to the inferred lack of continuity of POL impact between the pushes.

6.6 Recommendations

Data collected for this investigation confirms the presence of limited POL contamination in four areas of the Area 37 Fuel Farm. This data, and data from previous investigations should be combined and analyzed together to develop remedial and/or closure recommendations for the site.

Due to the scarcity of areally continuous data, there is some uncertainty of the extent of contamination at this site. If the data from previous investigations does not include locations near the four contaminated areas shown in Figure 5, additional, limited SCAPS LIF data and/or soil samples should be collected near them to better define the extent of contamination in those 4 areas. Two to four LIF pushes and/or soil samples in each area should be adequate. In particular, at least one location should be chosen between pushes FF37-03, FF37-19, FF37-20 and FF37-28 to determine whether a single continuous plume or 2 separate plumes are present in that area.

7.0 IR SITE 13

7.1 Background

IR Site 13 was occupied by the Pacific Coast Oil Works refinery between 1879 and 1903. Refinery wastes and asphaltic residues were dumped at the site during the refinery's period of operation. Additionally, a JP-5 release occurred at the east side of Building 397 in February 1991. Previous investigations at the site have shown the presence of a variety of volatile and semi-volatile hydrocarbons, pesticides, PCB's and metals in both ground water and soil at the site (PRC, 1996).

The purpose of the SCAPS investigation was to provide data for the use of the University of California, Berkeley in support of their intrinsic bioremediation and enhanced steam extraction treatability studies. The University requested pushes at seven specific locations, which correspond to sampling locations placed by the University. Pushes were placed at each of these locations and 4 additional locations. All push locations are shown in Figure 7.

The portion of IR Site 13 where the SCAPS investigation was performed consists of a large lot bounded to the west by 9th Street, to the south by Avenue L, to the east by 10th Street and to the north by Avenue K. The northwestern corner of the area is occupied by Building 397, a former jet engine test facility, while the remainder of the lot is an open field (see Figure 7). The field is sparsely vegetated with native grasses and weeds. Surface soils over much of the area are quite soft. The site was paved in the past. In some parts of the site there appeared to be relatively small amounts of asphaltic material visible at the surface. It is not known if these materials represent remnants of the former pavement or material associated with the former refinery.

No soil samples were collected at IR Site 13 due to accessibility problems. Following completion of the LIF pushes heavy rains occurred in the San Francisco Bay area which created extremely muddy conditions at the site. Even prior to the rains the SCAPS truck became stuck in soft soils at one location. The muddy conditions after the rains rendered the site inaccessible.

7.2 Site Soils

Based on the SCAPS soil classification logs generated during the field investigation, the subsurface materials encountered at IR Site 13 consist of interbedded sand, silt and clay layers. Bedding appears to somewhat continuous, but irregular over the site. In general, the upper layer consists of sand and silt. This layer is underlain in turn by a layer of clay and silt, a layer of relatively thin interbedded silt, sand and clay, and finally a layer of silt and sand.

7.3 *Site Hydrogeology*

The current SCAPS system does not directly measure ground-water conditions. No water level measurements were made in the existing monitoring wells at the time of the SCAPS investigation. Depth to ground water has been reported previously as being approximately 6 feet bgs (PRC, 1996). Ground-water flow is anticipated to be to the west towards San Francisco Bay.

7.4 *Summary of SCAPS Fluorescence Data and Soil Sampling Results*

The following Table 4 summarizes SCAPS fluorescence data and soil sample analytical results at IR Site 13. Further discussion of the lettered entries in the "Comments" column of Table 4 is provided immediately following the table.

Table 4
Summary of Fluorescence Data and Analytical Results
IR Site 13 - NAS Alameda

Push ID	Date	Max Depth (prepushed interval)	Max Fluorescence ¹ (counts), depth	Significant Fluorescence Intervals	Sample Results Depth, Concentration (soil=mg/kg) (water=ug/l) ²	Comments ³
IR13-01	12/2/96	26.0' (0' to 2')	255,247 @ 8.7'	6.5' to 17.0'	-	POL impact. (a) (b)
IR13-02	12/2/96	20.1'	128,572 @ 13.8'	6.5' to 16.4'	-	POL impact. (a)
IR13-03	12/3/96	22.2'	4,452 @ 6.1'	-	-	Background.
IR13-04	12/3/96	20.1'	102,194 @ 8.4'	8.0' to 10.2'	-	POL impact. (a)
IR13-05	12/5/96	18.0'	7,665 @ 3.3'	-	-	Background.
IR13-06	12/5/96	19.5'	5,508 @ 2.8'	-	Water @ 11.5 B<0.5 T<0.5 E<0.5 X<1.5	Background. (c)
IR13-07	12/5/96	24.4'	172,935 @ 7.0'	6.1' to 19.7'	-	POL impact. (a)
IR13-08	12/6/96	22.3'	3,876 @ 11.1'	-	-	Background.
IR13-09	12/7/96	22.2'	5,475 @ 9.5'	-	-	Background.
IR13-10	12/7/96	22.3'	4,710 @ 13.4'	7.8' to 14.6'	-	POL impact. (a)
IR13-11	12/7/96	8.8' - refusal	38,015 @ 5.6'	5.8' to 6.3'+ ?	-	Potential POL impact. (d)

note:

- Surface fluorescence intervals attributed to naturally occurring fluorescing soil constituents or atmospheric-derived deposition of PAH-rich combustion by-products are not reported. Bold significant fluorescent intervals indicate POL impact, "?" indicates potential POL impact, brackets indicate non-POL fluorescence.
- TPHg = Total Petroleum Hydrocarbons as gasoline (DHS Method) - gro indicates gasoline range organics, with chromatographic pattern not consistent with gasoline.
 TPHd = Total Petroleum Hydrocarbons as diesel (DHS Method) - dro indicates diesel range organics, with chromatographic pattern not consistent with diesel.
 TPHjp5 = Total Petroleum Hydrocarbons as JP-5 (DHS Method)
 BTEX = Benzene, Toluene, Ethylbenzene, Xylenes
 < ** = No concentration reported above laboratory detection limit of ** mg/kg
- Refer to summary of SCAPS data in immediately following Table 2 for description of lettered entries under "Comments".
- For pushes with inferred potential fluorescence, or had a soil sample collected, the maximum fluorescence listed in the table is for the potential POL fluorescence interval, or the interval associated with the sample. Higher fluorescence levels which may appear on the log are interpreted as background.

- (a) Fluorescence inferred to be a result of POL impact was observed at SCAPS push locations IR13-01, IR13-02, IR13-04, IR13-07 and IR13-10. At each of these locations, an increase in fluorescence intensity coupled with a shift in peak fluorescence wavelength was interpreted to represent POL impact. At sites with "heavy" oil/asphaltic contamination the shift in the peak wavelength is not necessarily a decrease. Depending on the range of the background wavelengths, the POL impacted zones at such sites can display an increase in the peak wavelength. The peak wavelengths of the inferred POL impacted zones at IR Site 13 are relatively high, but very consistent. The consistency of the peak wavelength is a key factor in interpreting a zone of POL impact. Background fluorescence typically exhibits a high degree of variability, and the changes in wavelength generally do not correlate with the intensity of the fluorescence. The inferred POL impacted intervals for the pushes listed above are notable for their consistent peak wavelength and very clear correlation with the increases in intensity.

While the inferred POL impacted intervals at IR Site 13 exhibit a high degree of consistency, there are two distinct peak wavelengths characteristic of these intervals. More specifically, the POL impacted intervals have a peak wavelength of approximately 500 nm and/or 524 nm. These two characteristic peak wavelengths indicate there may be two types of contamination present. This may represent two different "products", or fractionation/weathering of a single "product".

The Site Plan for IR Site 13 does not include an estimate of the lateral extent of POL impact because all but two pushes were placed along an east-west trending line. This configuration provides no constraint on the northern or southern boundaries of the plume. However, the lateral and vertical extent of contamination along the line of pushes is constrained. Cross section A-A' (Figure 8) depicts the distribution of POL impact on the line formed by the pushes.

- (b) Fluorescent intensities of 200,000 counts or more can be indicative of the presence of free product. Intensities above 200,000 counts were detected in one push only, IR13-01 (255,247 counts @ 8.7'). Intensities above 200,000 counts were observed from a depth of 8.7 feet bgs to 9.2 feet bgs.

In attempting to extend the depth of this push the expendable tip of probe fell off and the grout tube became blocked with dirt. After removing the probe from the hole and clearing the blockage, the probe was pushed back to the bottom of the hole in order to grout from the bottom up. As the probe was pushed down the open hole an oily black fluid was observed flowing out of the hole. This confirms the presence of free product at this location.

- (c) As noted in section 5.1 no soil samples were collected at this site due to the muddy conditions following heavy rain showers. However, a ground water sample was collected adjacent to push IR13-06 at a depth of 11.5 feet bgs prior to the rains. This push displayed only background fluorescence. This sample was analyzed for BTEX compounds by EPA Method 8020. Benzene, toluene and ethylbenzene were all below the detection limit of 0.5 ug/l, while total xylenes were below the detection limit of 1.5 ug/l.

An attempt was also made to collect a ground-water sample adjacent to push IR13-02 at depths of 9.5 and then at 11.5 feet bgs. However, the low permeability encountered here did not allow a sufficient volume of sample to be collected.

- (d) Potential POL impact is inferred for push IR13-11(38,015 counts @ 5.6') based on an increase in fluorescence intensity coupled with a decrease in peak wavelength. This push met refusal at a depth of 8.8 feet bgs (note that the LIF window is 2.2 feet above the probe tip, or 6.6 feet bgs upon refusal). The inferred potentially impacted zone was observed from a depth of 5.8 to 6.3

feet bgs. This zone consists of two narrow peaks of elevated fluorescence intensity. The peak wavelength and spectra for these two peaks are consistent with the inferred POL impacted observed in other pushes at the site. The interpretation of this zone is somewhat because the increase in intensity is relatively modest, and because the zone is so thin the consistency of the wavelength is not readily apparent.

7.5 Conclusions

- Site soil consists of interbedded sand, silt, and clay. Bedding appears to be somewhat continuous, but irregular over the area of investigation.
- The estimated depth to ground water is 6 feet bgs. All SCAPS pushes except IR13-11 reached a minimum depth of 18.0 feet bgs.
- POL impact is inferred in pushes locations IR13-01, IR13-02, IR13-04, IR13-07 and IR13-10. The zone of impact extends below the water table in each of these pushes.
- Fluorescence intensities above 200,000 counts, which may indicate the presence of free product, were observed only in push IR13-01, over an interval 0.5 feet thick. A black oily fluid was observed flowing from the push hole during a subsequent "grout" push.
- A thin (0.5 feet) interval at the bottom of Push IR13-11 is interpreted as potential POL impact based on a 2 narrow peaks of modestly increased fluorescence intensity with spectra similar to the POL impacted intervals observed in other pushes.
- One ground-water sample was collected at the site. This sample had no detectable BTEX contamination
- No soil samples were collected due to muddy conditions created by heavy rainfall.

7.6 Recommendations

The data collected at this site was intended to provide information needed for the treatability study being performed by UC Berkeley. Previous work at the site has established the extent of contamination at the site. The data collected for this investigation should be evaluated in conjunction with the data from previous work to determine if the extent of contamination should be modified. Remedial recommendations should then be developed for the site in conjunction with the findings from the UC Berkeley study.

8.0 WATER TOWERS PIPELINE AREA

8.1 Background

A network of pipelines was used to convey fuel throughout NAS Alameda. In conjunction with the removal of these pipelines a series of borings were placed adjacent to the pipelines at intervals of approximately 300 feet. Soil and ground-water samples were collected from each boring. A number of these samples indicated the presence of hydrocarbon contamination. Based on these results, three specific areas, adjacent to three different test borings, were designated for investigation by SCAPS. These three sites are discussed in sections 8, 9 and 10. The Work Plan called for three to four LIF pushes at each area. The purpose of the SCAPS investigation at these sites is to delineate the extent of contamination.

The first of these pipeline areas is located at the intersection of 5th Street and Avenue D (see Figures 2 and 9). Based on a figure prepared by Subsurface Consultants the pipeline at this location runs south from the intersection parallel to Fifth Street a few feet east of the eastern edge of the roadbed. The pipeline makes a 90-degree turn at the intersection and runs westward, parallel to Avenue D along the southern edge of the roadbed. The location of the sample boring is shown adjacent to the turn in the pipeline. A water sample collected from this boring indicated the presence of hydrocarbon contamination.

The area of interest at this site consists of the area immediately surrounding the intersection of 5th Street and Avenue D. The northeast and northwest corners of the intersection are occupied by asphalt paved parking lots. Building 92 is located on the southwestern corner of the intersection. Two large water towers are located to the east and southeast of the intersection, thus this location is referred to as the "Water Tower Pipeline" area.

The area is generally flat, with total relief estimated to be less than 1 foot. The streets and surrounding areas are all paved, or are occupied by buildings.

8.2 Site Soils

Based on the SCAPS soil classification logs generated during the field investigation, the subsurface materials encountered at the Water Towers Pipeline site consisted primarily of silt with interbedded sand and clay. Stratigraphy appears to be relatively continuous over the entire area encompassed by the four pushes placed at this site. In general, the upper portion of each push, extending to depths of approximately 7 to 10 feet bgs, consists of silty sand. The middle portion, to depths of approximately 15 to 16 feet bgs, consists of clayey silt. The lower portion, to the bottom of each push, is comprised of relatively thin alternating layers of sand silt and clay. These 3 layers appear to dip to the northeast.

To maximize the penetration depth without damaging the sensors, the upper three to five feet of each of these pushes were pre-pushed with a "dummy" probe which did not contain soil classification or LIF sensors. After an appropriate depth was reached, the instrumented probe was then pushed into the same hole until the target depth or refusal was reached. As a result of pushing the instrumented sensor into an existing hole and not into undisturbed soil, the soil classification log for the pre-pushed interval is not representative of actual soil types. The pre-pushed depth for these pushes are noted on both Table 5 "Summary of Fluorescence Data and Soil Analytical Results" and the SCAPS data profiles for these pushes. The LIF data remains unaffected by pre-pushing procedures.

8.3 Site Hydrogeology

The current SCAPS system does not directly measure groundwater conditions. The depth to ground water is estimated to be approximately five to seven feet bgs. The groundwater gradient is unknown.

8.4 Summary of SCAPS Fluorescence Data and Soil Sampling Results

The following Table 5 summarizes SCAPS fluorescence data and soil sample analytical results at the Water Towers Pipeline site. Further discussion of the lettered entries in the "Comments" column of Table 5 is provided immediately following the table.

Table 5
Summary of Fluorescence Data and Analytical Results
Water Towers Pipeline Site - NAS Alameda

Push ID	Date	Max Depth (prepused interval)	Max Fluorescence ¹ (counts), depth	Significant Fluorescence Intervals	Sample Results Depth, Concentration (mg/kg) ²	Comments ³
TOW-01	12/7/96	22.4' (0' to 4')	7,111 @ 18.8'	-	-	Background. (b)
TOW-02	12/7/96	22.2' (0' to 5')	7,074 @ 12.0'	-	-	Background. (b)
TOW-03	12/7/96	22.5' (0' to 3')	278,246 @ 6.8'	5.0' to 7.6'	Soil @ 7' TPHg=1,700(gro) TPHd=790(dro)	POL impact. (a)
TOW-04	12/7/96	22.2' (0' to 3')	7,666 @ 19.9'	-	-	Background. (b)

note:

- Surface fluorescence intervals attributed to naturally occurring fluorescing soil constituents or atmospheric-derived deposition of PAH-rich combustion by-products are not reported.
 Bold significant fluorescent intervals indicate POL impact, "?" indicates potential POL impact, brackets indicate non-POL fluorescence.
- TPHg = Total Petroleum Hydrocarbons as gasoline (DHS Method) - gro indicates gasoline range organics, with chromatographic pattern not consistent with gasoline.
 TPHd = Total Petroleum Hydrocarbons as diesel (DHS Method) - dro indicates diesel range organics, with chromatographic pattern not consistent with diesel.
 TPHjp5 = Total Petroleum Hydrocarbons as JP-5 (DHS Method)
 BTEX = Benzene, Toluene, Ethylbenzene, Xylenes
 <** = No concentration reported above laboratory detection limit of ** mg/kg
- Refer to summary of SCAPS data in immediately following Table 2 for description of lettered entries under "Comments".
- For pushes with inferred potential fluorescence, or had a soil sample collected, the maximum fluorescence listed in the table is for the potential POL fluorescence interval, or the interval associated with the sample. Higher fluorescence levels which may appear on the log are interpreted as background.

- (a) Fluorescence inferred to be a result of POL impact was observed at only one SCAPS push location at the Water Towers site, TOW-03. At this location, an increase in fluorescence intensity coupled with a decrease in peak fluorescence wavelength was interpreted to represent POL impact from 4.6 to 7.8 feet bgs. The highest fluorescence intensity detected in this zone was 278,246 counts at 6.8 feet bgs.

Fluorescent intensities of 200,000 counts or more can be indicative of the presence of free product. Intensities above 200,000 counts were observed from a depth of 6.5 to 7.3 feet bgs. Free product may be present over this interval.

A soil sample was collected adjacent to push TOW-03 at a depth of 7 feet bgs. This sample was analyzed for TPH as both diesel and gasoline. Results for these analyses were 790 mg/kg (dro) and 1,700 mg/kg (gro), respectively. These results confirm the LIF data. When this sample was collected it was noted to be saturated, and to have both a strong hydrocarbon odor and a hydrocarbon sheen.

Because only one push had POL fluorescence the areal extent is somewhat uncertain. However, the other pushes, with background fluorescence, do constrain the maximum possible extent to the south and west. The vertical extent of POL impact is displayed in cross sections A-A' and B-B' (see Figure 8).

- (b) The remaining three pushes had maximum fluorescence intensities below 8,000 counts and relatively high peak wavelengths. Based on this these pushes are all interpreted as having only background fluorescence.

8.5 *Conclusions*

- The soils encountered at the Water Towers pipeline site consisted of silt with interbedded sand and clay. Stratigraphy appears to be relatively continuous over the entire area
- The depth to groundwater is estimated to be 5 to 7 feet. Ground-water flow is expected to be to the south towards San Francisco Bay.
- POL impact is inferred in only one push, TOW-03. The POL impacted interval ranges from 4.6 to 7.8 feet bgs.
- Fluorescence intensities above 200,000 counts, which may indicate the presence of free product, were observed from 6.5 to 7.3 feet bgs.
- A soil sample collected adjacent to push TOW-03 confirms the LIF data.
- The areal extent of the contamination is uncertain due to the lack of multiple pushes with POL fluorescence. Due to time limitations, no additional pushes were attempted at this site. However, pushes TOW-01 and TOW-04 are south (i.e., assumed to be down gradient) of the contamination. This suggests the plume at this site should extend to the north and west a distance less than the distance between push TOW-03 and pushes TOW-01 and TOW-04.

8.6 Recommendations

The data collected at this site indicates the contamination is of limited extent. Remedial recommendations could be developed based on this data. Alternatively, additional LIF data and/or soil samples could be collected to better define the extent of contamination prior to developing remedial recommendations. Two to four additional LIF/sample locations should be adequate.

9.0 SEA PLANE LAGOON PIPELINE AREA

9.1 Background

The second pipeline area is located adjacent to the northwest corner of the former Sea Plane Lagoon at NAS Alameda (see Figures 2 and 11).

Based on a figure prepared by Subsurface Consultants, there are two pipelines at this location. The pipelines are parallel and run northward and westward with a 90-degree turn located very near the northwestern corner of the former SEA Plane lagoon. The location of the sample boring is shown several feet northwest of the turns in the pipelines. Hydrocarbon contamination was detected in both a soil and a water sample at this location.

As specified in the Work Plan, three LIF pushes were placed at this site. The locations of the pushes are shown in Figure 11.

Topography at this site is flat and all surfaces are paved.

9.2 Site Soils

Based on the SCAPS soil classification logs generated during the field investigation, the subsurface materials encountered at the Sea Plane Lagoon pipeline site consisted of 2 soil types, sandy silt and clay. The two soil types form 4 continuous layers. The sandy silt appears in the upper portion of each push and extends to a depth of approximately 11 to 13 feet bgs. This layer is underlain by a thin clay layer approximately 1 foot thick, which is in turn underlain by another layer of sandy silt approximately 3 feet thick. This layer is underlain by a second clay layer which extends to the bottom of each push. These layers all appear to dip uniformly to the west.

To maximize the penetration depth without damaging the sensors, the upper five feet of each of these pushes were pre-pushed with a "dummy" probe which did not contain soil classification or LIF sensors. After an appropriate depth was reached, the instrumented probe was then pushed into the same hole until the target depth or refusal was reached. As a result of pushing the instrumented sensor into an existing hole and not into undisturbed soil, the soil classification log for the pre-pushed interval is not representative of actual soil types. The pre-pushed depth for these pushes are noted on both Table 5 "Summary of Fluorescence Data and Soil Analytical Results" and the SCAPS data profiles for these pushes. The LIF data remains unaffected by pre-pushing procedures.

9.3 Site Hydrogeology

The current SCAPS system does not directly measure groundwater conditions. Based on the proximity of the Sea Plane Lagoon (i.e., San Francisco Bay) the depth to ground water is estimated to be approximately 5 to 7 feet bgs, with a southeast flow direction towards the Sea Plane Lagoon.

9.4 Summary of SCAPS Fluorescence Data and Soil Sampling Results

The following Table 6 summarizes SCAPS fluorescence data and soil sample analytical results at the Sea Plane Lagoon Pipeline area. As indicated by the table, no POL fluorescence was observed in any of the three pushes at this site. A soil sample collected adjacent to push SPL-02 at a depth of 6 feet bgs confirms the LIF data. No cross section was prepared for this site.

**Table 6
Summary of Fluorescence Data and Analytical Results
Sea Plane Lagoon Pipeline Site- NAS Alameda**

Push ID	Date	Max Depth (pushed interval)	Max Fluorescence ¹ (counts), depth	Significant Fluorescence Intervals	Sample Results Depth, Concentration (mg/kg) ²	Comments ³
SPL-01	12/3/96	25.5' (0' to 5')	8,149 @ 18.5'	-	-	Background.
SPL-02	12/3/96	25.6' (0' to 5')	8,946 @ 19.6'	-	Soil @ 6' TPHd<10	Background.
SPL-03	12/4/96	24.0' (0' to 5')	12,771 @ 15.0'	-	-	Background.

note:

- Surface fluorescence intervals attributed to naturally occurring fluorescing soil constituents or atmospheric-derived deposition of PAH-rich combustion by-products are not reported.
Bold significant fluorescent intervals indicate POL impact, "?" indicates potential POL impact, brackets indicate non-POL fluorescence.
- TPHg = Total Petroleum Hydrocarbons as gasoline (DHS Method) - gro indicates gasoline range organics, with chromatographic pattern not consistent with gasoline.
TPHd = Total Petroleum Hydrocarbons as diesel (DHS Method) - dro indicates diesel range organics, with chromatographic pattern not consistent with diesel.
TPHjp5 = Total Petroleum Hydrocarbons as JP-5 (DHS Method)
BTEX = Benzene, Toluene, Ethylbenzene, Xylenes
<** = No concentration reported above laboratory detection limit of ** mg/kg
- Refer to summary of SCAPS data in immediately following Table 2 for description of lettered entries under "Comments".
- For pushes with inferred potential fluorescence, or had a soil sample collected, the maximum fluorescence listed in the table is for the potential POL fluorescence interval, or the interval associated with the sample. Higher fluorescence levels which may appear on the log are interpreted as background.

9.5 Conclusions

- Site soils at the Sea Plane Lagoon Pipeline area consist of alternating layers of sandy silt and clay, which dip to the west.
- Three LIF pushes were placed at the site, none of which encountered any zones of POL fluorescence.
- One soil sample collected at the site had no detectable TPH concentrations, confirming the LIF data.

9.6 Recommendations

The data collected at this site did not indicate POL impact. Based on this data we recommend that this site be submitted for closure with no further action.

10.0 FIRE STATION PIPELINE AREA

10.1 Background

The last of the three pipeline areas is located at the intersection of 2nd Street and Avenue D (see Figures 2 and 13). Based on a figure prepared by Subsurface Consultants the pipeline at this location runs east-west Avenue D along the southern edge of the roadbed. The location of the sample boring is shown approximately at the center of Avenue D very close to the western edge of 2nd Street, several feet north of the pipeline. Petroleum hydrocarbon contamination was detected in both a soil and a water sample collected from this boring.

The area of interest at this site consists of the area immediately surrounding the intersection of 2nd Street and Avenue D. The southwest corner of the intersection is occupied by a parking area, the northwest corner is occupied by Building 62, the northeast corner is occupied by Building 114 and the southeast corner is occupied by Building 6, which is the base Fire Station, thus the site is referred to as the Fire Station Pipeline area.

The area is generally flat, with total relief estimated to be less than 1 foot. The streets and surrounding areas are all paved, or are occupied by a building. Relatively small areas of landscaping are located at the perimeter of Buildings 62 and 6, and along the southern edge of Avenue D, west of the intersection. As shown in Figure 13, three pushes were placed within the paved roadway near the northwestern, northeastern and southeastern corners of the intersection.

10.2 Site Soils

Based on the SCAPS soil classification logs generated during the field investigation, the subsurface materials encountered at the Fire Station pipeline site consisted primarily of silt and sand with thin (less than 1 foot thick) clay interbeds at approximately 12 to 13 feet bgs. Stratigraphy is continuous between all three pushes. The soils above the clay are mostly sand, below the clay they are mostly silt to the bottom of each push. The contacts between the three layers dip to the east.

10.3 Site Hydrogeology

The current SCAPS system does not directly measure groundwater conditions. Depth to groundwater is estimated to be 6 to 7 feet bgs. The shallowest push at the Fire Station pipeline site (FS-02) reached a depth of 22.1 feet bgs. Ground water is expected to be southward towards San Francisco Bay.

10.4 Summary of SCAPS Fluorescence Data and Soil Sampling Results

The following Table 7 summarizes SCAPS fluorescence data and soil sample analytical results at the Fire Station pipeline site. Further discussion of the lettered entries in the "Comments" column of Table 7 is provided immediately following the table..

**Table 7
Summary of Fluorescence Data and Analytical Results
Fire Station Site Pipeline Site - NAS Alameda**

Push ID	Date	Max Depth (pushed interval)	Max Fluorescence ¹ (counts), depth	Significant Fluorescence Intervals	Sample Results Depth, Concen- tration (mg/kg) ²	Comments ³
FS-01	12/3/96	22.3'	223,824 @ 8.1'	7.5' to 8.6'	Soil @ 8.1' TPHg=30(gro) TPHd=700(dro)	POL Impact. (a)
FS-02	12/3/96	22.1'	12,535 @ 1.1'	-	-	Background. (b)
FS-03	12/3/96	25.8'	15,582 @ 1.0'	-	-	Background. (b)

note:

- Surface fluorescence intervals attributed to naturally occurring fluorescing soil constituents or atmospheric-derived deposition of PAH-rich combustion by-products are not reported.
Bold significant fluorescent intervals indicate POL impact, "?" indicates potential POL impact, brackets indicate non-POL fluorescence.
- TPHg = Total Petroleum Hydrocarbons as gasoline (DHS Method) - gro indicates gasoline range organics, with chromatographic pattern not consistent with gasoline.
TPHd = Total Petroleum Hydrocarbons as diesel (DHS Method) - dro indicates diesel range organics, with chromatographic pattern not consistent with diesel.
TPHjp5 = Total Petroleum Hydrocarbons as JP-5 (DHS Method)
BTEX = Benzene, Toluene, Ethylbenzene, Xylenes
<** = No concentration reported above laboratory detection limit of ** mg/kg
- Refer to summary of SCAPS data in immediately following Table 2 for description of lettered entries under "Comments".
- For pushes with inferred potential fluorescence, or had a soil sample collected, the maximum fluorescence listed in the table is for the potential POL fluorescence interval, or the interval associated with the sample. Higher fluorescence levels which may appear on the log are interpreted as background.

- (a) Fluorescence inferred to be a result of POL impact was observed at only one SCAPS push location at the Fire Station Pipeline site, FS-01. At this location, an increase in fluorescence intensity coupled with a decrease in peak fluorescence wavelength was interpreted to represent POL impact from 7.5 to 8.6 feet bgs. The highest fluorescence intensity detected in this zone was 223,824 counts at 8.1 feet bgs.

Fluorescent intensities of 200,000 counts or more can be indicative of the presence of free product. Intensities above 200,000 counts were observed at just one data point At 8.1 feet bgs, indicating the interval of potential free product is very thin, approximately 0.3 feet at most.

A soil sample was collected adjacent to push FS-01 at a depth of 8.1 feet bgs. When this sample was collected it was noted to be saturated, and to have hydrocarbon odor. This sample was analyzed for TPH as both diesel and gasoline. Results for these analyses were 700 mg/kg (dro) and 30 mg/kg (gro), respectively. While these results are much lower than would be expected for a zone of free product, they do not necessarily contradict the interpretation of potential free product @ 8.1 feet bgs. The sample submitted to the lab is 0.5 feet long, and the subsample analyzed by the lab is only a small portion of that. So the laboratory result does not necessarily correspond to the exact depth of the sample as stated in this report. These results confirm the LIF data.

Because only one push had POL fluorescence the areal extent is somewhat uncertain. However, the other pushes, with only background fluorescence, do constrain the maximum possible extent to the north-northwest. The vertical extent of POL impact is displayed in cross section A-A' (see Figure 14a).

- (b) The remaining two pushes had maximum fluorescence intensities below 16,000 counts and predominantly relatively high peak wavelengths. The one zone in these pushes that has a low wavelength is a shallow zone in FS-02 with peak wavelengths of 411 nm and spectra typical of sea shells. Based on this, both of these pushes are interpreted as having only background fluorescence.

10.5 Conclusions

- The soils encountered at the Fire Station Pipeline site consisted of silt and sand with thin clay interbeds. Stratigraphy appears to be relatively continuous over the entire area
- The depth to groundwater is estimated to be 6 to 8 feet. Ground-water flow is assumed to the south toward San Francisco Bay.
- POL impact is inferred in only one push, FS-01. The POL impacted interval ranges from 7.5 to 8.6 feet bgs.
- Fluorescence intensities above 200,000 counts, which may indicate the presence of free product, were observed at just one data point at 8.1 feet bgs.
- A soil sample collected adjacent to push FS-01 confirms the LIF data.
- The areal extent of the contamination is uncertain due to the lack of multiple pushes with POL fluorescence. Due to time limitations, no additional LIF pushes were attempted at this site.

10.6 Recommendations

The data collected at this site indicates a plume of POL contamination of limited extent is present. Remedial recommendations could be developed based on this data. Alternatively, additional LIF data and/or soil samples could be collected to better define the extent of contamination prior to developing remedial recommendations. Two to four additional LIF/sample locations should be adequate.

11.0 IR SITE 5

11.1 Background

IR Site 5 was not included in the Work Plan for this SCAPS deployment. This work was added at the request of Naval Facilities Engineering Service Center (NFESC) personnel with the approval of EFA West. IR Site 5 is occupied by Building 5. Building 5 was used as a machining, plating, manufacturing and repair facility. Previous investigations at the site have shown that a variety of contaminants have impacted soil and/or ground water at the site. Known contaminants include heavy metals, chlorinated solvents and miscellaneous petroleum hydrocarbons.

NFESC requested four groups of pushes. The first two groups consisted of two pushes each. Two pushes were placed near a former waste pit, the other two pushes were placed adjacent to an underground storage tank.. These pushes were chosen due to the likely presence of both petroleum hydrocarbons, which can be detected by SCAPS LIF technology, and chlorinated solvents which are not detectable by current LIF technology. These pushes were placed in support of research into the potential use of LIF technology to indirectly detect chlorinated solvents, by detecting petroleum hydrocarbon compounds dissolved in the chlorinated solvent plume. Please note that this use of SCAPS is considered strictly experimental at this time. This report is only concerned with findings relative to petroleum hydrocarbons. Chlorinated solvents are not discussed in this report except to present, for informational purposes, the results of laboratory analyses on soil samples collected by SCAPS.

The other two groups of pushes requested by NFESC consisted of 6 pushes each. These pushes were requested for the purpose of providing lithologic information to confirm the results of seismic reflection profiling performed at the site. These push locations were not selected for the purpose of delineating hydrocarbon contamination.

The pushes at IR Site 5 were placed near the middle of the eastern end of Building 5 (see Figure 2 and 13). This area consists of paved parking and driveway areas. The area is flat, with total relief estimated to be less than 1 foot.

11.2 Site Soils

Based on the SCAPS soil classification logs generated during the field investigation, the subsurface materials encountered at IR Site 5 consist of interbedded silt, sand and clay. Stratigraphy is continuous between adjacent pushes, but between the different groups of pushes stratigraphy is generally similar but the soils tend to become finer with more clay towards the north. In all pushes the soils in the upper 10 to 13 feet consist primarily of silt and sand. The next 30 to 35 feet consists of relatively thin interbeds of silt and sand. The last few feet of each push consist of relatively dense fine grained materials which probably represent formational materials. All pushes met refusal in these dense soils. The contacts between these three generalized layers appear to dip to the north.

11.3 Site Hydrogeology

The current SCAPS system does not directly measure groundwater conditions. Depth to groundwater is estimated to be 6 to 7 feet bgs. The shallowest push at IR Site 5 (IR5-04) reached a depth of 44.7 feet bgs. Ground water flow is expected to be southward towards San Francisco Bay.

11.4 Summary of SCAPS Fluorescence Data and Soil Sampling Results

The following Table 8 summarizes SCAPS fluorescence data and soil sample analytical results at IR Site 5. Further discussion of the lettered entries in the "Comments" column of Table 8 is provided immediately following the table.

**Summary of Fluorescence Data and Analytical Results
IR Site 5 - NAS Alameda**

Push ID	Date	Max Depth (prepunched interval)	Max Fluorescence ¹ (counts), depth	Significant Fluorescence Intervals	Sample Results Depth, Concen- tration (mg/kg) ²	Comments ³
IR5-01	12/4/96	47.5'	12,495 @ 34.5	-	Soil @ 34.5' 1,1,1-Trichloroethane=0.11 SVOC's all below detection limits.	Background. (c)
IR5-02	12/4/96	45.7'	284,414 @ 8.2'	3.6' to 10.9'	Soil @ 8.2' 1,1,1-Trichloroethane=630 1,1-Dichloroethane=24 1,1-Dichloroethene=23 1,2-Dichlorobenzene=5 Ethylbenzene=9 Tetrachloroethene=74 Toluene=67 Trichloroethene=2,600 Trichlorotrifluoroethane=850 Total Xylenes=75 2-Methylnaphthalene=14 bis(2-ethylhexyl)phthalate=80 Naphthalene=39 Soil @ 9.3' 1,1,1-Trichloroethane=400 1,1-Dichloroethane=13 1,1-Dichloroethene=16 Ethylbenzene=10 Tetrachloroethene=42 Toluene=60 Trichloroethene=1,500 Trichlorotrifluoroethane=970 Total Xylenes=81 2-Methylnaphthalene=12 bis(2-ethylhexyl)phthalate=174 Fluorene=2 Naphthalene=35 Soil @ 30.8' 1,1,1-Trichloroethane=0.25 Trichloroethene=0.51 SVOC's all below detection limits.	POL Impact. (a) (b) (c)
IR5-03	12/9/96	44.7'	134,061 @ 7.3'	6.9' to 9.6'	-	POL Impact. (a)

**Table 8
Summary of Fluorescence Data and Analytical Results
IR Site 5 - NAS Alameda**

Push ID	Date	Max Depth (prepunched interval)	Max Fluorescence ¹ (counts), depth	Significant Fluorescence Intervals	Sample Results Depth, Concentration (mg/kg) ²	Comments ³
IR5-04	12/9/96	44.7'	235,595 @ 7.9'	7.2' to 8.4'	-	POL Impact. (a) (b)
IR5-05	12/12/96	47.9'	10,727 @ 16.7'	-	-	Background.
IR5-06	12/12/96	47.7'	7,596 @ 29.8'	-	-	Background.
IR5-07	12/12/96	47.9'	9,610 @ 33.9'	-	-	Background.
IR5-08	12/12/96	53.1'	10,056 @ 38.6'	-	-	Background.
IR5-09	12/13/96	51.1'	8,443 @ 34.0'	1.8' to 2.6' ?	-	Potential POL Impact. (d)
IR5-10	12/13/96	48.2'	7,306 @ 36.4'	-	-	Background.
IR5-11	12/13/96	47.1'	6,401 @ 14.6'	-	-	Background.
IR5-12	12/13/96	46.0'	6,764 @ 14.4'	-	-	Background.
IR5-13	12/13/96	45.6'	14,983 @ 3.3'	3.4' to 4.7' ?	-	Potential POL Impact. (d)
IR5-14	12/13/96	44.9'	7,398 @ 3.3'	3.1' to 3.4' ?	-	Potential POL Impact. (d)
IR5-15	12/13/96	48.4'	8,181 @ 32.8'	-	-	Background.
IR5-16	12/13/96	46.9'	6,742 @ 14.5'	-	-	Background.

note:

- Surface fluorescence intervals attributed to naturally occurring fluorescing soil constituents or atmospheric-derived deposition of PAH-rich combustion by-products are not reported.
Bold significant fluorescent intervals indicate POL impact, "?" indicates potential POL impact, brackets indicate non-POL fluorescence.
- TPHg = Total Petroleum Hydrocarbons as gasoline (DHS Method) - "gro" indicates gasoline range organics, with chromatographic pattern not consistent with gasoline.
TPHd = Total Petroleum Hydrocarbons as diesel (DHS Method) - "dro" indicates diesel range organics, with chromatographic pattern not consistent with diesel.
TPHjp5 = Total Petroleum Hydrocarbons as JP-5 (DHS Method)
BTEX = Benzene, Toluene, Ethylbenzene, Xylenes
<** = No concentration reported above laboratory detection limit of ** mg/kg
- Refer to summary of SCAPS data in immediately following Table 2 for description of lettered entries under "Comments".
- For pushes with inferred potential fluorescence, or had a soil sample collected, the maximum fluorescence listed in the table is for the potential POL fluorescence interval, or the interval associated with the sample. Higher fluorescence levels which may appear on the log are interpreted as background.

- (a) Fluorescence inferred to be a result of POL impact was observed at SCAPS push locations IR5-02, IR5-03 and IR5-04. At these locations an increase in fluorescence intensity coupled with a decrease in peak fluorescence wavelength was interpreted to represent POL impact. The estimated areal extent of POL impact is shown in Figure 13. The areal extent is uncertain due to the lack of pushes throughout the area of contamination. It bears repeating that delineating the extent of POL impact was not an objective at IR Site 5. The vertical extent of POL impact is shown in cross sections B-B', C-C' and D-D' (see Figures 14b and c).

The highest fluorescence intensity observed at the site was 284,414 counts @ 8.2 feet bgs in push IR5-02. The zone of inferred POL fluorescence in this push was observed from 3.6 to 10.9 feet bgs. The peak wavelength in this zone is very consistent, ranging from approximately 450 to 460 nm. The peak wavelength in the zones of inferred POL fluorescence in push IR5-04 (235,559 counts @ 7.9') is also consistent and in the same 450 to 460 nm. Peak wavelength in the zone of inferred POL impact in push IR5-03 (134,061 counts @ 7.3') is also consistent, but somewhat lower with wavelengths as low as 430 nm.

- (b) Fluorescent intensities of 200,000 counts or more can be indicative of the presence of free product. Intensities above 200,000 counts were observed in pushes IR5-02 and IR5-04. The interval with fluorescence intensities above 200,000 counts in push IR5-02 occurred from 8.1 to 9.3 feet bgs. In push IR5-04 only one data point, at 7.9 feet bgs, had fluorescence intensities above 200,000 counts. Free product may be present within these intervals.
- (c) One soil sample was collected adjacent to push IR5-01 at a depth of 34.5 feet bgs. This sample was analyzed for volatile and semivolatile organic compounds by EPA Methods 8420 and 8470, respectively. 1,1,1-Trichloroethane, at a concentration of 0.11 mg/kg, was the only volatile organic compound detected in this sample. No semivolatile compounds were detected in this sample. As noted above current LIF technology is not capable of detecting chlorinated solvents such as 1,1,1-Trichloroethane. Conversely many of the semivolatile organic compounds are detectable with current LIF technology. Since the LIF data indicated no POL impact at the depth where this sample was collected, these laboratory results confirm the LIF data.

Three soil samples were collected adjacent to push IR5-02 at depths of 8.2, 9.3 and 30.8 feet bgs. These samples were also analyzed for volatile and semivolatile organic compounds by EPA Methods 8420 and 8470. Several semivolatile organic compounds (SVOC's) were detected in the two shallow samples where the LIF data indicated POL impact. In both of these samples the compound with the highest concentration was bis(2-ethylhexyl)phthalate. The concentration of this compound in the sample from 8.2 feet was 80 mg/kg. The concentration of this compound in the sample from 9.3 feet was 174 mg/kg. The results for all SVOC's detected in these samples are shown in Table 8. Refer to the laboratory report in Appendix B for complete results of these analyses. In the deep sample, where the fluorescence was interpreted as background, no SVOC's were detected. These results confirm the LIF data.

Several volatile organic compounds (VOC's) were detected in all three samples collected adjacent to push IR5-02. The compound with the highest concentration in all three samples was Trichloroethene. Going from the shallowest sample to the deepest sample, the concentration reported for Trichloroethene was 2,600 mg/kg, 1,500 mg/kg and 0.51 mg/kg, respectively. The results for all VOC's detected in these samples are shown in Table 8. Refer to the laboratory report in Appendix B for complete results of these analyses. Since current LIF technology is not capable of detecting the compounds found in these samples, these results are not relevant to the LIF data.

- (d) Three pushes at IR Site 5 (IR5-09, IR5-13 and IR5-14) had intervals of elevated fluorescence intensity coupled with a decrease in peak wavelength that are interpreted as potential POL impact. Pushes IR5-13 and IR5-14 both had relatively small peaks, 14,983 and 7,398 counts respectively, at 3.3 feet bgs with peak wavelengths of approximately 455 nm. Both peaks represent thin (less than 1 foot thick) intervals of elevated fluorescence. These zones are consistent with low level POL impact. However, the low intensities and shallow depth of these zones, and the fact that these zones correlate very closely with a change in soil type, suggest they may represent elevated background fluorescence.

Push IR5-09 (13,729 counts @ 1.9') also had a thin zone of slightly elevated fluorescence intensity with a peak wavelength of approximately 432 nm. As with pushes IR5-13 and IR5-14, this response is consistent with low level POL impact. However, the relatively low intensity and shallow depth of this zone suggests this may represent elevated background fluorescence.

11.5 Conclusions

- The soils encountered at the IR Site 5 consisted of interbedded silt sand and clay. Stratigraphy appears to be relatively continuous over the entire area, with soils generally becoming finer towards the north. Bedding appears to dip to the north.
- The depth to groundwater is estimated to be 6 to 8 feet bgs.
- The SCAPS investigation at this site was for the purpose of providing data for ongoing research, not to define the extent of contamination on site.
- POL impact is inferred in pushes IR5-02, IR5-03 and IR5-04. The POL impacted intervals in each of these pushes corresponds very closely with the estimated depth to the water table.
- Fluorescence intensities above 200,000 counts, which may indicate the presence of free product, were observed at just one data point at in push IR5-04, and over an interval from 8.1 to 9.3 feet bgs in push IR5-02.
- Four soil samples collected adjacent to pushes IR5-01 and IR5-02 were analyzed for VOC's and SVOC's. The results for the SVOC's confirm the LIF data.
- Several VOC's, including several chlorinated compounds, were detected in each of the four samples. These compounds are not detectable with current LIF technology.
- The areal extent of POL impact is uncertain due to the scarcity of LIF data.

11.6 Recommendations

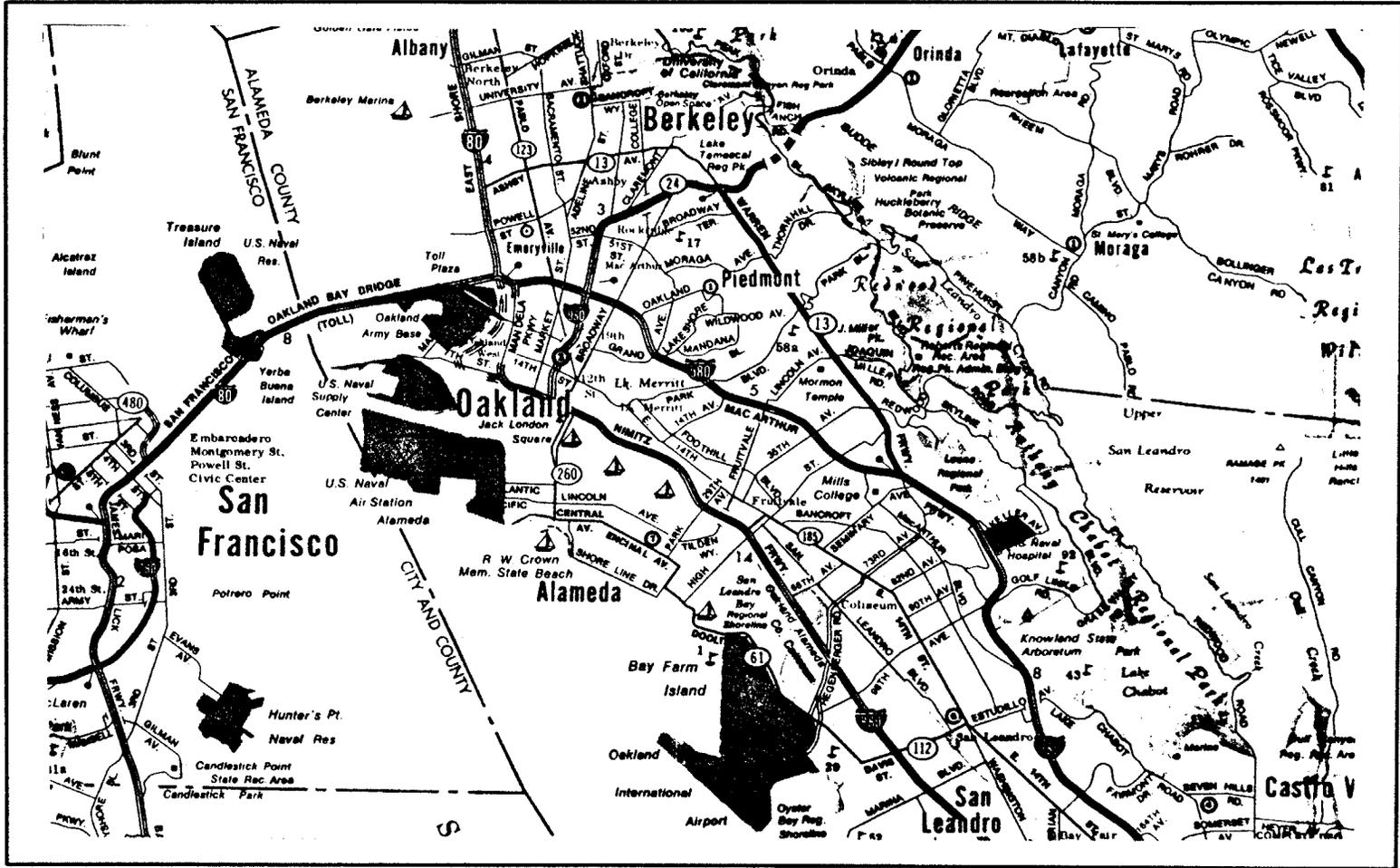
The data collected at this site indicates the presence of POL contamination in two areas. The extent of contamination appears to be fairly limited, but is not well defined. This data should be combined with the data from previous work, if any, performed in the same area to better define the extent of contamination. If previous work was not performed in these areas, additional LIF data and/or soil samples should be collected. Two to four additional LIF/sample locations in each area should be adequate. At least two soil samples should be collected in the area near pushes IR5-03 and IR5-04. These samples should be tested for both TPH and chlorinated solvents.

After, the extent of contamination has been refined, remedial recommendations should be developed for both areas. The remedial recommendations for the area near push IR5-02 should take into account the chlorinated solvents present in this area. If chlorinated solvents are detected in the area near pushes IR5-03 and IR5-04, the remedial recommendations for this area should take this into account.

12.0 REFERENCES

PRC Environmental Management, Inc., 1995, 1995 Base Realignment and Closure Cleanup Plan - Revision 01

PRC Environmental Management, Inc., 1996, Remedial Investigation/Feasibility Study, Sites 1, 2, 3, Runway Area, 6, 7a, 7b, 7c, 9, 10b, 11, 13, 15, 16, and 19, Naval Air Station, Alameda, Alameda, California.



Graphic Scale - Miles
(approximate)



VICINITY MAP	
NAVAL AIR STATION ALAMEDA ALAMEDA, CALIFORNIA	
U.S. NAVY PUBLIC WORKS CENTER ENVIRONMENTAL DEPARTMENT CODE 980	FIGURE 1

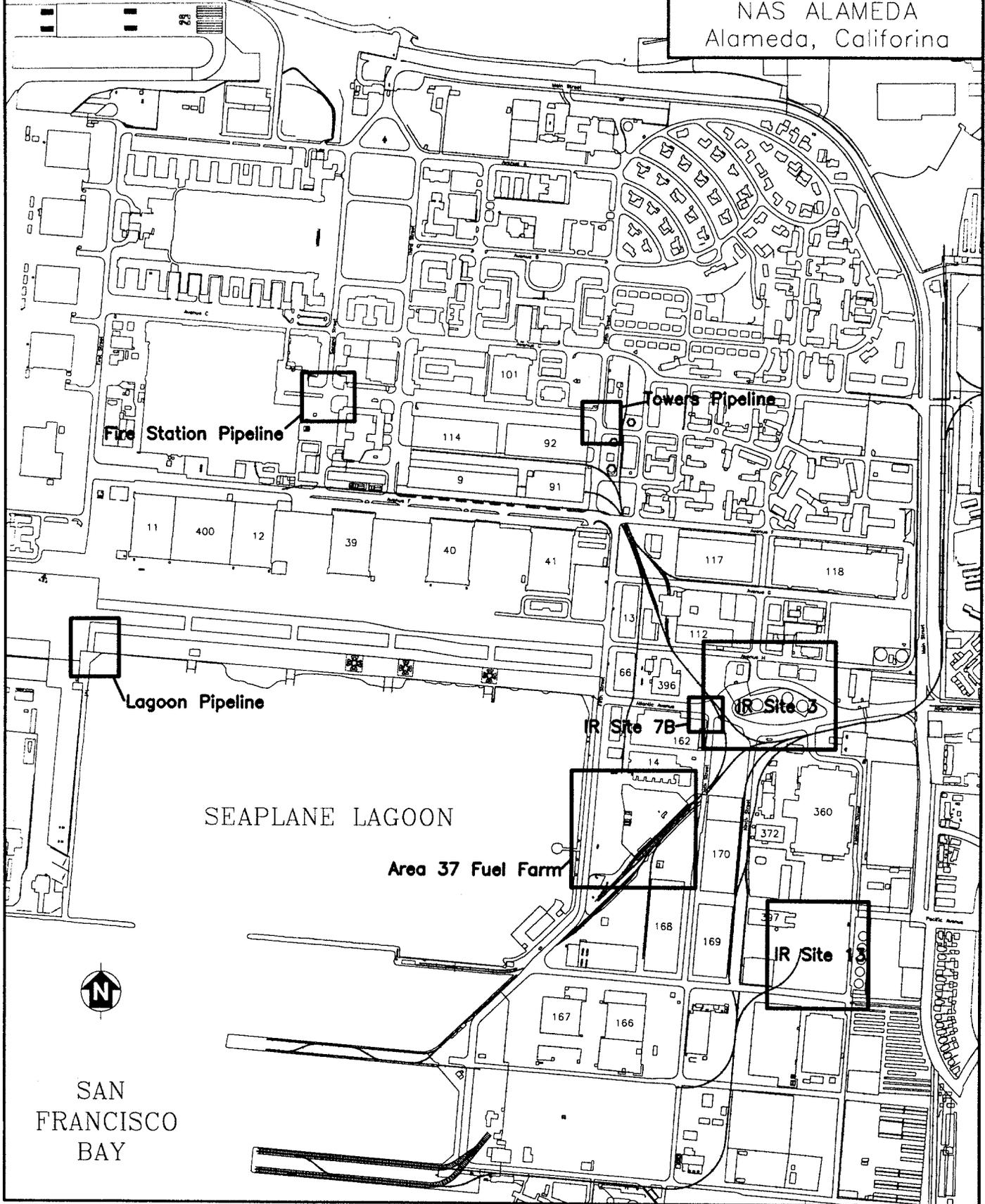
NOTE: Map is copied from City Map of Oakland, Rand McNally, 1995.

OAKLAND INNER HARBOR

U.S. NAVY PWC
ENVIRONMENTAL
DEPARTMENT
CODE 980

SCALE: 1"=800'
NOVEMBER, 1996

FIGURE 2
SITE LOCATION MAP
NAS ALAMEDA
Alameda, California



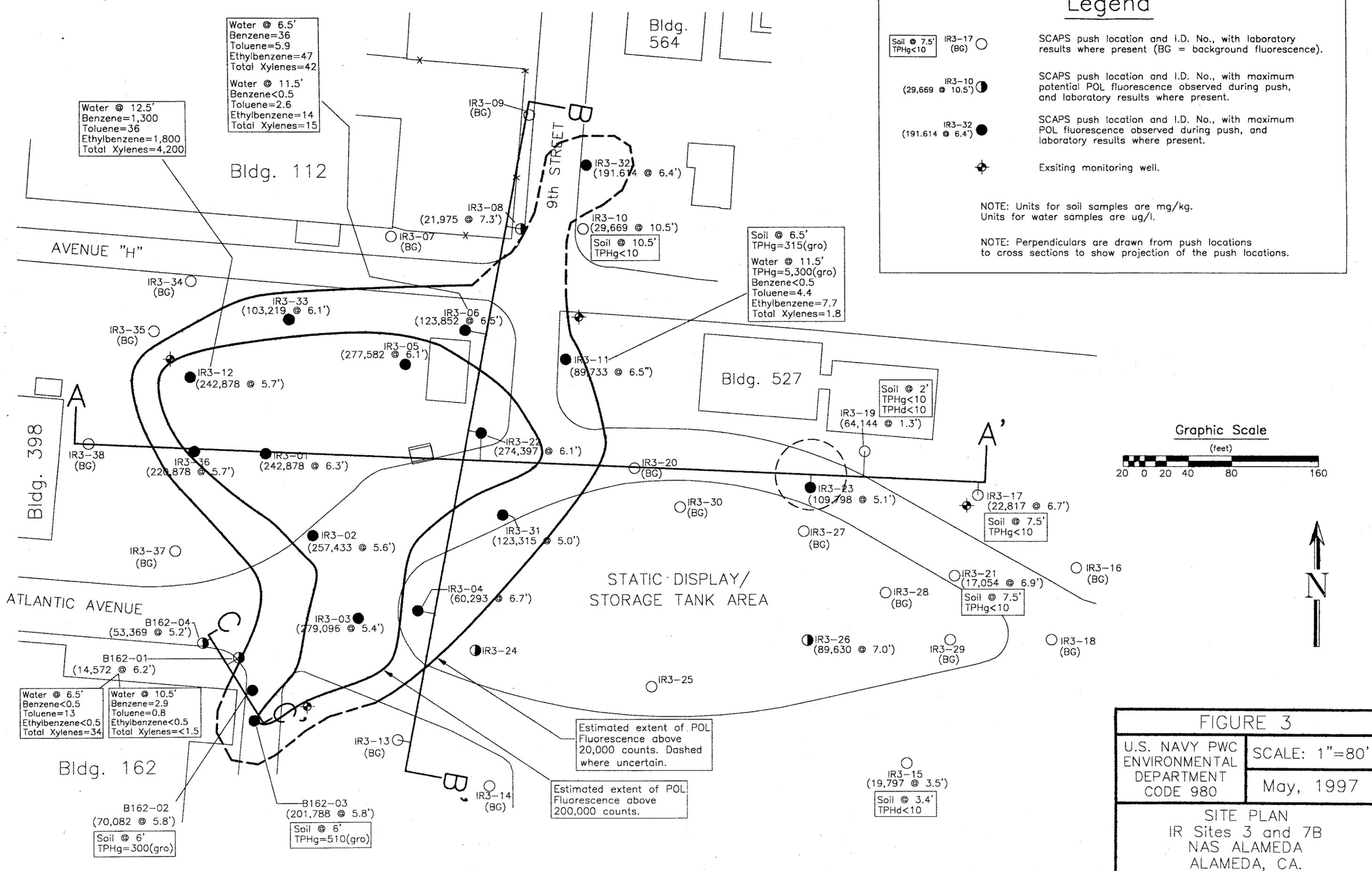
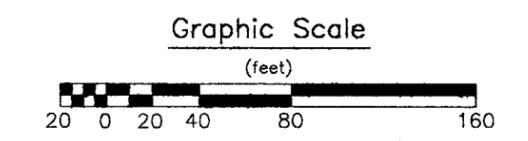
SAN
FRANCISCO
BAY

Legend

- SCAPS push location and I.D. No., with laboratory results where present (BG = background fluorescence).
- SCAPS push location and I.D. No., with maximum potential POL fluorescence observed during push, and laboratory results where present.
- SCAPS push location and I.D. No., with maximum potential POL fluorescence observed during push, and laboratory results where present.
- Existing monitoring well.

NOTE: Units for soil samples are mg/kg.
Units for water samples are ug/l.

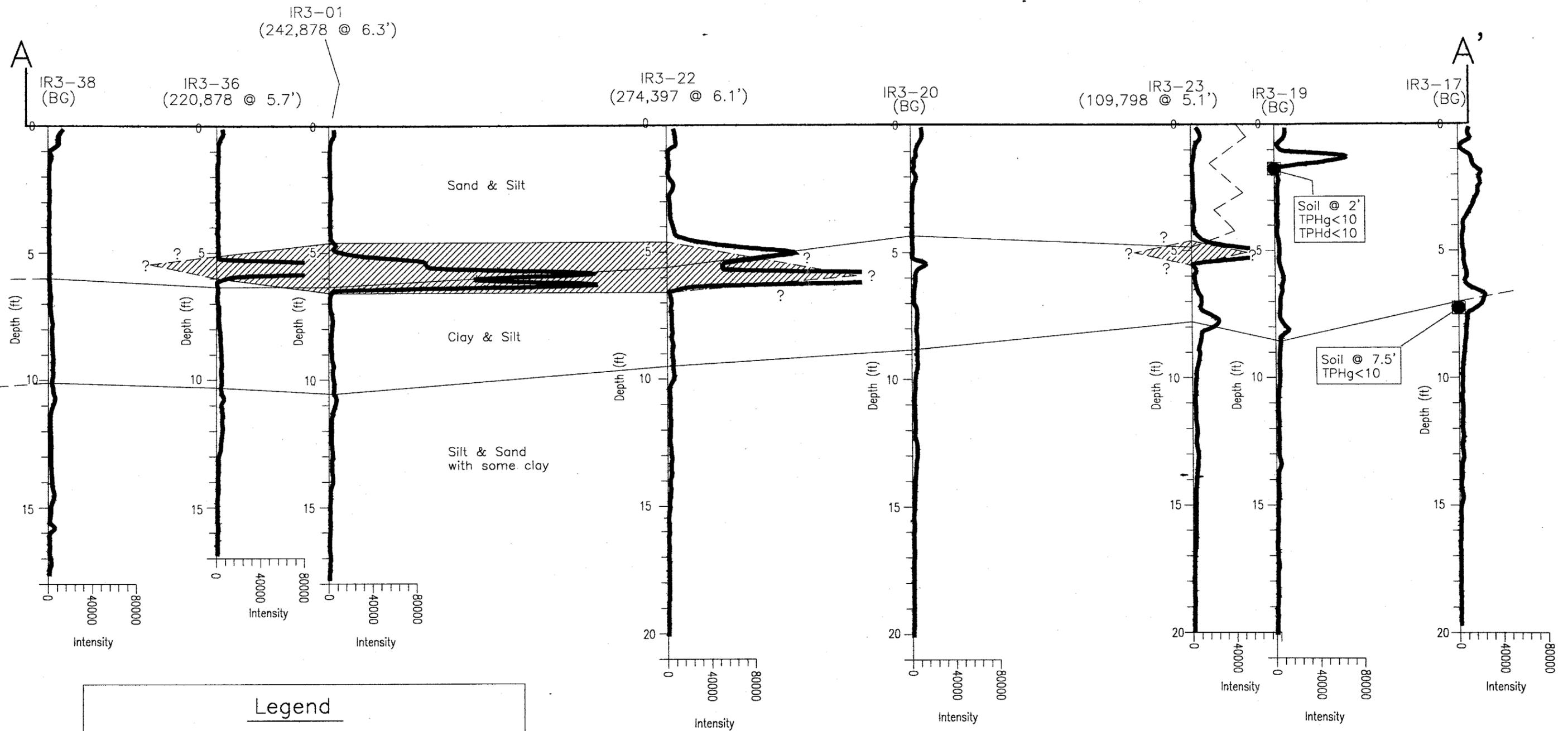
NOTE: Perpendiculars are drawn from push locations to cross sections to show projection of the push locations.



Estimated extent of POL Fluorescence above 20,000 counts. Dashed where uncertain.

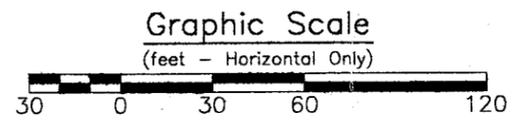
Estimated extent of POL Fluorescence above 200,000 counts.

FIGURE 3	
U.S. NAVY PWC ENVIRONMENTAL DEPARTMENT CODE 980	SCALE: 1"=80'
May, 1997	
SITE PLAN IR Sites 3 and 7B NAS ALAMEDA ALAMEDA, CA.	



Legend

- SCAPS soil sample showing depth and analytical results, in mg/kg.
- ▨ Zone of significant POL impact, based on SCAPS LIF data. Boundary is dashed and queried where uncertain.
- SCAPS LIF fluorescence intensity profile. Vertical axis is push location. Push I.D. and maximum fluorescence are shown.



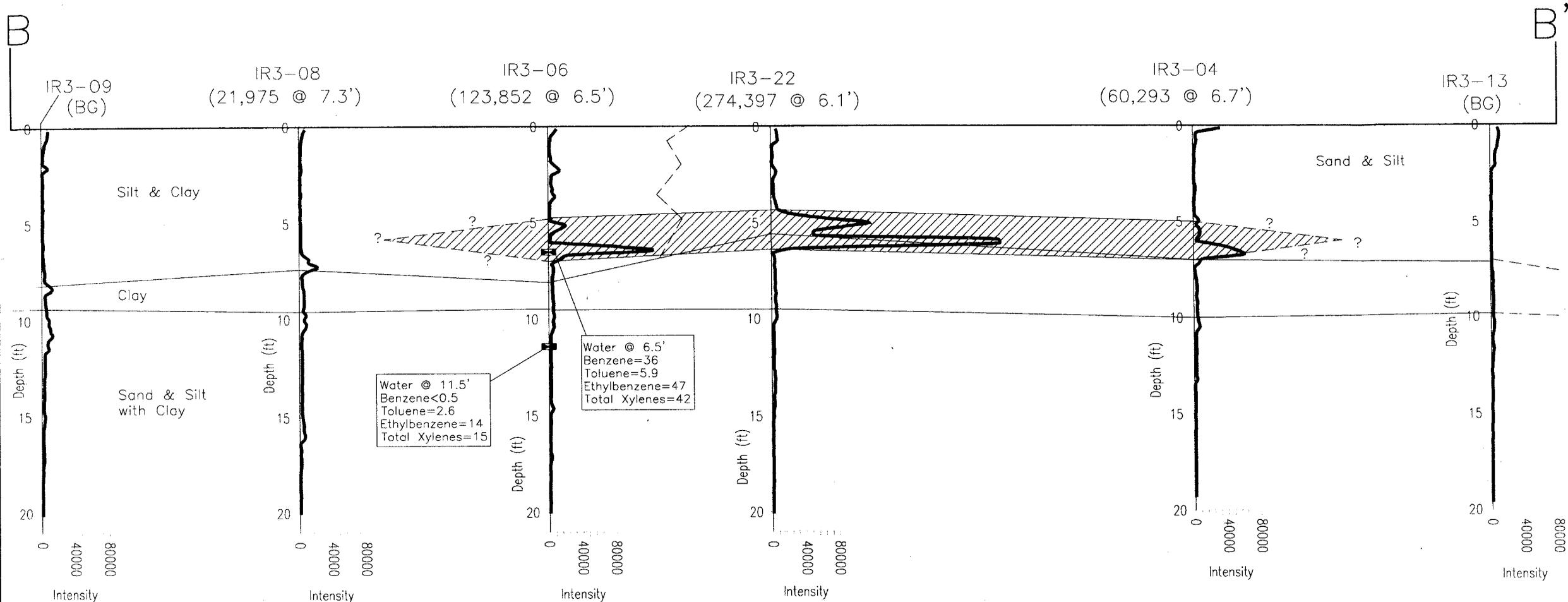
NOTE: Soil types are generalized and based on CPT data. Contacts are dashed where uncertain.

NOTE: The vertical length of each push is exaggerated by a factor of 15X to aid viewing.

FIGURE 4a

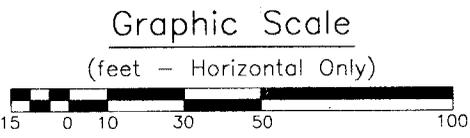
U.S. NAVY PWC ENVIRONMENTAL DEPARTMENT CODE 980	SCALE: 1"=60' (Horizontal Only)
June, 1997	

Cross Section A-A'
IR Sites 3 and 7B
NAS ALAMEDA
ALAMEDA, CA.



Legend

- SCAPS water sample showing depth and analytical results, in ug/l.
- Zone of significant POL impact, based on SCAPS LIF data. Boundary is dashed and queried where uncertain.
- SCAPS LIF fluorescence intensity profile. Vertical axis is push location. Push I.D. and maximum fluorescence are shown

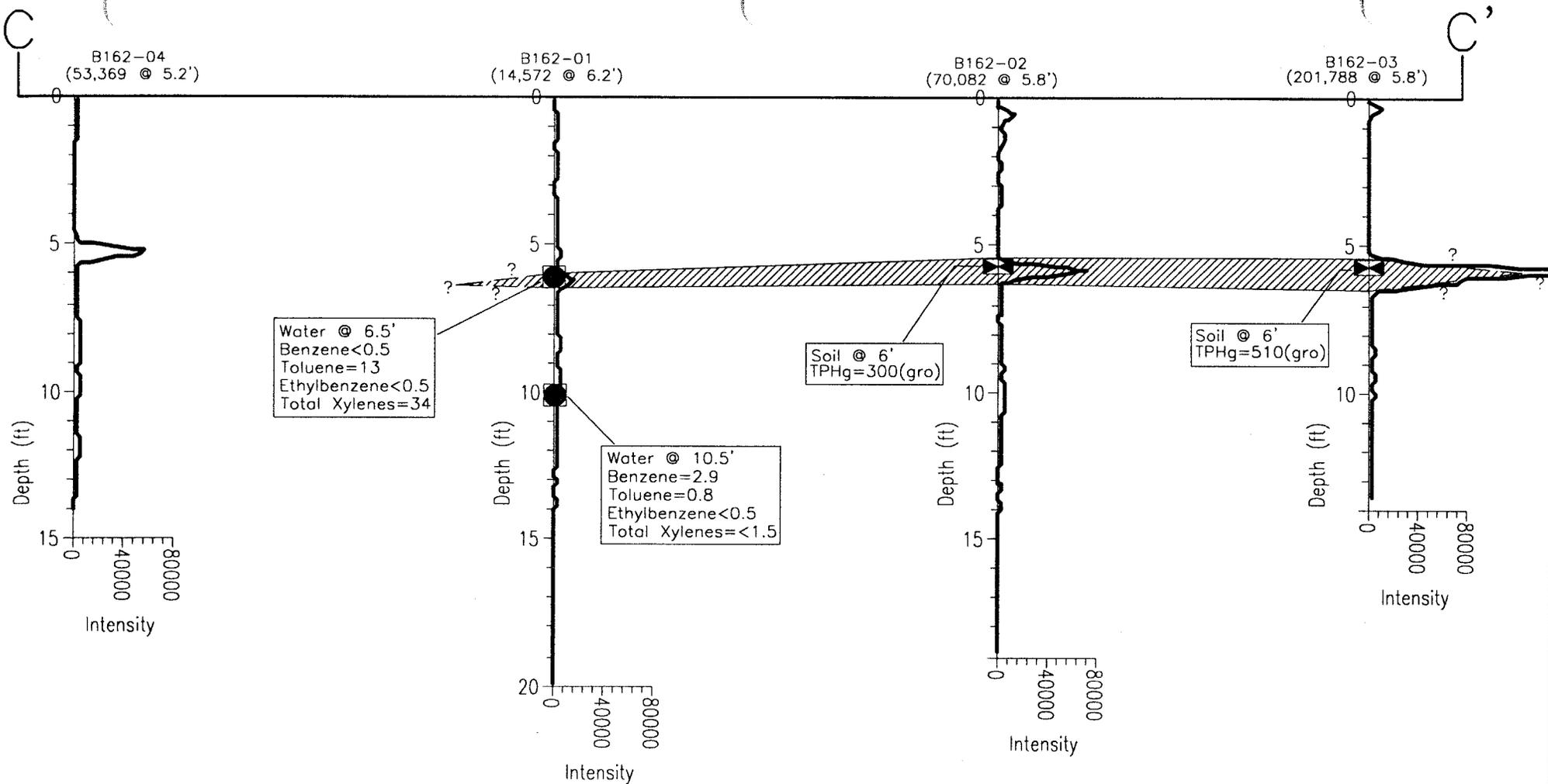


NOTE: The vertical length of each push is exaggerated by a factor of 8X to aid viewing.

NOTE: Soil types are generalized and based on CPT data. Contacts are dashed where uncertain.

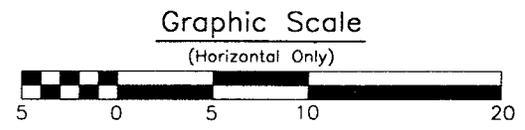
FIGURE 4b

U.S. NAVY PWC ENVIRONMENTAL DEPARTMENT CODE 980	SCALE: 1"=50' (Horizontal Only)
June, 1997	
Cross Section B-B' IR Sites 3 and 7B NAS ALAMEDA ALAMEDA, CA.	



Legend

- SCAPS soil sample showing depth and analytical results, in mg/kg.
- SCAPS water sample showing depth and analytical results, in ug/l.
- Zone of significant PCBs based on SCAPS LIF data. Boundary is dashed and queried where uncertain.
- SCAPS LIF fluorescence intensity profile. Vertical axis is push location. Push I.D. and maximum fluorescence are shown.

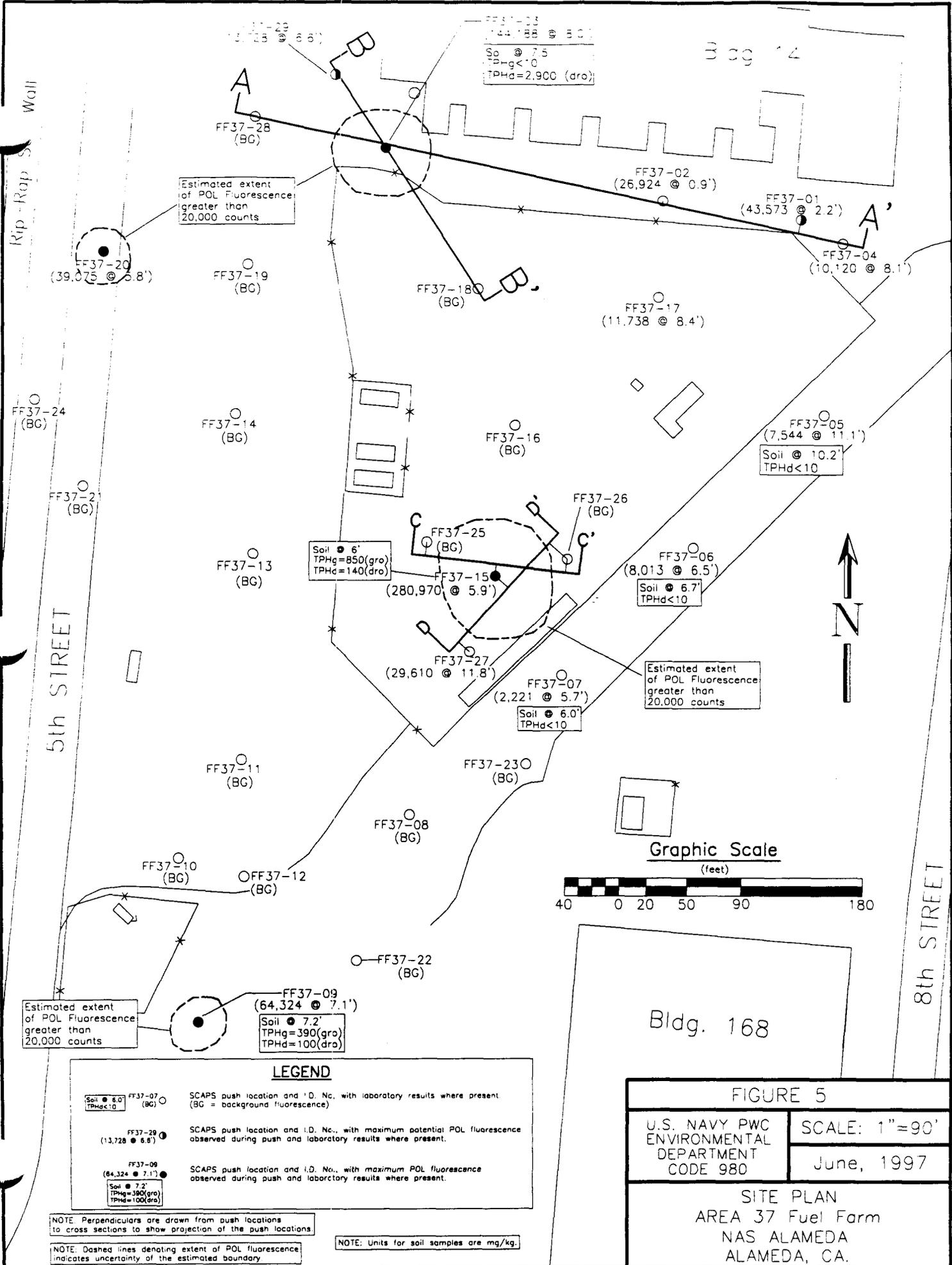


NOTE: The vertical length of each push is exaggerated by a factor of 2X to aid viewing.

FIGURE 4c

U.S. NAVY PWC ENVIRONMENTAL DEPARTMENT CODE 980	SCALE: 1"=10' (Horizontal Only)
	June, 1997

Cross Section C-C'
IR Sites 3 and 7B
NAS ALAMEDA
ALAMEDA, CA.



Estimated extent of POL Fluorescence greater than 20,000 counts

Estimated extent of POL Fluorescence greater than 20,000 counts

Estimated extent of POL Fluorescence greater than 20,000 counts

LEGEND

- FF37-07 (BG) SCAPS push location and I.D. No. with laboratory results where present (BG = background fluorescence)
- FF37-29 (13,728 @ 6.6') SCAPS push location and I.D. No., with maximum potential POL fluorescence observed during push and laboratory results where present.
- FF37-09 (64,324 @ 7.1') SCAPS push location and I.D. No., with maximum POL fluorescence observed during push and laboratory results where present.

NOTE: Perpendiculars are drawn from push locations to cross sections to show projection of the push locations.

NOTE: Dashed lines denoting extent of POL fluorescence indicates uncertainty of the estimated boundary

NOTE: Units for soil samples are mg/kg.

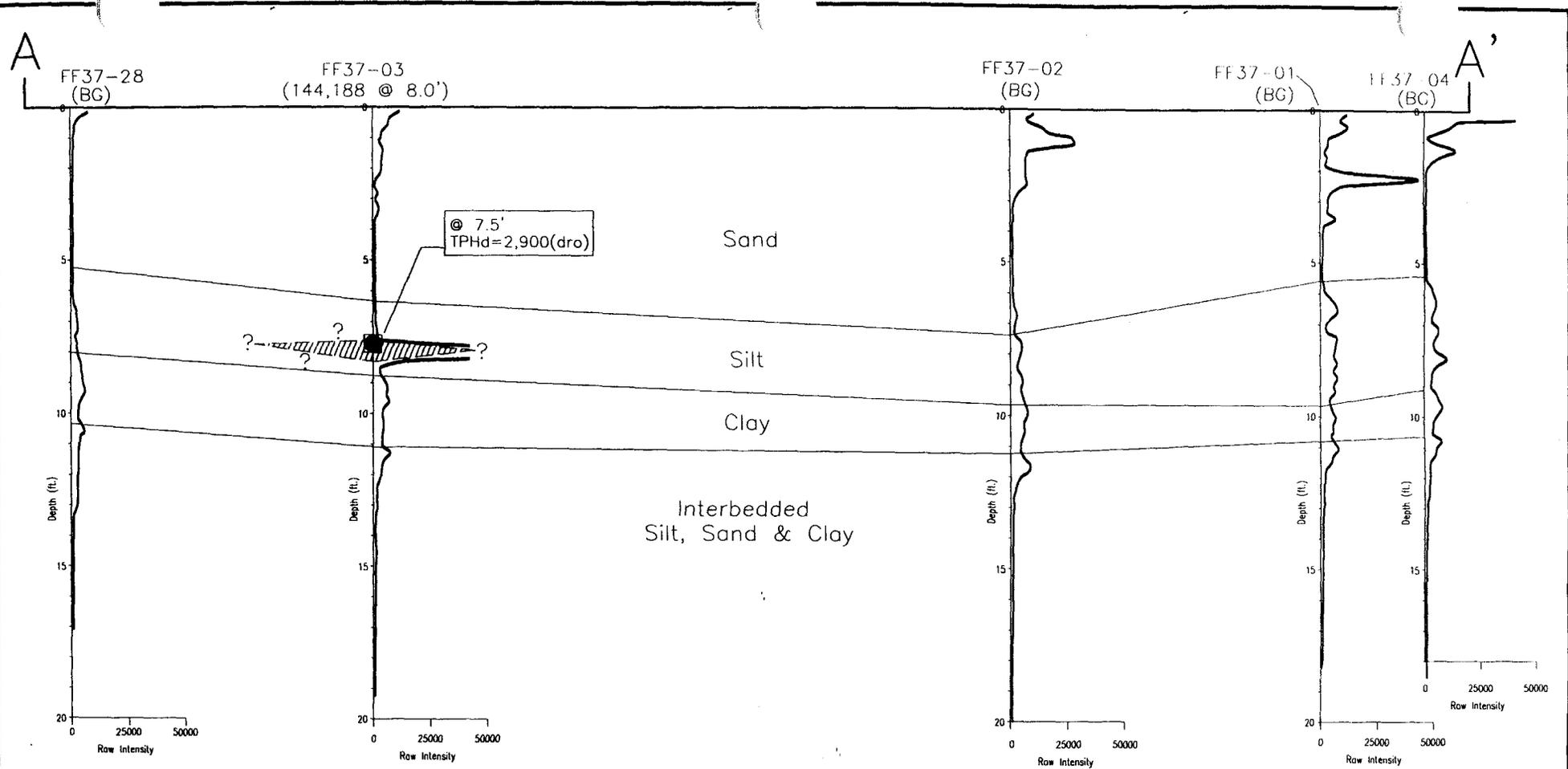
FIGURE 5

U.S. NAVY PWC ENVIRONMENTAL DEPARTMENT CODE 980

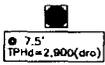
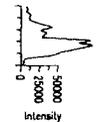
SCALE: 1"=90'

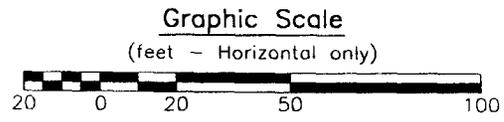
June, 1997

SITE PLAN
 AREA 37 Fuel Farm
 NAS ALAMEDA
 ALAMEDA, CA.



Legend

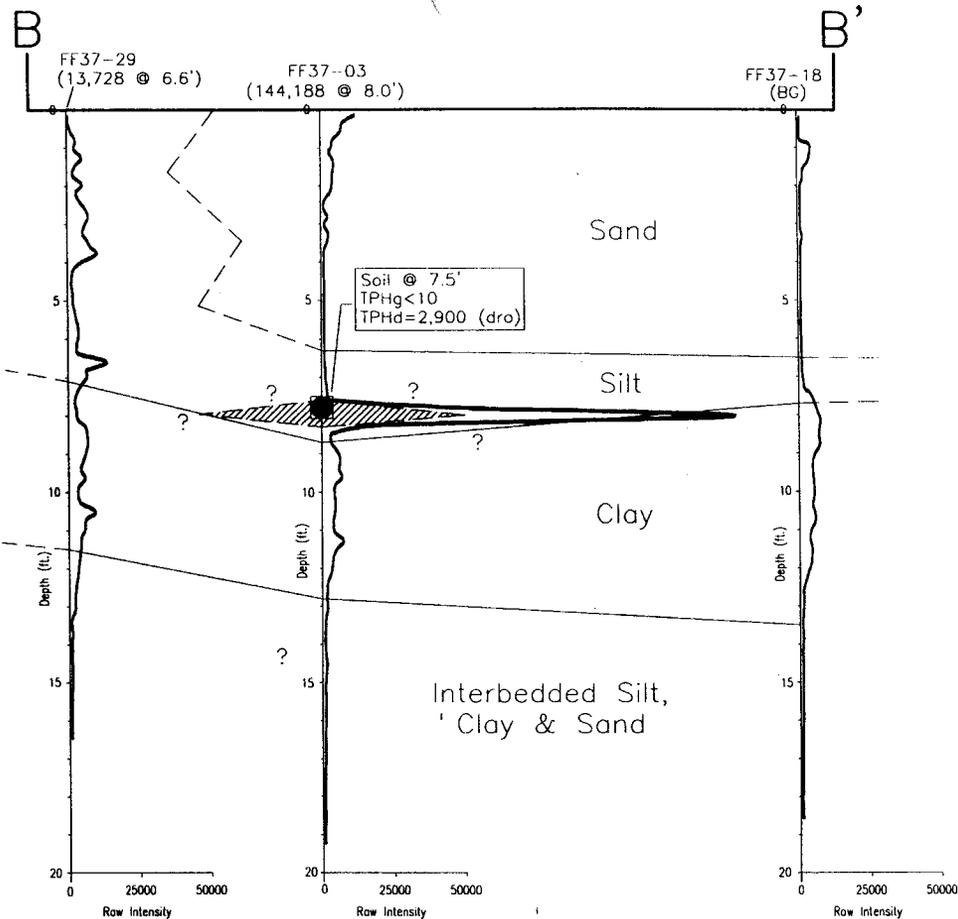
- 
 SCAPS soil sample showing depth and analytical results, in mg/kg.
- 
 Zone of significant POL impact, based on SCAPS LIF data. Boundary is dashed and queried where uncertain.
- 
 SCAPS LIF fluorescence intensity profile. Vertical axis is push location. Push I.D. and maximum fluorescence are shown at the top of each push.



NOTES: The vertical length of each push is exaggerated by a factor of 10X to aid viewing. Soil types are generalized and based on SCAPS CPT logs. Contacts are dashed where uncertain.

FIGURE 6a

U.S. NAVY PWC ENVIRONMENTAL DEPARTMENT CODE 980	SCALE: 1"=50' (horizontal only)
June, 1997	
Cross Section A-A' AREA 37 Fuel Farm NAS ALAMEDA ALAMEDA, CA.	



Legend

● 7.5'
TPHg = 2,900 (dro)

SCAPS soil sample showing depth and analytical results, in mg/kg.



Zone of significant POL impact, based on SCAPS LIF data. Boundary is dashed and queried where uncertain.



SCAPS LIF fluorescence intensity profile. Vertical axis is push location. Push I.D. and maximum fluorescence are shown at the top of each push.

Graphic Scale

(feet - Horizontal only)



NOTES: The vertical length of each push is exaggerated by a factor of 10X to aid viewing. Soil types are generalized and based on SCAPS CPT logs. Contacts are dashed where uncertain.

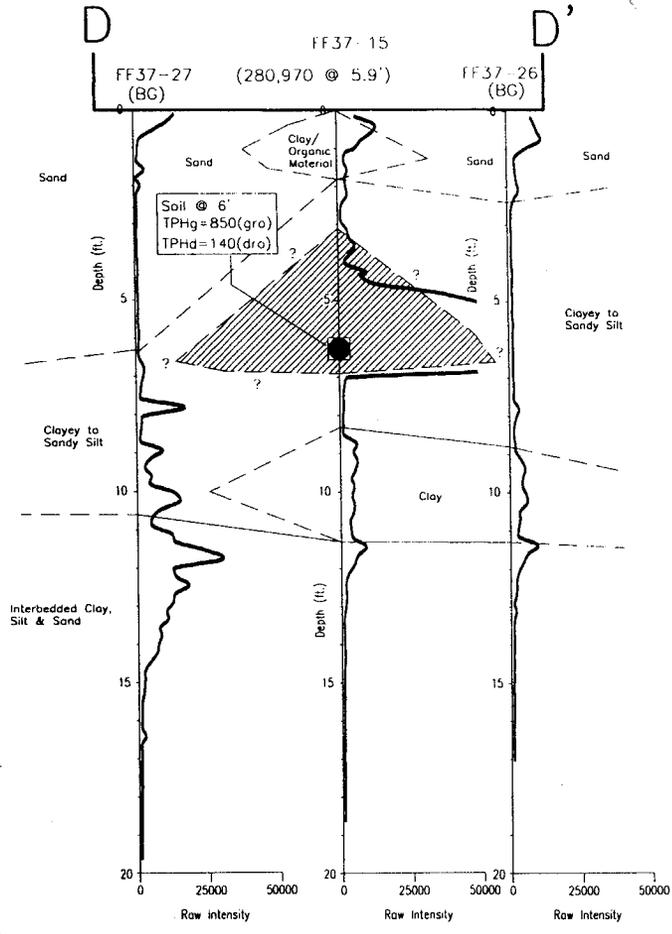
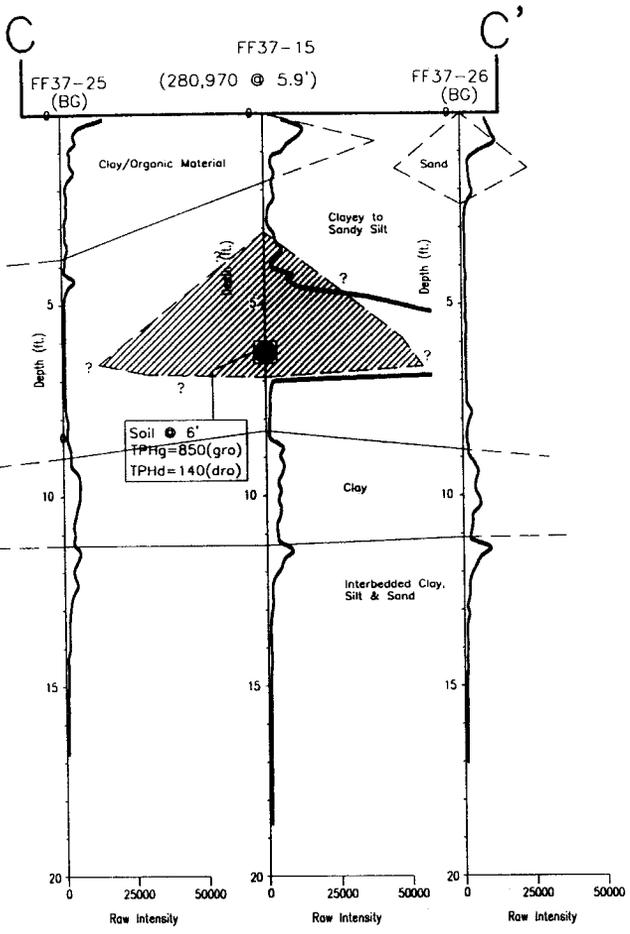
FIGURE 6b

U.S. NAVY PWC
ENVIRONMENTAL
DEPARTMENT
CODE 980

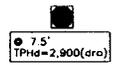
SCALE: 1"=50'
(horizontal only)

June, 1997

Cross Section B-B'
AREA 37 Fuel farm.
NAS ALAMEDA
ALAMEDA, CA.



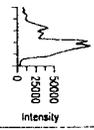
Legend



SCAPS soil sample showing depth and analytical results, in mg/kg.



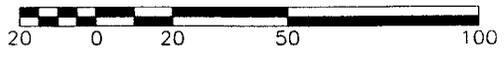
Zone of significant POL impact, based on SCAPS LIF data. Boundary is dashed and queried where uncertain.



SCAPS LIF fluorescence intensity profile. Vertical axis is push location. Push I.D. and maximum fluorescence are shown at the top of each push.

Graphic Scale

(feet- Horizontal only)



NOTES: The vertical length of each push is exaggerated by a factor of 10X to aid viewing. Soil types are generalized and based on SCAPS CPT logs. Contacts are dashed where uncertain.

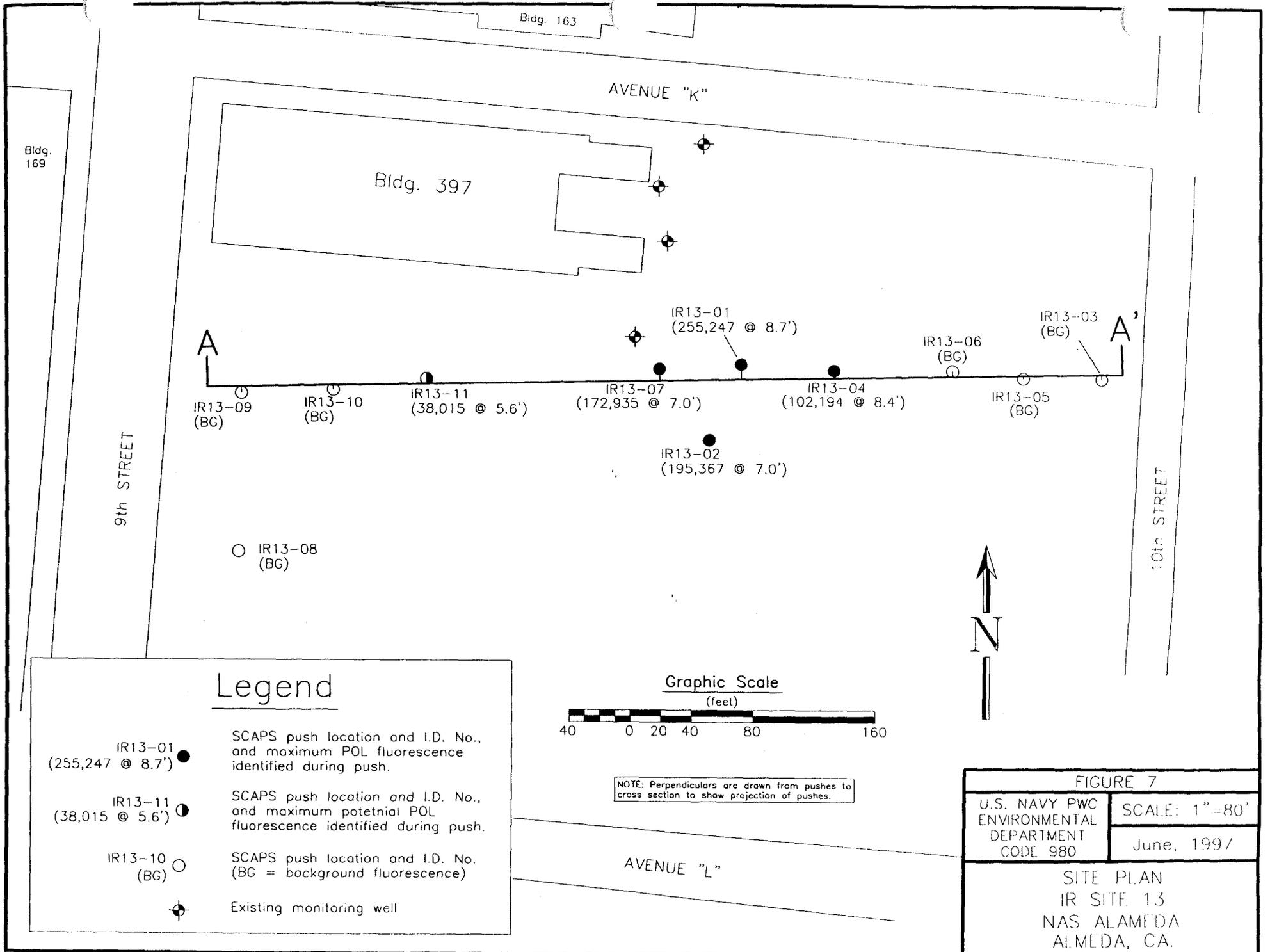
FIGURE 6c

U.S. NAVY PWC ENVIRONMENTAL DEPARTMENT CODE 980

SCALE: 1"=50' (horizontal only)

June, 1997

Cross Sections C-C' & D-D'
AREA 37 Fuel Farm
NAS ALAMEDA
ALAMEDA, CA.



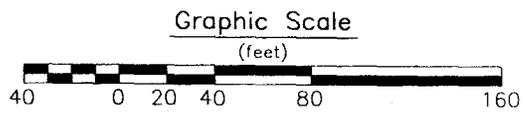
Legend

- 
 IR13-01
 (255,247 @ 8.7')

SCAPS push location and I.D. No., and maximum POL fluorescence identified during push.
- 
 IR13-11
 (38,015 @ 5.6')

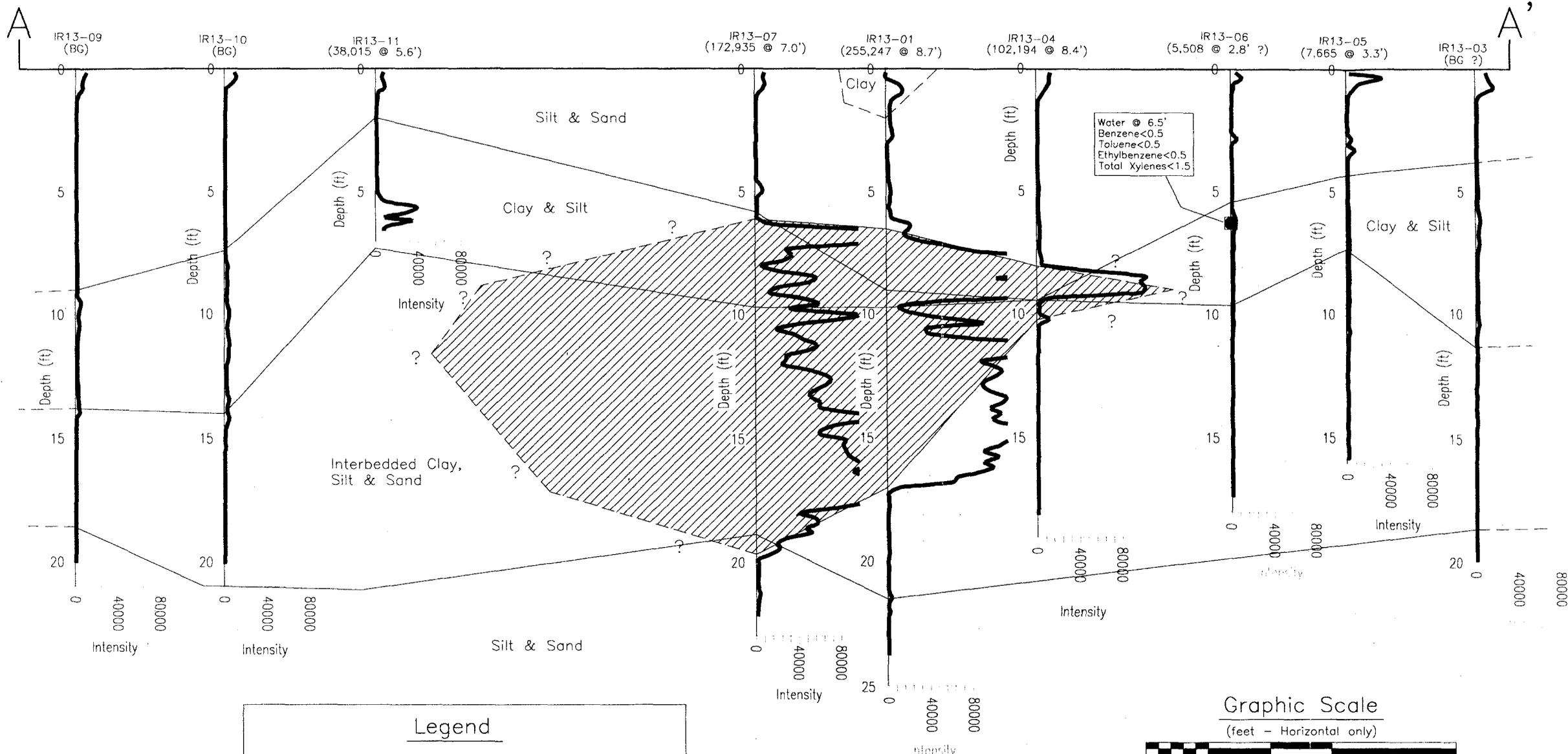
SCAPS push location and I.D. No., and maximum potential POL fluorescence identified during push.
- 
 IR13-10
 (BG)

SCAPS push location and I.D. No. (BG = background fluorescence)
- 
 Existing monitoring well



NOTE: Perpendiculars are drawn from pushes to cross section to show projection of pushes.

FIGURE 7	
U.S. NAVY PWC ENVIRONMENTAL DEPARTMENT CODE 980	SCALE: 1"=80' June, 1997
SITE PLAN IR SITE 13 NAS ALAMEDA ALAMEDA, CA.	



Legend

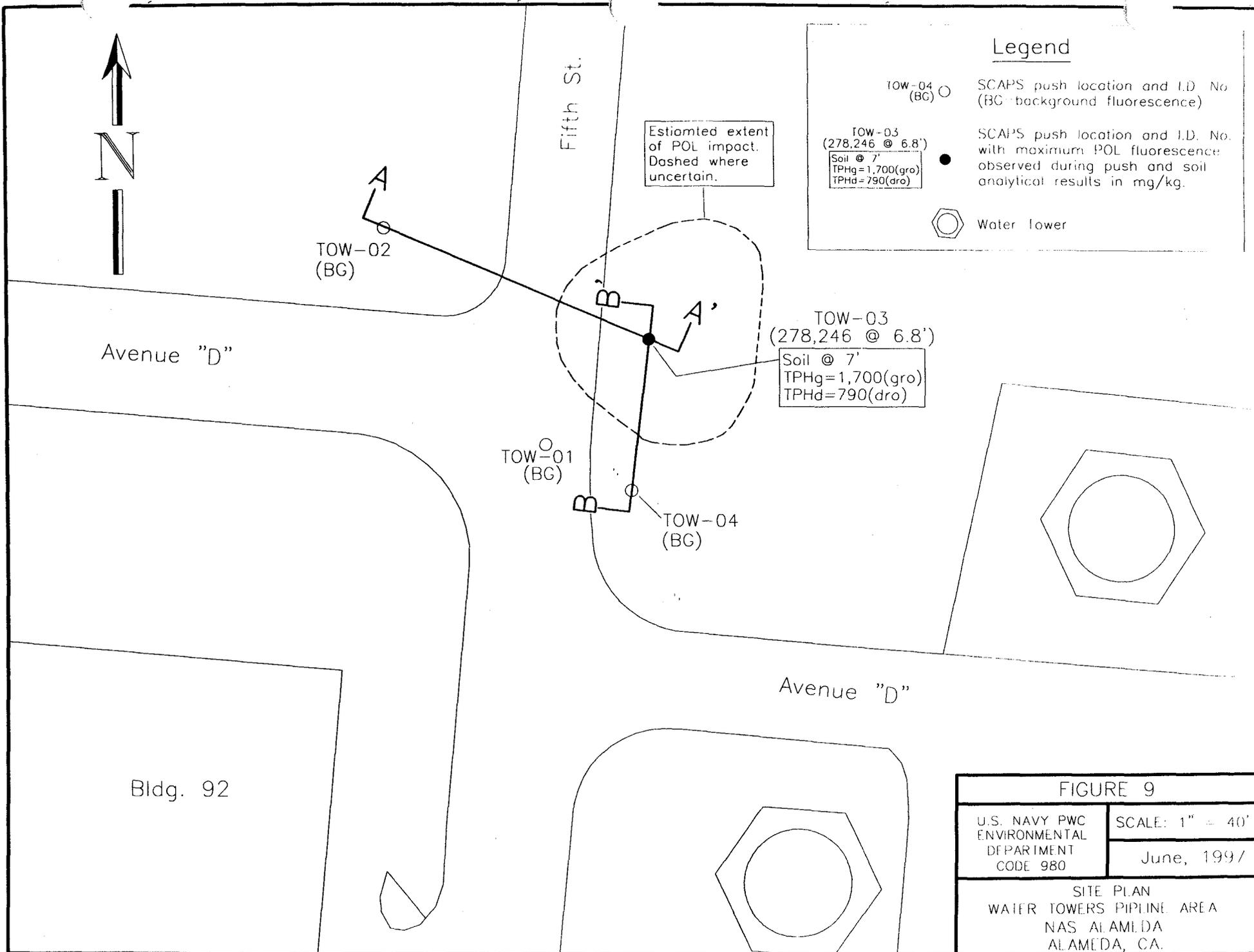
- SCAPS water sample showing depth and analytical results in ug/l.
- Zone of significant POL impact, based on SCAPS LIF data. Boundary is dashed and queried where uncertain.
- SCAPS LIF fluorescence intensity profile. Vertical axis is push location. Push I.D. and maximum fluorescence are shown.

NOTE: Soil types are generalized, and based on CPT data. Contacts are dashed where uncertain.

NOTE: The vertical length of each push is exaggerated by a factor of 10X to aid viewing.

FIGURE 8

U.S. NAVY PWC ENVIRONMENTAL DEPARTMENT CODE 980	SCALE: 1"=50' (Horizontal only)
June, 1997	
Cross Section A-A' IR SITE 13 - FORMER REFINERY NAS ALAMEDA ALAMEDA, CA.	



Legend

- TOW-04 (BG) ○ SCAPS push location and I.D. No. (BG - background fluorescence)
- TOW-03 (278,246 @ 6.8')
Soil @ 7'
TPHg=1,700(gro)
TPHd=790(dro) ● SCAPS push location and I.D. No. with maximum POL fluorescence observed during push and soil analytical results in mg/kg.
- ⬡ Water tower

Estimated extent of POL impact. Dashed where uncertain.

TOW-03 (278,246 @ 6.8')
Soil @ 7'
TPHg=1,700(gro)
TPHd=790(dro)

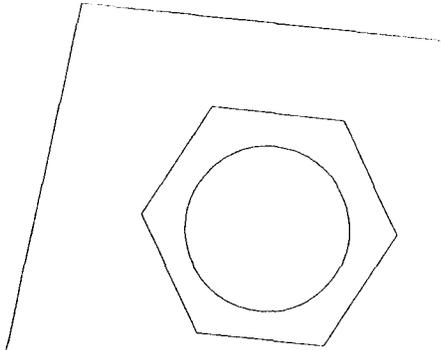
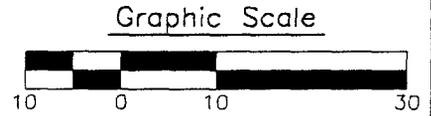
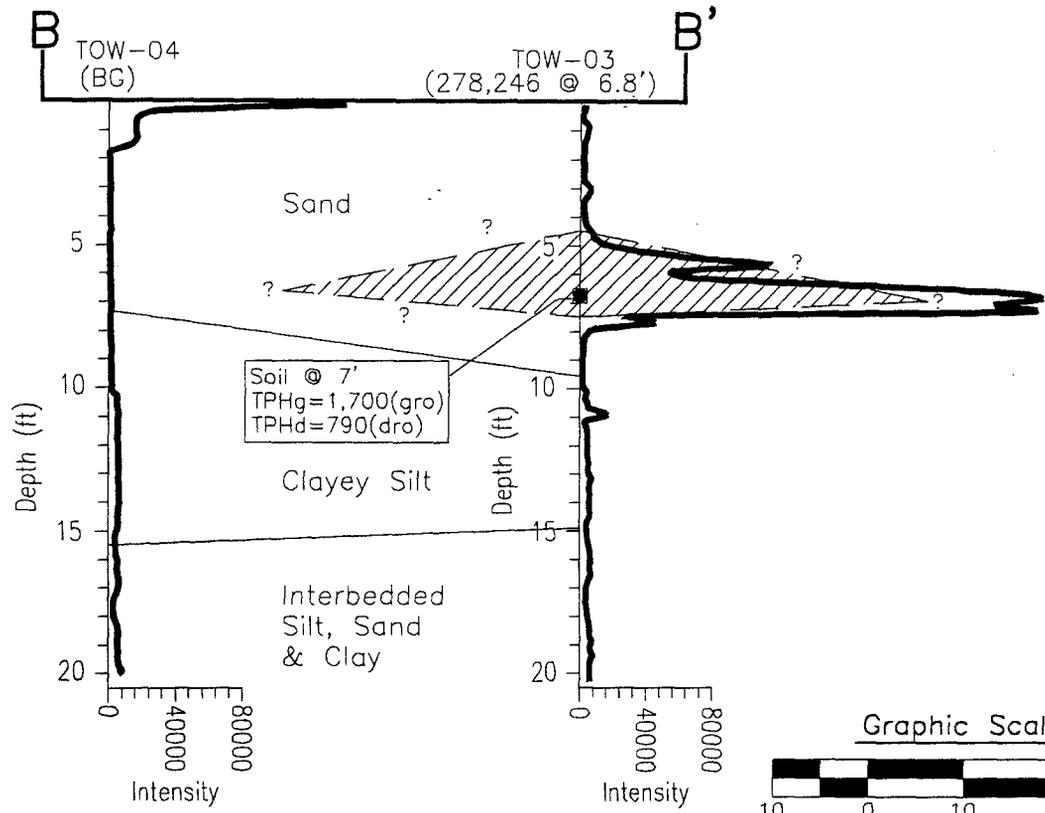
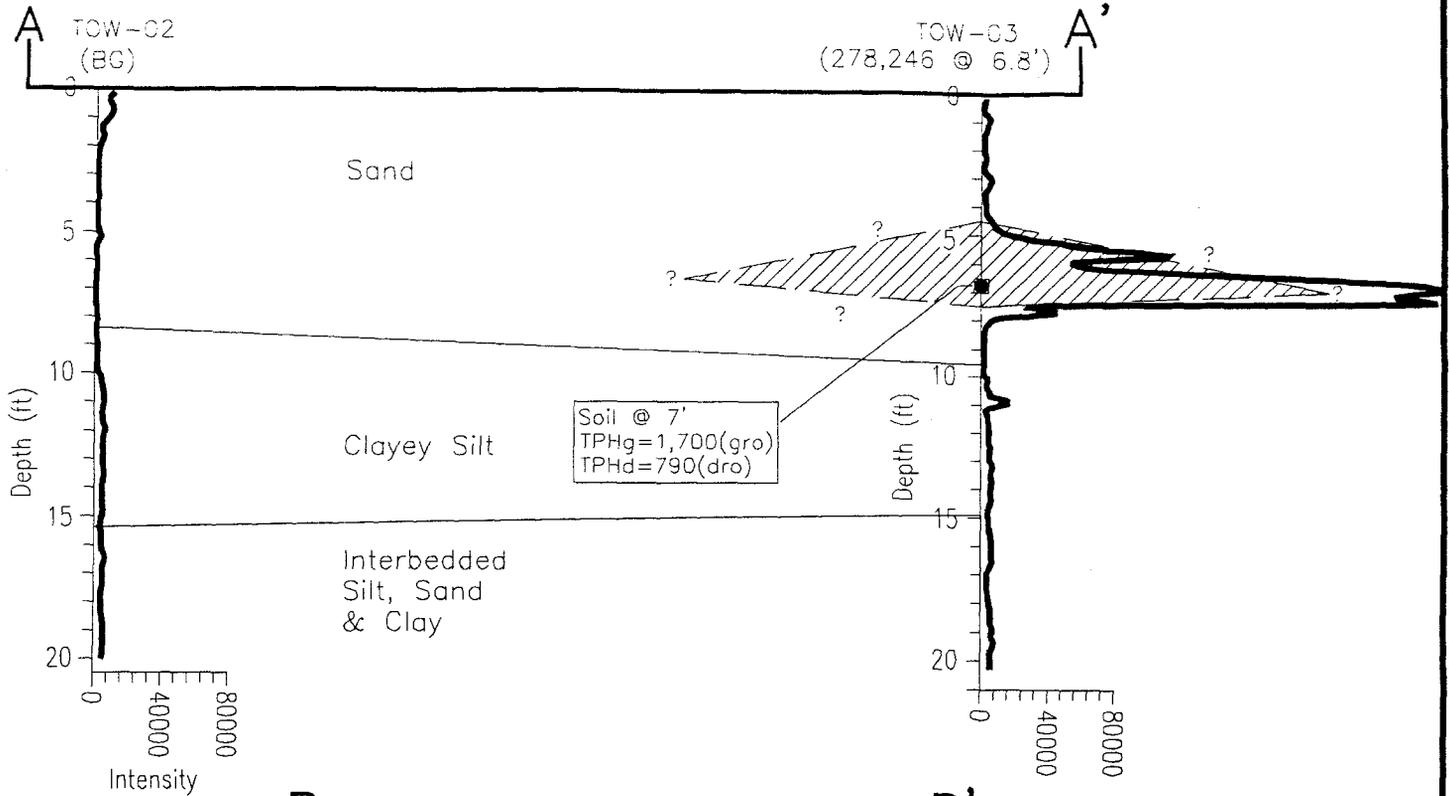


FIGURE 9	
U.S. NAVY PWC ENVIRONMENTAL DEPARTMENT CODE 980	SCALE: 1" = 40'
	June, 1997
SITE PLAN WATER TOWERS PIPELINE AREA NAS ALAMEDA ALAMEDA, CA.	



Legend

- SCAPS soil sample showing depth and analytical results, in mg/kg.
- ▨ Zone of significant POL impact, based on SCAPS LIF data. Boundary is dashed and queried where uncertain.
-  SCAPS LIF fluorescence intensity profile. Vertical axis is push location. Push I.D. and maximum fluorescence are shown.

NOTE: Vertical scale exaggerated by a factor of 3X to aid viewing.

NOTE: Soil types are generalized and based on CPT data.

FIGURE 10

U.S. NAVY PWC ENVIRONMENTAL DEPARTMENT CODE 980	SCALE: 1" = 20' (Horizontal only)
APRIL, 1997	
CROSS SECTIONS A-A' & B-B' WATER TOWERS PIPELINE AREA NAS ALAMEDA ALAMEDA, CA.	



Legend

SPL-01 (BG) ○ SCAPS push location and I.D. No., and analytical results, in mg/kg.
(BG = background fluorescence)

Soil @ 6' TPHd < 10

○ SPL-01 (BG)

Graphic Scale



○ SPL-02 (BG)

Soil @ 6' TPHd < 10

○ SPL-03 (BG)

Fire Hydrant



Manhole

Sea Wall

Shoreline (approx. location)

SEA PLANE LAGOON

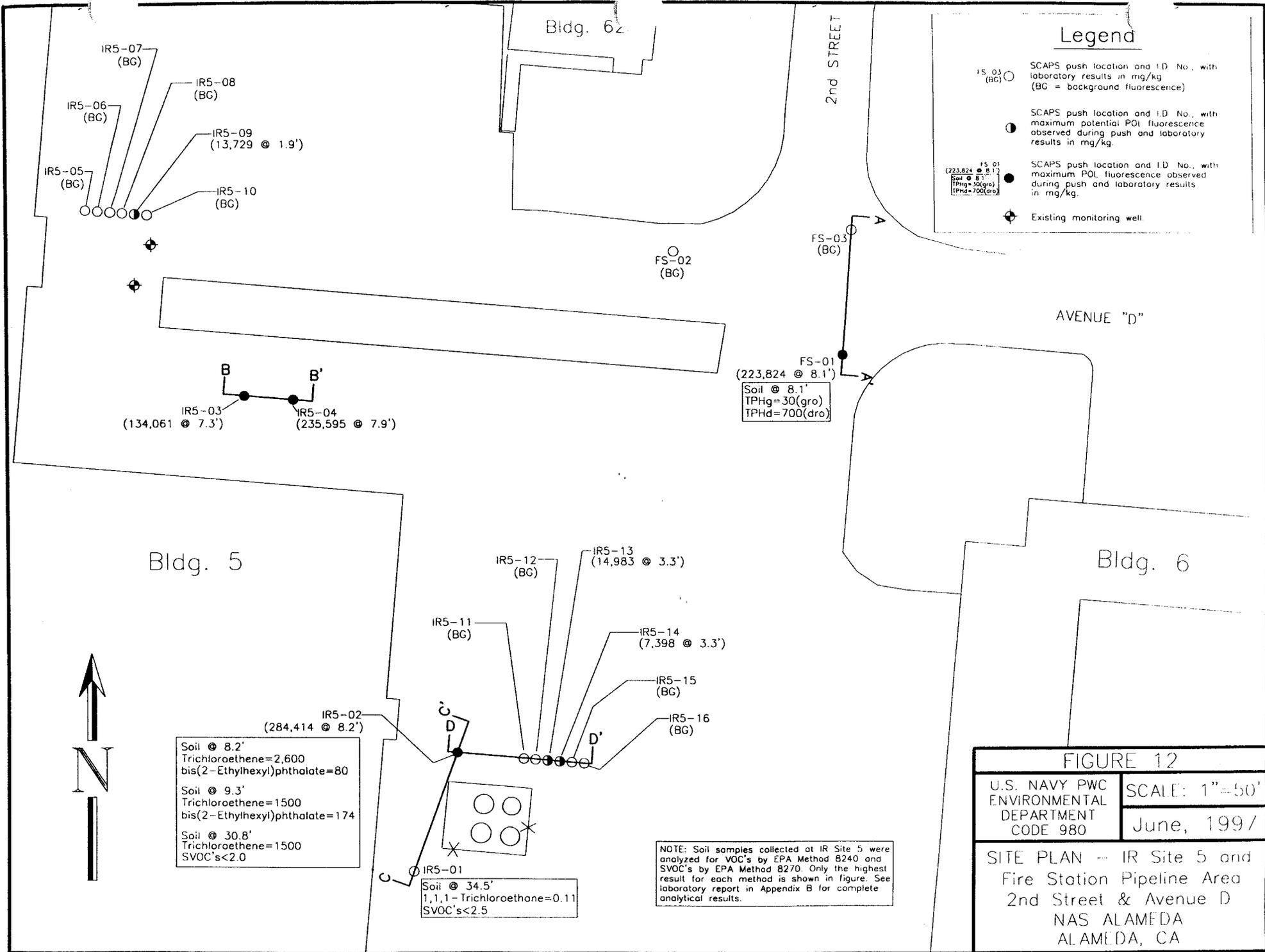
FIGURE 11

U.S. NAVY PWC ENVIRONMENTAL DEPARTMENT CODE 980

SCALE: 1" = 20'

June, 1997

SITE PLAN
SEA PLANE LAGOON
PIPELINE AREA
NAS ALAMEDA
ALAMEDA, CA.



Legend

- FS 03 (BG) SCAPS push location and I.D. No., with laboratory results in mg/kg (BG = background fluorescence)
- SCAPS push location and I.D. No., with maximum potential PDI fluorescence observed during push and laboratory results in mg/kg.
- ◻ FS 01 (223,824 @ 8.1') Soil @ 8.1' TPHg=30(gro) TPHd=700(dro) SCAPS push location and I.D. No., with maximum PDI fluorescence observed during push and laboratory results in mg/kg.
- ⊕ Existing monitoring well.

Soil @ 8.2'
Trichloroethene=2,600
bis(2-Ethylhexyl)phthalate=80

Soil @ 9.3'
Trichloroethene=1500
bis(2-Ethylhexyl)phthalate=174

Soil @ 30.8'
Trichloroethene=1500
SVOC's<2.0

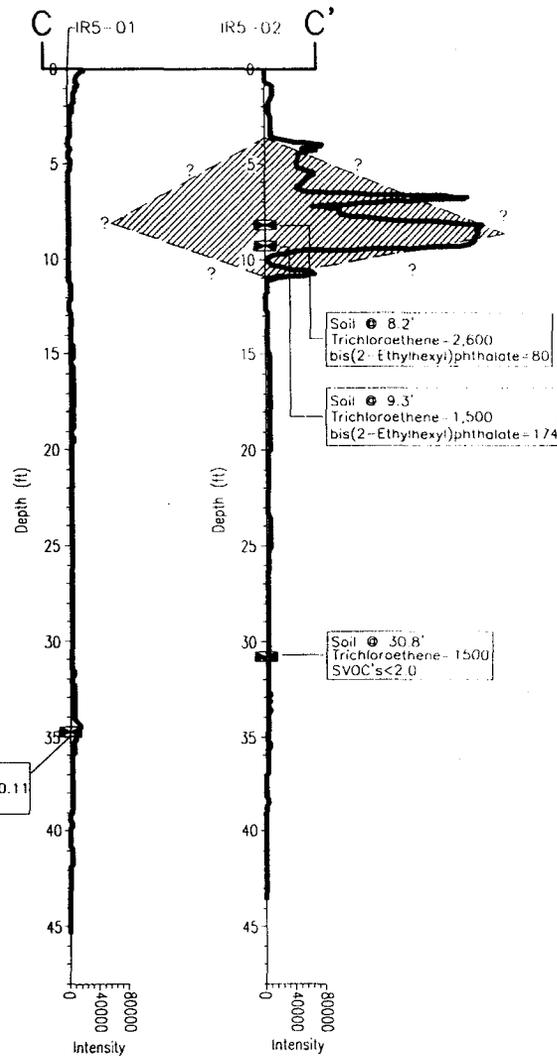
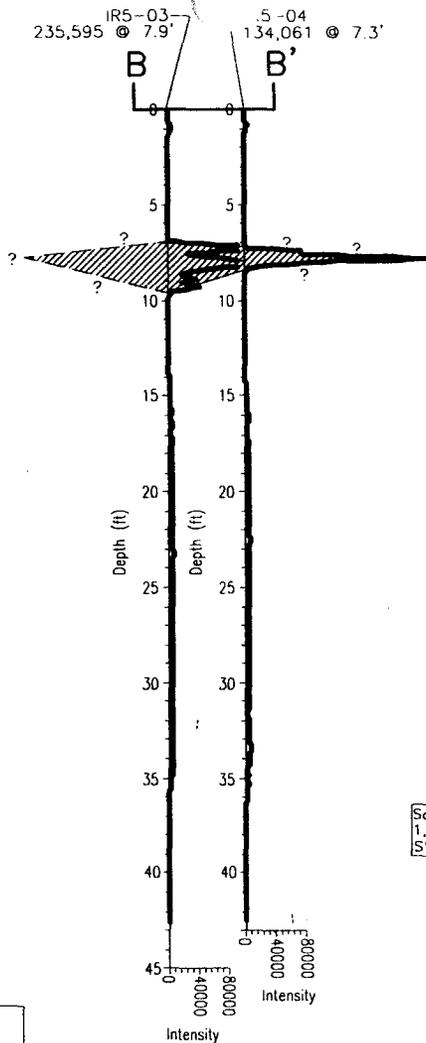
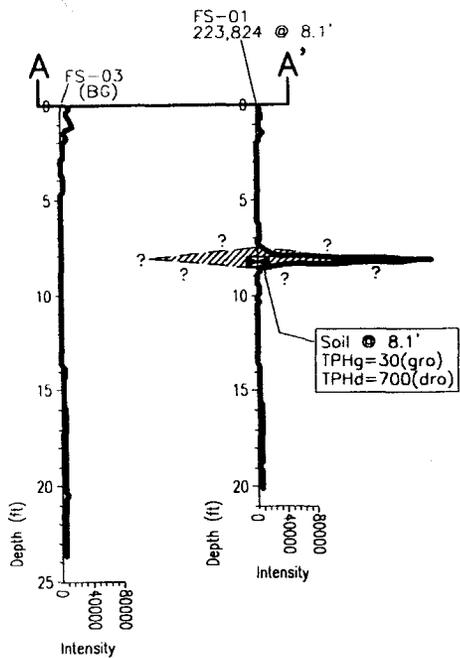
IR5-01
Soil @ 34.5'
1,1,1-Trichloroethene=0.11
SVOC's<2.5

NOTE: Soil samples collected at IR Site 5 were analyzed for VOC's by EPA Method 8240 and SVOC's by EPA Method 8270. Only the highest result for each method is shown in figure. See laboratory report in Appendix B for complete analytical results.

FIGURE 12

U.S. NAVY PWC ENVIRONMENTAL DEPARTMENT CODE 980	SCALE: 1"=50'
	June, 1997

SITE PLAN -- IR Site 5 and
Fire Station Pipeline Area
2nd Street & Avenue D
NAS ALAMEDA
ALAMEDA, CA



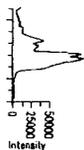
Legend



SCAPS soil sample showing depth and analytical results, in mg/kg.



Zone of significant POL impact, based on SCAPS LIF data. Boundary is dashed and queried where uncertain.



SCAPS LIF fluorescence intensity profile. Vertical axis is push location. Push I.D. and maximum fluorescence are shown

Graphic Scale

(feet - Horizontal only)



NOTE: The vertical length of each push is exaggerated by a factor of 10X to aid viewing.

NOTE: Soil samples collected at IR Site 5 were analyzed for VOC's by EPA Method 8240 and SVOC's by EPA Method 8270. Only the highest result for each method is shown in figure. See laboratory report in Appendix B for complete analytical results.

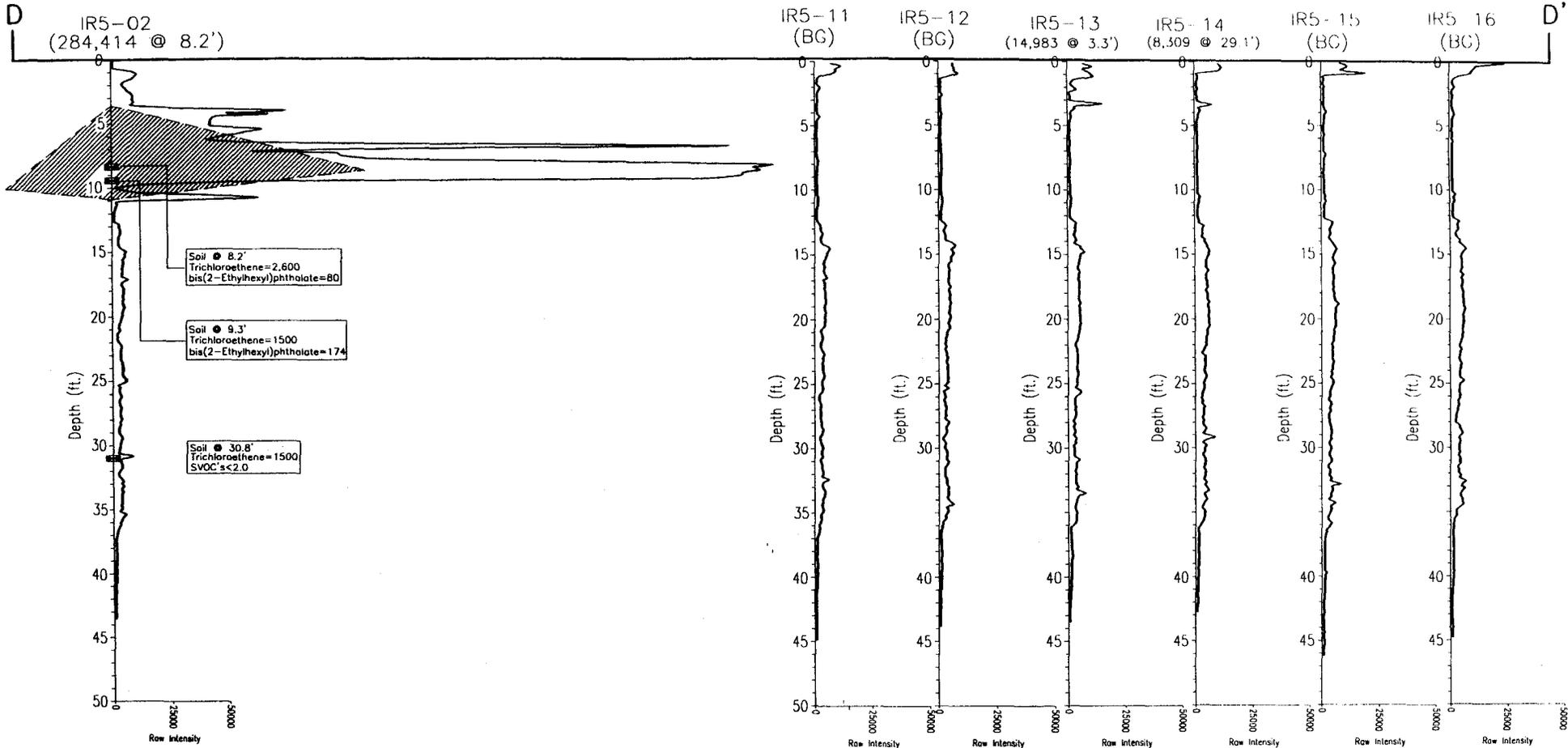
FIGURE 13a

U.S. NAVY PWC
ENVIRONMENTAL
DEPARTMENT
CODE 980

SCALE: 1"=50'

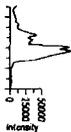
June, 1997

Cross Sections- IR Site 5 and
Fire Station Pipeline Area
2nd Street & Avenue D
NAS ALAMEDA
ALAMEDA, CA



Legend

-  SCAPS soil sample showing depth and analytical results, in mg/kg.
-  Zone of significant POL impact, based on SCAPS LIF data. Boundary is dashed and queried where uncertain.



SCAPS LIF fluorescence intensity profile. Vertical axis is push location. Push I.D. and maximum fluorescence are shown

Graphic Scale

(feet - Horizontal only)



NOTE: The vertical length of each push is compressed by a factor of 0.5X to aid viewing. The elevation at the top of each push relative to the datum is not exaggerated!

NOTE: Soil samples collected at IR Site 5 were analyzed for VOC's by EPA Method 8240 and SVOC's by EPA Method 8270. Only the highest result for each method is shown in figure. See laboratory report in Appendix B for complete analytical results.

FIGURE 13b

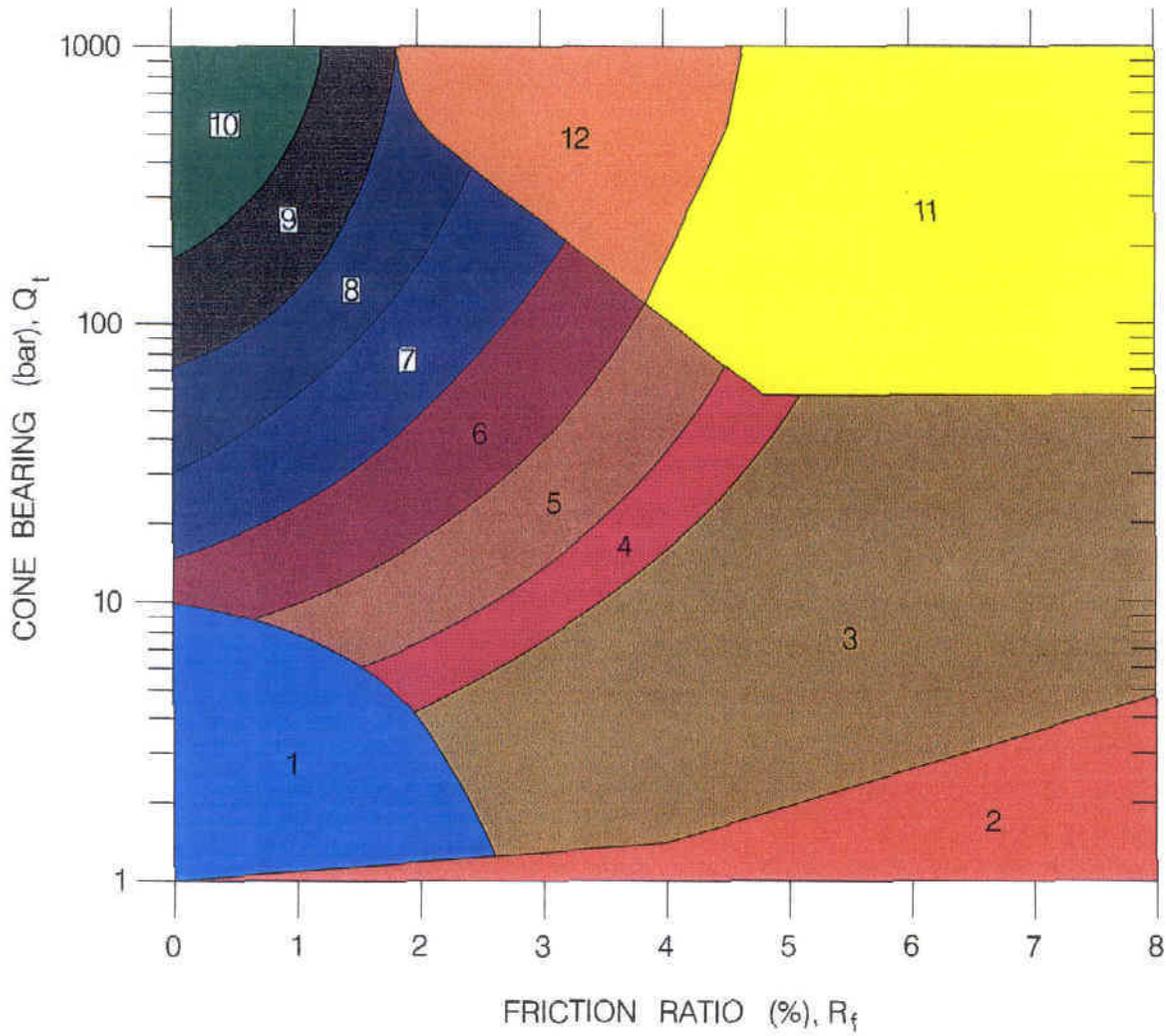
U.S. NAVY PWC
ENVIRONMENTAL
DEPARTMENT
CODE 980

SCALE: 1"=6'
(Horizontal only)

June, 1997

Cross Section - IR Site 5 and
Fire Station Pipeline Area
2nd Street & Avenue D
NAS ALAMEDA
ALAMEDA, CA

CPT CLASSIFICATION CHART
(after Robertson and Campanella, 1988)



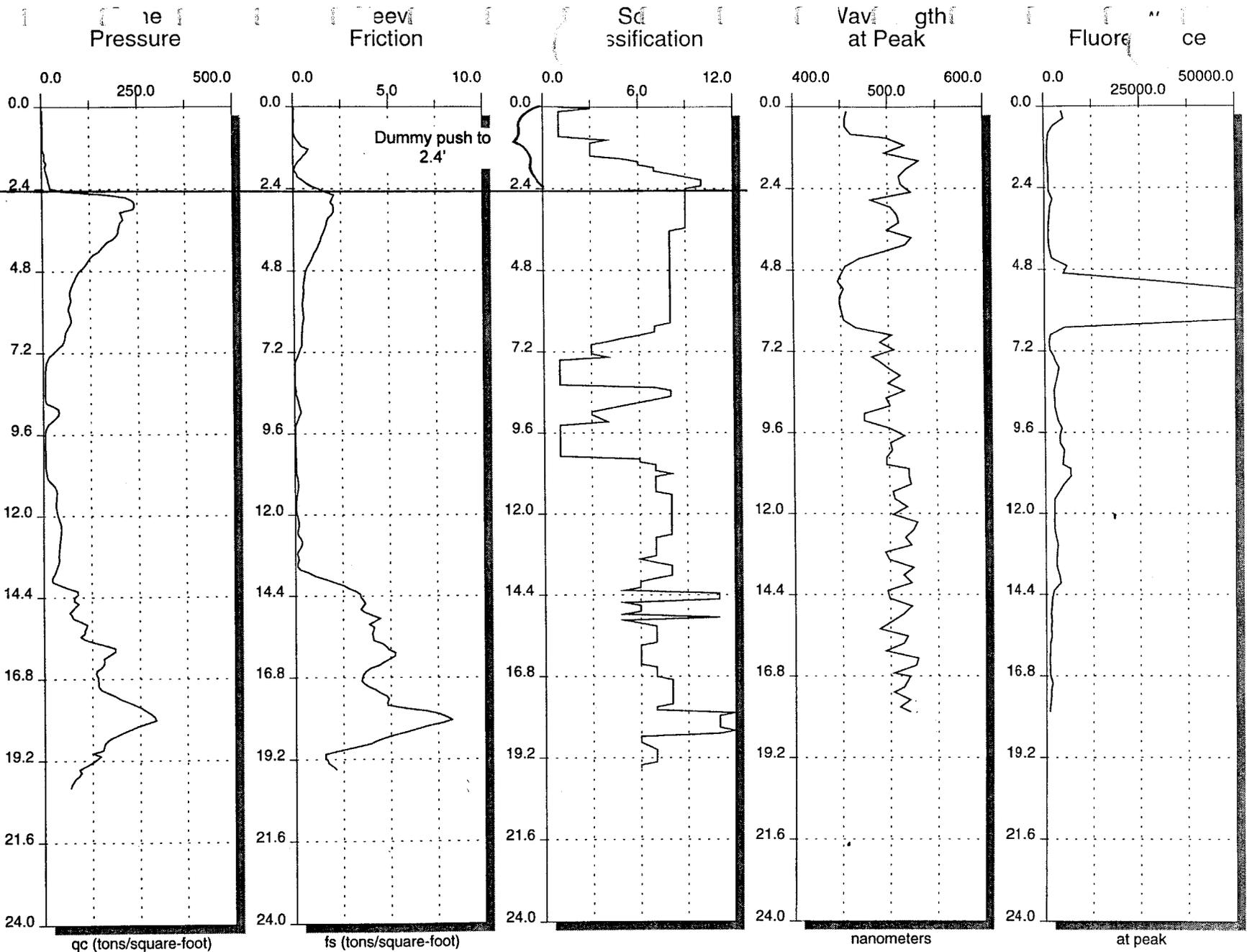
Zone	Q_t / N	Soil Behaviour Type
1	2	sensitive fine grained
2	1	organic material
3	1	clay
4	1.5	silty clay to clay
5	2	clayey silt to silty clay
6	2.5	sandy silt to clayey silt
7	3	silty sand to sandy silt
8	4	sand to silty sand
9	5	sand
10	6	gravelly sand to sand
11	1	very stiff fine grained*
12	2	sand to clayey sand*

* overconsolidated or cemented

FIGURE 14

APPENDIX A

SCAPS DATA



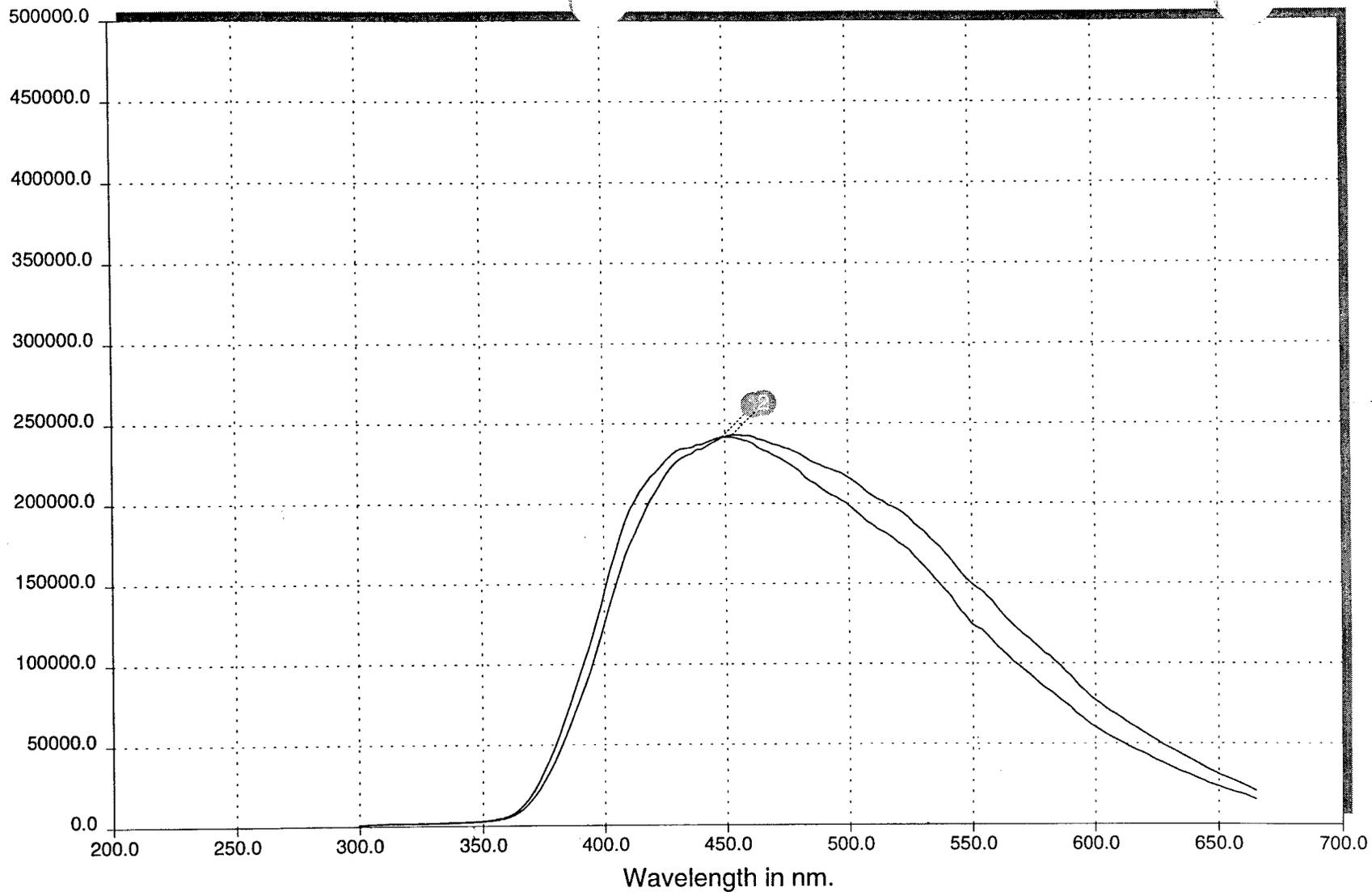
Time: 14:11:56
Date: 11-20-1996
Version: 1.0

Push: C:\BASIC71\DATA\IR3-01.PSH
Probe: C:\BASIC71\DATA\PROBE23B.PR3
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

Fluorescence Intensity



1: 5.8 ft.; 241623 @ 448.8 nm

2: 6.3 ft.; 242879 @ 453.0 nm

Time: 14:11:56

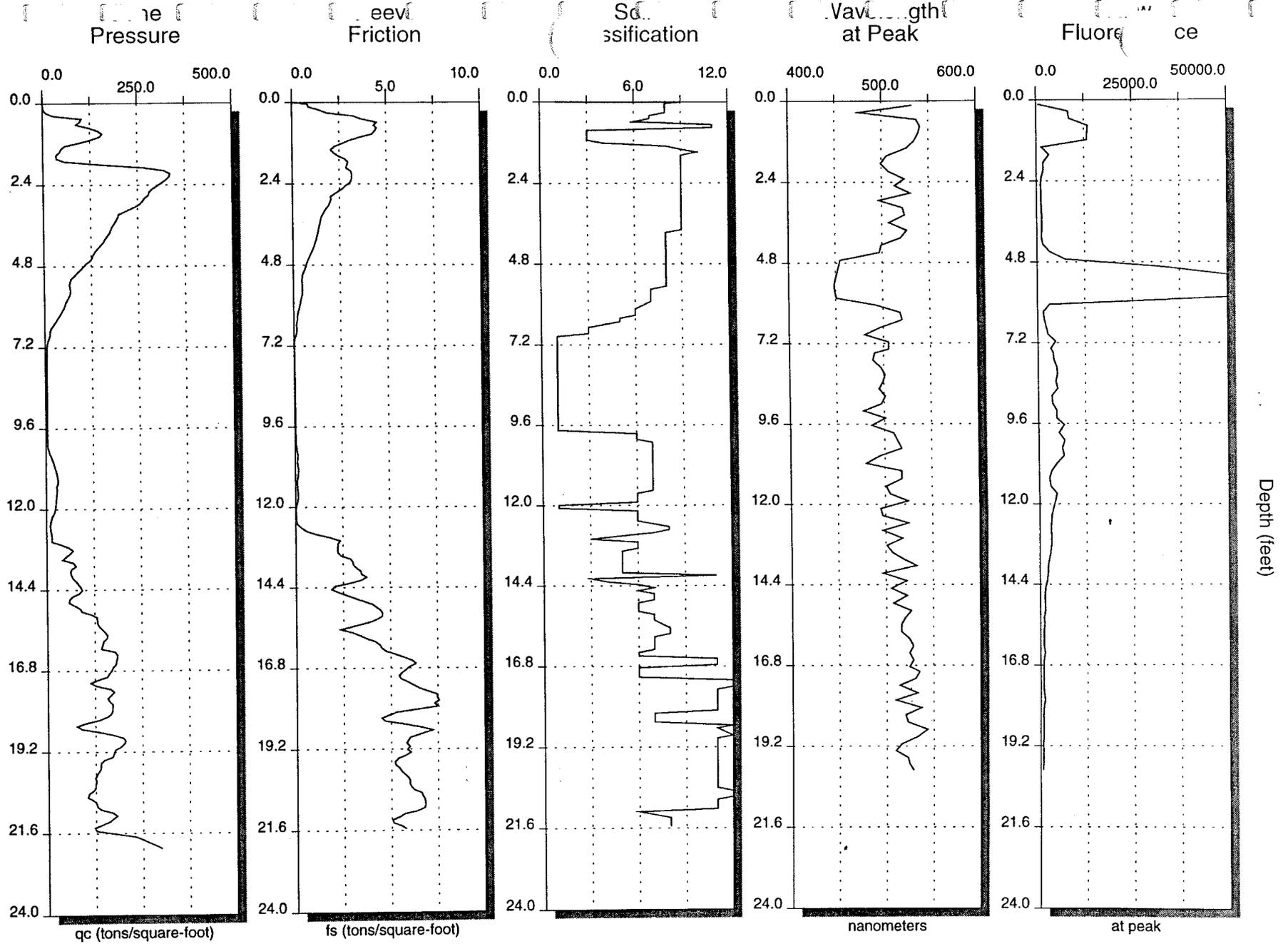
Date: 11-20-1996

Version: 1.0

Main: C:\BASIC71\DATA\IR3-01.PSH

Probe: C:\BASIC71\DATA\PROBE23B.PR

Calibration: C:\BASIC71\DATA\1213DFM.CAL

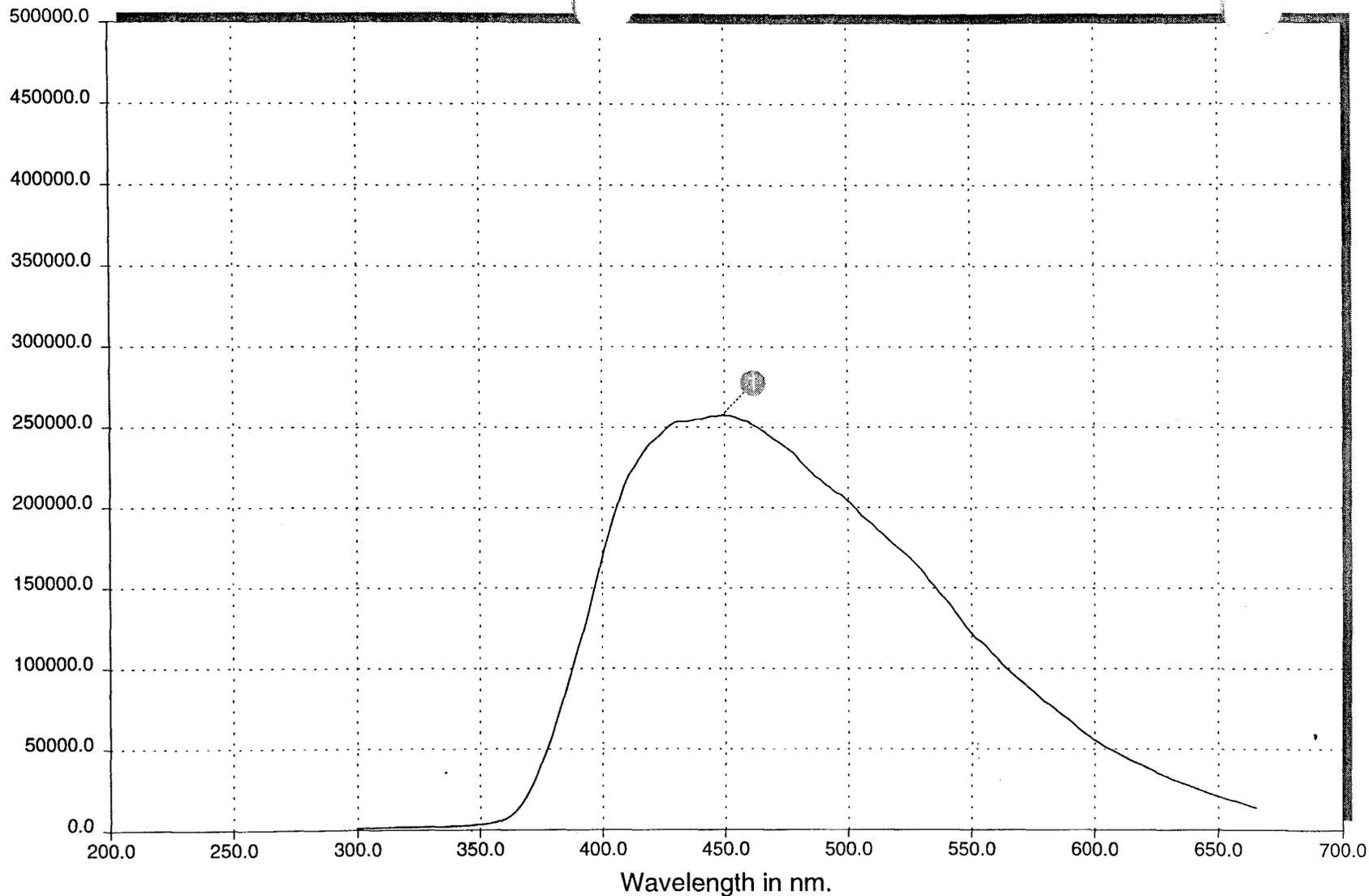


Time: 14:42:02
Date: 11-20-1996
Version: 1.0

Push: C:\BASIC71\DATA\IR3-02.PSH
Probe: C:\BASIC71\DATA\PROBE23B.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Fluorescence Intensity



1: 5.6 ft.; 257443 @ 448.8 nm

Time: 14:42:02

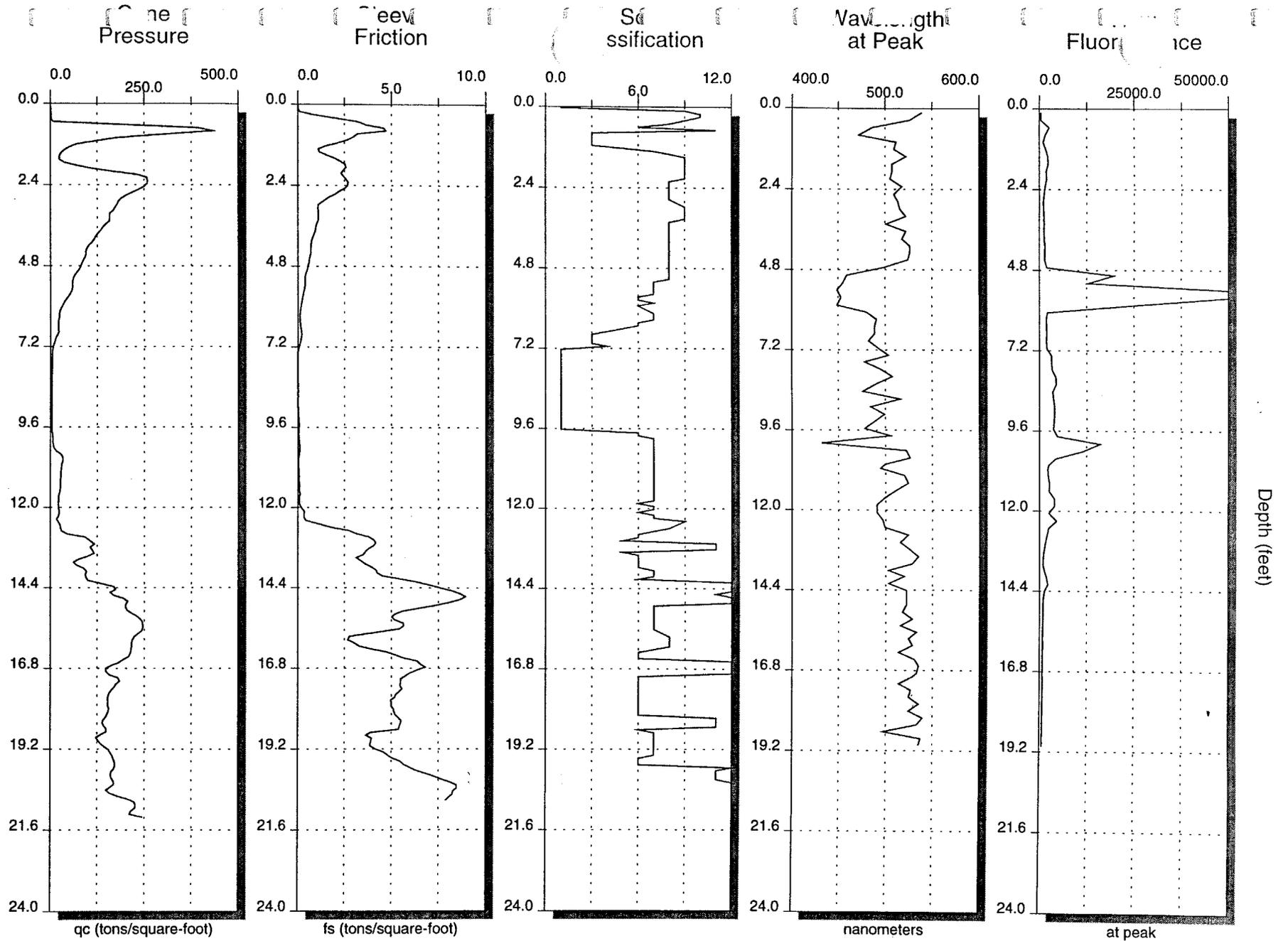
Date: 11-20-1996

Version: 1.0

Main: C:\BASIC71\DATA\IR3-02.PSH

Probe: C:\BASIC71\DATA\PROBE23B.PR3

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Time: 15:17:08

Date: 11-20-1996

Version: 1.0

Push: C:\BASIC71\DATA\IR3-03.PSH

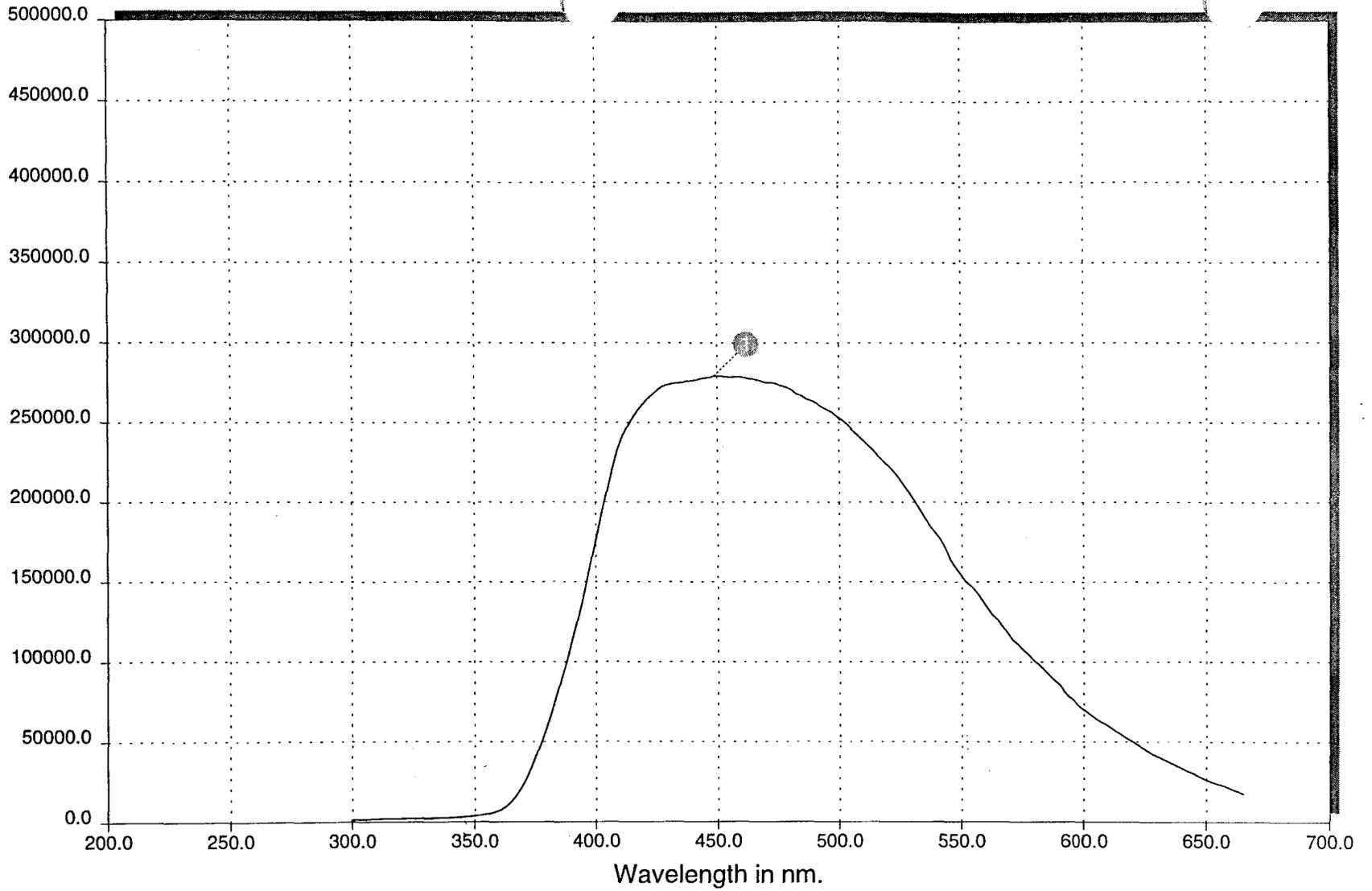
Probe: C:\BASIC71\DATA\PROBE23B.PR3

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Fluorescence Intensity

Spectral Plot(s)



1: 5.4 ft.; 279096 @ 448.8 nm

Time: 15:17:08

Date: 11-20-1996

Version: 1.0

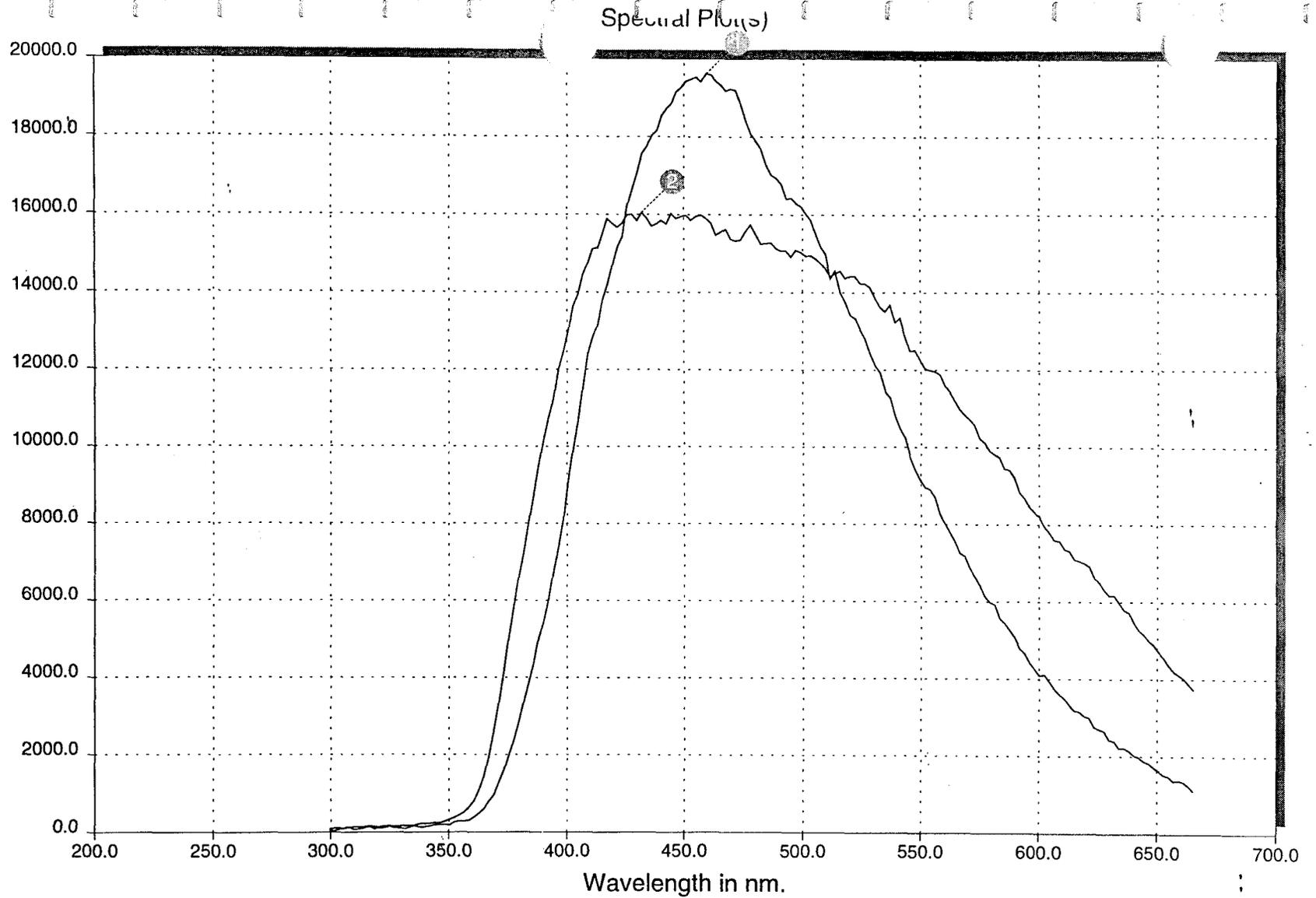
Main: C:\BASIC71\DATA\IR3-03.PSH

Probe: C:\BASIC71\DATA\PROBE23B.PR3

Calibration: C:\BASIC71\DATA\1213DFM.CAL



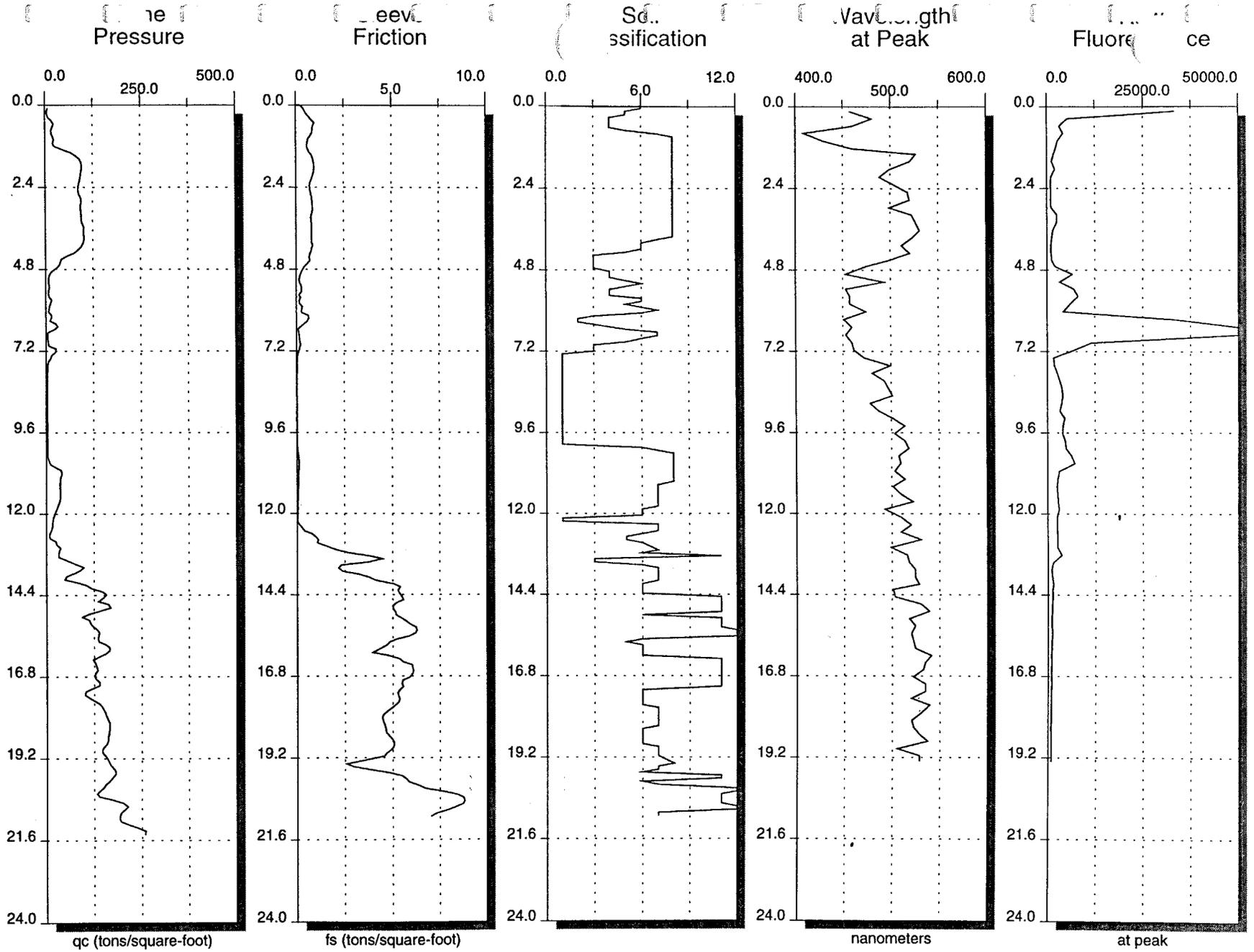
Fluorescence Intensity



Time: 15:17:08
Date: 11-20-1996
Version: 1.0

1: 5.0 ft.; 19626 @ 459.3 nm
2: 10.0 ft.; 16047 @ 432.0 nm

Main: C:\BASIC71\DATA\IR3-03.PSH
Probe: C:\BASIC71\DATA\PROBE23B.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



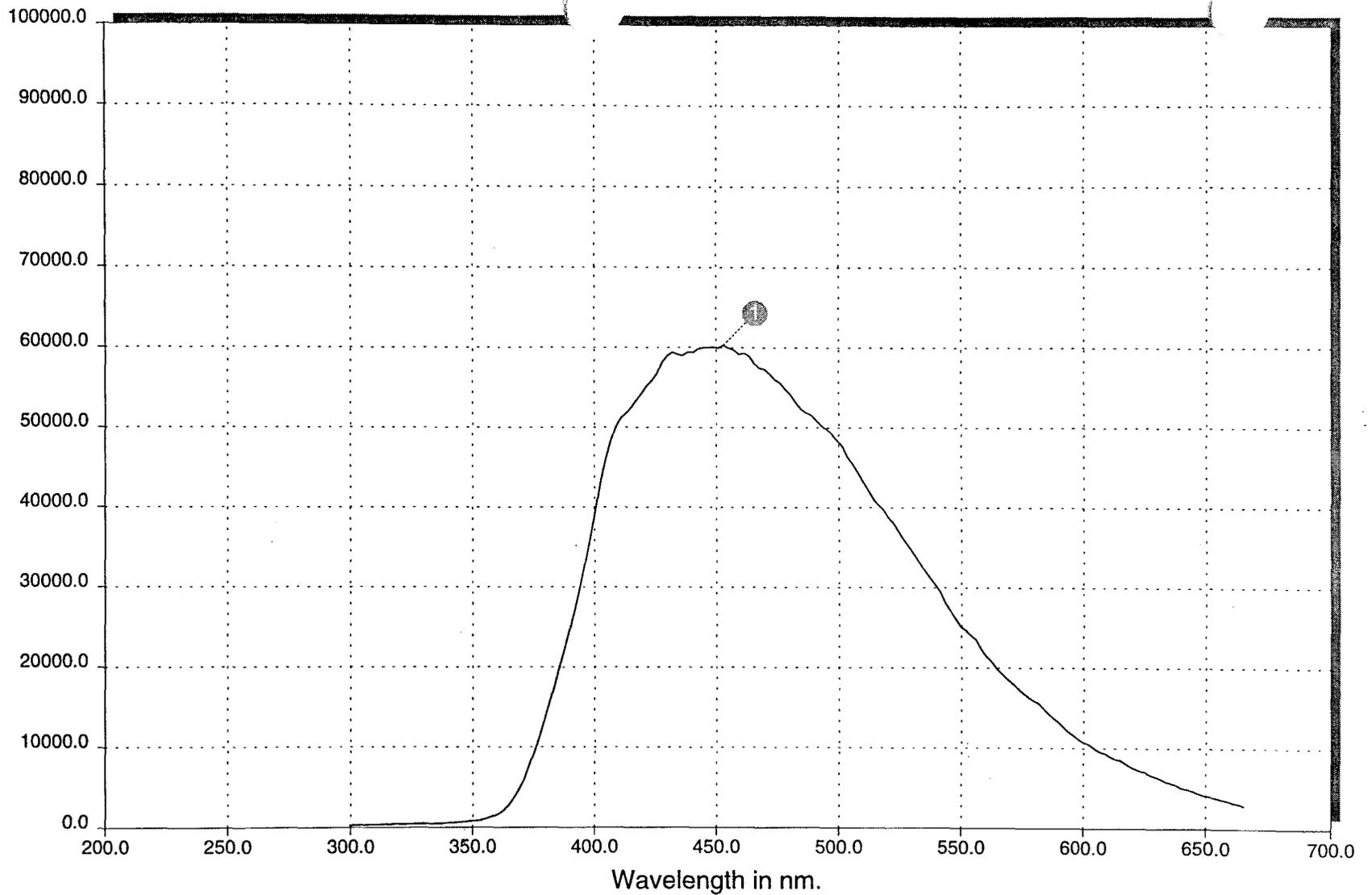
Depth (feet)

Time: 15:46:14
Date: 11-20-1996
Version: 1.0

Push: C:\BASIC71\DATA\IR3-04.PSH
Probe: C:\BASIC71\DATA\PROBE23B.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Fluorescence Intensity



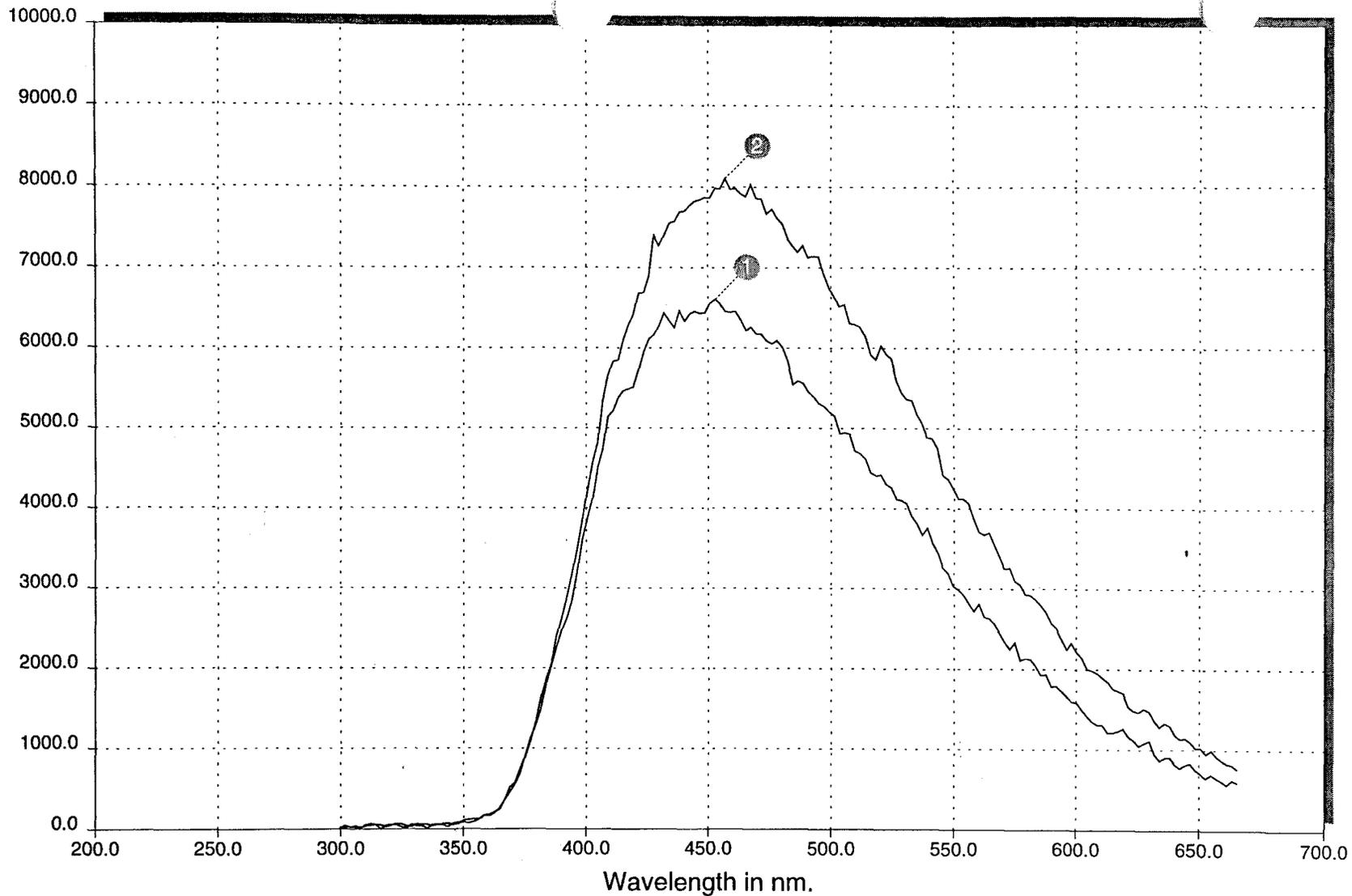
1: 6.7 ft.; 60293 @ 453.0 nm

Time: 15:46:14
Date: 11-20-1996
Version: 1.0

Main: C:\BASIC71\DATA\IR3-04.PSH
Probe: C:\BASIC71\DATA\PROBE23B.PR8
Calibration: C:\BASIC71\DATA\1213DFM.CAL



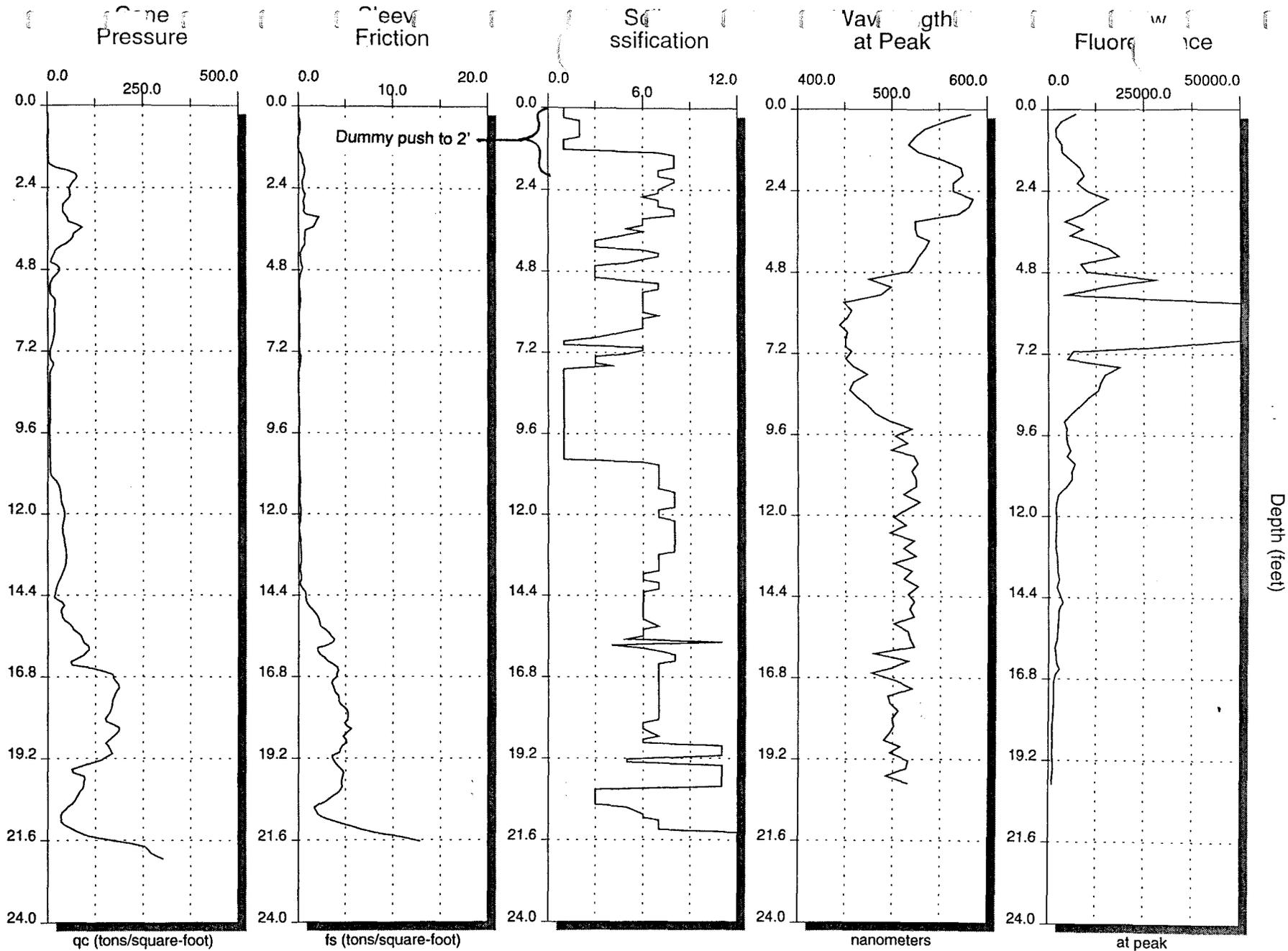
Fluorescence Intensity



1: 4.9 ft.; 6607 @ 453.0 nm
2: 5.6 ft.; 8105 @ 457.2 nm

Time: 15:46:14
Date: 11-20-1996
Version: 1.0

Main: C:\BASIC71\DATA\IR3-04.PSH
Probe: C:\BASIC71\DATA\PROBE23B.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Time: 06:50:55

Date: 11-21-1996

Version: 1.0

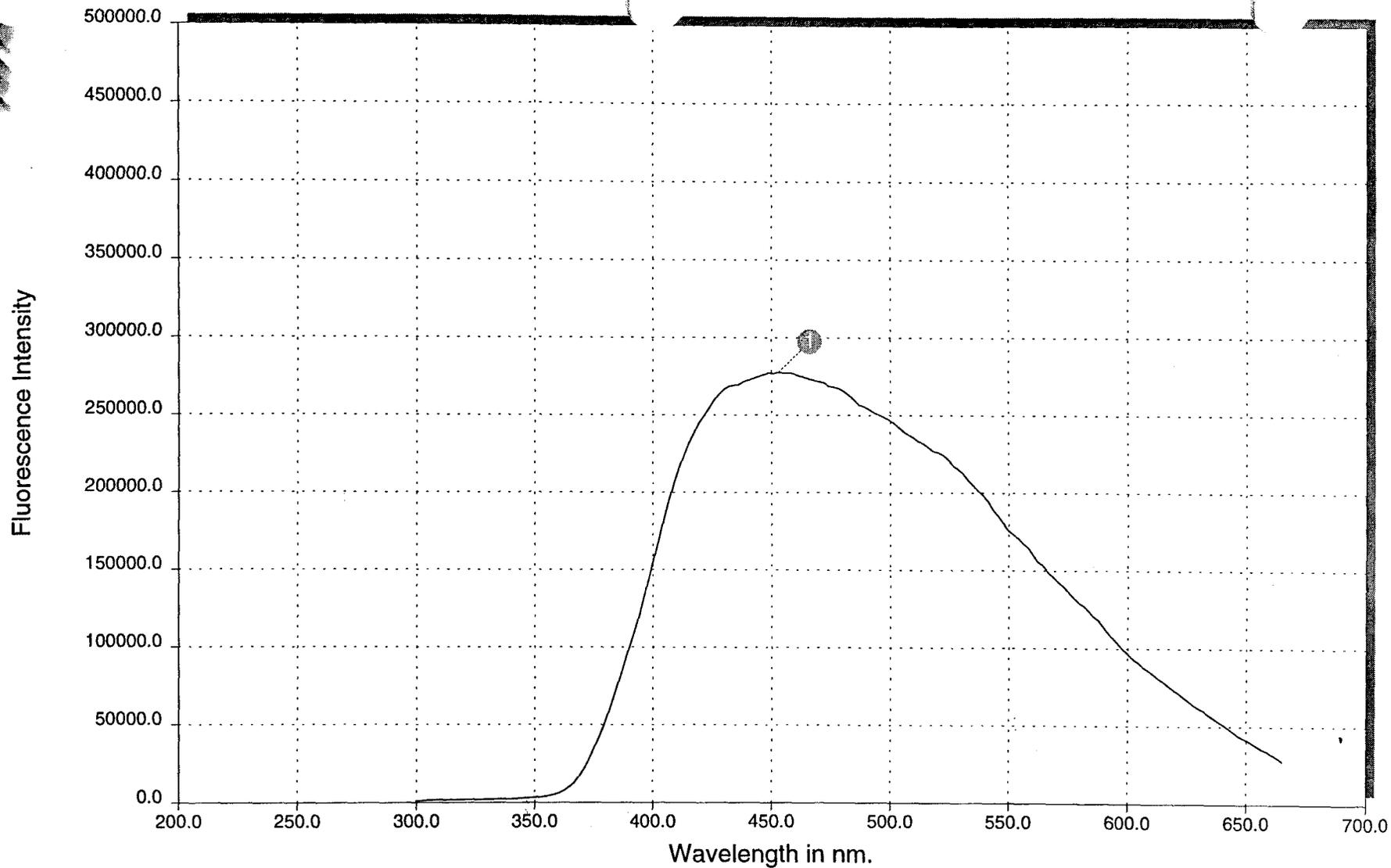
Push: C:\BASIC71\DATA\IR3-05.PSH

Probe: C:\BASIC71\DATA\PROBE23B.PR3

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)



1: 6.1 ft.; 277582 @ 453.0 nm

Time: 06:50:55

Date: 11-21-1996

Version: 1.0

Main: C:\BASIC71\DATA\IR3-05.PSH

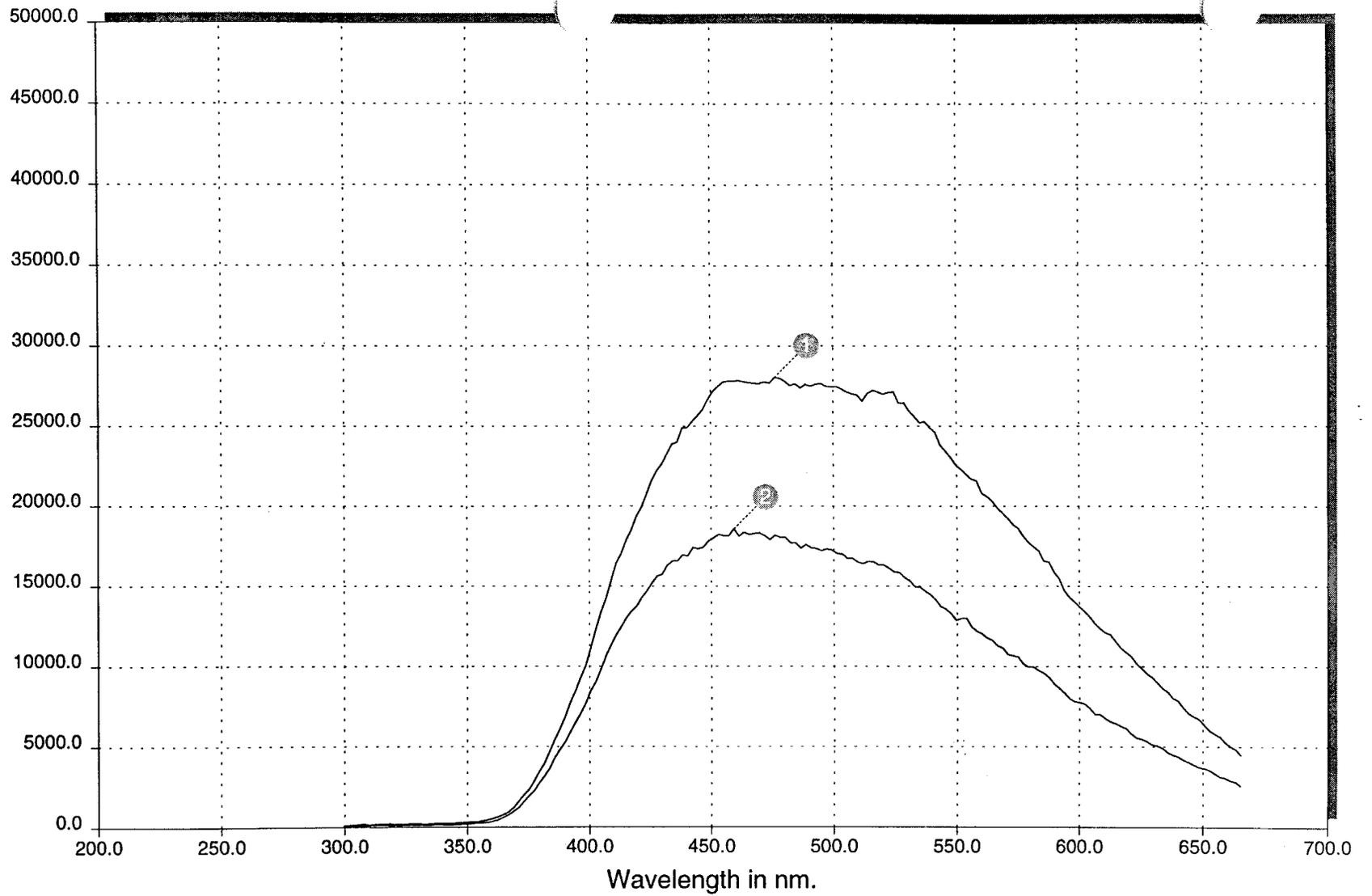
Probe: C:\BASIC71\DATA\PROBE23B.PR3

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plus(s)

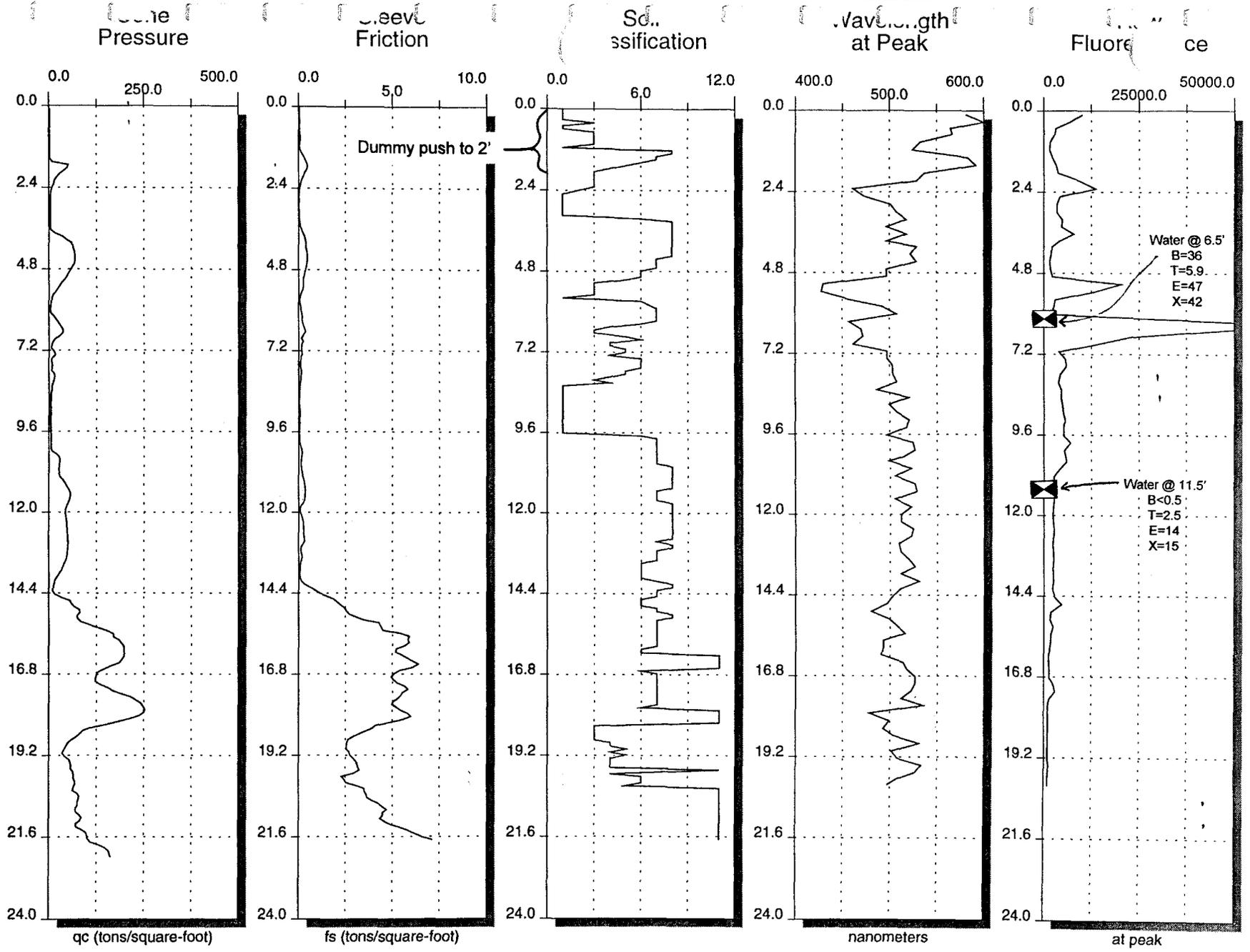
Fluorescence Intensity



1: 5.0 ft.; 28019 @ 476.1 nm
2: 7.6 ft.; 18573 @ 459.3 nm

Time: 06:50:55
Date: 11-21-1996
Version: 1.0

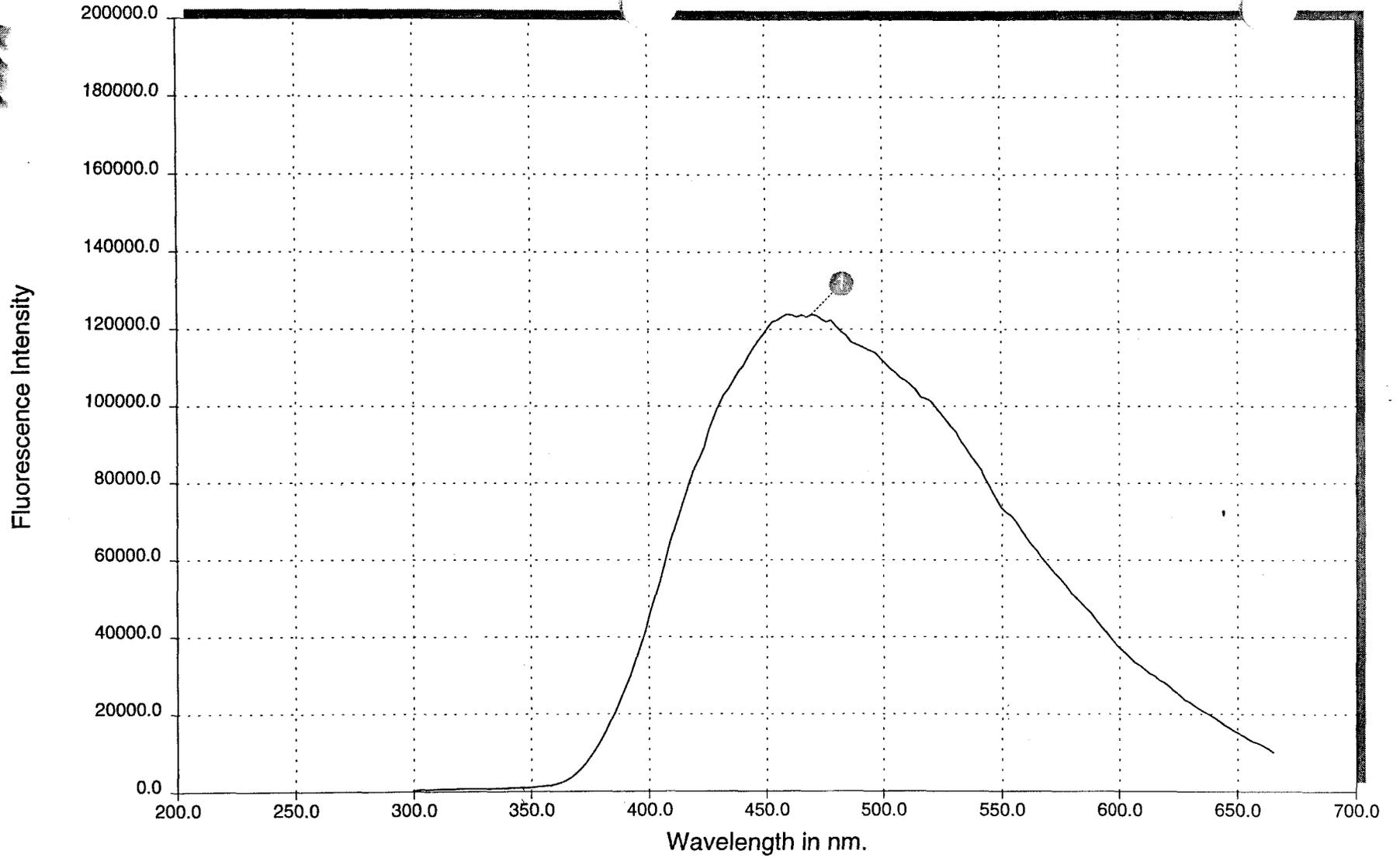
Main: C:\BASIC71\DATA\IR3-05.PSH
Probe: C:\BASIC71\DATA\PROBE23B.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Depth (feet)



Spectral Plot(s)



1: 6.5 ft.; 123852 @ 469.8 nm

Time: 07:38:43

Date: 11-21-1996

Version: 1.0

Main: C:\BASIC71\DATA\IR3-06.PSH

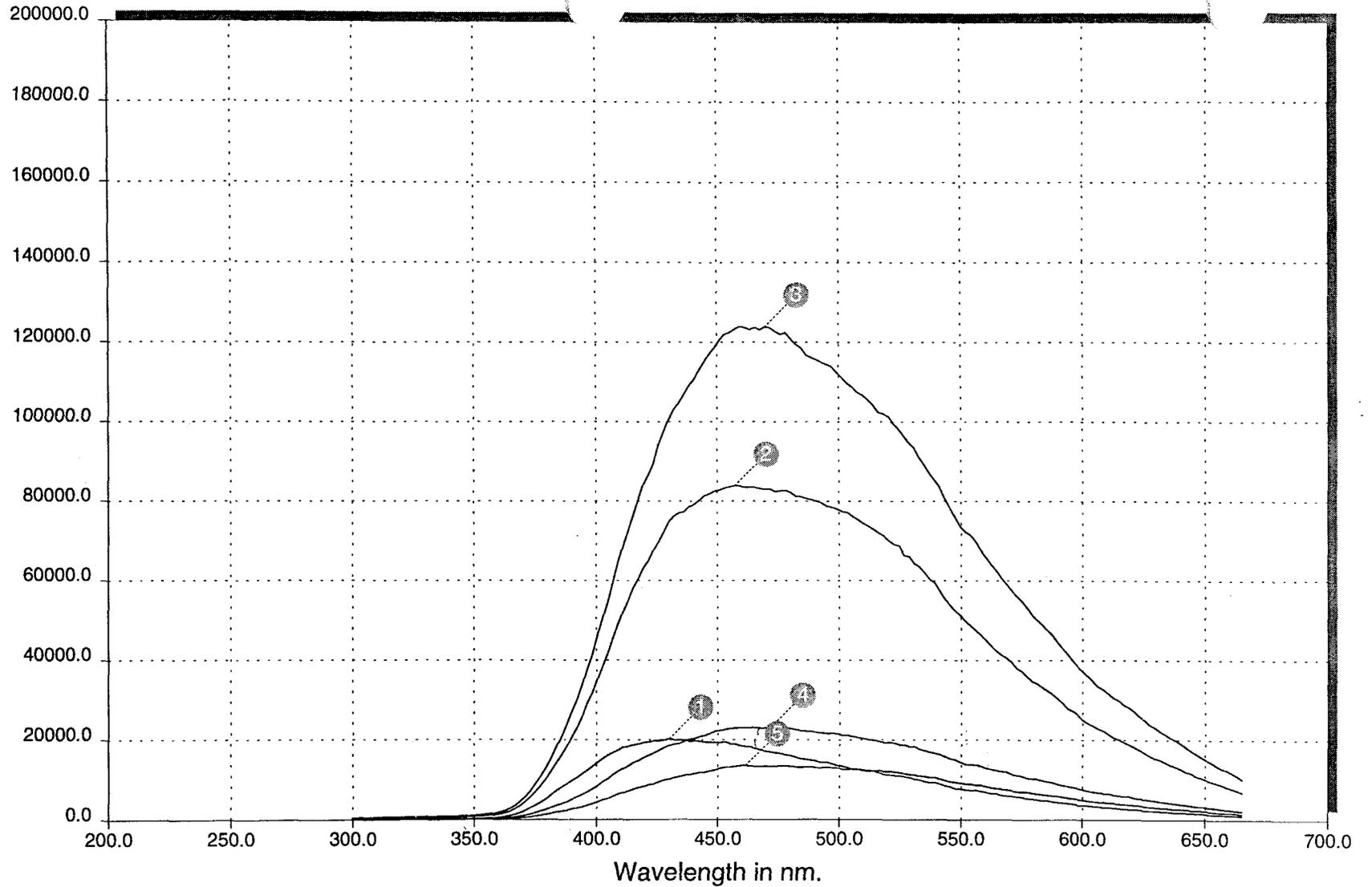
Probe: C:\BASIC71\DATA\PROBE23B.PR8

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

Fluorescence Intensity



1: 5.1 ft.; 20227 @ 429.9 nm

5: 6.9 ft.; 13540 @ 461.4 nm

2: 6.2 ft.; 83824 @ 457.2 nm

3: 6.5 ft.; 123852 @ 469.8 nm

4: 6.7 ft.; 23216 @ 471.9 nm

Main: C:\BASIC71\DATA\IR3-06.PSH

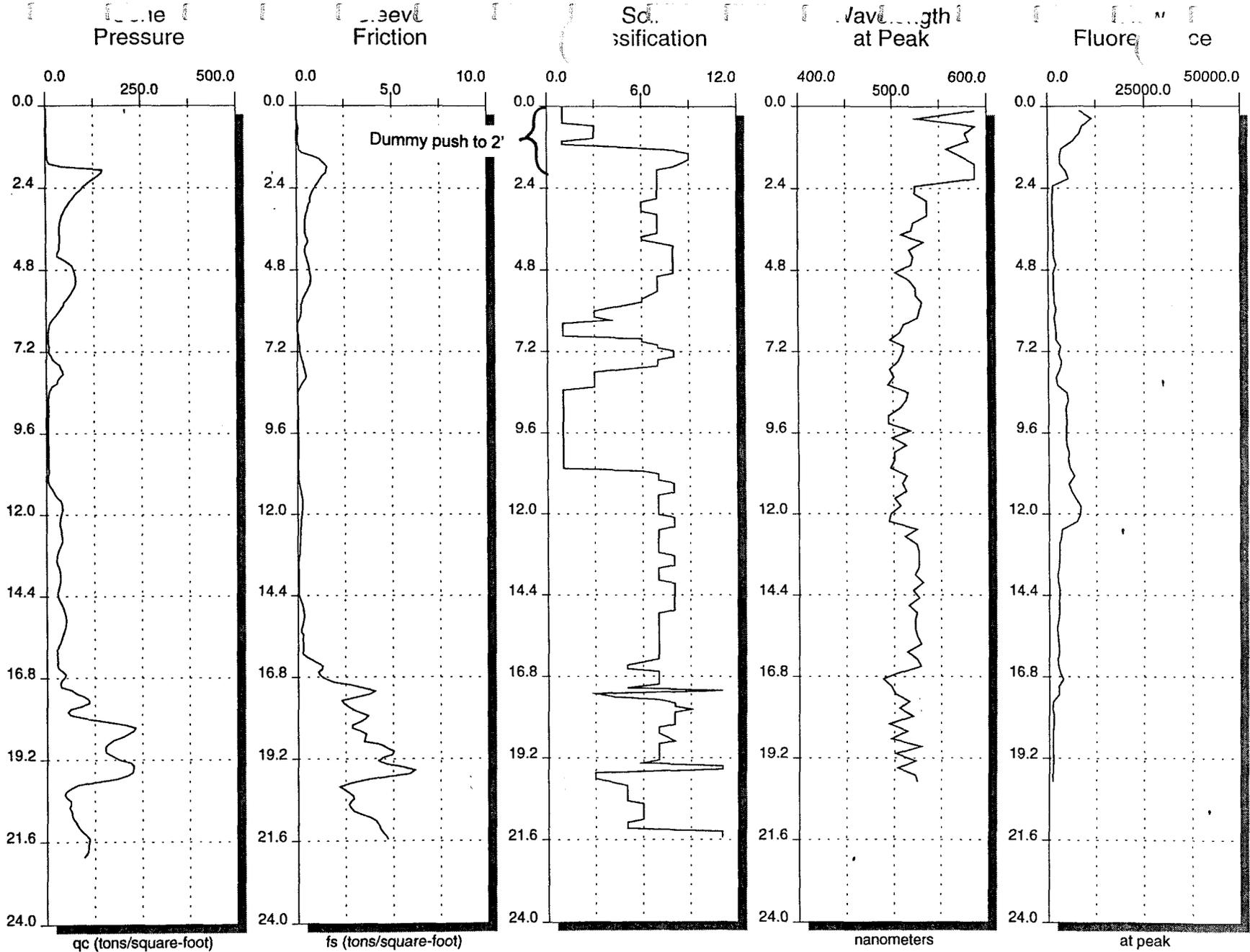
Probe: C:\BASIC71\DATA\PROBE23B.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL

Time: 07:38:43

Date: 11-21-1996

Version: 1.0



Time: 08:08:36

Date: 11-21-1996

Version: 1.0

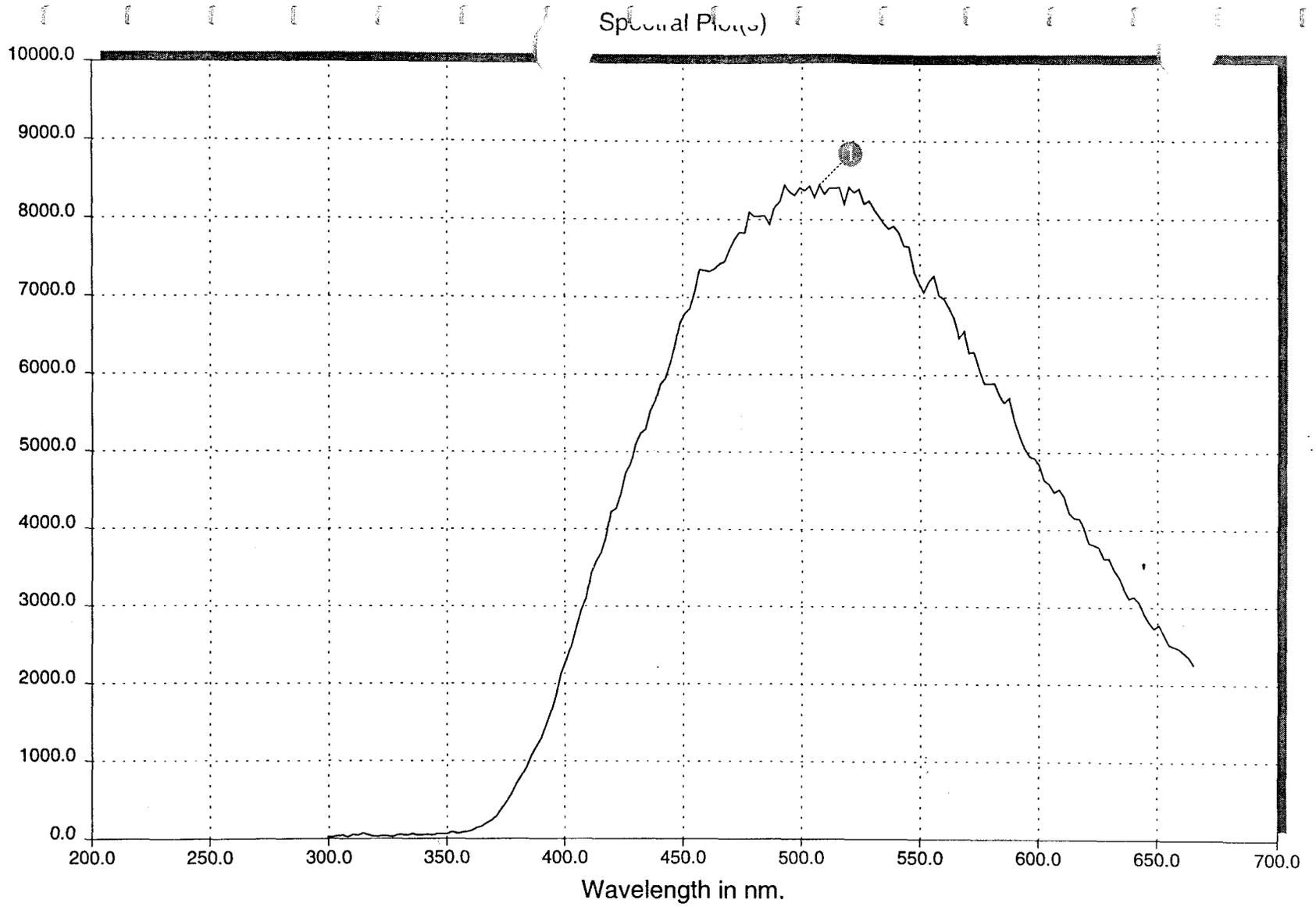
Push: C:\BASIC71\DATA\IR3-07.PSH

Probe: C:\BASIC71\DATA\PROBE23B.PR3

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Fluorescence Intensity



Wavelength in nm.

1: 11.8 ft.; 8439 @ 507.6 nm

Time: 08:08:36

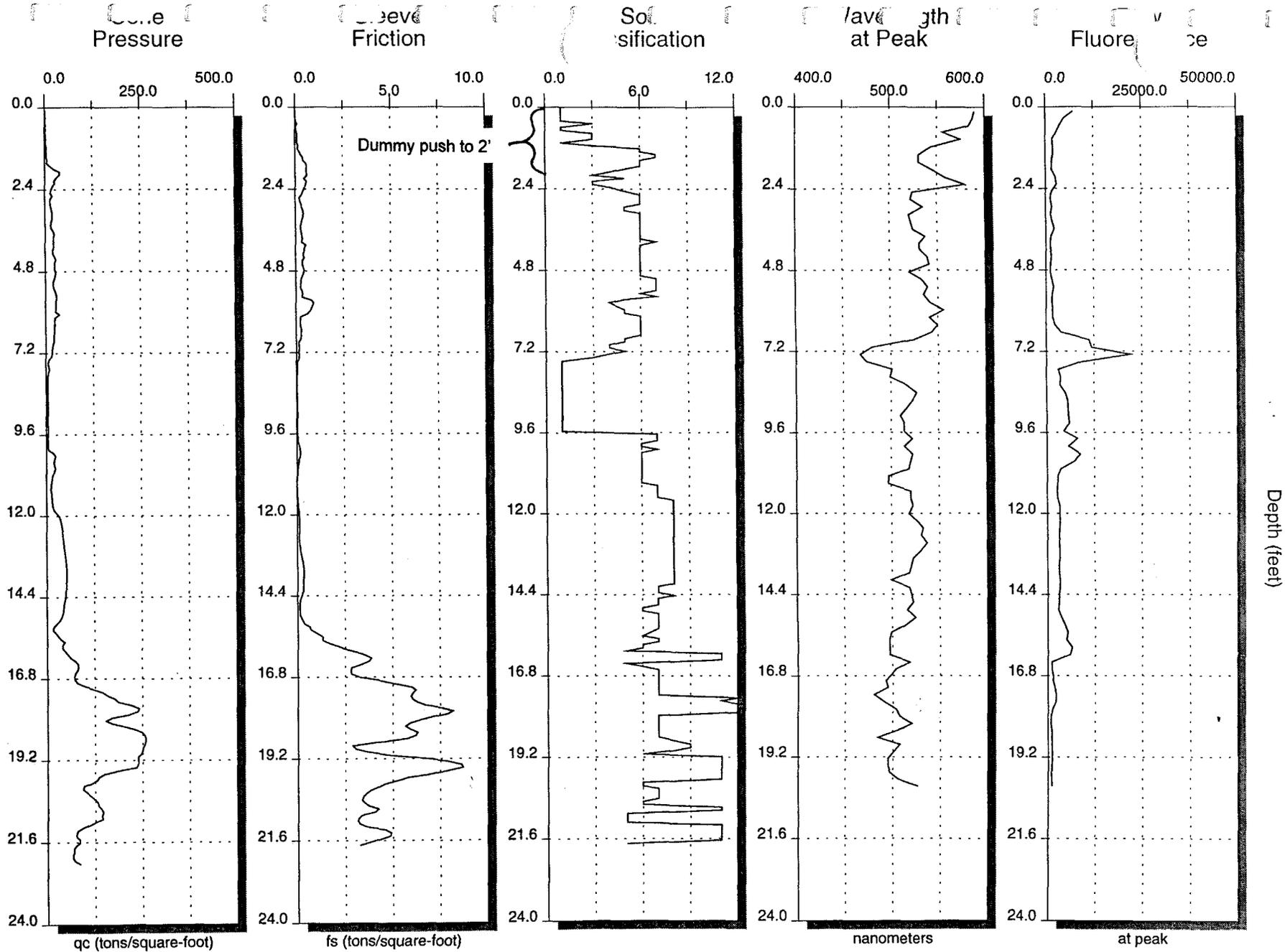
Date: 11-21-1996

Version: 1.0

Main: C:\BASIC71\DATA\IR3-07.PSH

Probe: C:\BASIC71\DATA\PROBE23B.PRB

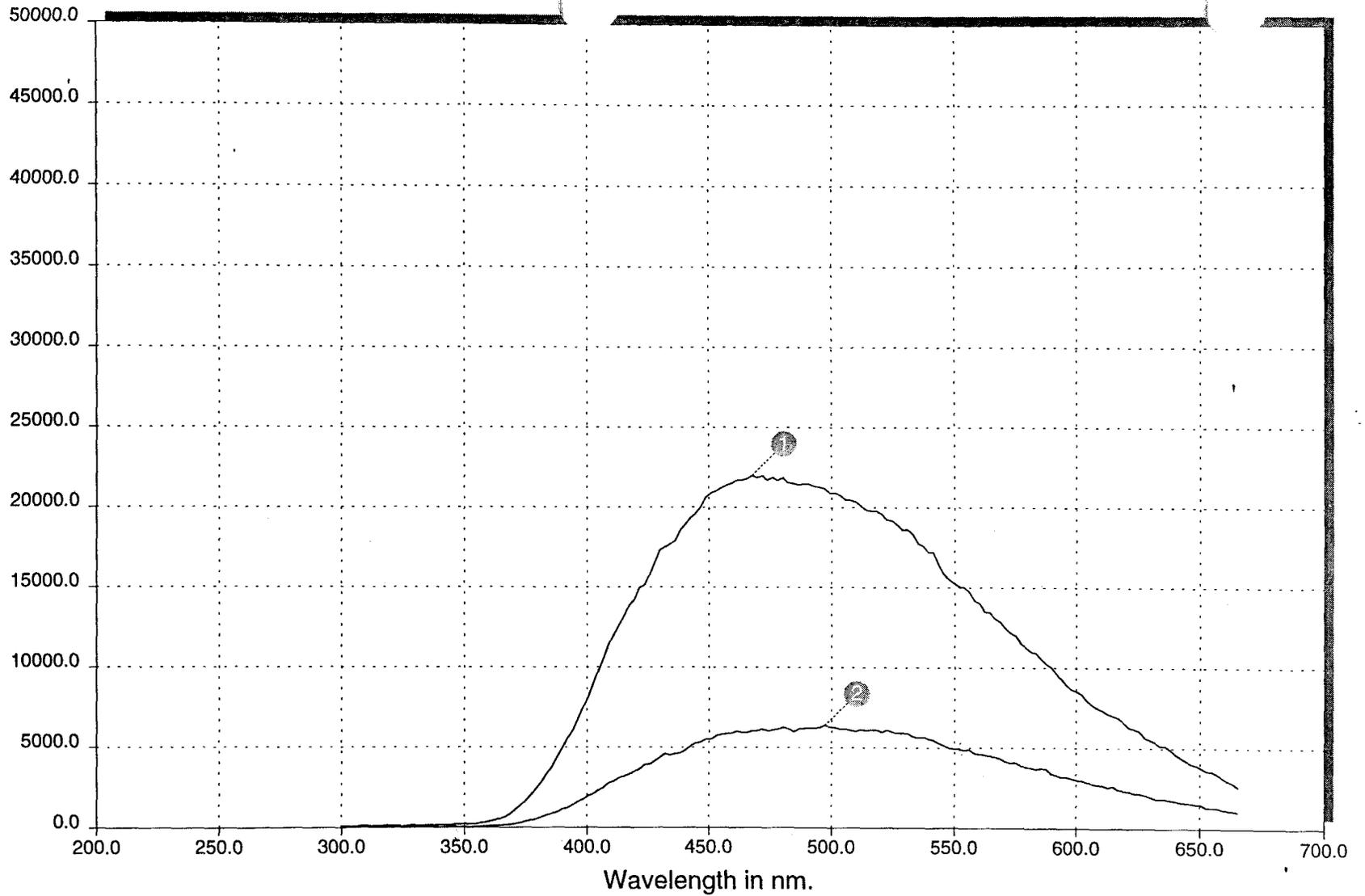
Calibration: C:\BASIC71\DATA\1213DFM.CAL





Spectral Plot(s)

Fluorescence Intensity



1: 7.3 ft.; 21975 @ 467.7 nm

2: 16.0 ft.; 6374 @ 497.1 nm

Time: 09:03:19

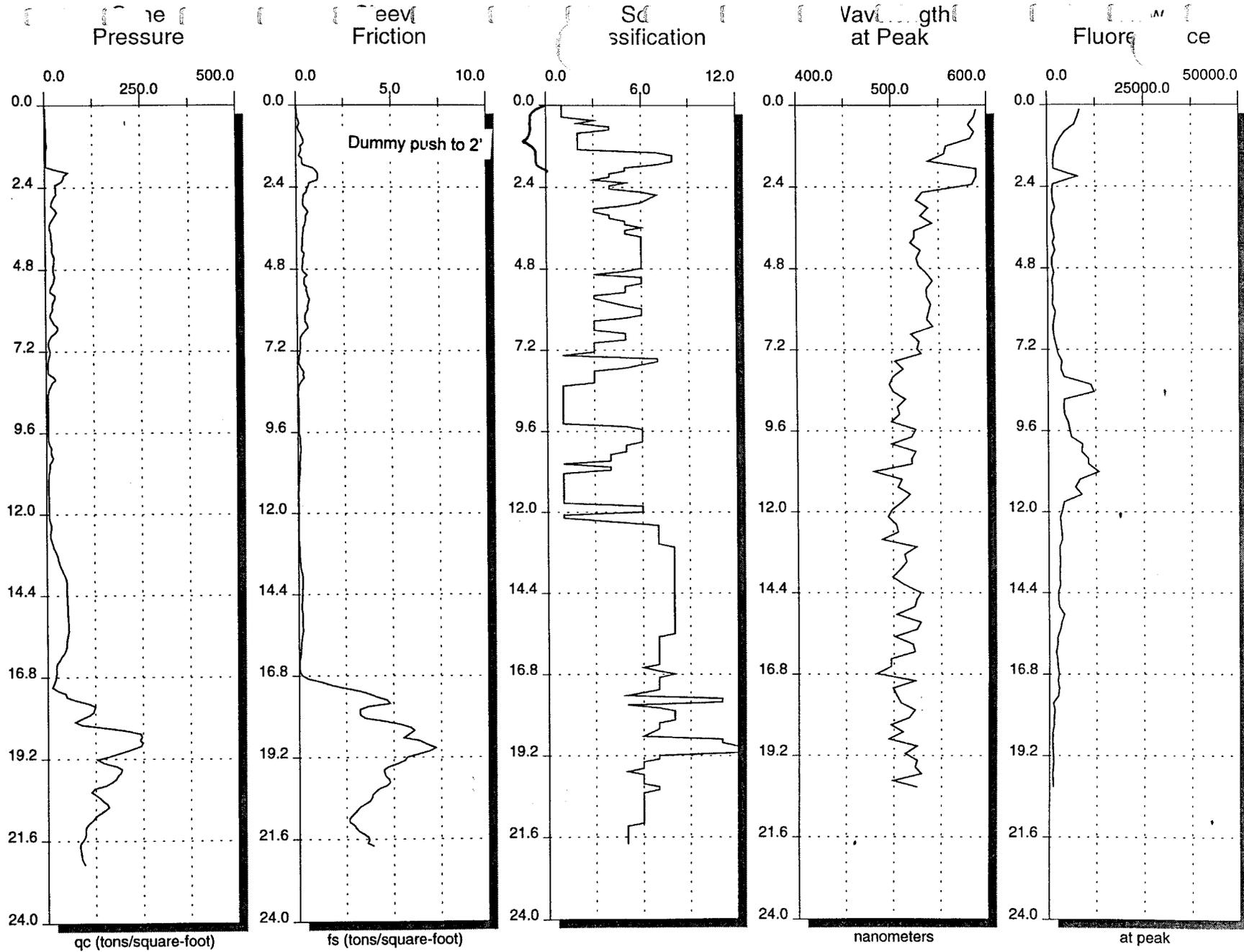
Date: 11-21-1996

Version: 1.0

Main: C:\BASIC71\DATA\IR3-08.PSH

Probe: C:\BASIC71\DATA\PROBE23B.PR8

Calibration: C:\BASIC71\DATA\1213DFM.CAL

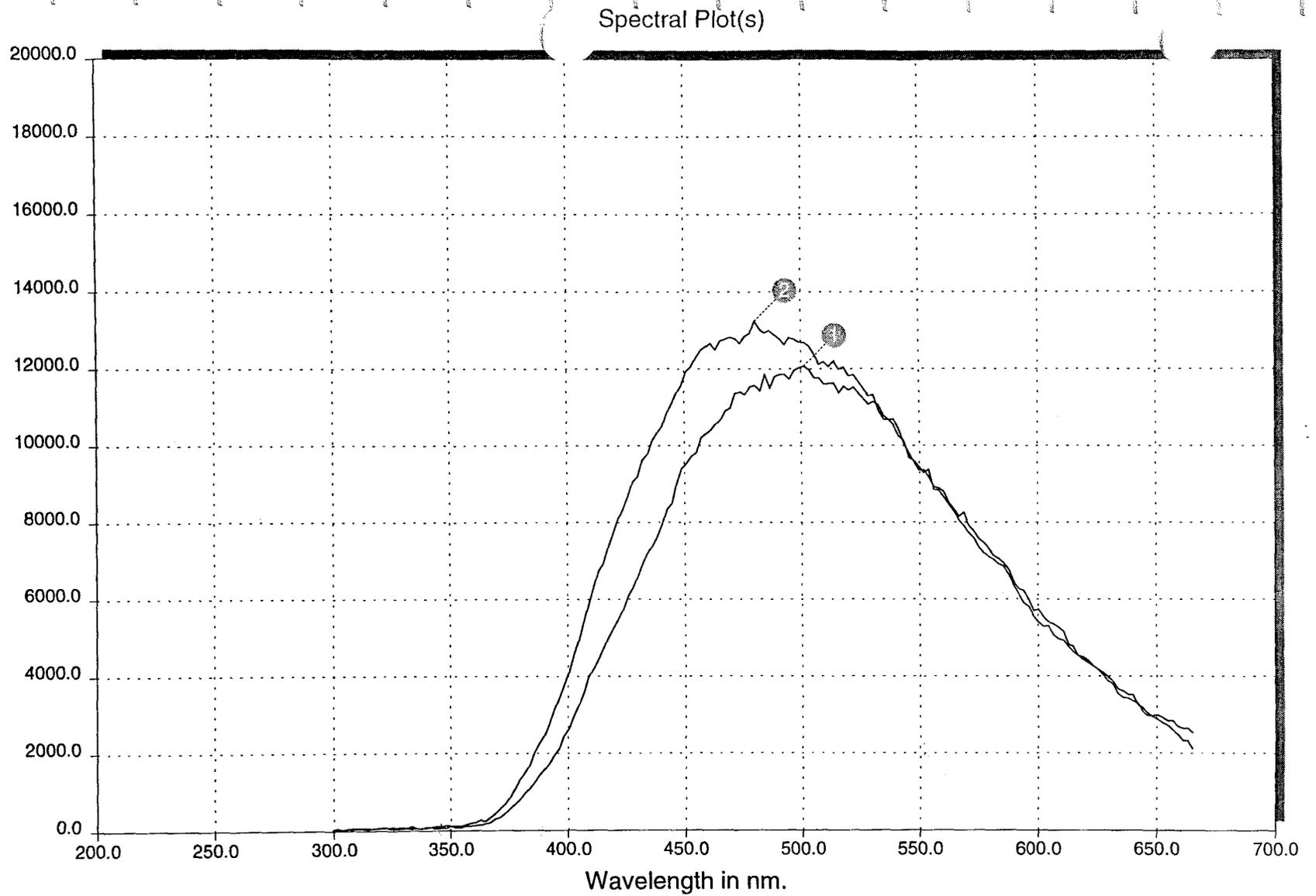


Time: 09:29:03
Date: 11-21-1996
Version: 1.0

Push: C:\BASIC71\DATA\IR3-09.PSH
Probe: C:\BASIC71\DATA\PROBE23B.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Fluorescence Intensity



Wavelength in nm.

1: 8.4 ft.; 12074 @ 501.3 nm

2: 10.8 ft.; 13234 @ 480.3 nm

Time: 09:29:03

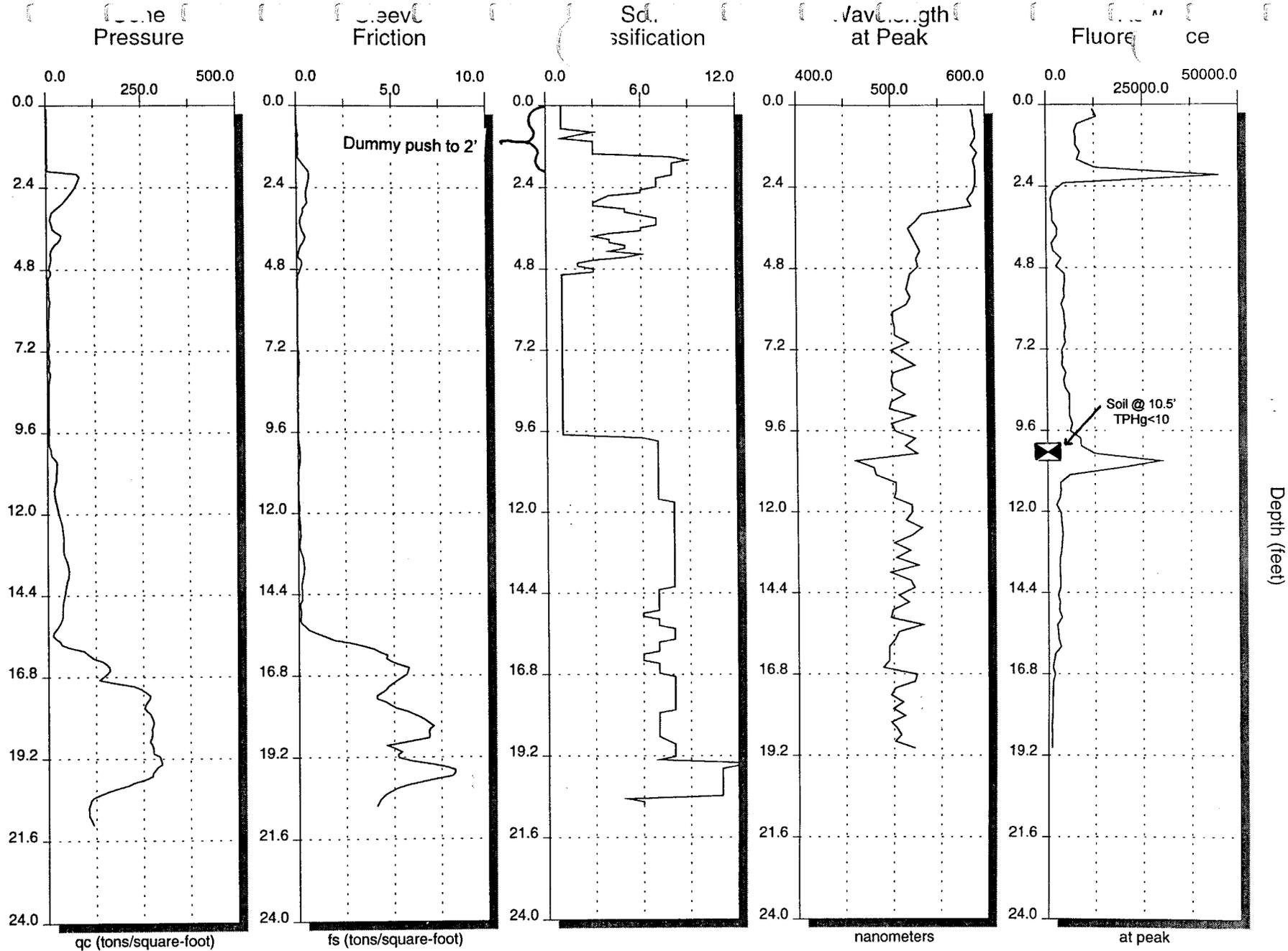
Date: 11-21-1996

Version: 1.0

Main: C:\BASIC71\DATA\IR3-09.PSH

Probe: C:\BASIC71\DATA\PROBE23B.PR

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Time: 10:02:46

Date: 11-21-1996

Version: 1.0

Push: C:\BASIC71\DATA\IR3-10.PSH

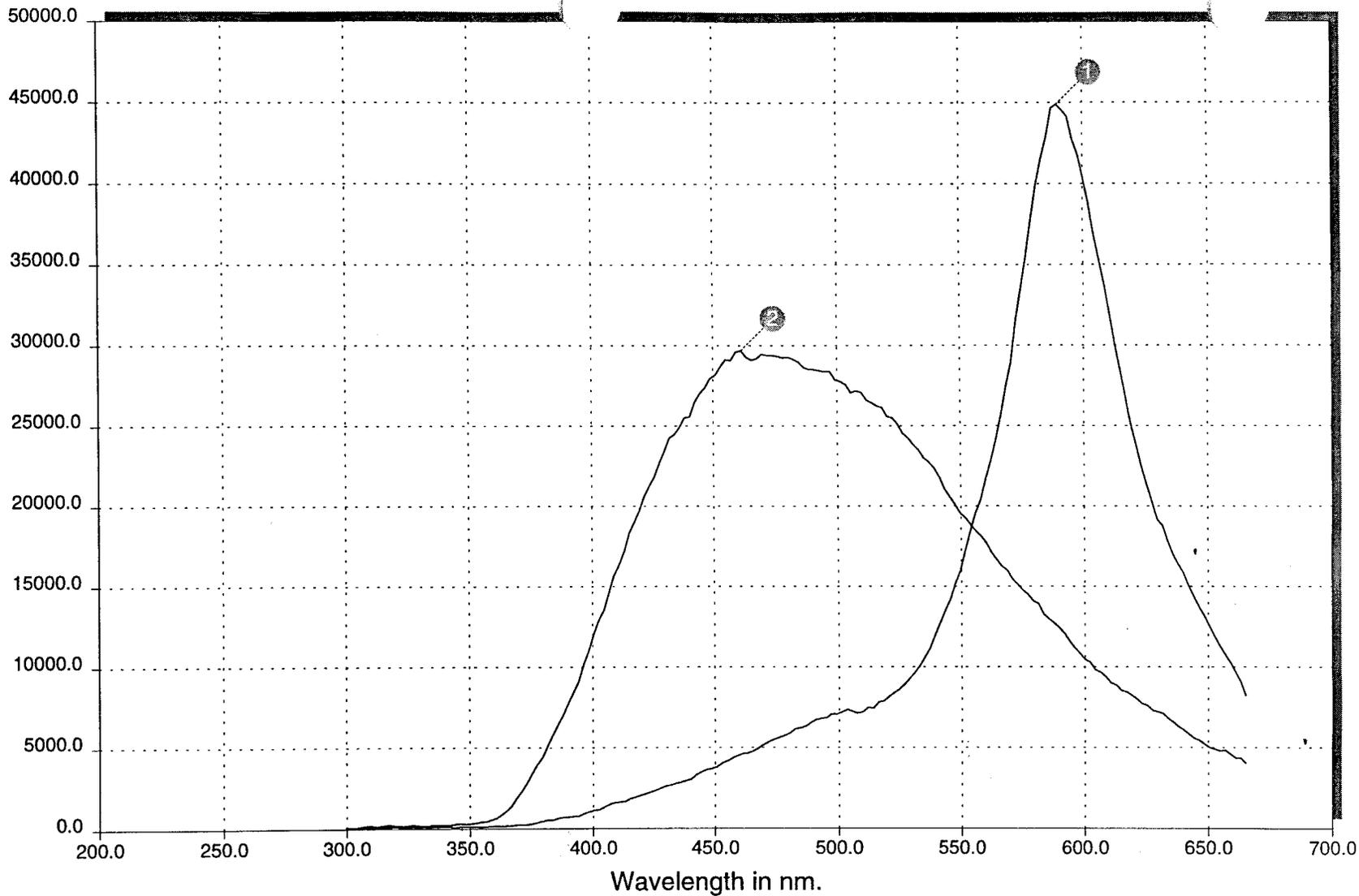
Probe: C:\BASIC71\DATA\PROBE23B.PR

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

Fluorescence Intensity



1: 2.1 ft.; 44880 @ 589.6 nm
2: 10.5 ft.; 29669 @ 461.4 nm

Time: 10:02:46

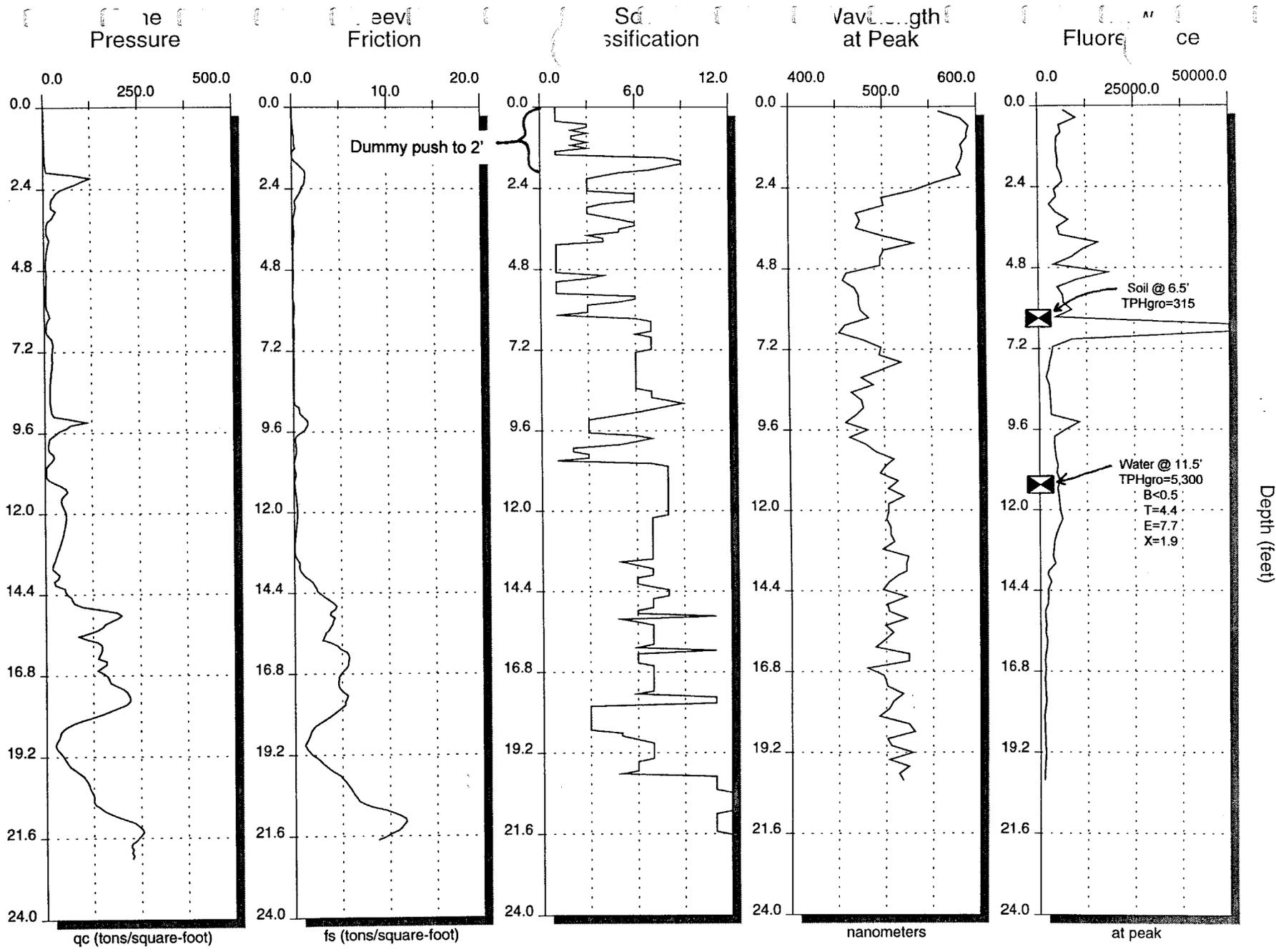
Date: 11-21-1996

Version: 1.0

Main: C:\BASIC71\DATA\IR3-10.PSH

Probe: C:\BASIC71\DATA\PROBE23B.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL

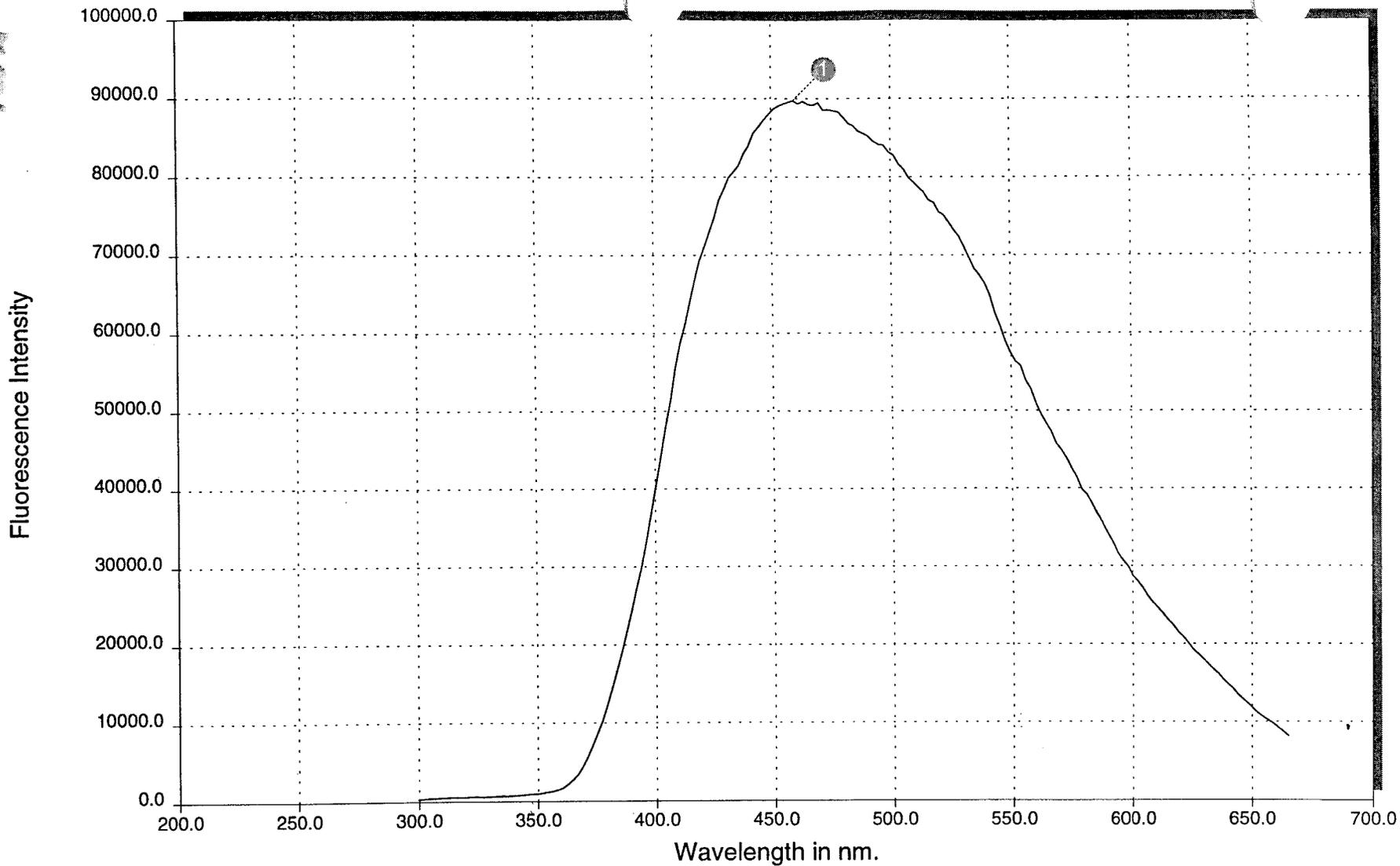


Time: 11:58:28
Date: 11-21-1996
Version: 1.0

Push: C:\BASIC71\DATA\IR3-11.PSH
Probe: C:\BASIC71\DATA\PROBE23B.PR3
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)



1: 6.5 ft.; 89733 @ 459.3 nm

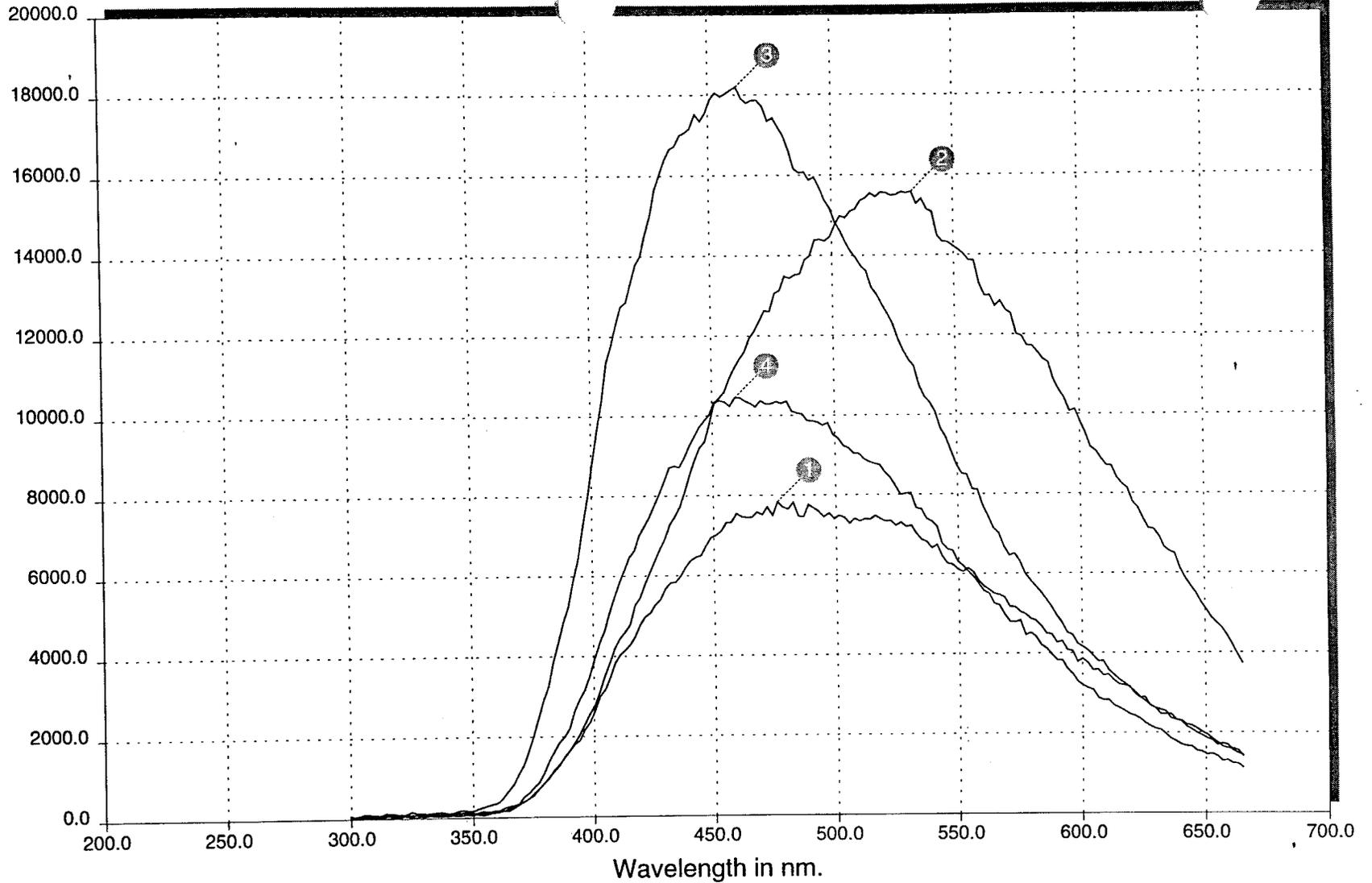
Time: 11:58:28
Date: 11-21-1996
Version: 1.0

Main: C:\BASIC71\DATA\IR3-11.PSH
Probe: C:\BASIC71\DATA\PROBE23B.PR8
Calibration: C:\BASIC71\DATA\1213DFM.CAL

Spectral Plot(s)



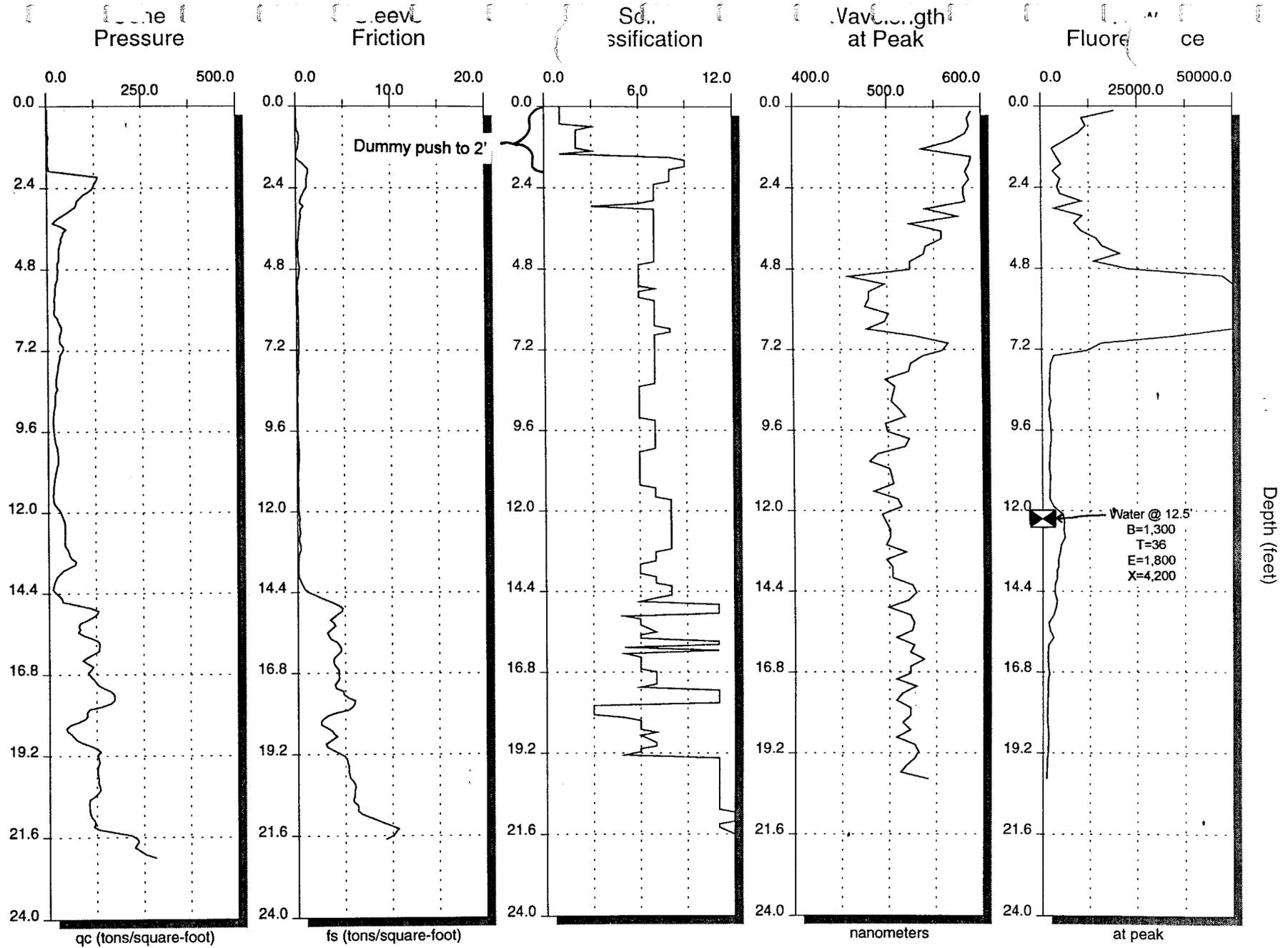
Fluorescence Intensity



Time: 11:58:28
Date: 11-21-1996
Version: 1.0

1: 3.4 ft.; 7828 @ 476.1 nm
2: 4.0 ft.; 15580 @ 532.8 nm
3: 4.9 ft.; 18196 @ 461.4 nm
4: 9.4 ft.; 10445 @ 459.3 nm

Main: C:\BASIC71\DATA\IR3-11.PSH
Probe: C:\BASIC71\DATA\PROBE23B.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Time: 12:33:41

Date: 11-21-1996

Version: 1.0

Push: C:\BASIC71\DATA\IR3-12.PSH

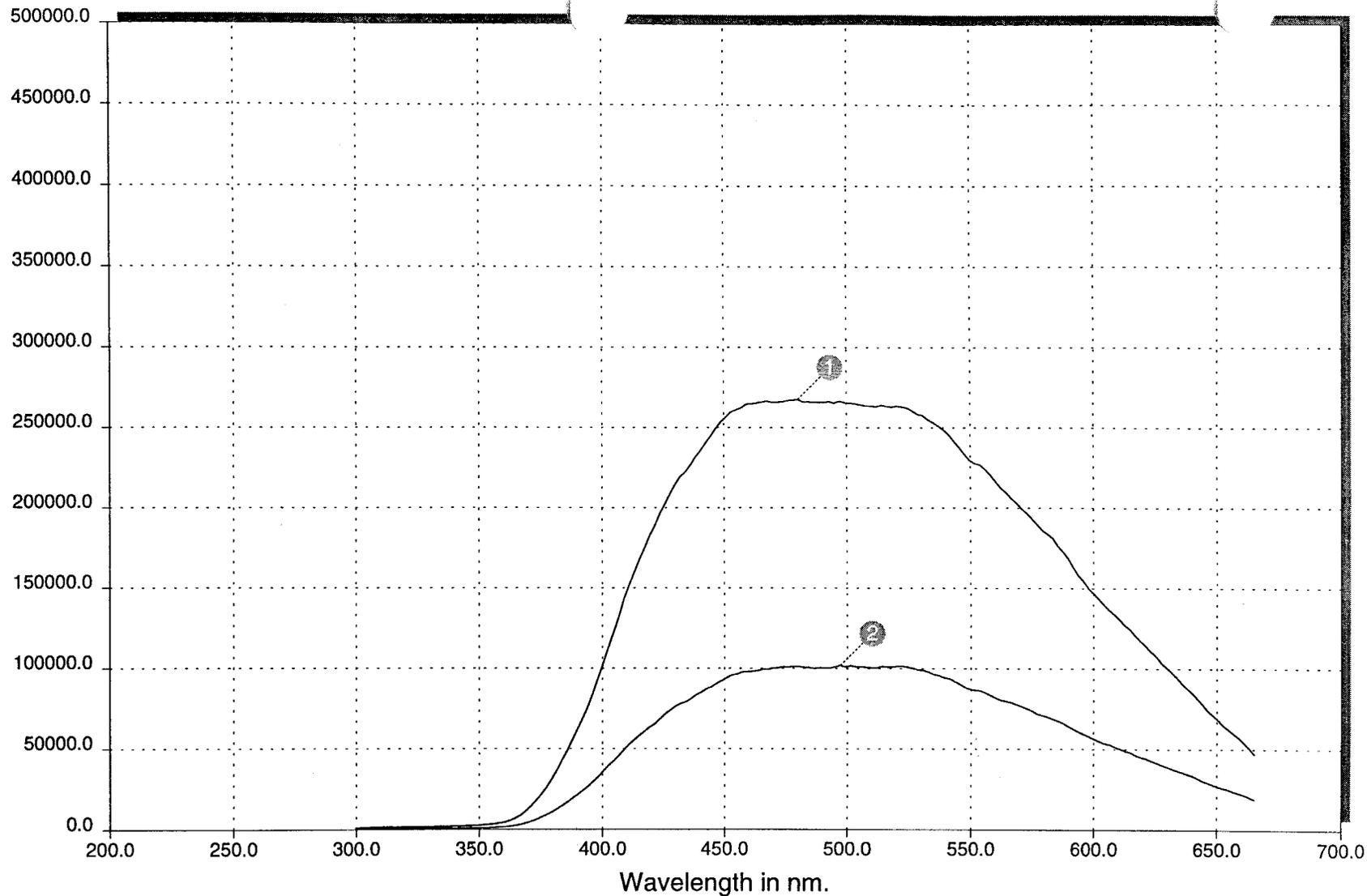
Probe: C:\BASIC71\DATA\PROBE23B.PR

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

Fluorescence Intensity



Wavelength in nm.

1: 5.7 ft.; 267530 @ 480.3 nm

2: 6.4 ft.; 101822 @ 497.1 nm

Time: 12:33:41

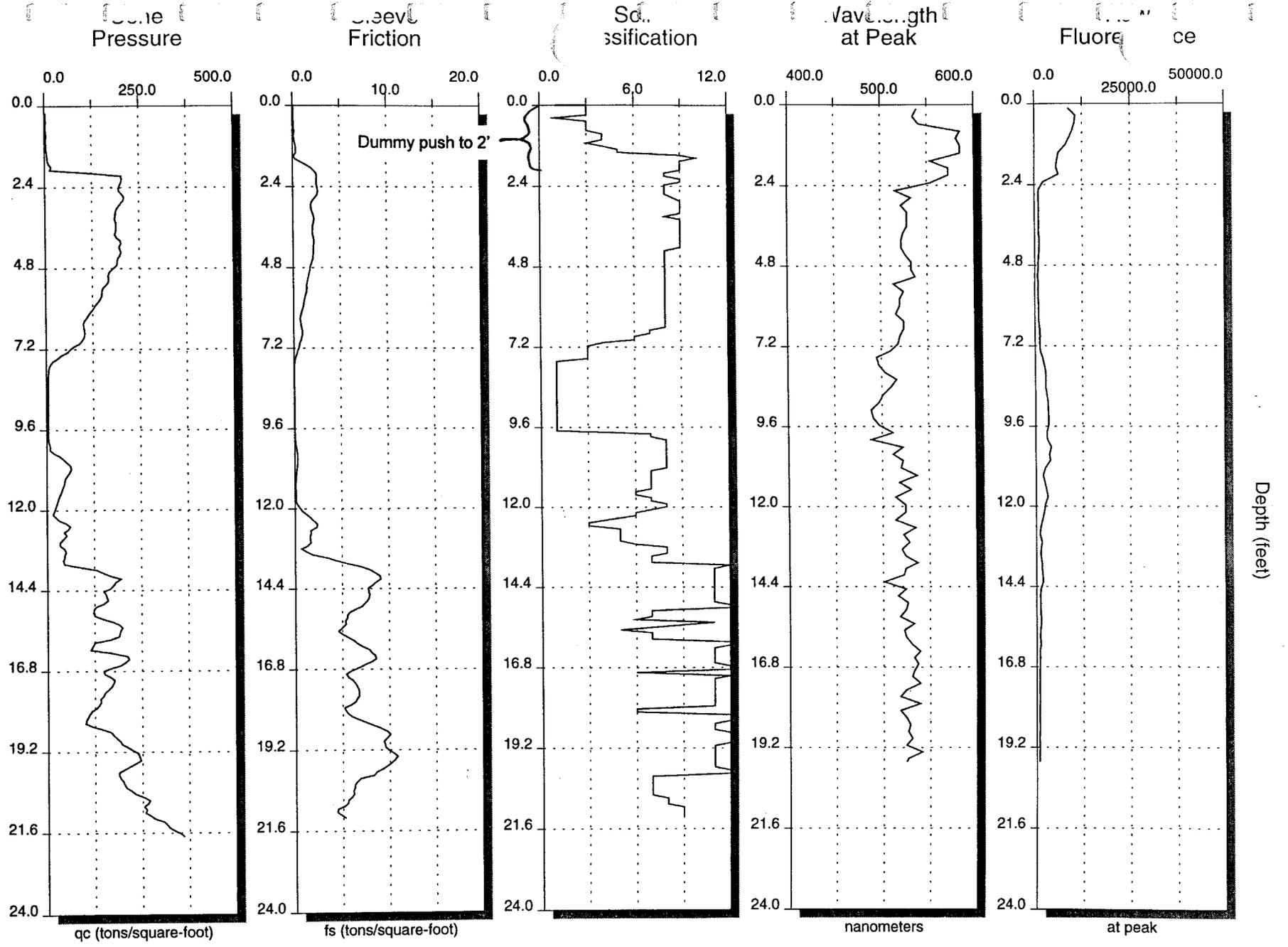
Date: 11-21-1996

Version: 1.0

Main: C:\BASIC71\DATA\IR3-12.PSH

Probe: C:\BASIC71\DATA\PROBE23B.PR8

Calibration: C:\BASIC71\DATA\1213DFM.CAL



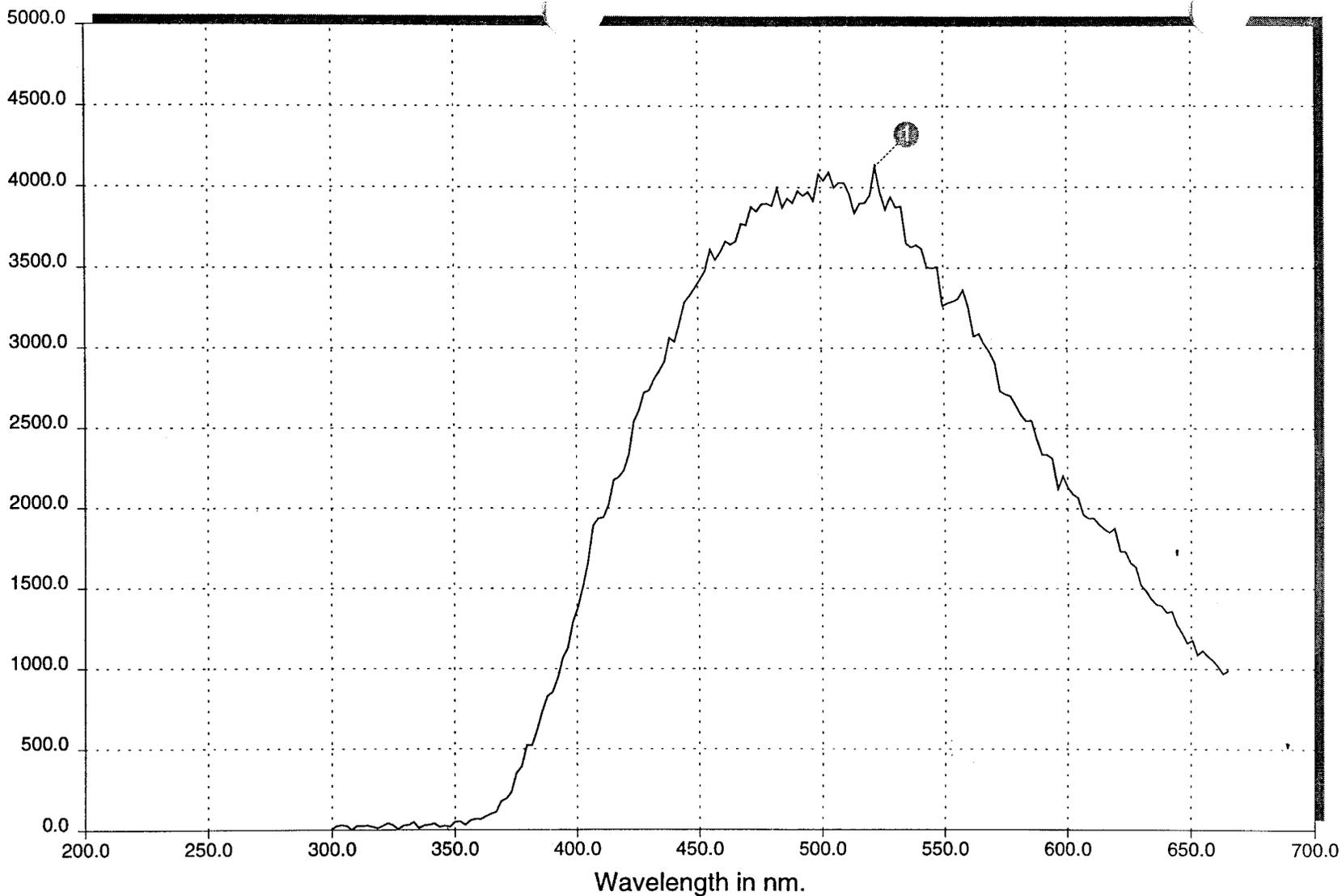
Time: 13:00:35
Date: 11-21-1996
Version: 1.0

Push: C:\BASIC71\DATA\IR3-13.PSH
Probe: C:\BASIC71\DATA\PROBE23B.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

Fluorescence Intensity



1: 10.2 ft.; 4129 @ 522.3 nm

Time: 13:00:35

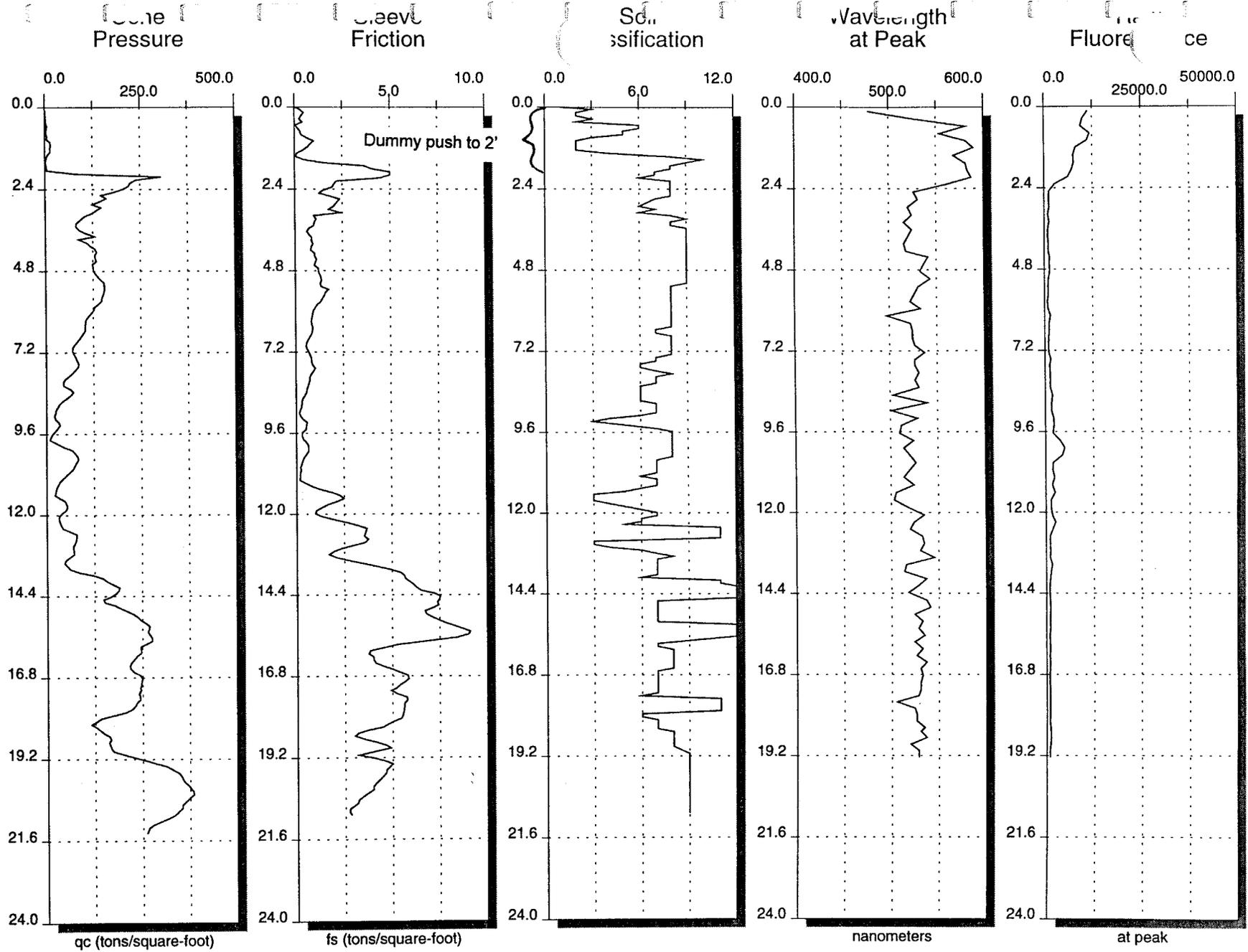
Date: 11-21-1996

Version: 1.0

Main: C:\BASIC71\DATA\IR3-13.PSH

Probe: C:\BASIC71\DATA\PROBE23B.PR8

Calibration: C:\BASIC71\DATA\1213DFM.CAL

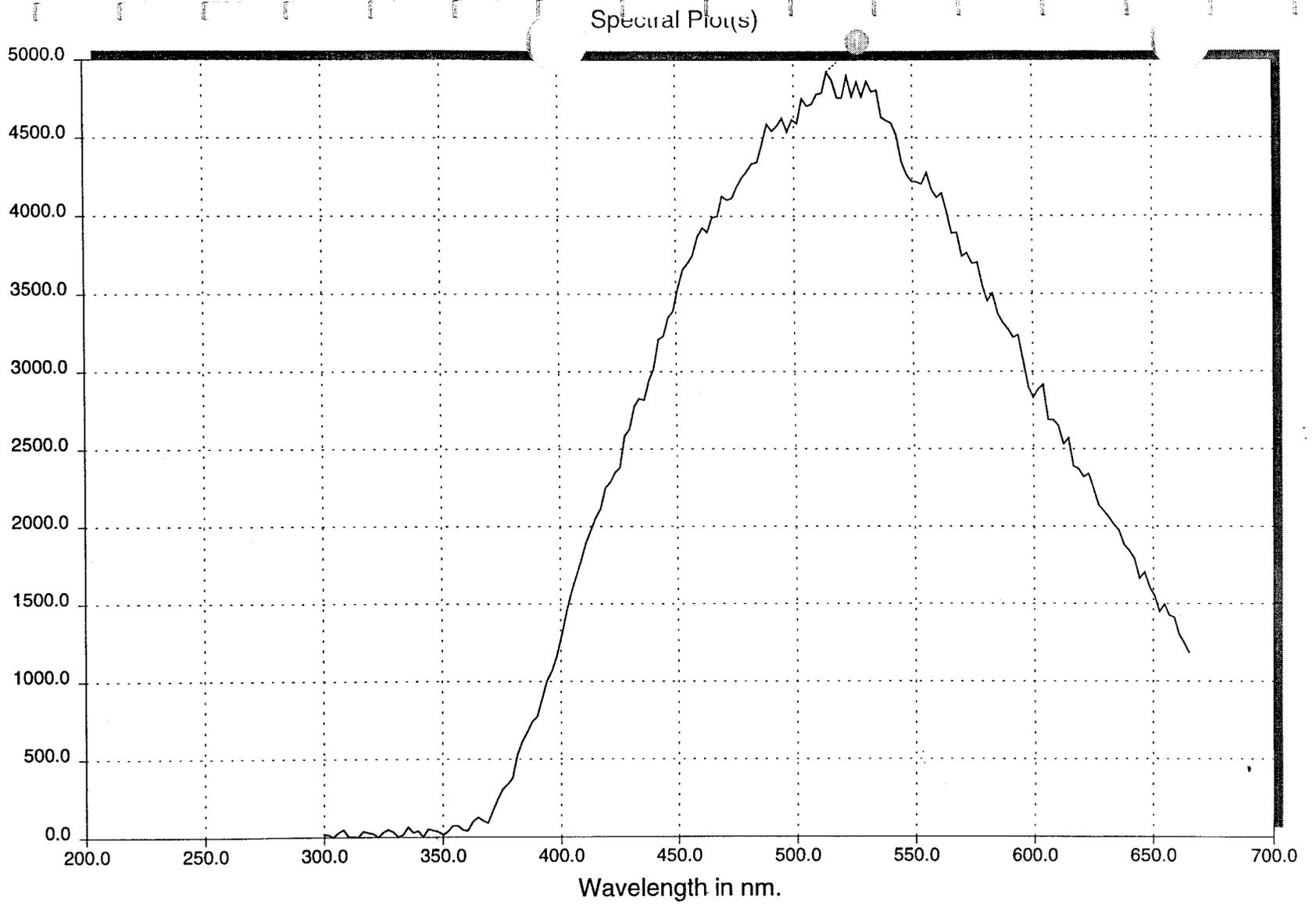


Time: 13:28:28
Date: 11-21-1996
Version: 1.0

Push: C:\BASIC71\DATA\IR3-14.PSH
Probe: C:\BASIC71\DATA\PROBE23B.PR3
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Fluorescence Intensity



1: 10.1 ft.; 4922 @ 513.9 nm

Time: 13:28:28

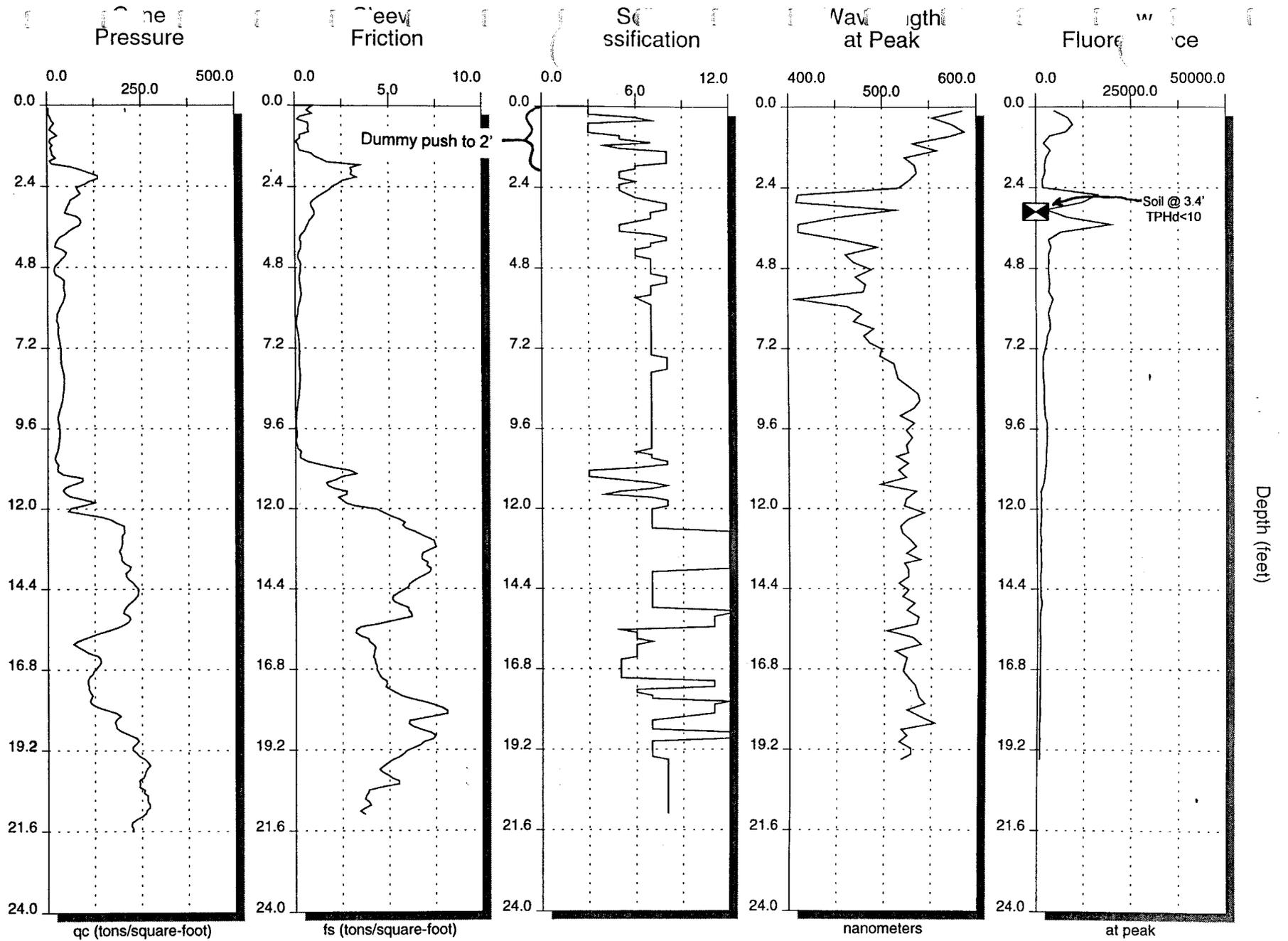
Date: 11-21-1996

Version: 1.0

Main: C:\BASIC71\DATA\IR3-14.PSH

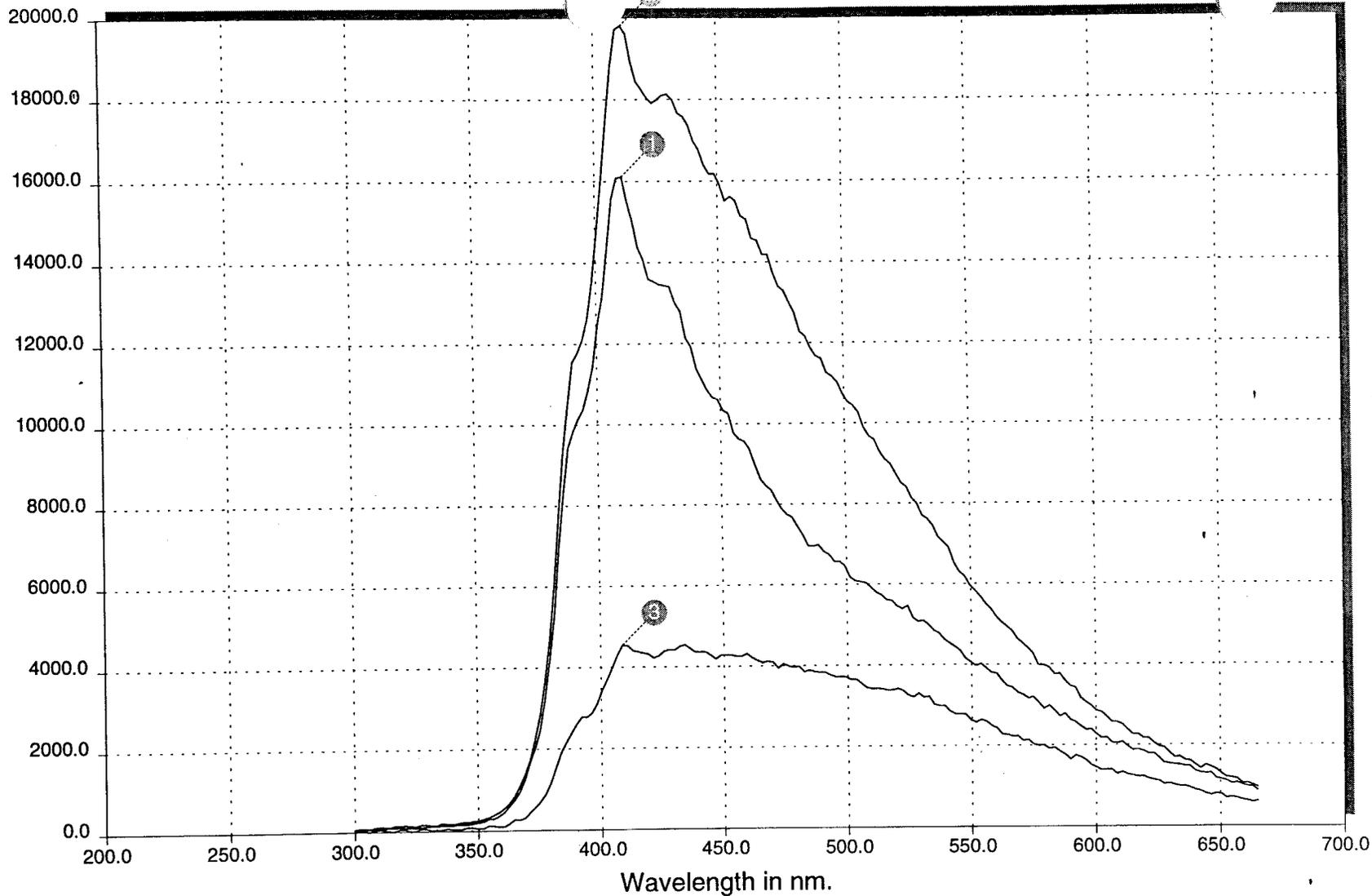
Probe: C:\BASIC71\DATA\PROBE23B.PR3

Calibration: C:\BASIC71\DATA\1213DFM.CAL





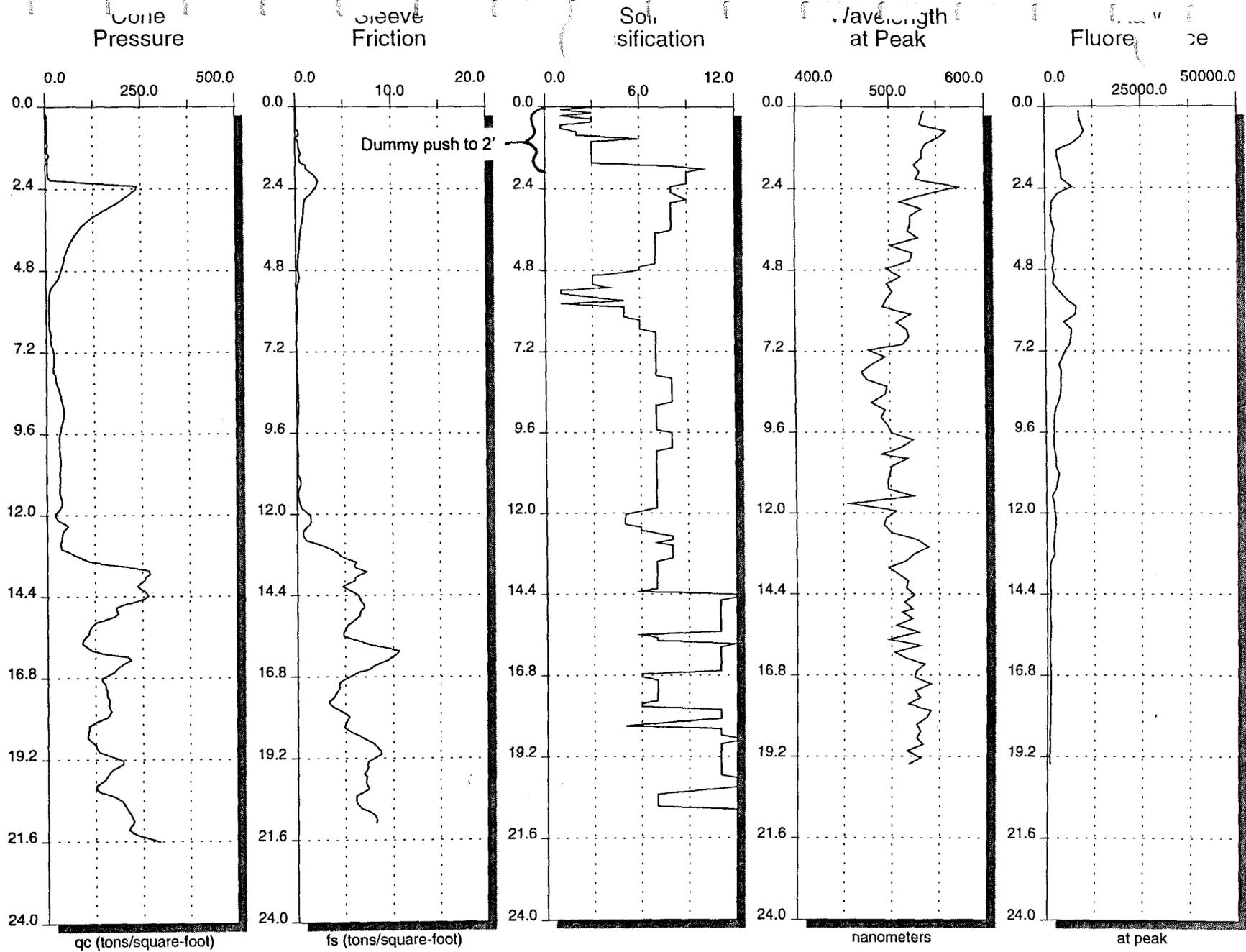
Fluorescence Intensity



Time: 13:56:51
Date: 11-21-1996
Version: 1.0

1: 2.6 ft.; 16108 @ 411.0 nm
2: 3.5 ft.; 19797 @ 411.0 nm
3: 5.7 ft.; 4543 @ 408.9 nm

Main: C:\BASIC71\DATA\IR3-15.PSH
Probe: C:\BASIC71\DATA\PROBE23B.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



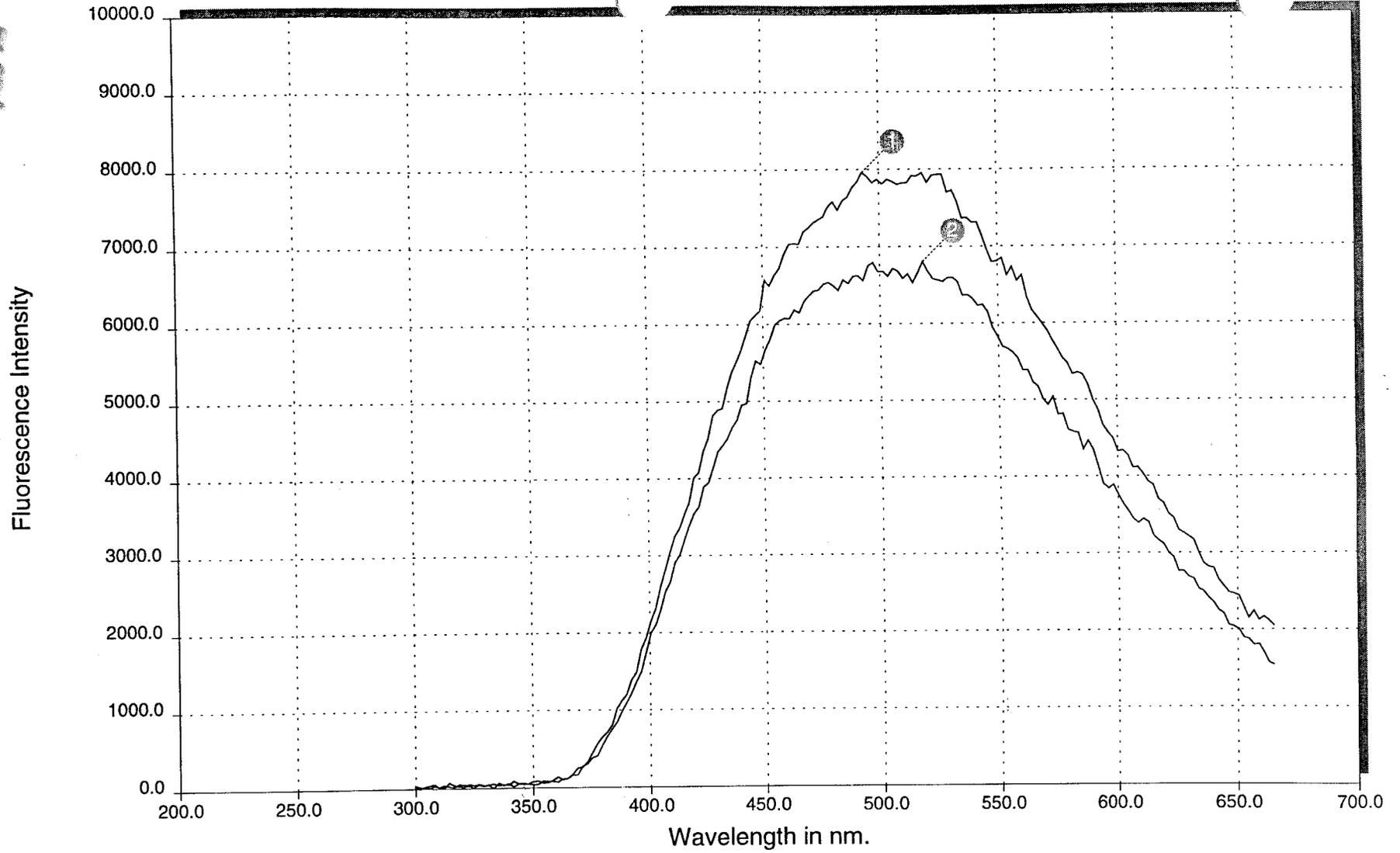
Depth (feet)

Time: 14:58:43
Date: 11-21-1996
Version: 1.0

Push: C:\BASIC71\DATA\IR3-16.PSH
Probe: C:\BASIC71\DATA\PROBE23B.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



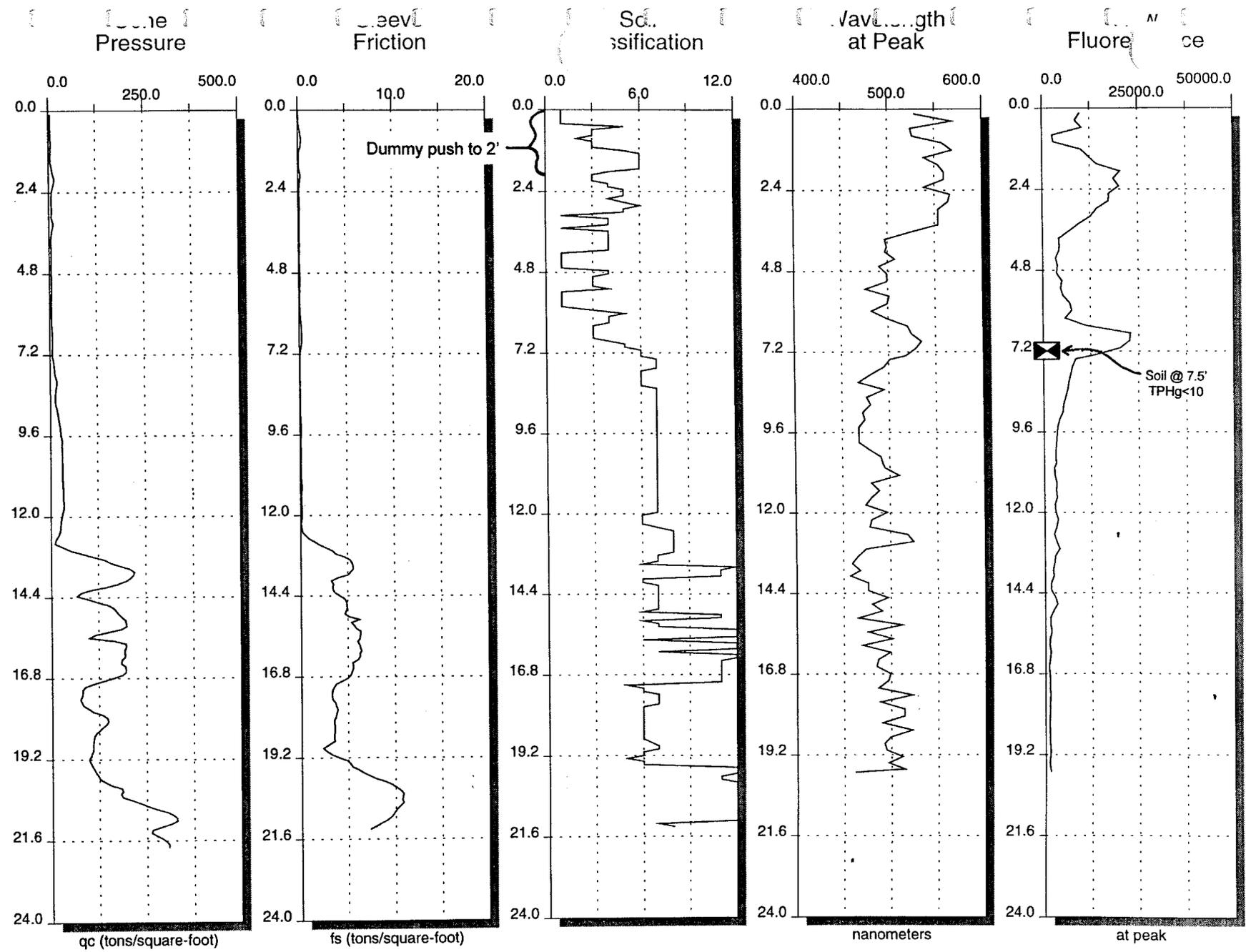
Spectral Plot(s)



Time: 14:58:43
Date: 11-21-1996
Version: 1.0

1: 5.9 ft.; 7957 @ 492.9 nm
2: 6.6 ft.; 6803 @ 518.1 nm

Main: C:\BASIC71\DATA\IR3-16.PSH
Probe: C:\BASIC71\DATA\PROBE23B.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Depth (feet)

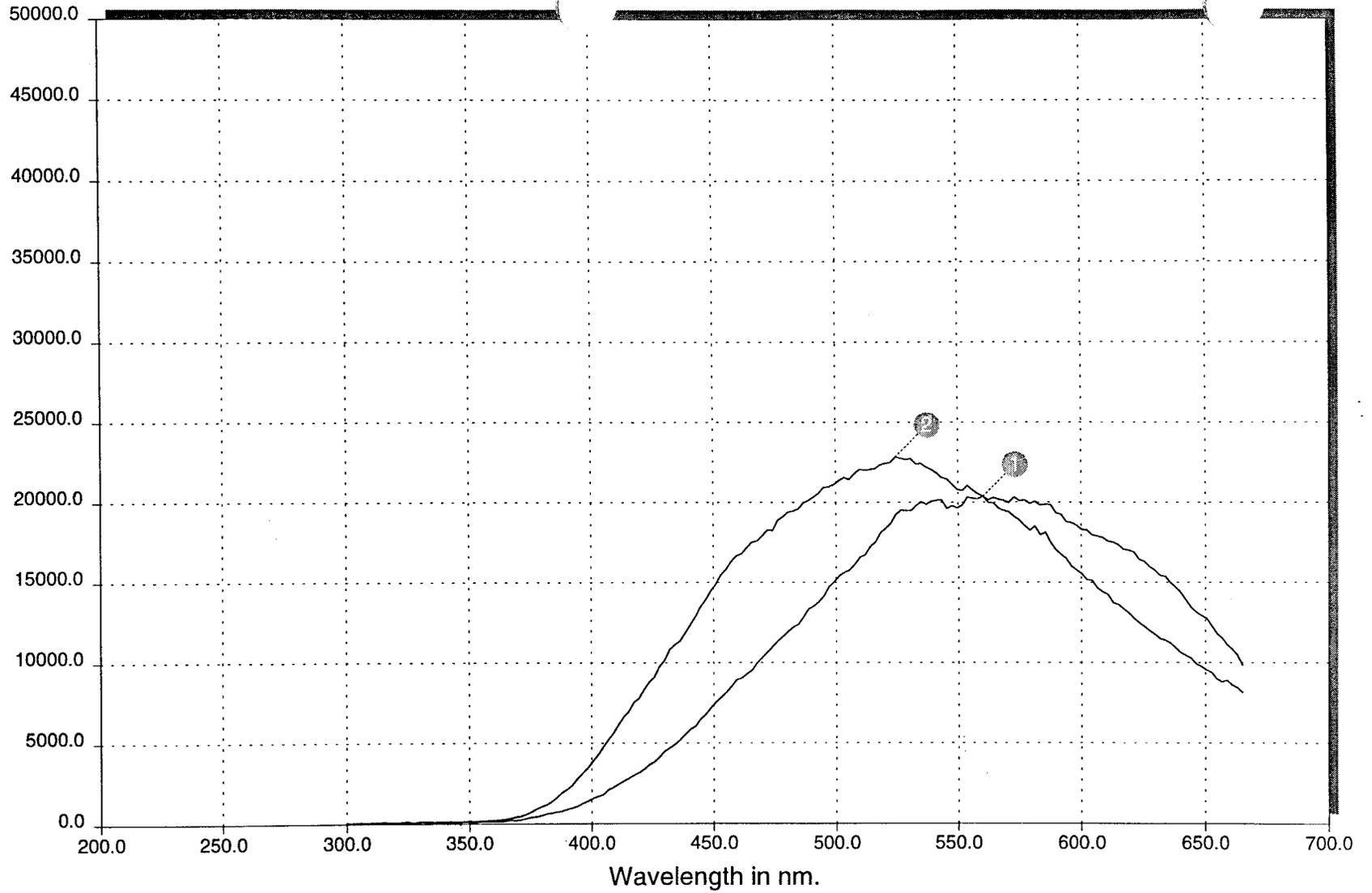
Time: 15:49:57
Date: 11-21-1996
Version: 1.0

Push: C:\BASIC71\DATA\IR3-17.PSH
Probe: C:\BASIC71\DATA\PROBE23B.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

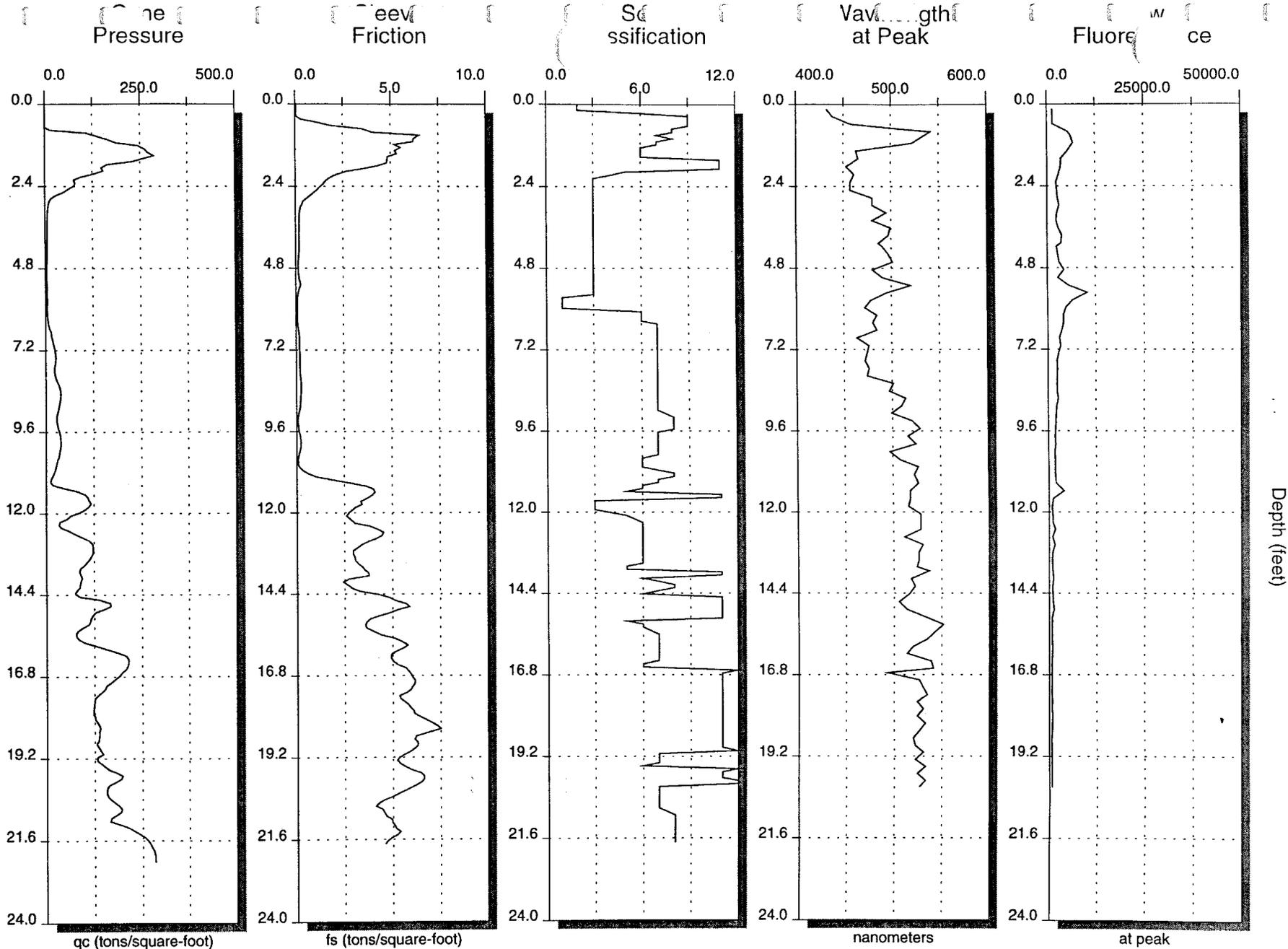
Fluorescence Intensity



1: 1.9 ft.; 20356 @ 560.2 nm
2: 6.7 ft.; 22817 @ 524.4 nm

Time: 15:49:57
Date: 11-21-1996
Version: 1.0

Main: C:\BASIC71\DATA\IR3-17.PSH
Probe: C:\BASIC71\DATA\PROBE23B.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL

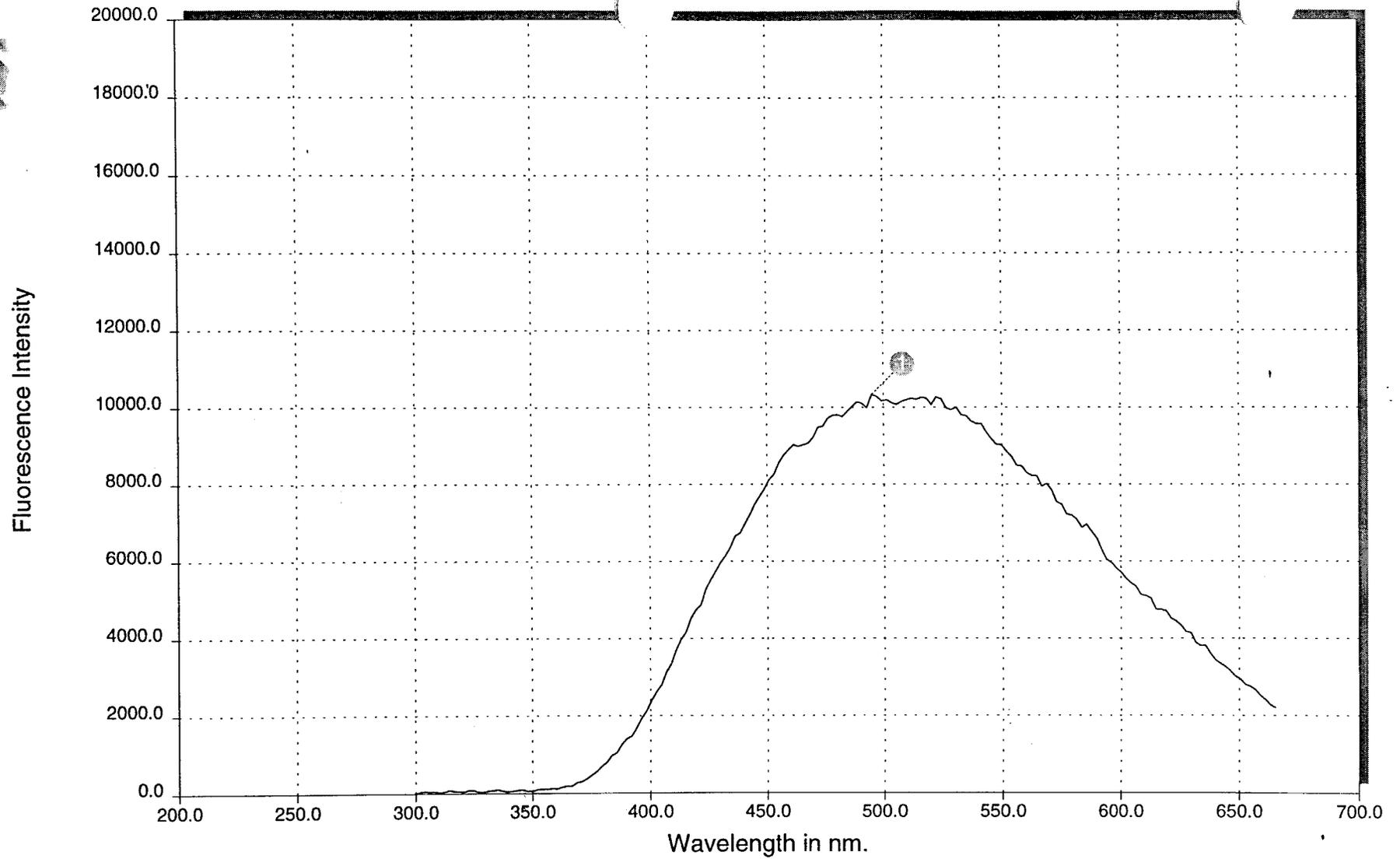


Time: 07:07:13
Date: 11-22-1996
Version: 1.0

Push: C:\BASIC71\DATA\IR3-18.PSH
Probe: C:\BASIC71\DATA\PROBE23B.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)



1: 5.5 ft.; 10329 @ 495.0 nm

Time: 07:07:13

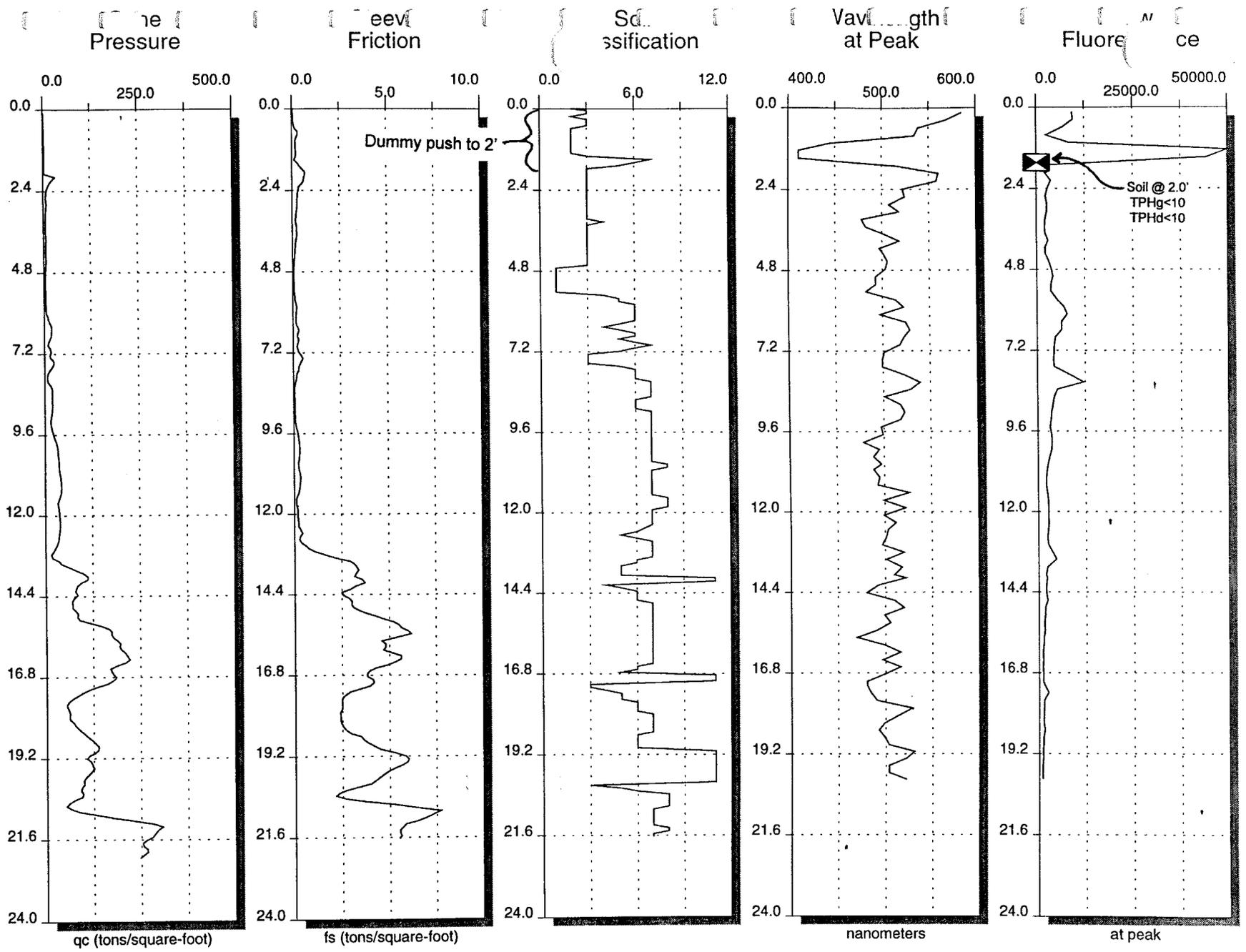
Date: 11-22-1996

Version: 1.0

Main: C:\BASIC71\DATA\IR3-18.PSH

Probe: C:\BASIC71\DATA\PROBE23B.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL



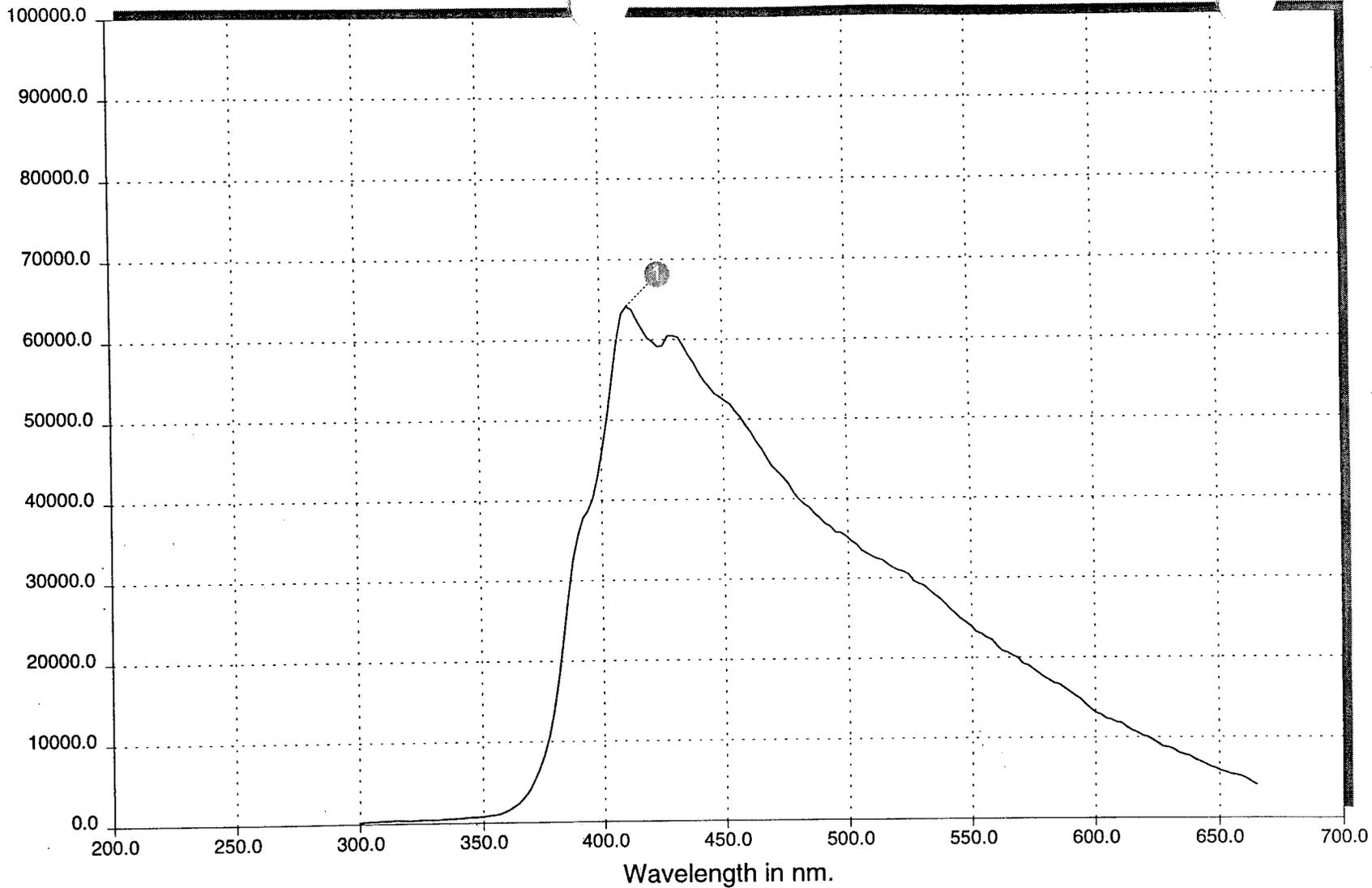
Time: 07:47:02
Date: 11-22-1996
Version: 1.0

Push: C:\BASIC71\DATA\IR3-19.PSH
Probe: C:\BASIC71\DATA\PROBE23B.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

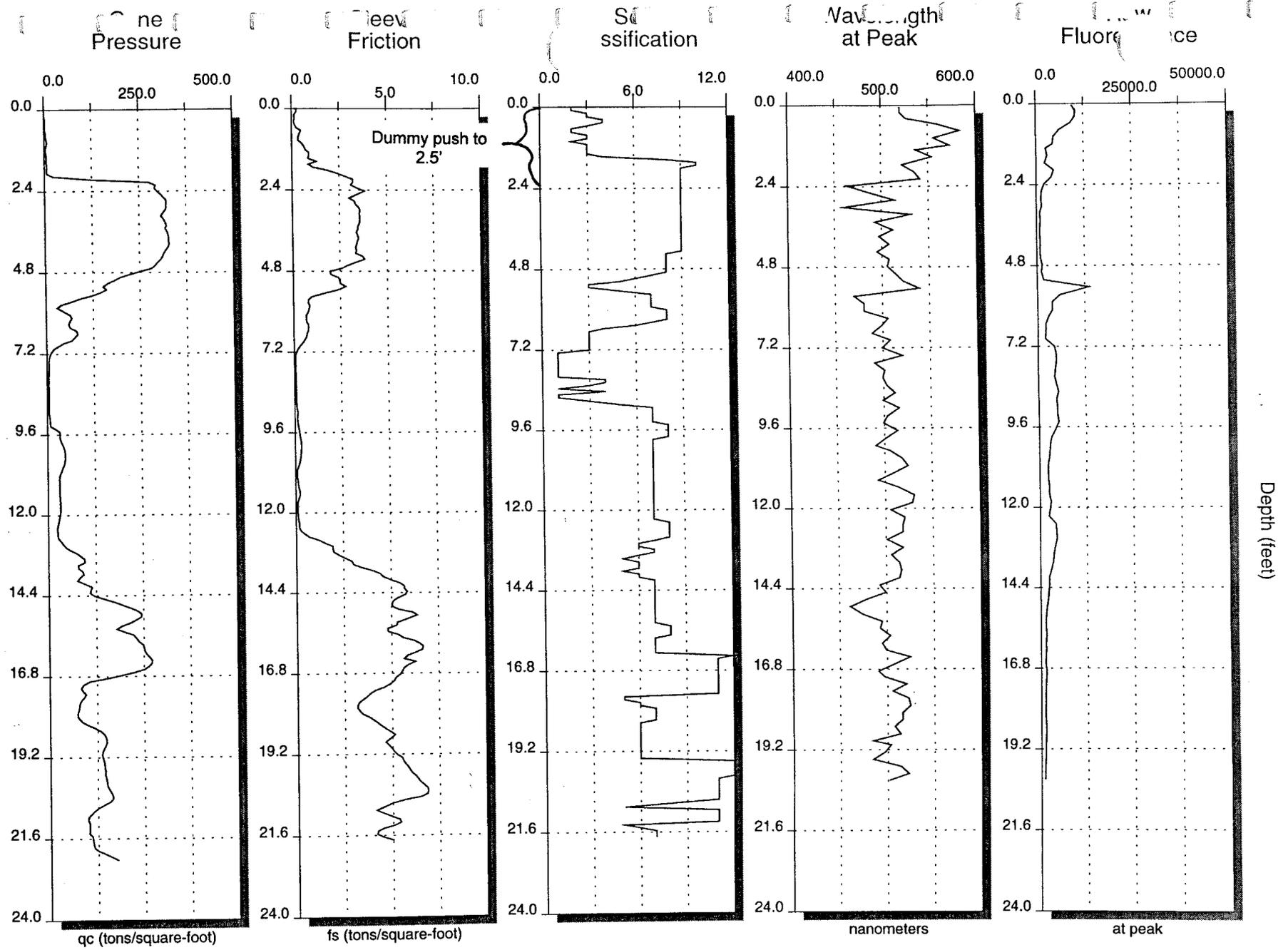
Fluorescence Intensity



1: 1.3 ft.; 64144 @ 411.0 nm

Time: 07:47:02
Date: 11-22-1996
Version: 1.0

Main: C:\BASIC71\DATA\IR3-19.PSH
Probe: C:\BASIC71\DATA\PROBE23B.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL

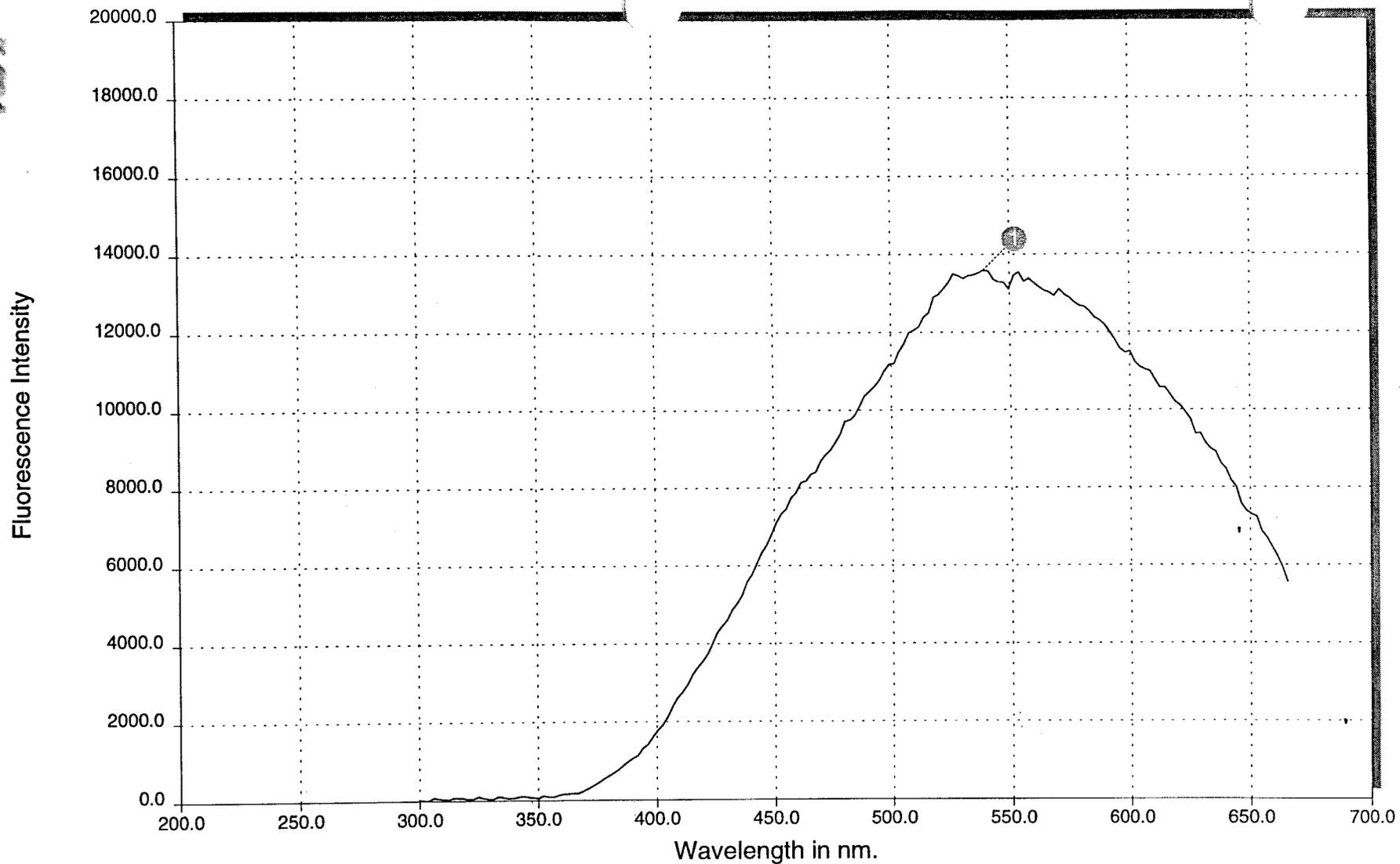


Time: 08:16:46
Date: 11-22-1996
Version: 1.0

Push: C:\BASIC71\DATA\IR3-20.PSH
Probe: C:\BASIC71\DATA\PROBE23B.PR3
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)



1: 5.4 ft.; 13588 @ 539.1 nm

Time: 08:16:46

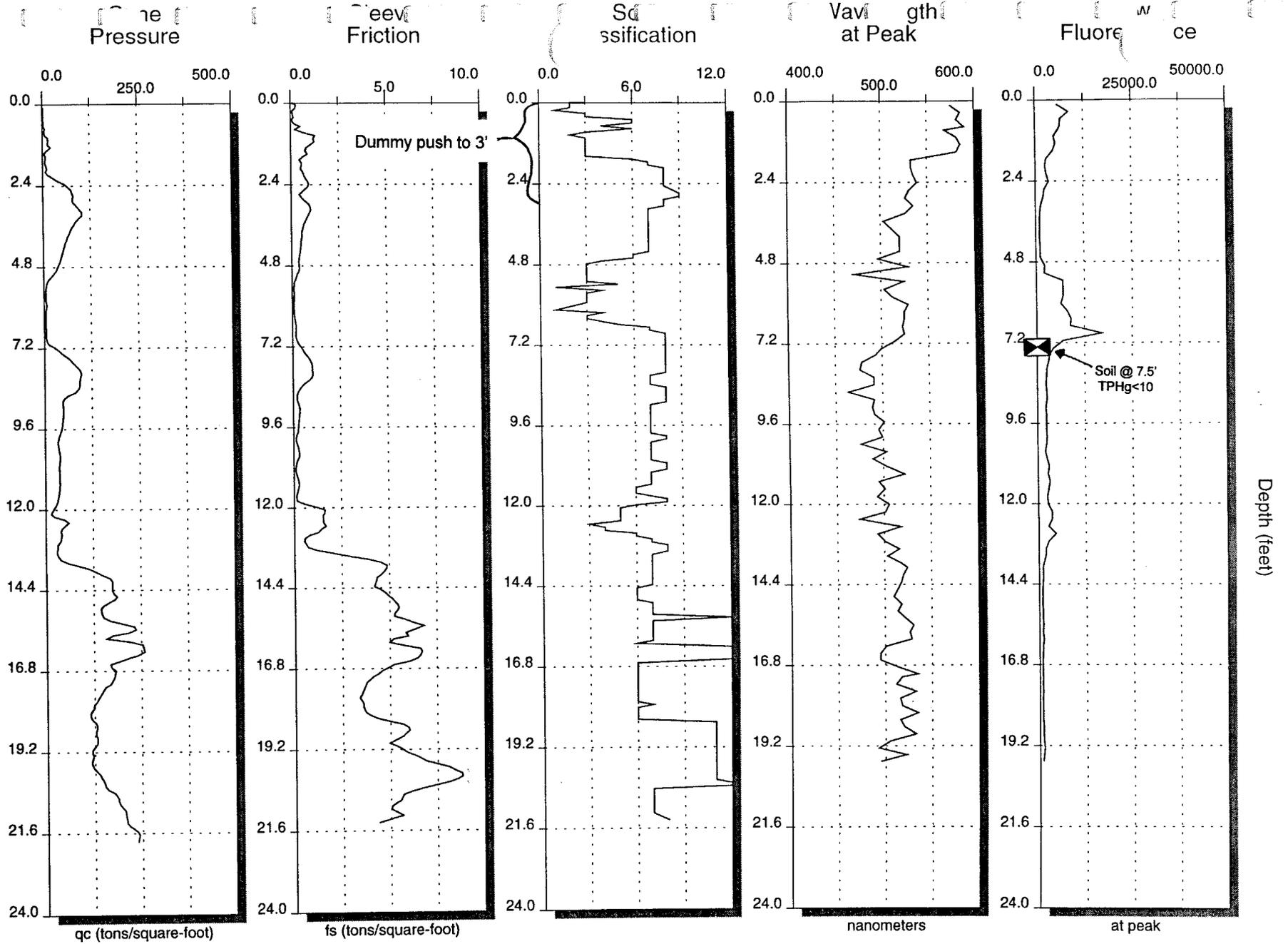
Date: 11-22-1996

Version: 1.0

Main: C:\BASIC71\DATA\IR3-20.PSH

Probe: C:\BASIC71\DATA\PROBE23B.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL

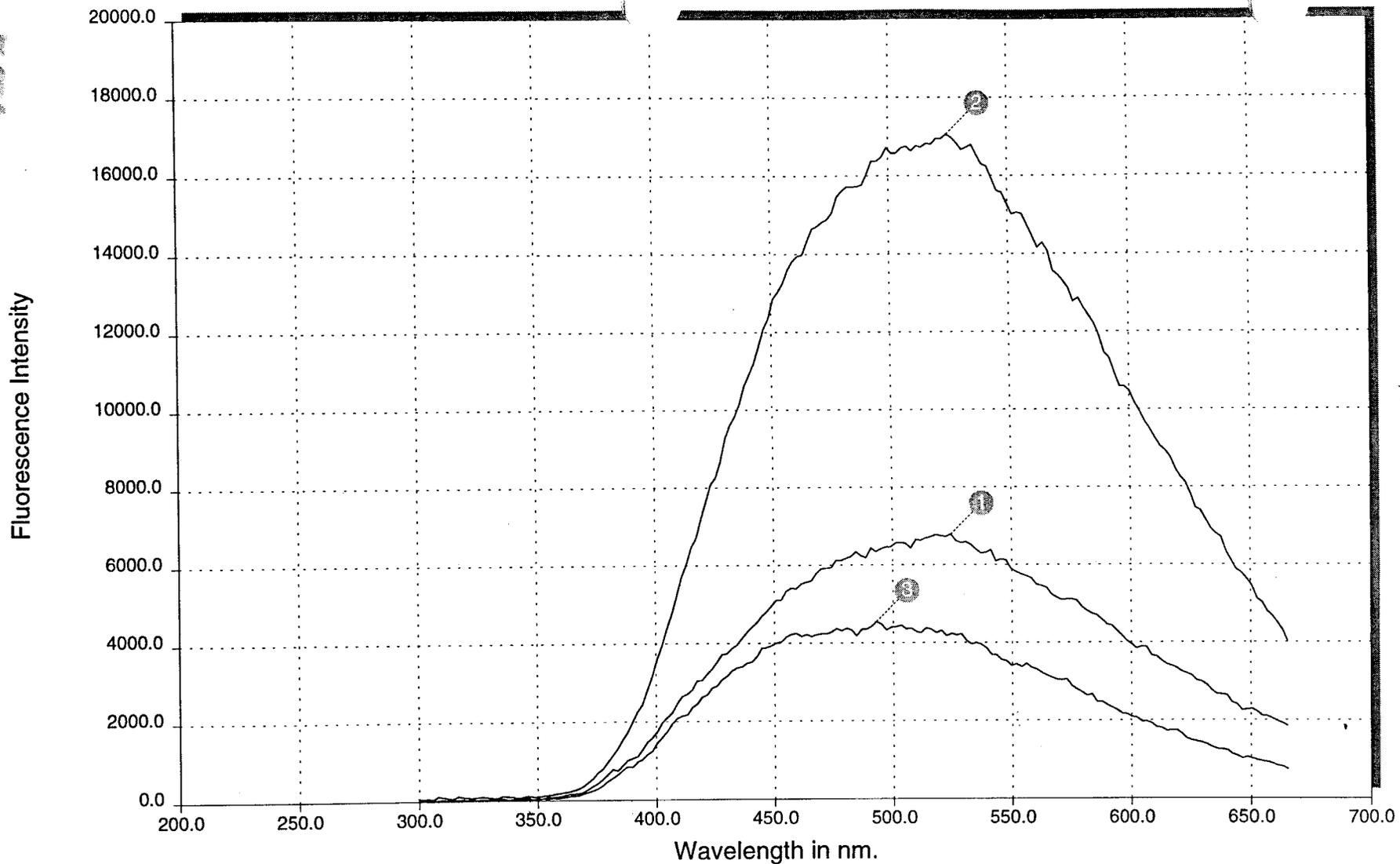


Time: 08:59:34
Date: 11-22-1996
Version: 1.0

Push: C:\BASIC71\DATA\IR3-21.PSH
Probe: C:\BASIC71\DATA\PROBE23B.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



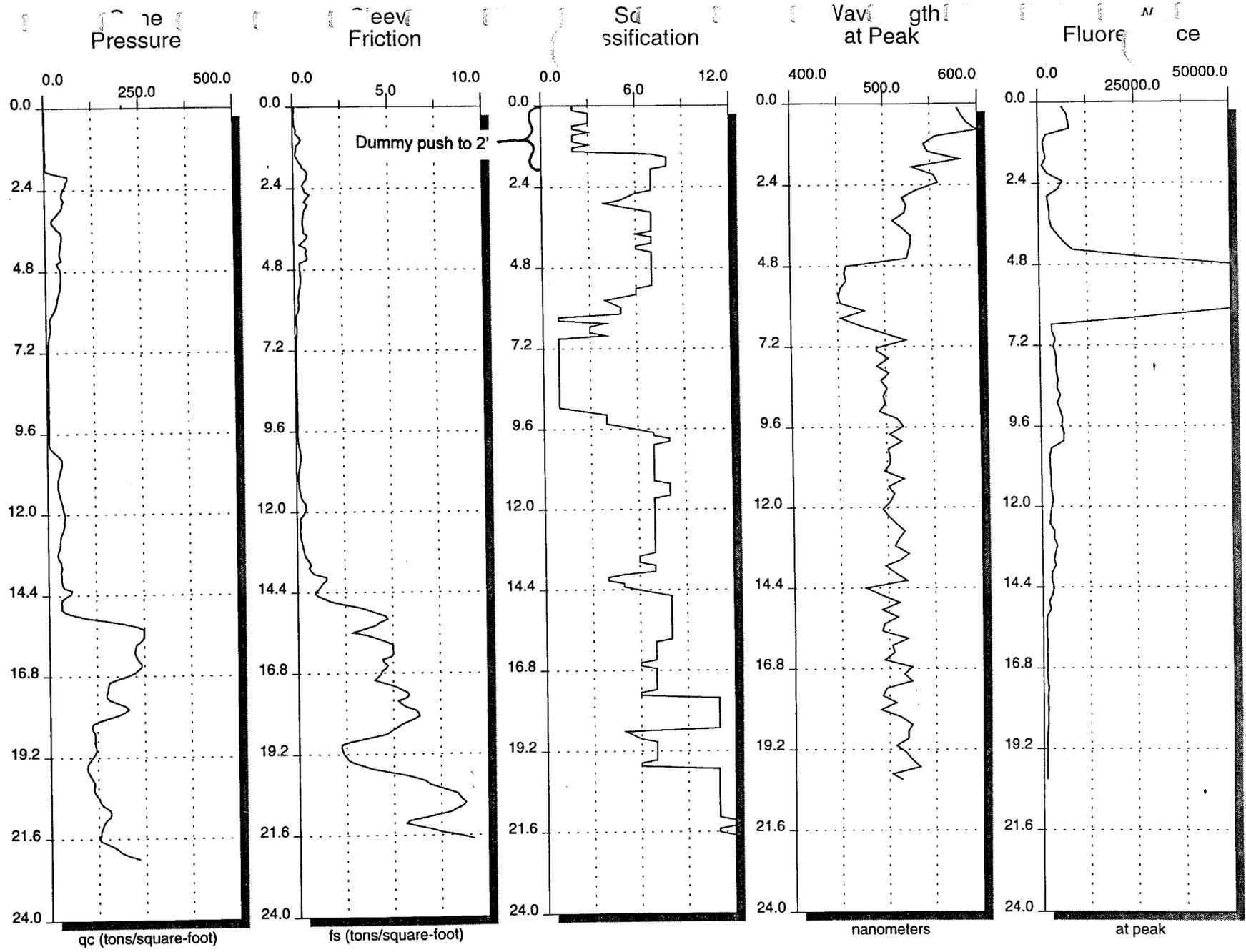
Spectral Plot(s)



1: 5.3 ft.; 6783 @ 524.4 nm
2: 6.9 ft.; 17054 @ 524.4 nm
3: 12.9 ft.; 4543 @ 492.9 nm

Time: 08:59:34
Date: 11-22-1996
Version: 1.0

Main: C:\BASIC71\DATA\IR3-21.PSH
Probe: C:\BASIC71\DATA\PROBE23B.PR8
Calibration: C:\BASIC71\DATA\1213DFM.CAL



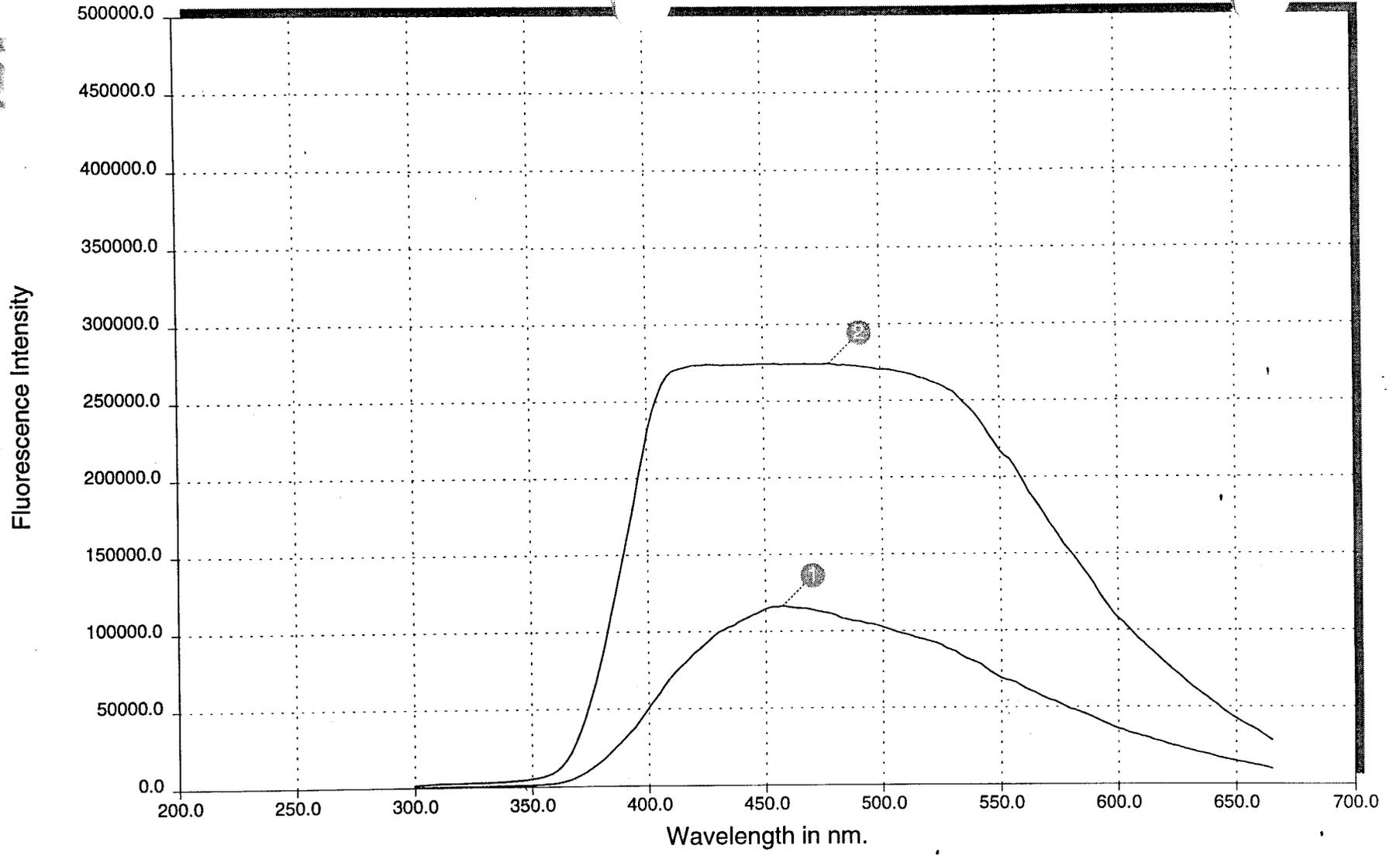
Depth (feet)

Time: 09:32:31
Date: 11-22-1996
Version: 1.0

Push: C:\BASIC71\DATA\IR3-22.PSH
Probe: C:\BASIC71\DATA\PROBE23B.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



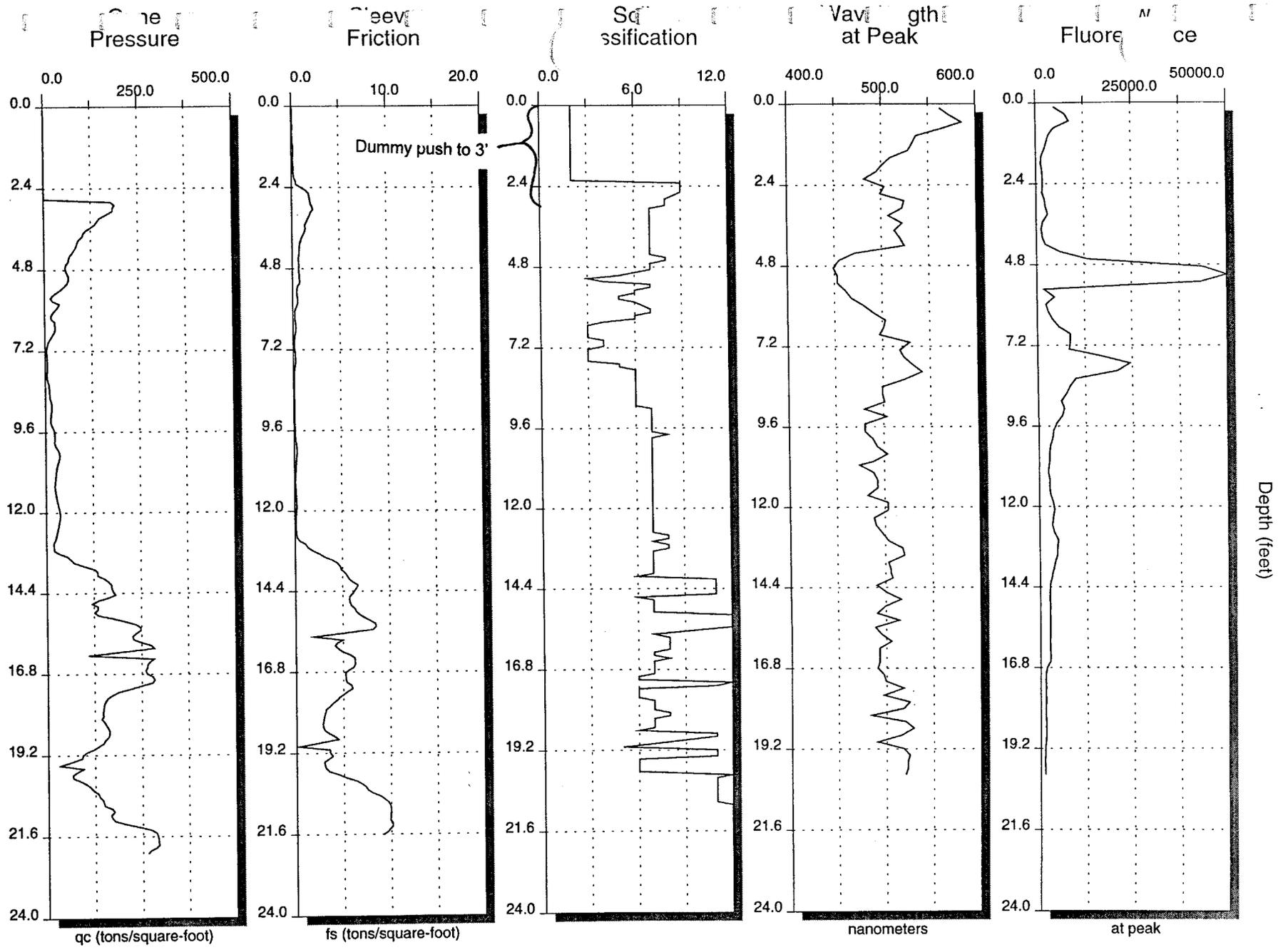
Spectral Plot(s)



Time: 09:32:31
Date: 11-22-1996
Version: 1.0

1: 5.0 ft.; 116313 @ 457.2 nm
2: 6.1 ft.; 274397 @ 478.2 nm

Main: C:\BASIC71\DATA\IR3-22.PSH
Probe: C:\BASIC71\DATA\PROBE23B.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL

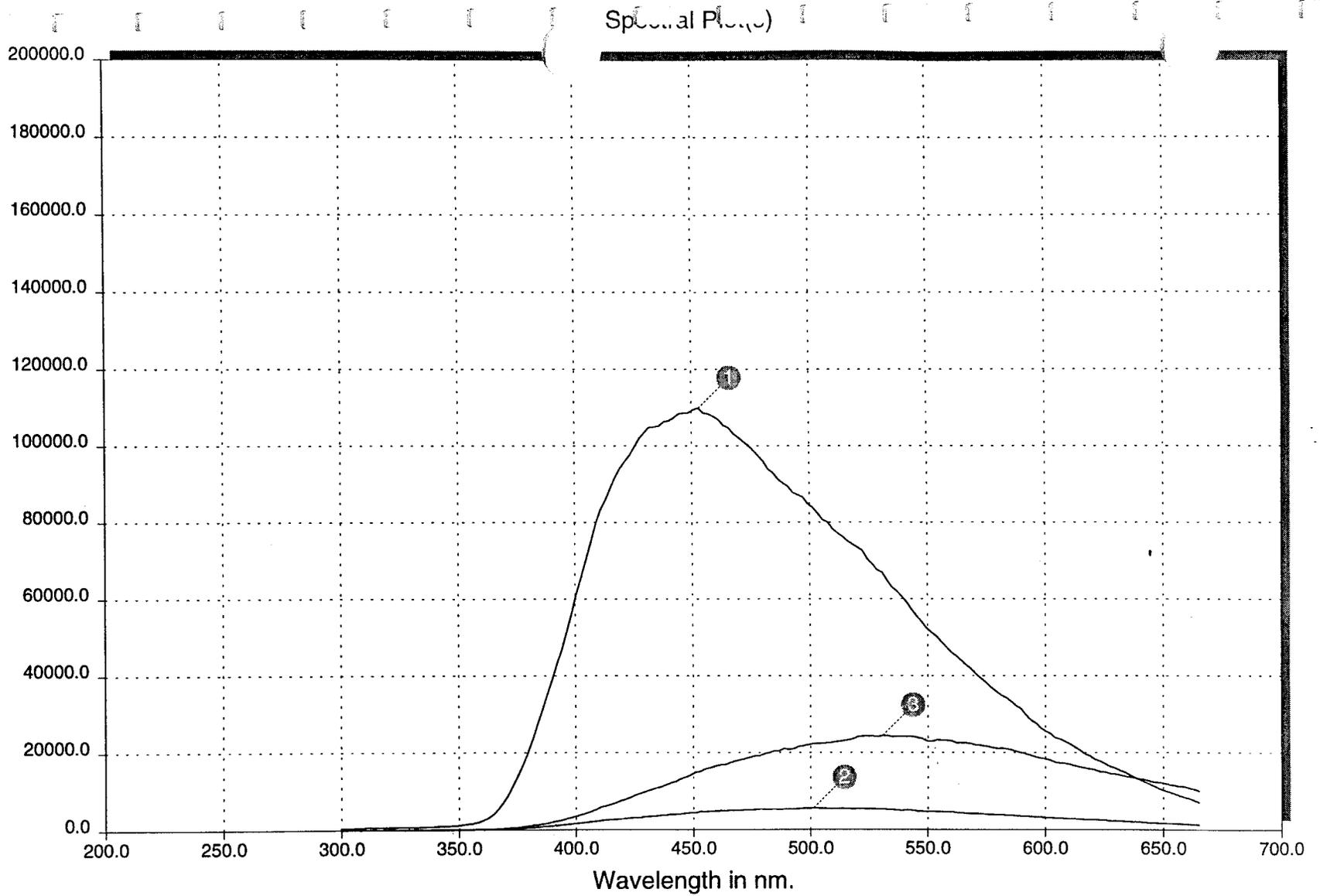


Time: 08:43:17
Date: 11-24-1996
Version: 1.0

Push: C:\BASIC71\DATA\IR3-23.PSH
Probe: C:\BASIC71\DATA\PROBE23D.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Fluorescence Intensity



1: 5.1 ft.; 109798 @ 453.0 nm
2: 6.6 ft.; 5632 @ 501.3 nm
3: 7.7 ft.; 24391 @ 530.7 nm

Time: 08:43:17

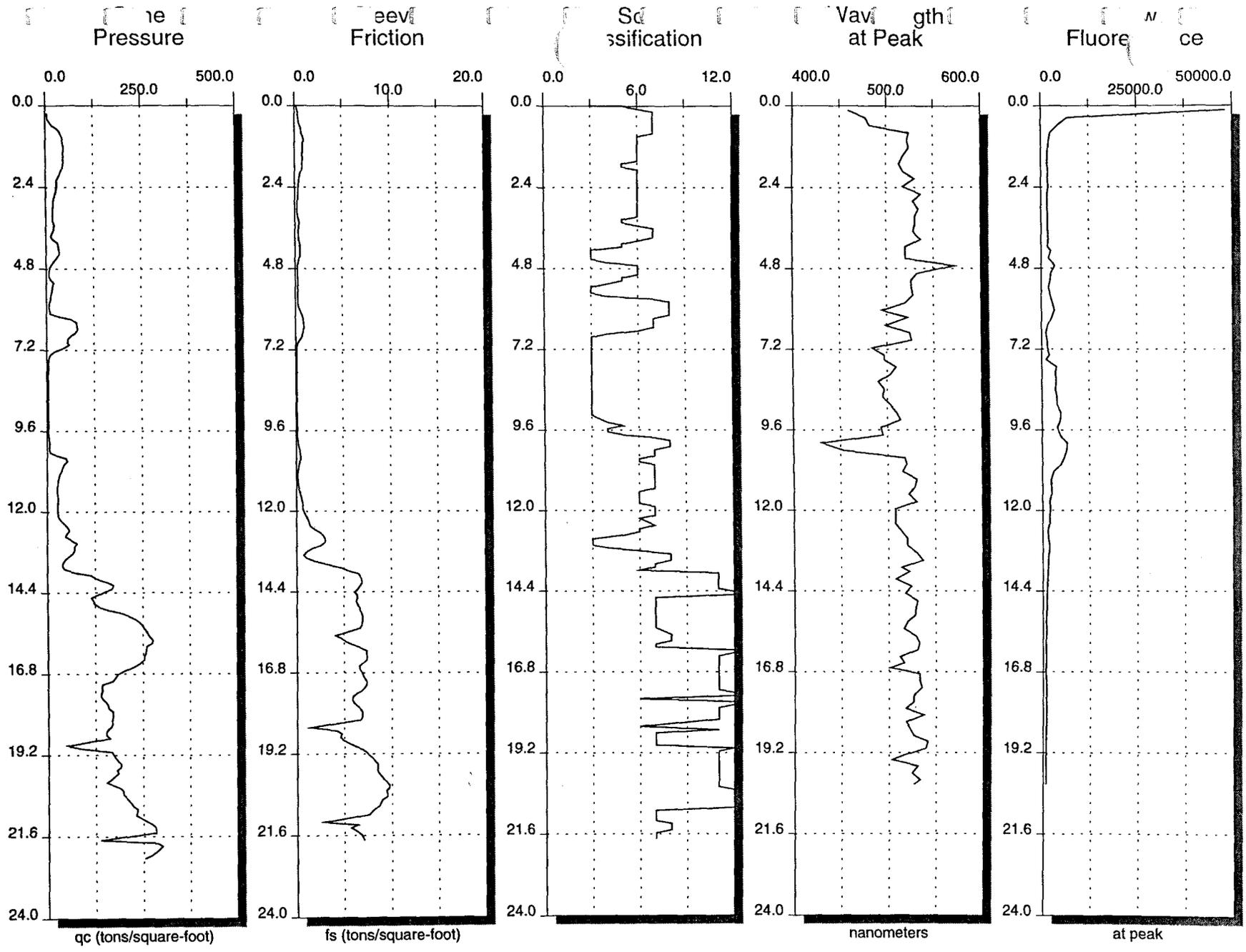
Date: 11-24-1996

Version: 1.0

Main: C:\BASIC71\DATA\IR3-23.PSH

Probe: C:\BASIC71\DATA\PROBE23D.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL

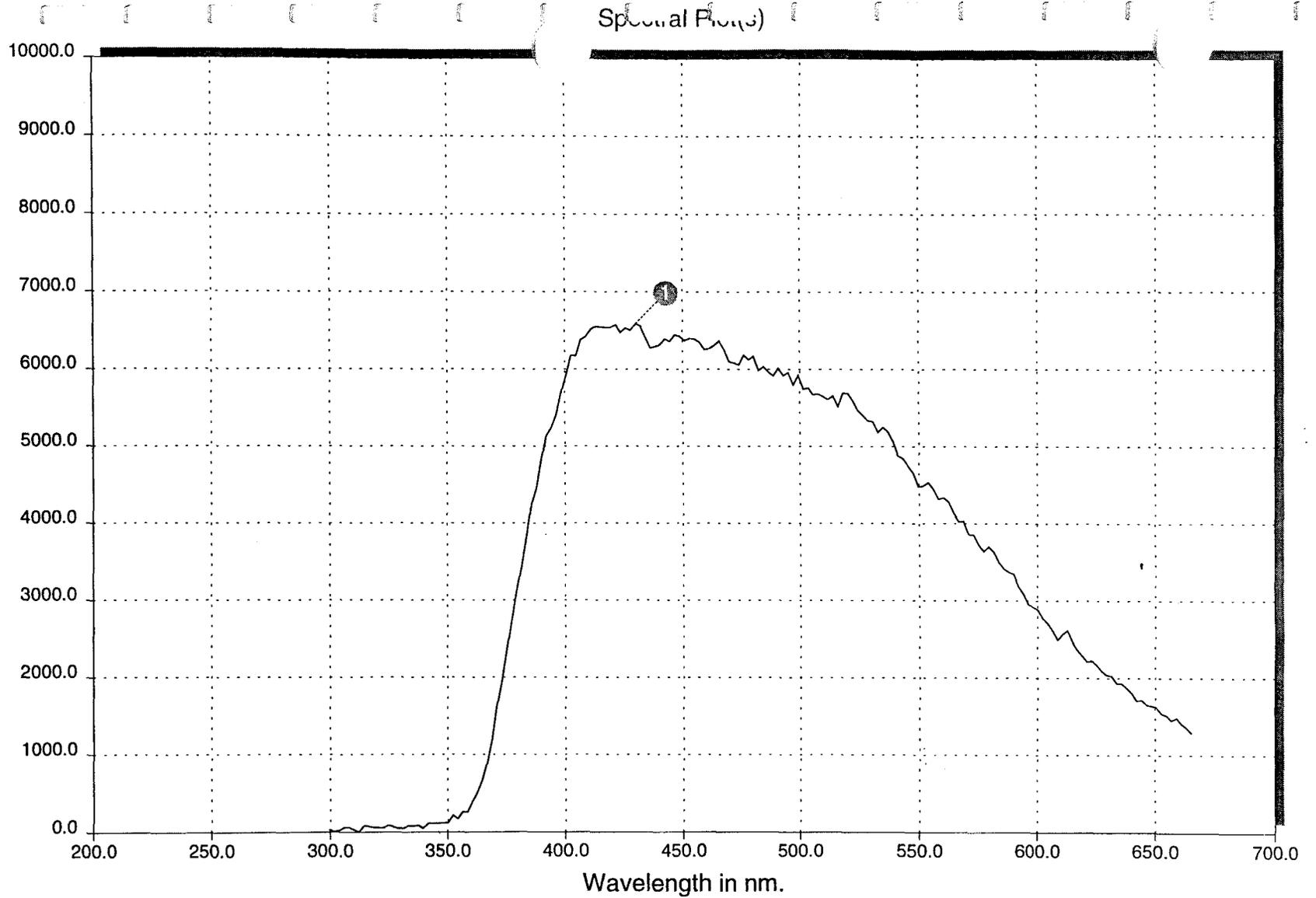


Time: 07:00:18
Date: 11-25-1996
Version: 1.0

Push: C:\BASIC71\DATA\IR3-24.PSH
Probe: C:\BASIC71\DATA\PROBE23D.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Fluorescence Intensity



1: 10.0 ft.; 6587 @ 429.9 nm

Time: 07:00:18

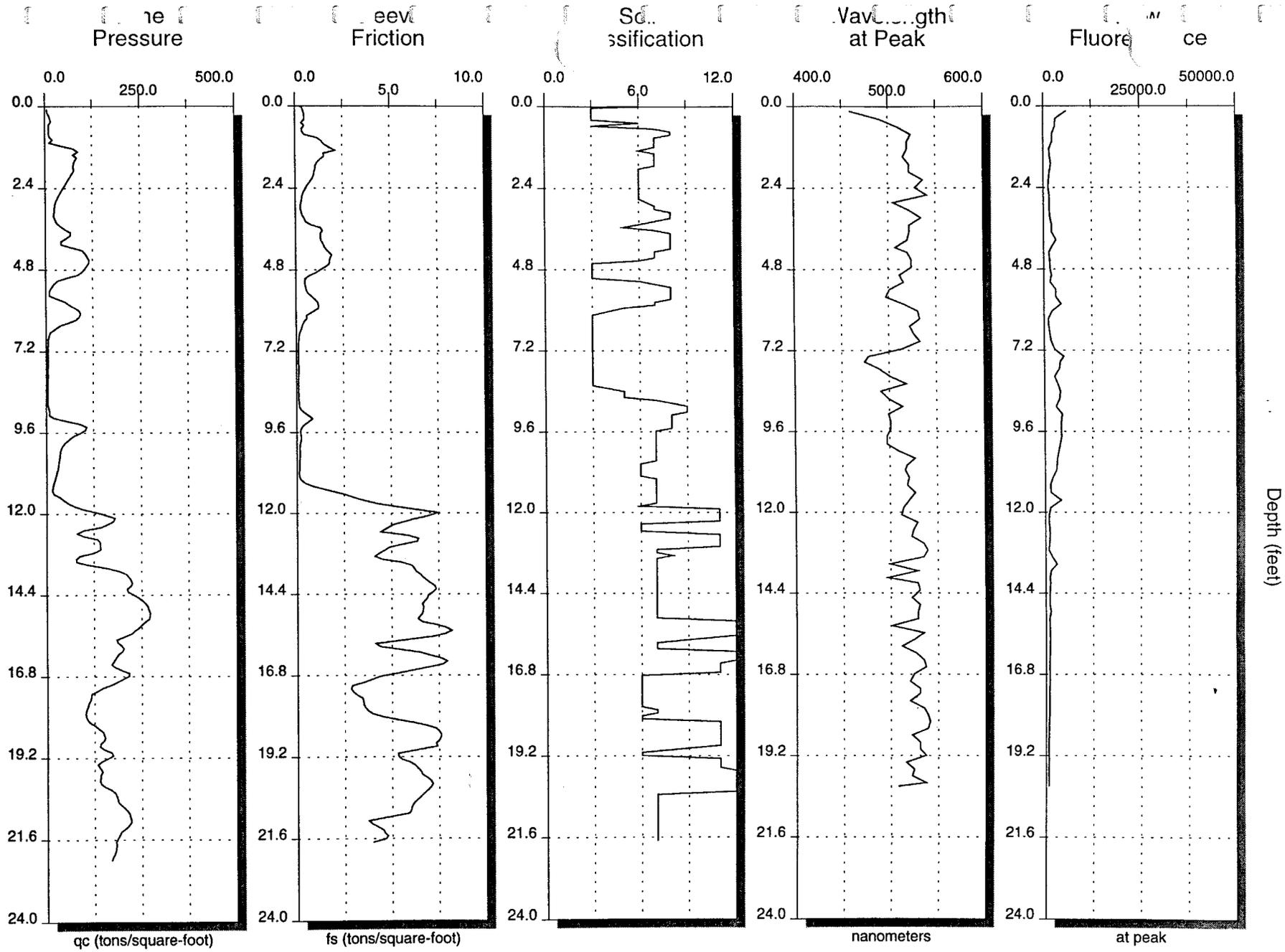
Date: 11-25-1996

Version: 1.0

Main: C:\BASIC71\DATA\IR3-24.PSH

Probe: C:\BASIC71\DATA\PROBE23D.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Time: 09:25:59

Date: 11-25-1996

Version: 1.0

Push: C:\BASIC71\DATA\IR3-25.PSH

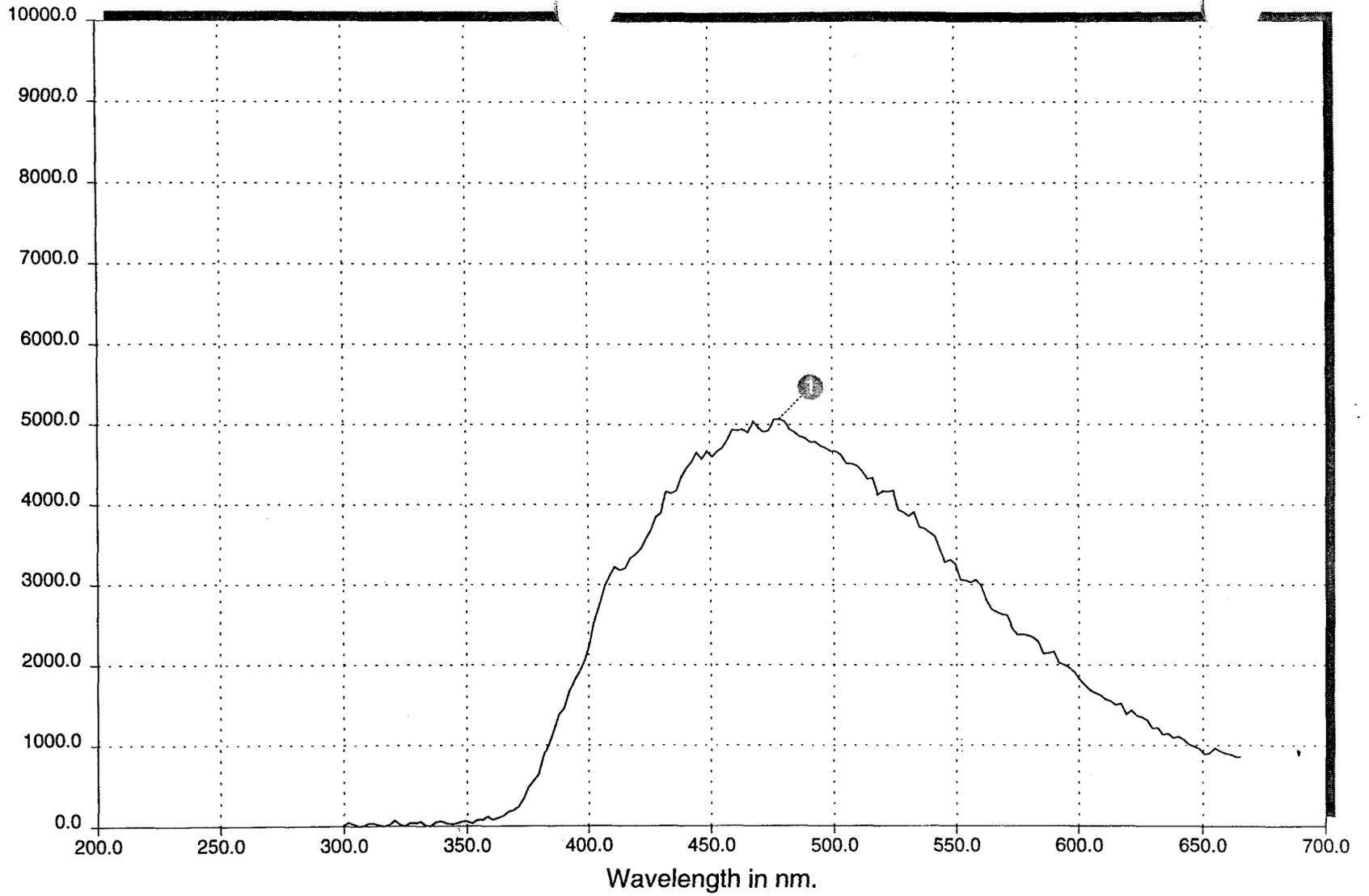
Probe: C:\BASIC71\DATA\PROBE23D.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

Fluorescence Intensity



1: 7.4 ft.; 5067 @ 478.2 nm

Time: 09:25:59

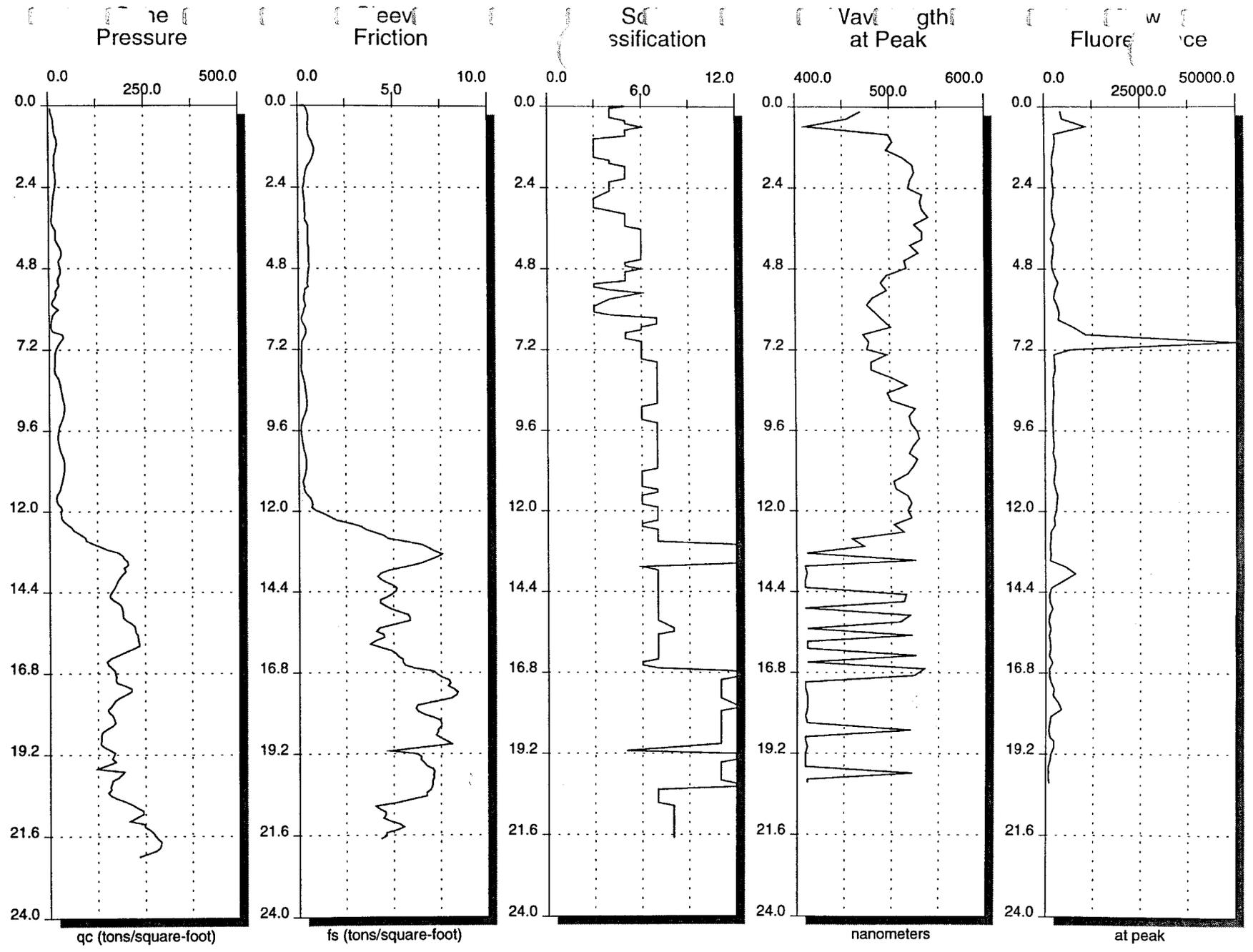
Date: 11-25-1996

Version: 1.0

Main: C:\BASIC71\DATA\IR3-25.PSH

Probe: C:\BASIC71\DATA\PROBE23D.PR8

Calibration: C:\BASIC71\DATA\1213DFM.CAL

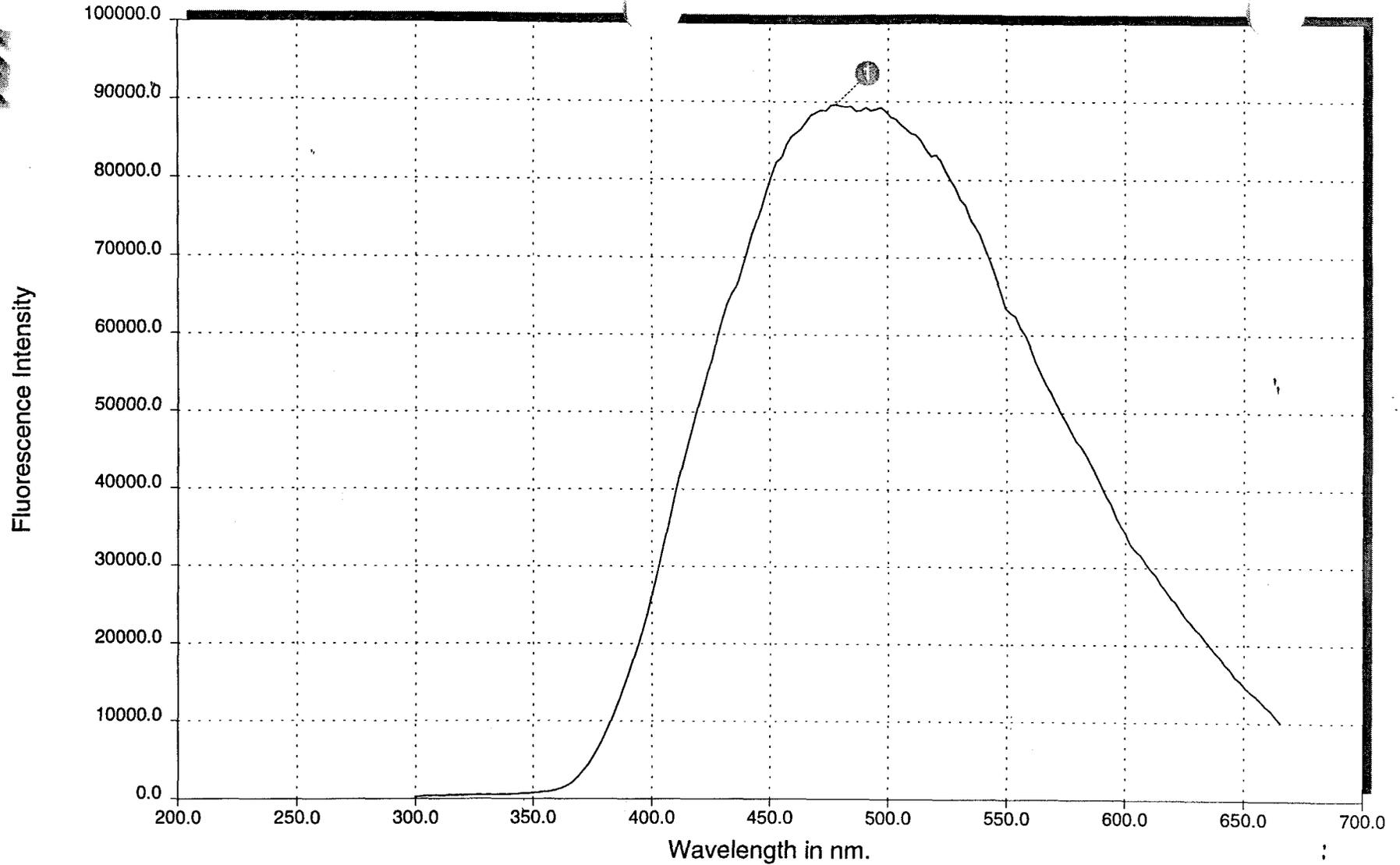


Time: 09:55:06
Date: 11-25-1996
Version: 1.0

Push: C:\BASIC71\DATA\IR3-26.PSH
Probe: C:\BASIC71\DATA\PROBE23D.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)



1: 7.0 ft.; 89630 @ 478.2 nm

Time: 09:55:06

Date: 11-25-1996

Version: 1.0

Main: C:\BASIC71\DATA\IR3-26.PSH

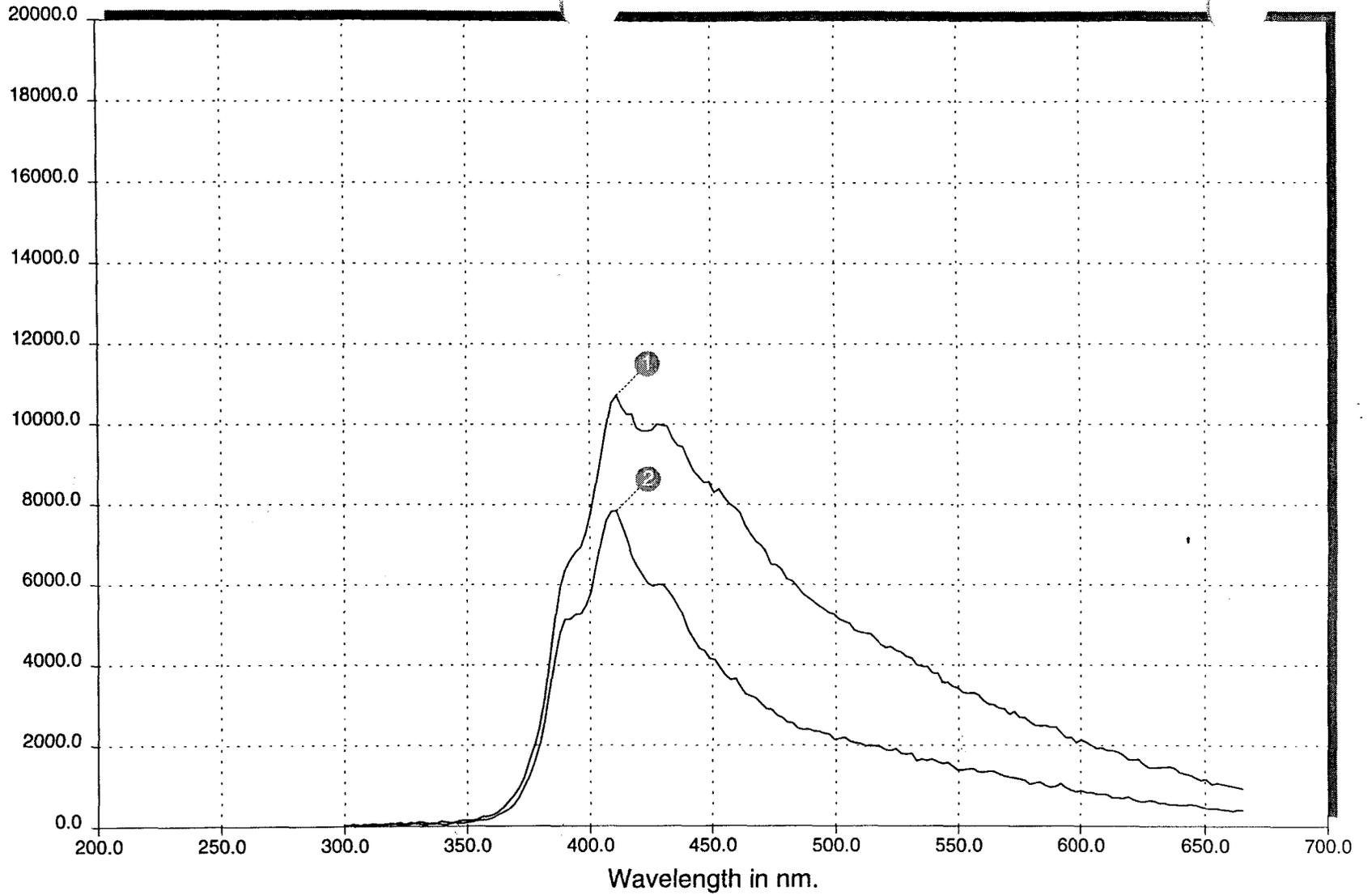
Probe: C:\BASIC71\DATA\PROBE23D.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

Fluorescence Intensity



1: 0.6 ft.; 10710 @ 411.0 nm

2: 13.9 ft.; 7834 @ 411.0 nm

Time: 09:55:06

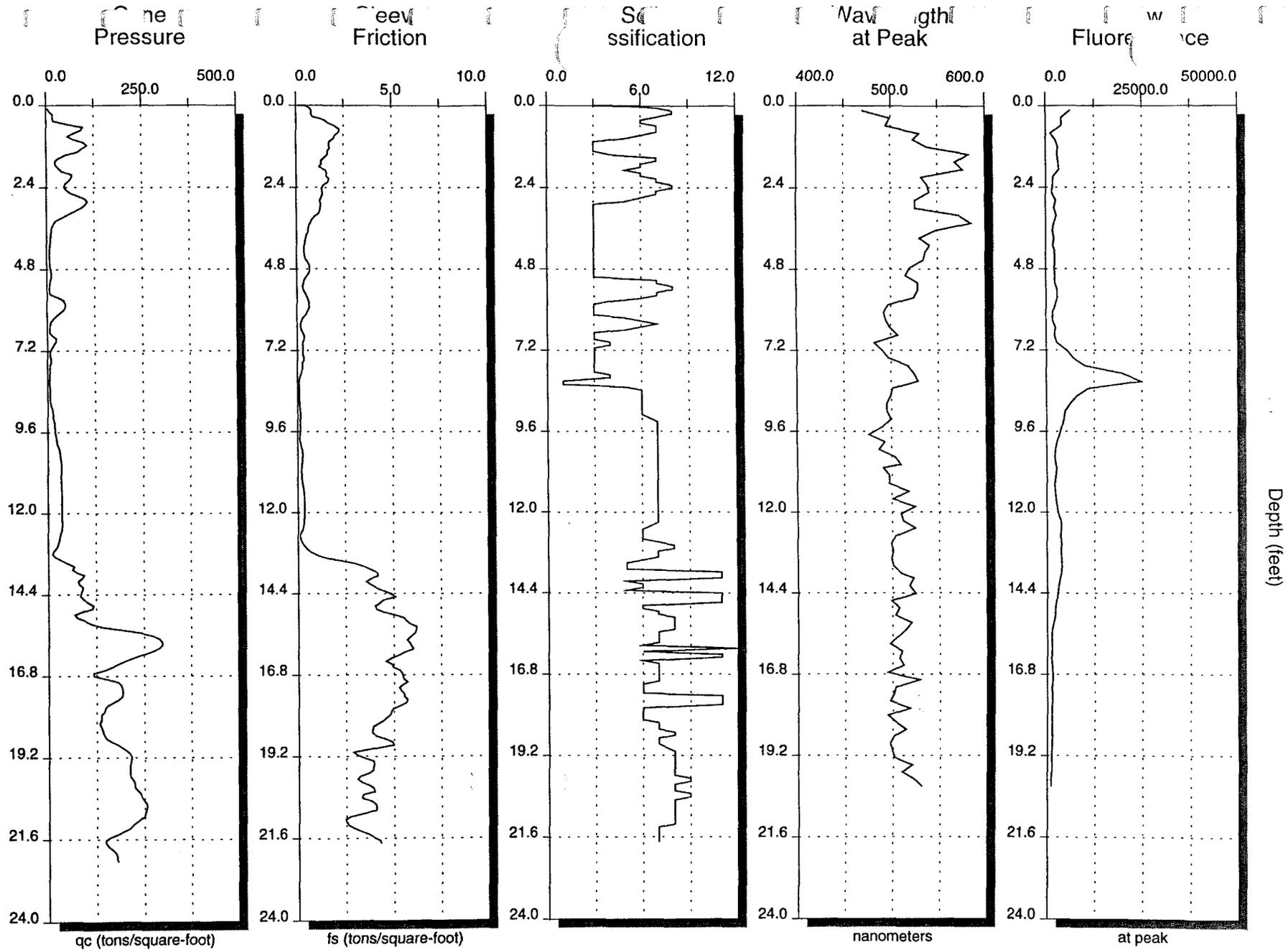
Date: 11-25-1996

Version: 1.0

Main: C:\BASIC71\DATA\IR3-26.PSH

Probe: C:\BASIC71\DATA\PROBE23D.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Time: 11:35:05

Date: 11-25-1996

Version: 1.0

Push: C:\BASIC71\DATA\IR3-27.PSH

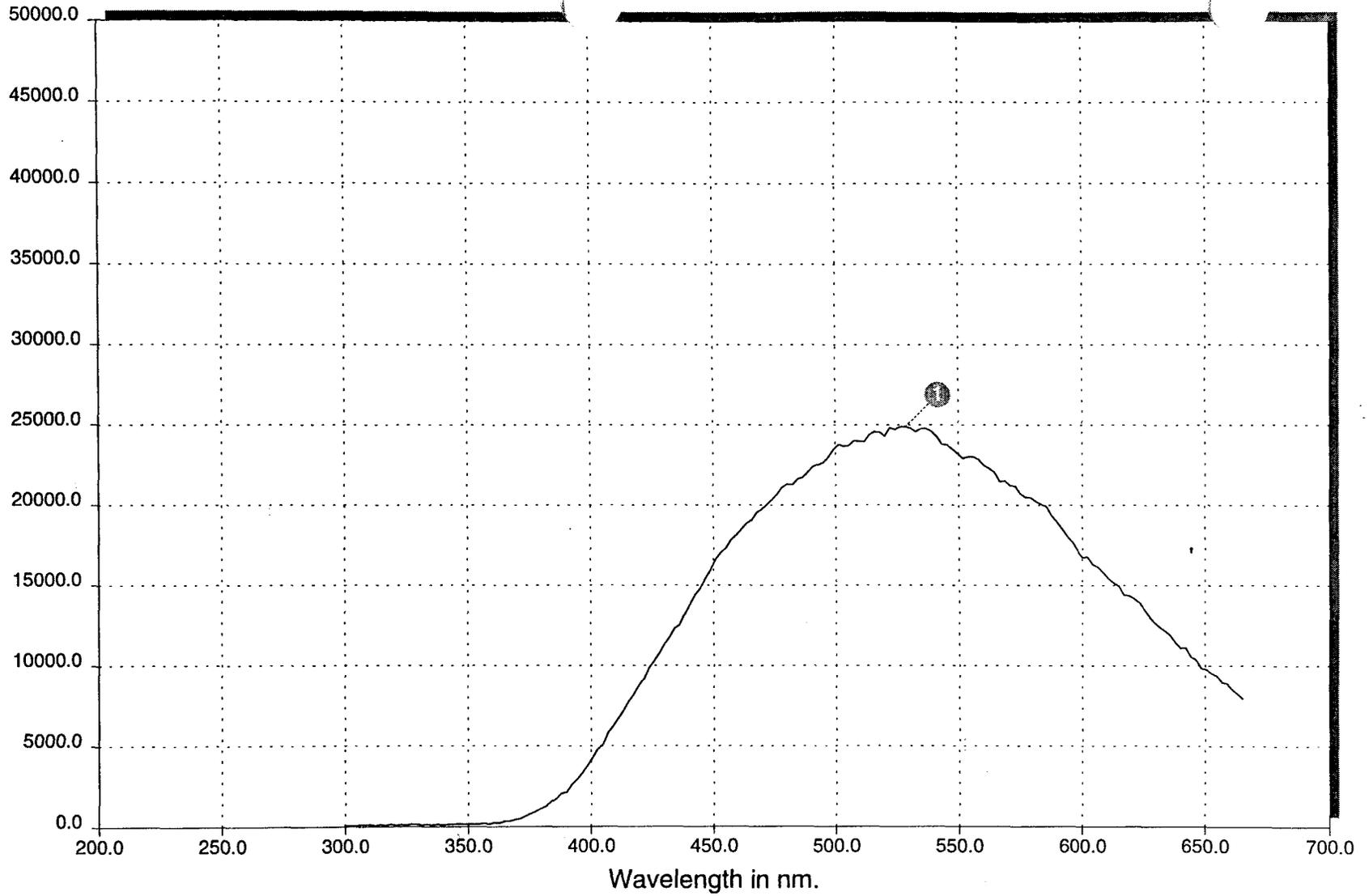
Probe: C:\BASIC71\DATA\PROBE23D.PR3

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

Fluorescence Intensity



1: 8.1 ft.; 24885 @ 528.6 nm

Time: 11:35:05

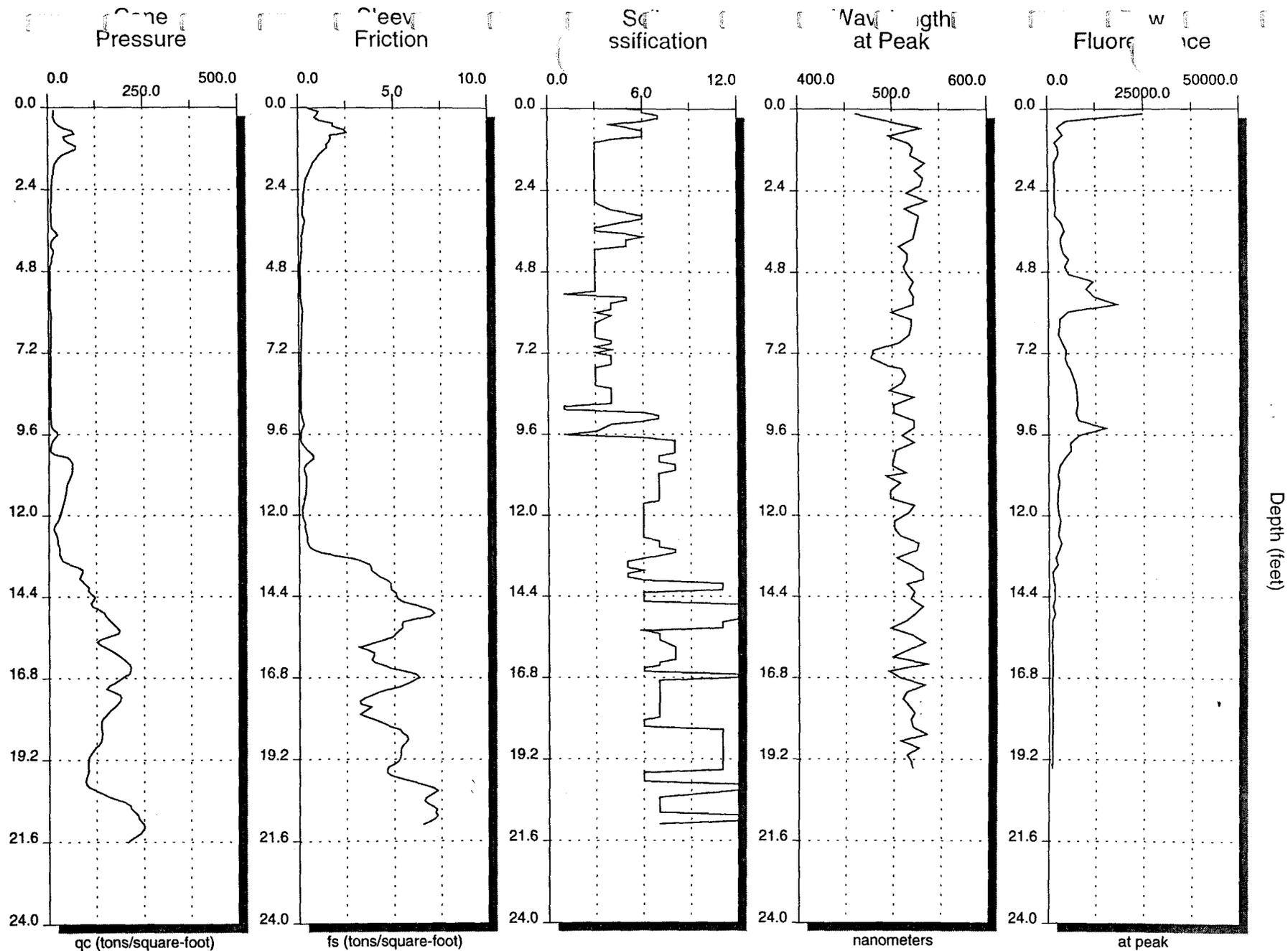
Date: 11-25-1996

Version: 1.0

Main: C:\BASIC71\DATA\IR3-27.PSH

Probe: C:\BASIC71\DATA\PROBE23D.PR

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Time: 12:03:34

Date: 11-25-1996

Version: 1.0

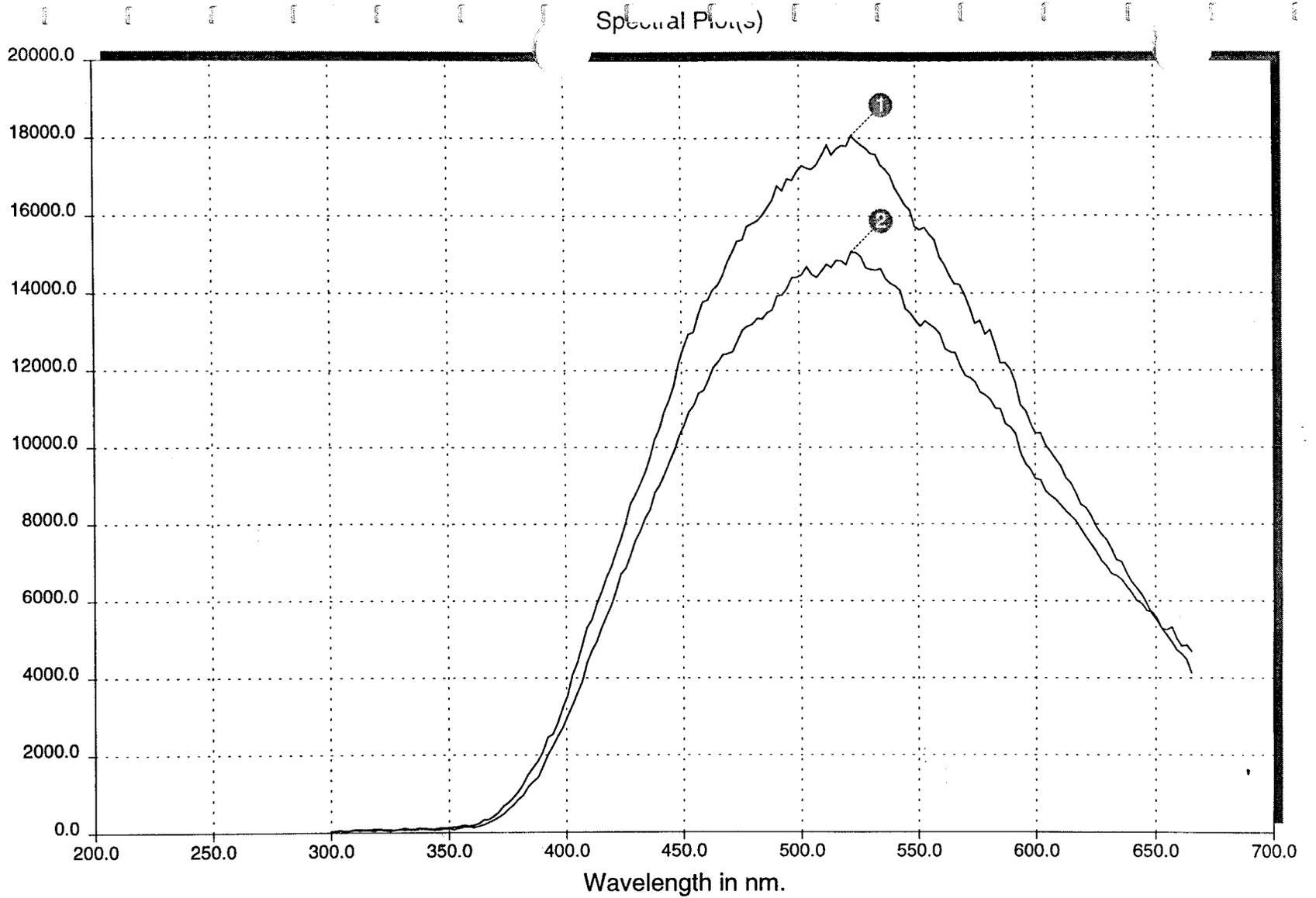
Push: C:\BASIC71\DATA\IR3-28.PSH

Probe: C:\BASIC71\DATA\PROBE23D.PR3

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Fluorescence Intensity



Wavelength in nm.

1: 5.8 ft.; 18058 @ 522.3 nm

2: 9.4 ft.; 15068 @ 522.3 nm

Time: 12:03:34

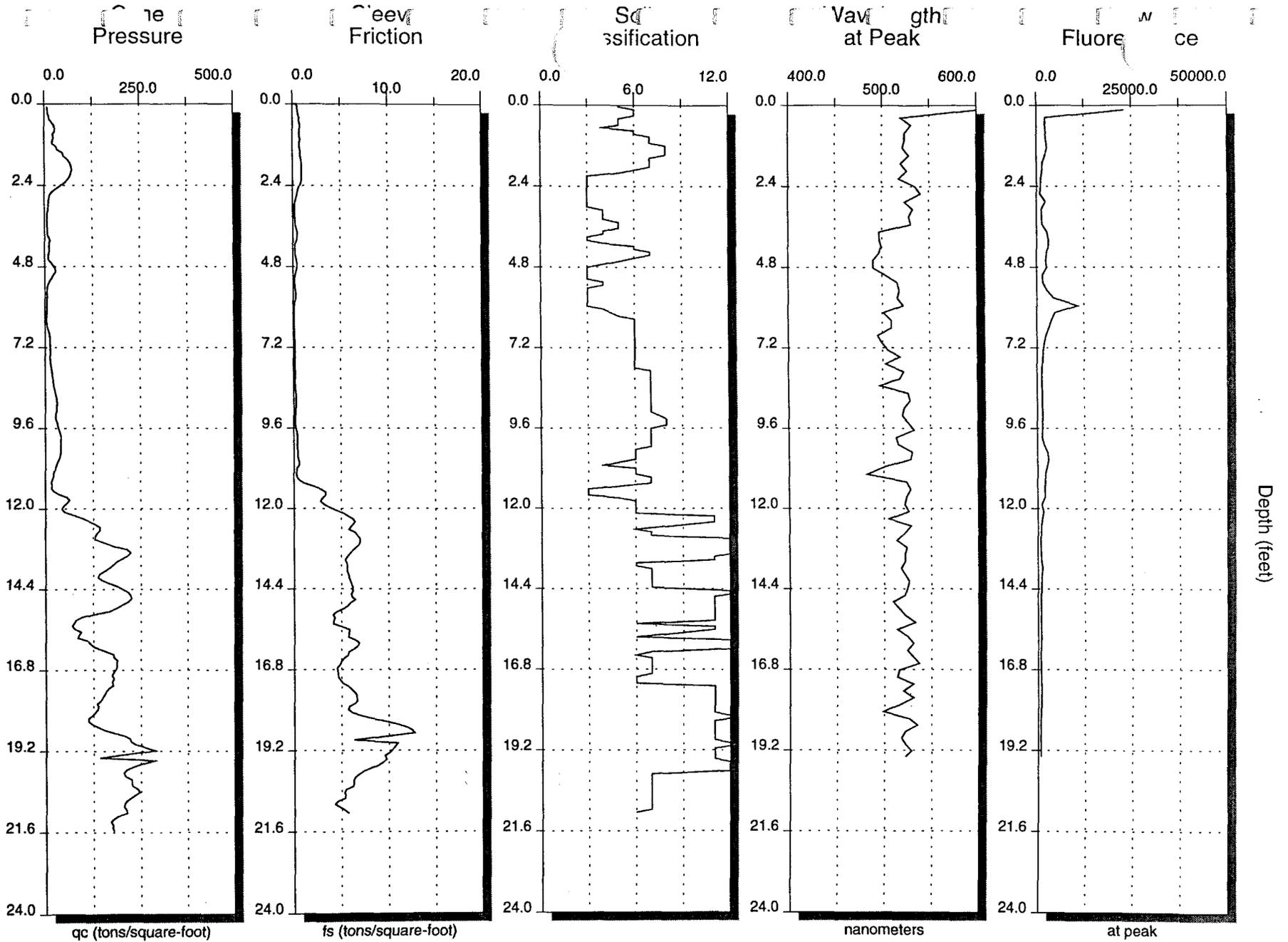
Date: 11-25-1996

Version: 1.0

Main: C:\BASIC71\DATA\IR3-28.PSH

Probe: C:\BASIC71\DATA\PROBE23D.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Time: 12:33:19

Date: 11-25-1996

Version: 1.0

Push: C:\BASIC71\DATA\IR3-29.PSH

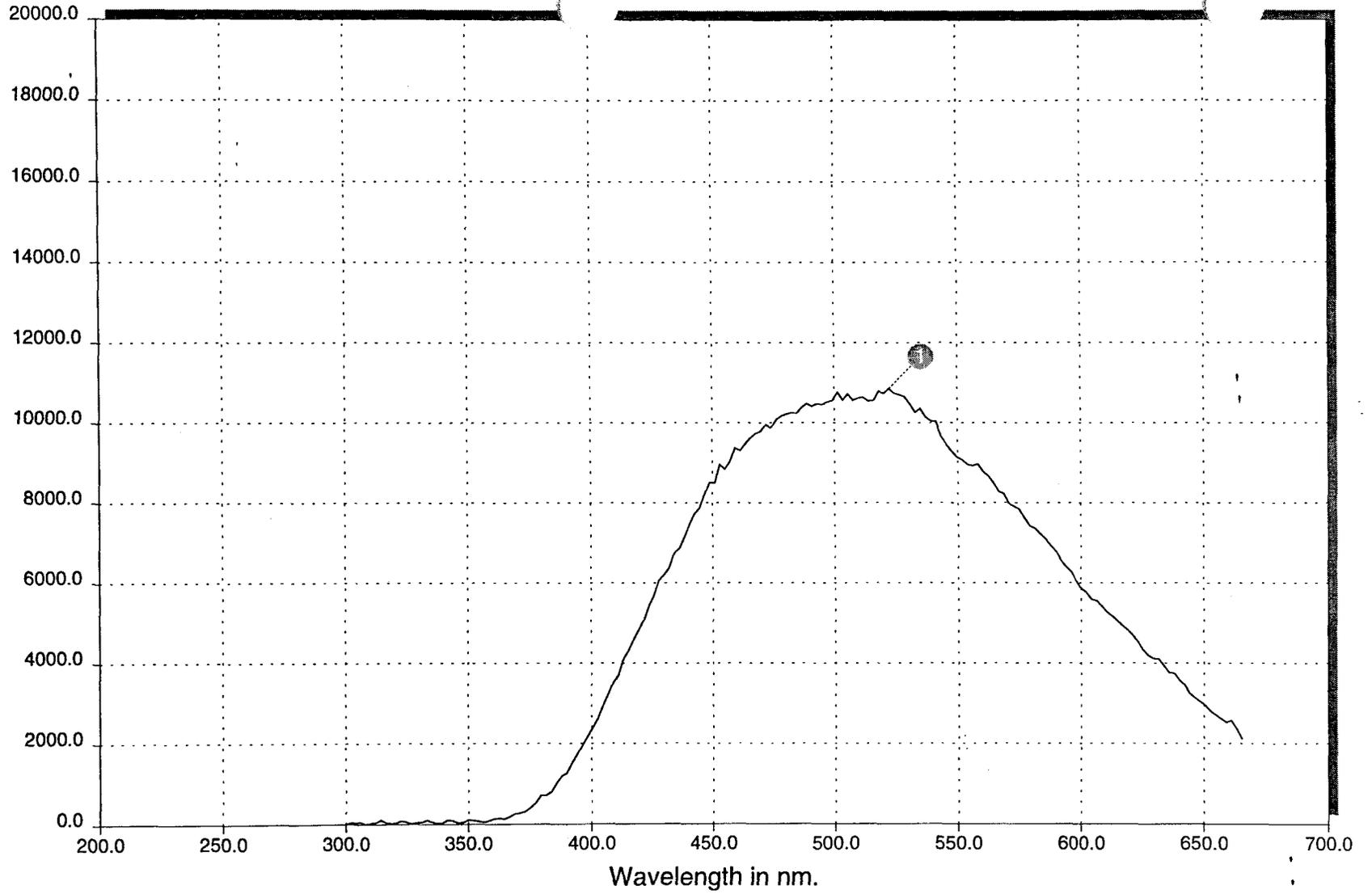
Probe: C:\BASIC71\DATA\PROBE23D.PR3

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

Fluorescence Intensity



1: 5.9 ft.; 10852 @ 522.3 nm

Time: 12:33:19

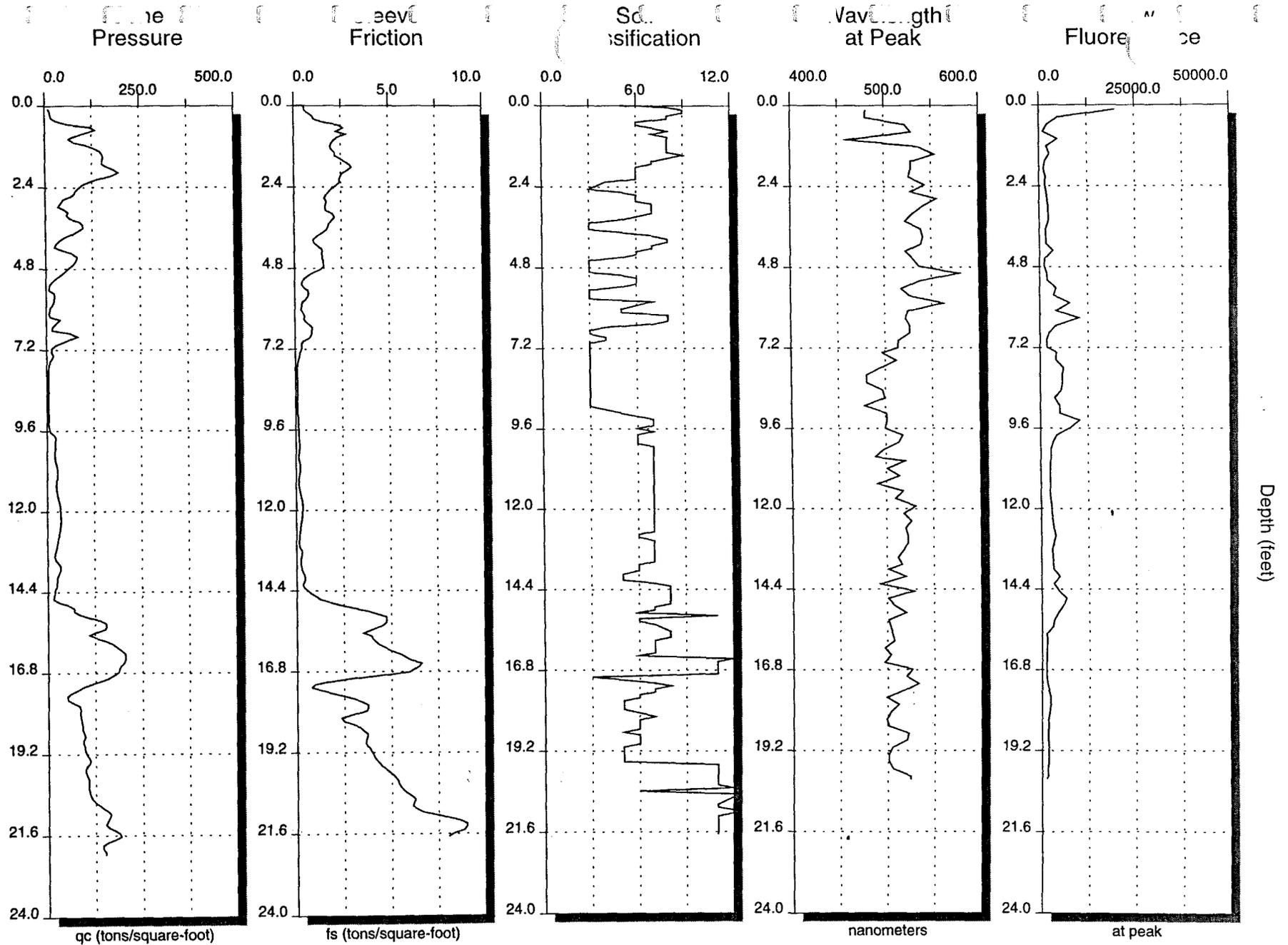
Date: 11-25-1996

Version: 1.0

Main: C:\BASIC71\DATA\IR3-29.PSH

Probe: C:\BASIC71\DATA\PROBE23D.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL

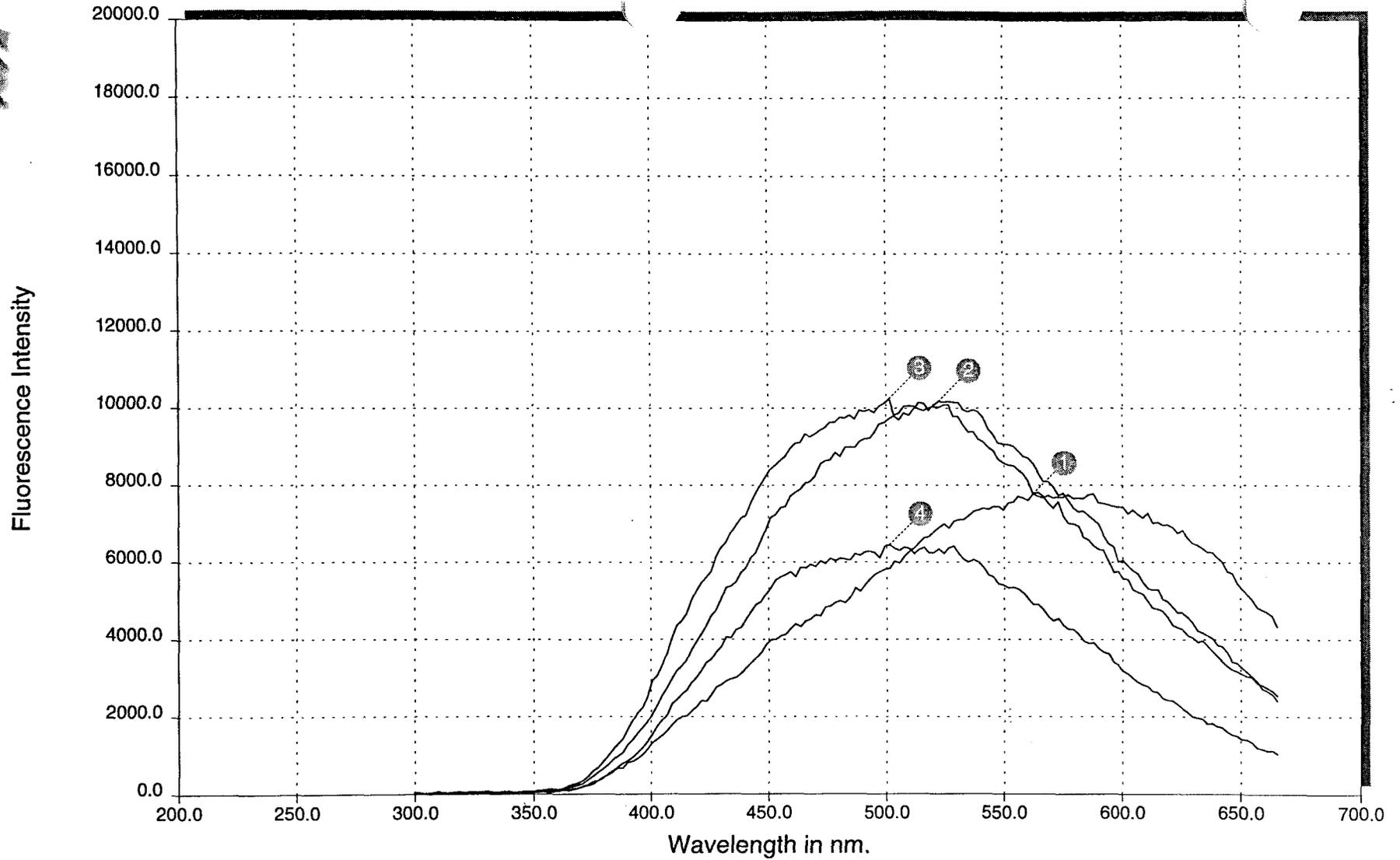


Time: 13:04:20
Date: 11-25-1996
Version: 1.0

Push: C:\BASIC71\DATA\IR3-30.PSH
Probe: C:\BASIC71\DATA\PROBE23D.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



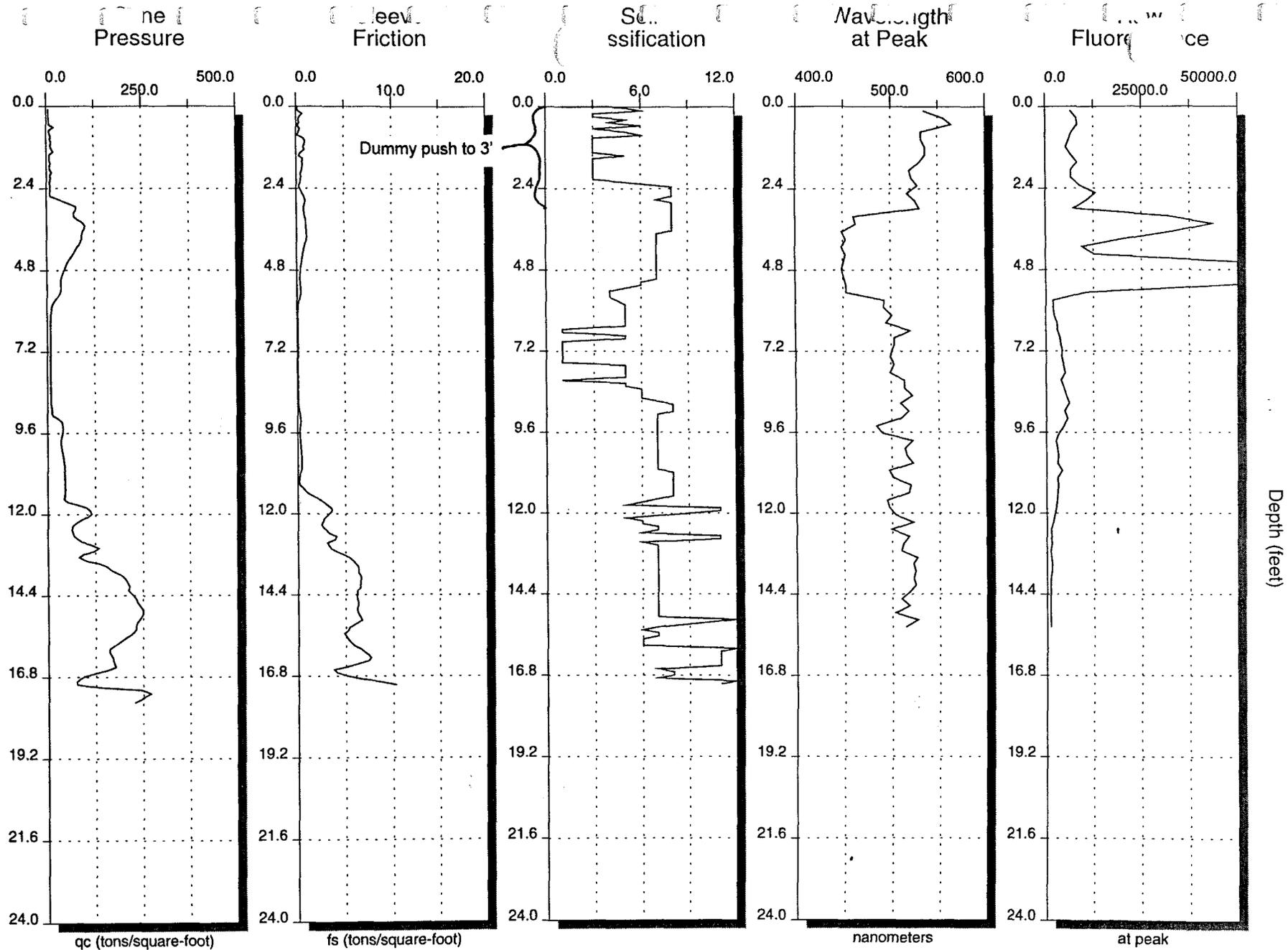
Spectral Plot(s)



Time: 13:04:20
Date: 11-25-1996
Version: 1.0

1: 5.9 ft.; 7776 @ 562.3 nm
2: 6.3 ft.; 10177 @ 522.3 nm
3: 9.4 ft.; 10246 @ 501.3 nm
4: 14.7 ft.; 6454 @ 501.3 nm

Main: C:\BASIC71\DATA\IR3-30.PSH
Probe: C:\BASIC71\DATA\PROBE23D.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



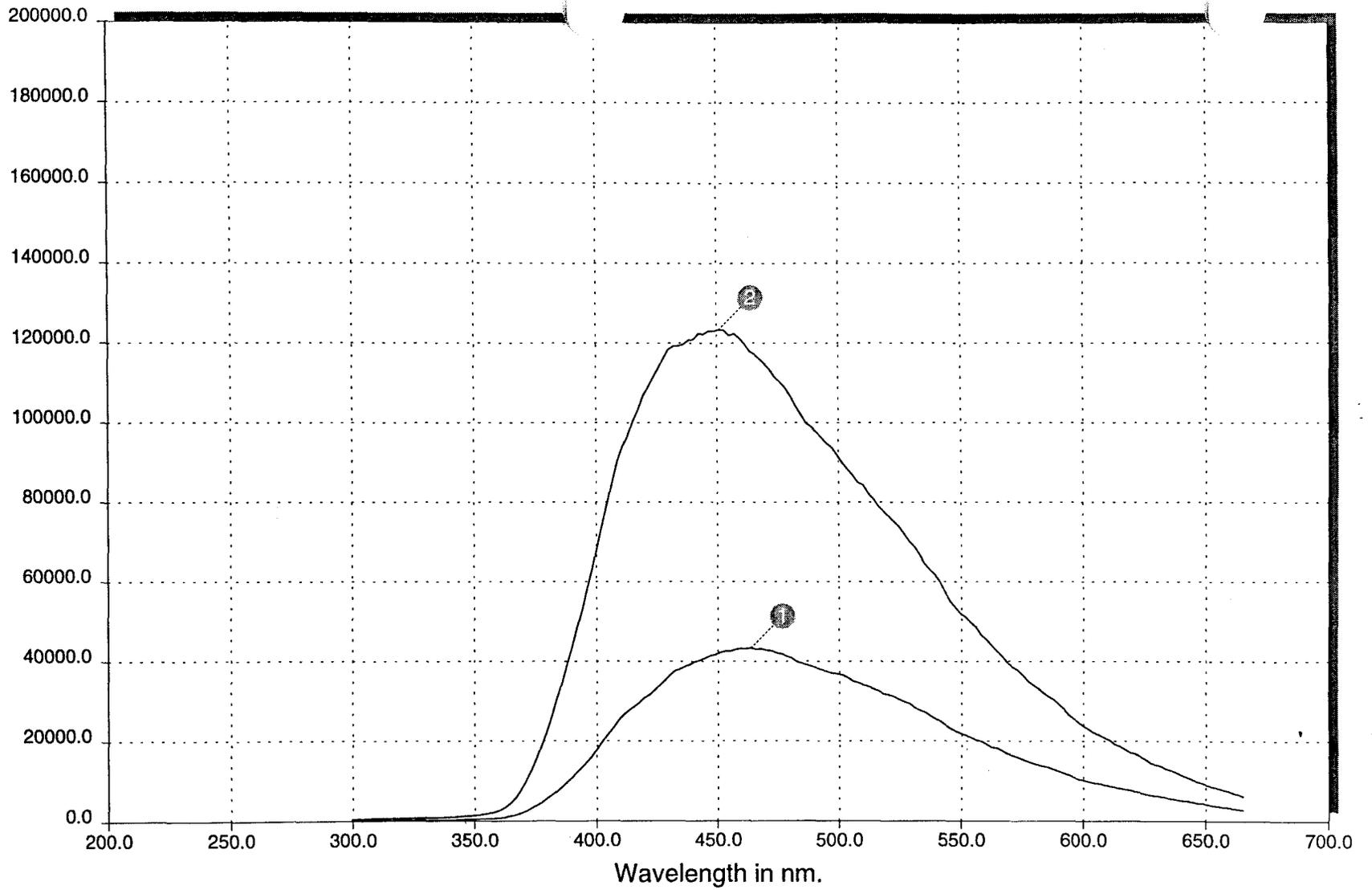
Time: 13:42:00
Date: 12-07-1996
Version: 1.0

Push: C:\BASIC71\DATA\IR3-31.PSH
Probe: C:\BASIC71\DATA\PROBE23E.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

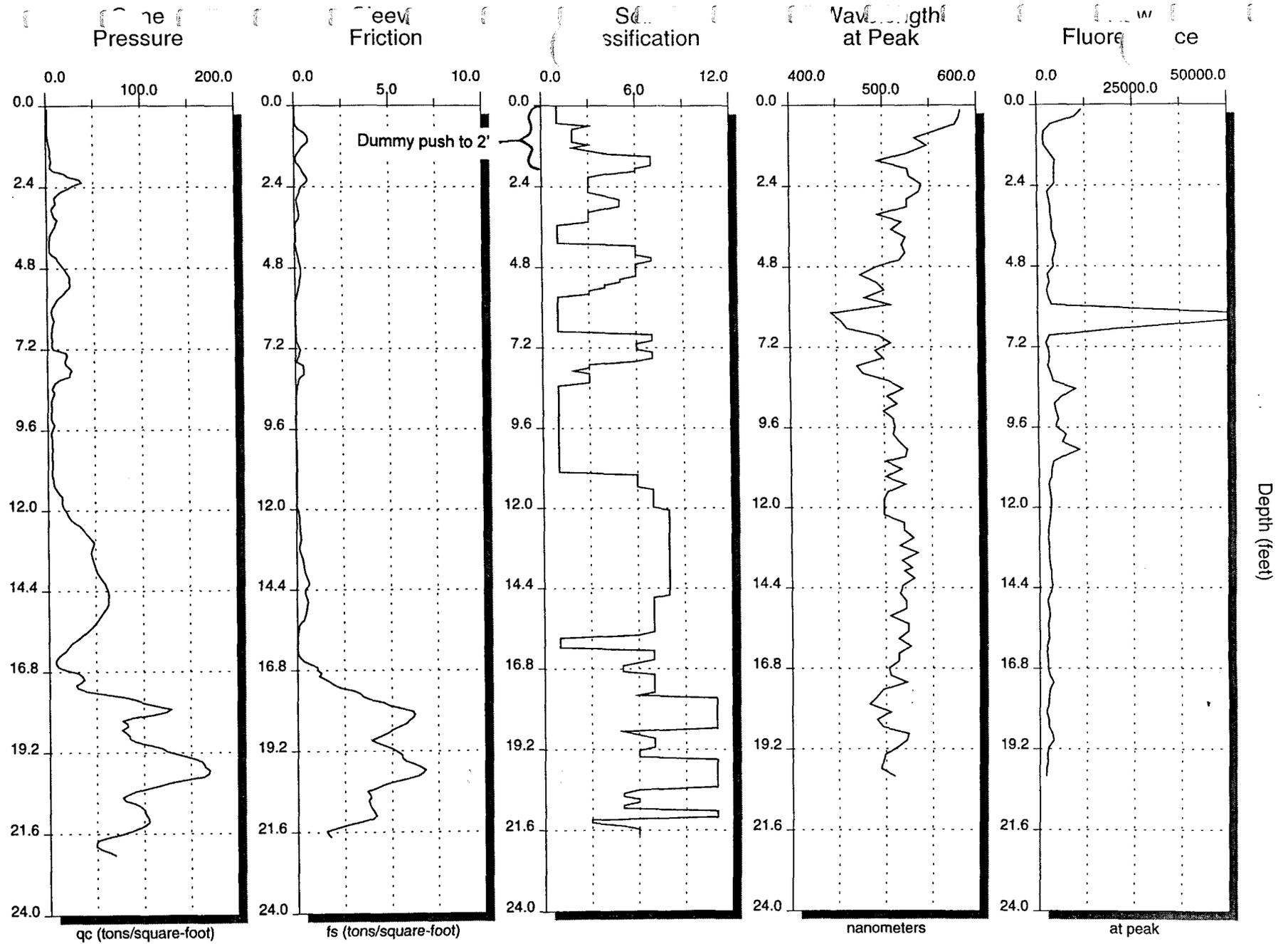
Fluorescence Intensity



1: 3.4 ft.; 43307 @ 463.5 nm
2: 5.0 ft.; 123315 @ 450.9 nm

Time: 13:42:00
Date: 12-07-1996
Version: 1.0

Main: C:\BASIC71\DATA\IR3-31.PSH
Probe: C:\BASIC71\DATA\PROBE23E.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL

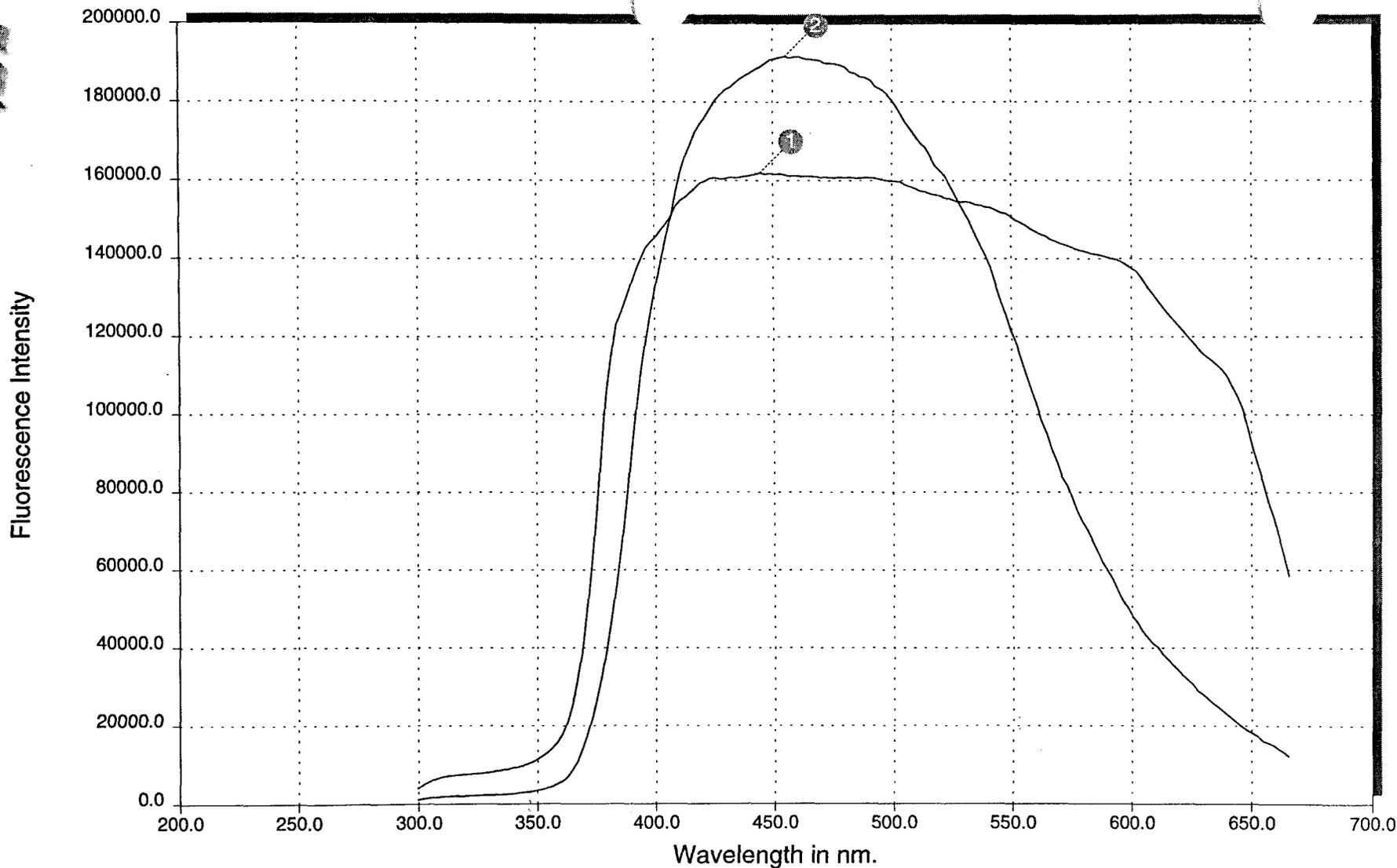


Time: 15:33:52
Date: 12-11-1996
Version: 1.0

Push: C:\BASIC71\DATA\IR3-32.PSH
Probe: C:\BASIC71\DATA\PROBE23F.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



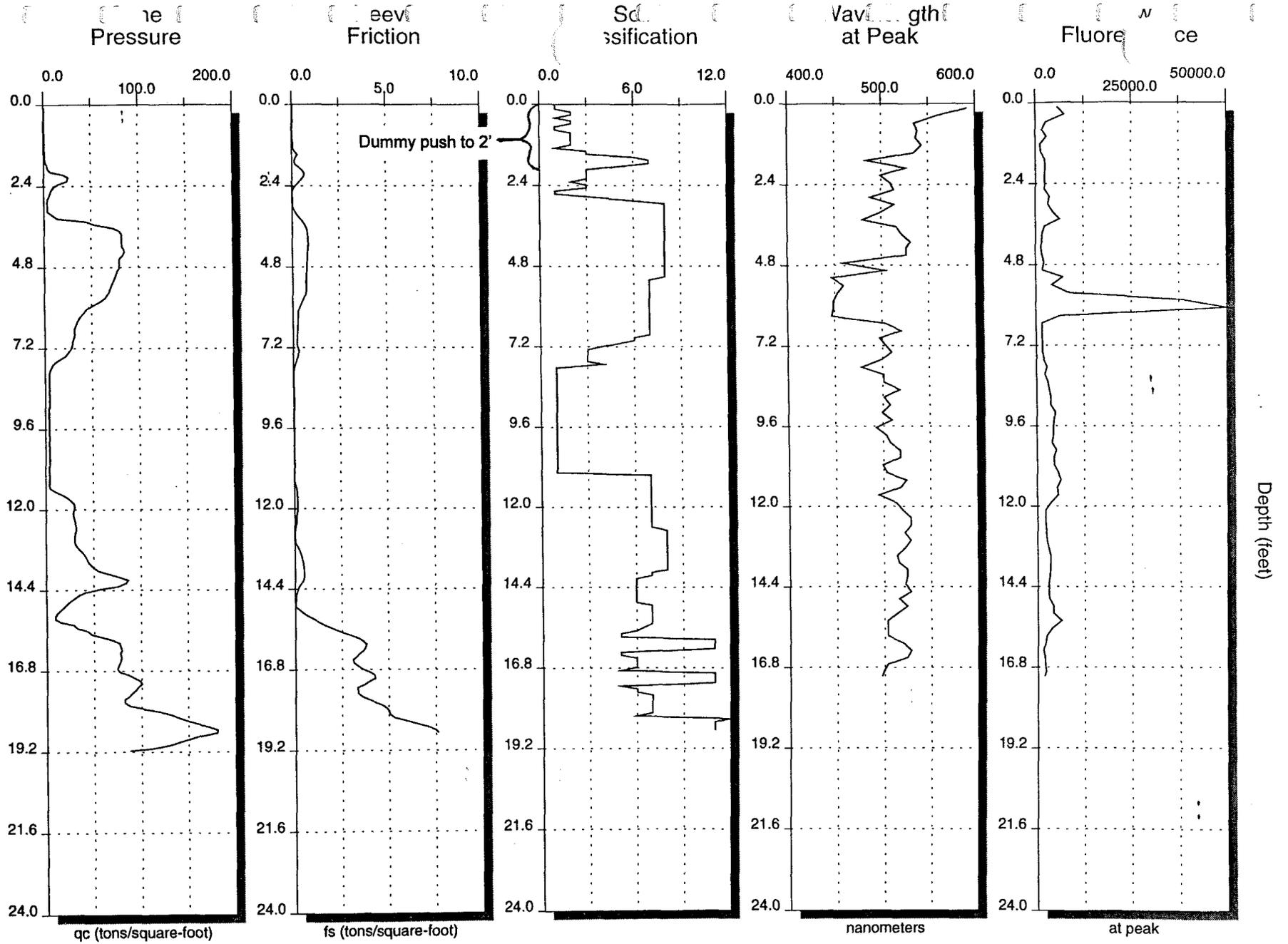
Spectral Plot(s)



Time: 15:33:52
Date: 12-11-1996
Version: 1.0

1: 6.2 ft.; 161942 @ 444.6 nm
2: 6.4 ft.; 191614 @ 455.1 nm

Main: C:\BASIC71\DATA\IR3-32.PSH
Probe: C:\BASIC71\DATA\PROBE23F.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL

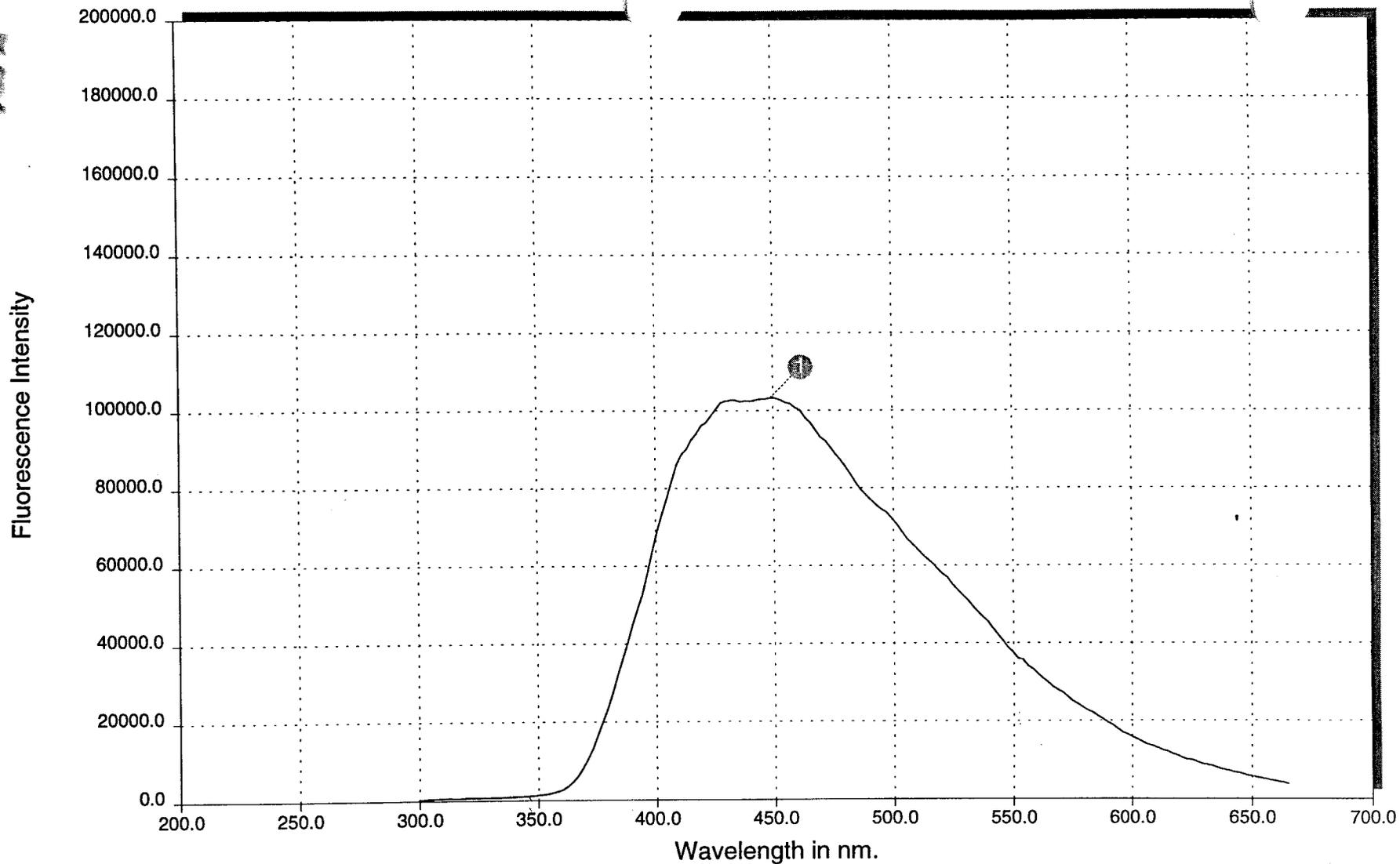


Time: 16:19:04
Date: 12-11-1996
Version: 1.0

Push: C:\BASIC71\DATA\IR3-33.PSH
Probe: C:\BASIC71\DATA\PROBE23F.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)



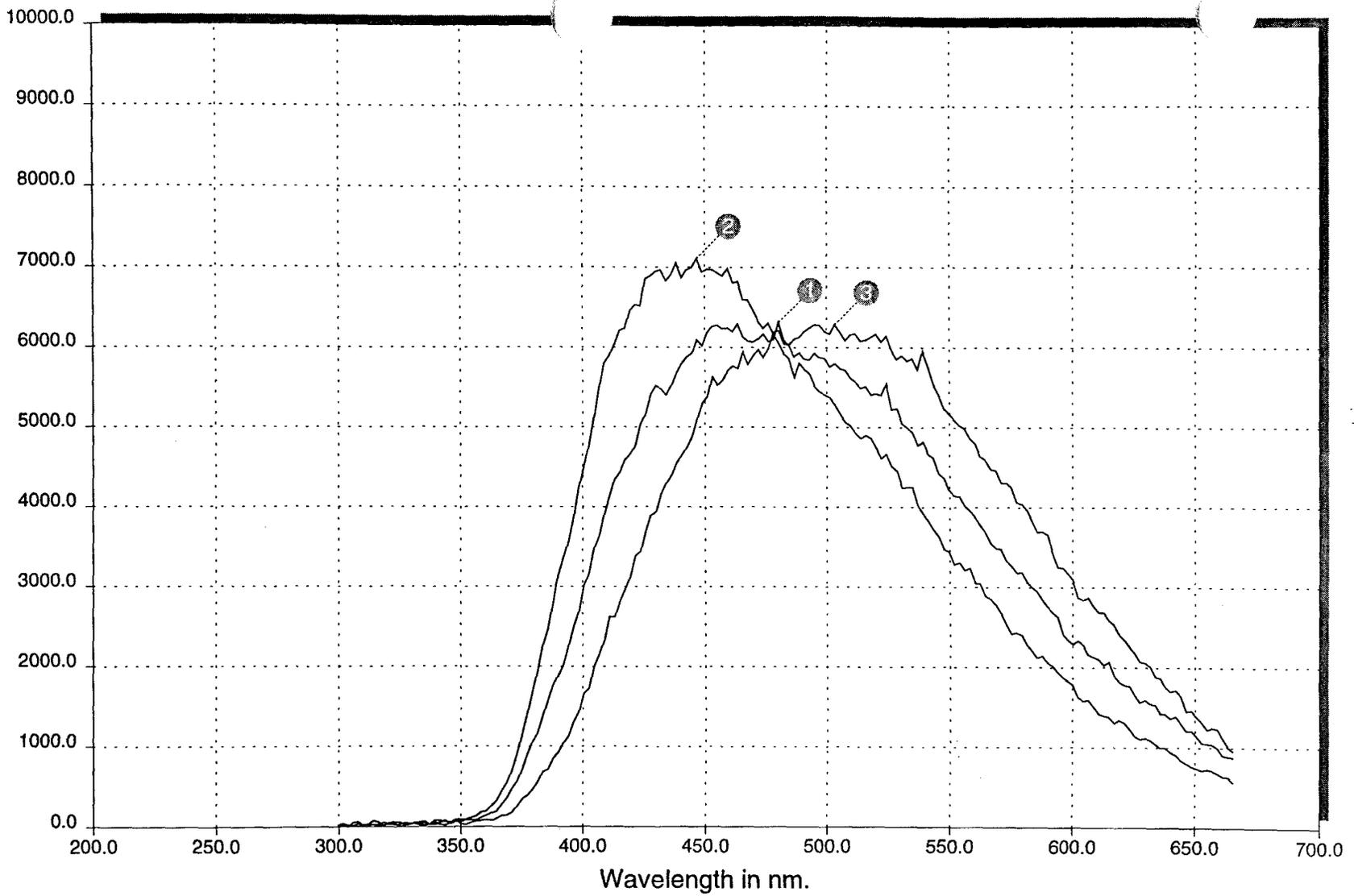
1: 6.1 ft.; 103219 @ 448.8 nm

Time: 16:19:04
Date: 12-11-1996
Version: 1.0

Main: C:\BASIC71\DATA\IR3-33.PSH
Probe: C:\BASIC71\DATA\PROBE23F.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



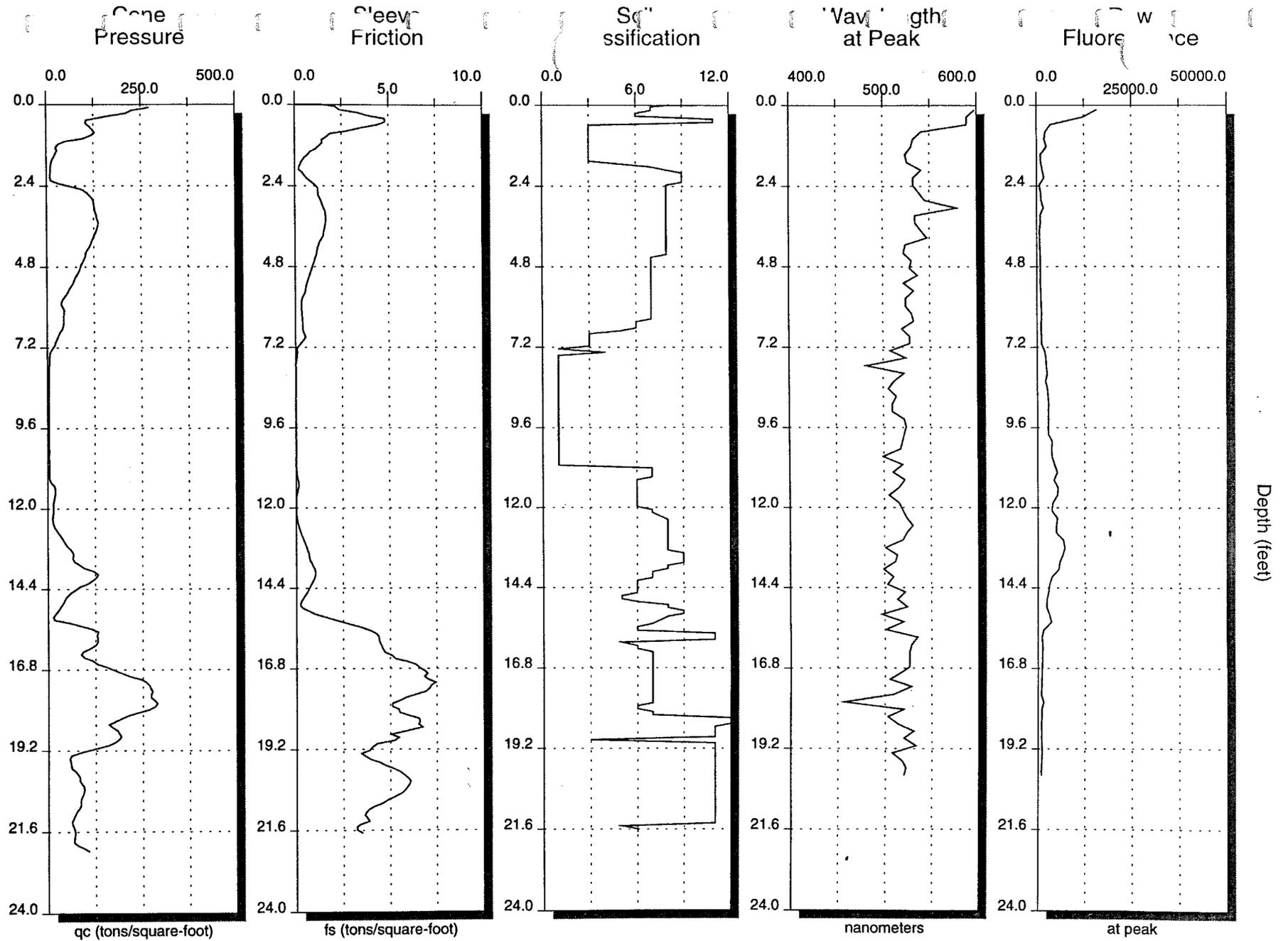
Fluorescence Intensity



- 1: 3.4 ft.; 6313 @ 480.3 nm
- 2: 5.2 ft.; 7109 @ 446.7 nm
- 3: 15.4 ft.; 6286 @ 503.4 nm

Time: 16:19:04
Date: 12-11-1996
Version: 1.0

Main: C:\BASIC71\DATA\IR3-33.PSH
Probe: C:\BASIC71\DATA\PROBE23F.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Time: 06:48:56

Date: 12-12-1996

Version: 1.0

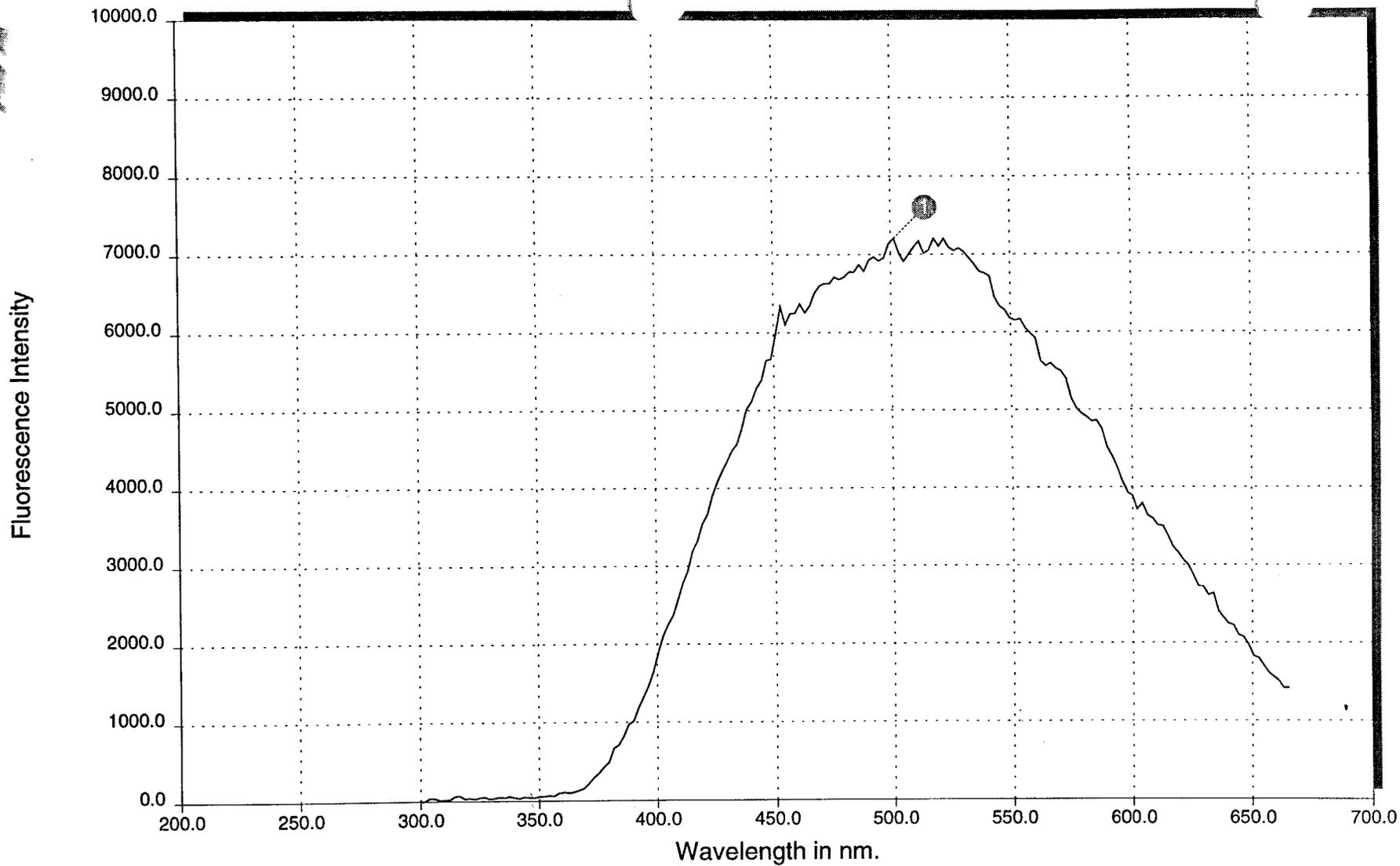
Push: C:\BASIC71\DATA\IR3-34.PSH

Probe: C:\BASIC71\DATA\PROBE23F.PR3

Calibration: C:\BASIC71\DATA\1213DFM.CAL



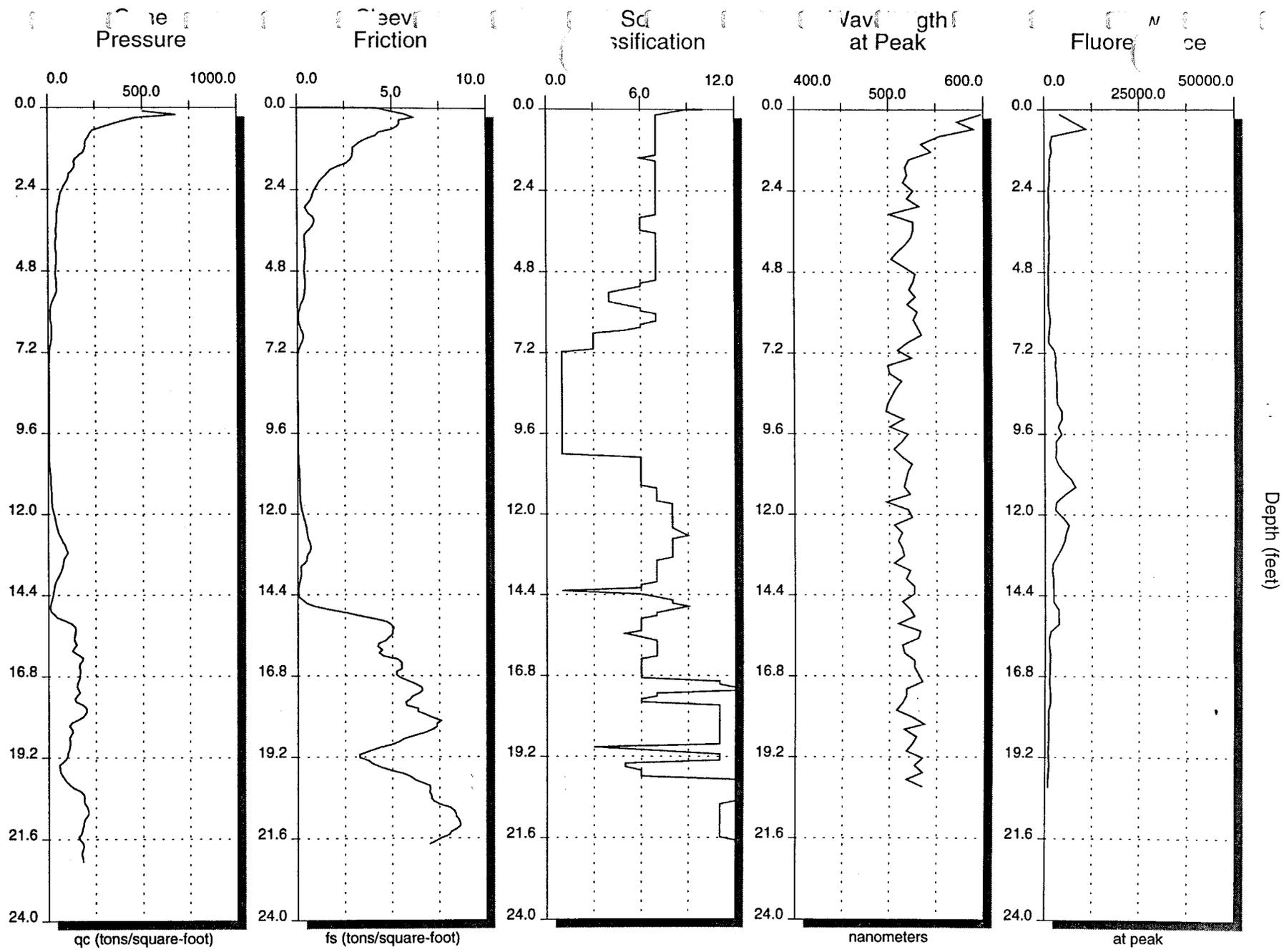
Spectral Plot(s)



1: 13.2 ft.; 7202 @ 501.3 nm

Time: 06:48:56
Date: 12-12-1996
Version: 1.0

Main: C:\BASIC71\DATA\IR3-34.PSH
Probe: C:\BASIC71\DATA\PROBE23F.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL

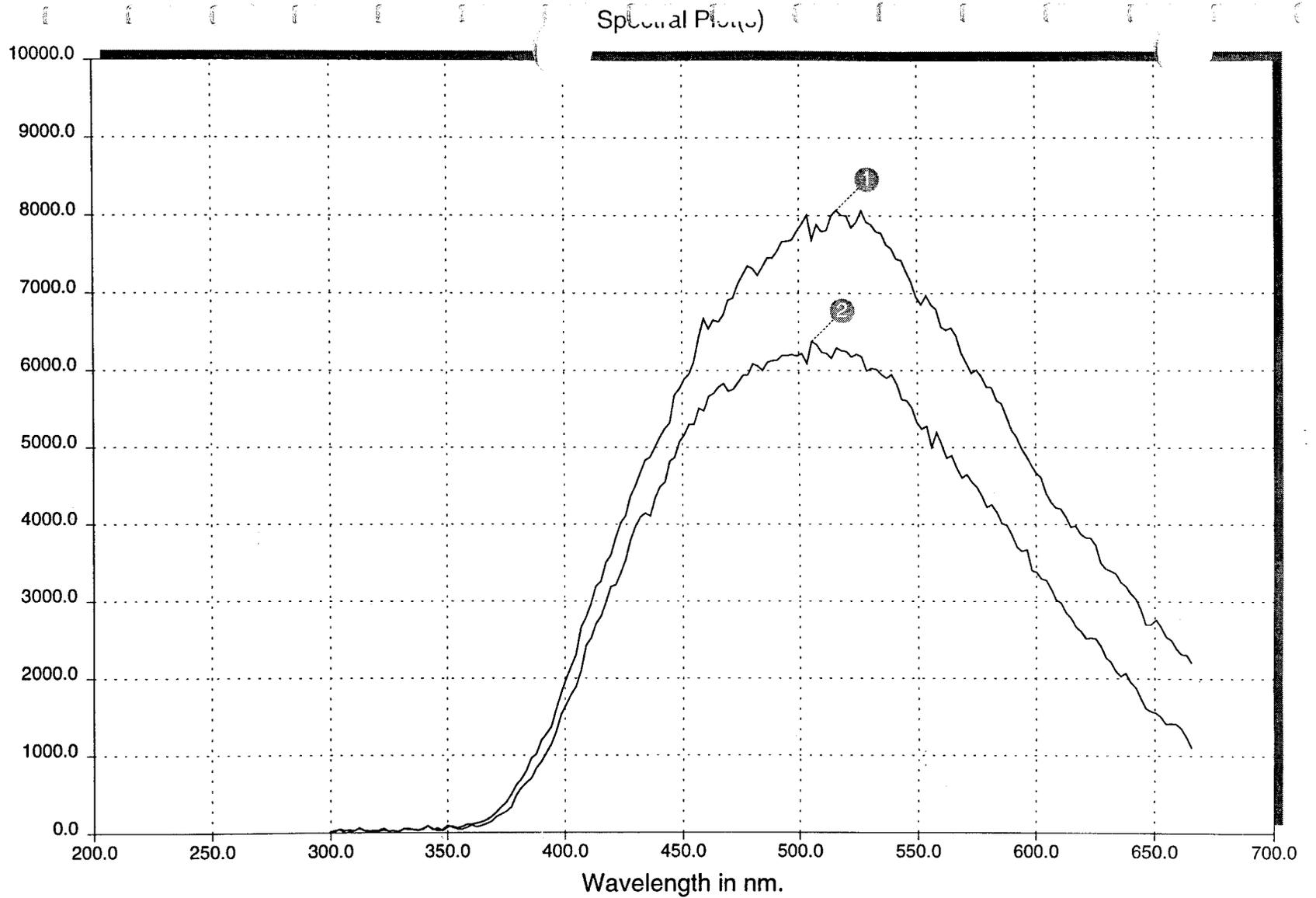


Time: 07:19:37
Date: 12-12-1996
Version: 1.0

Push: C:\BASIC71\DATA\IR3-35.PSH
Probe: C:\BASIC71\DATA\PROBE23F.PR3
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Fluorescence Intensity



Wavelength in nm.

1: 11.2 ft.; 8069 @ 516.0 nm

2: 12.3 ft.; 6374 @ 505.5 nm

Time: 07:19:37

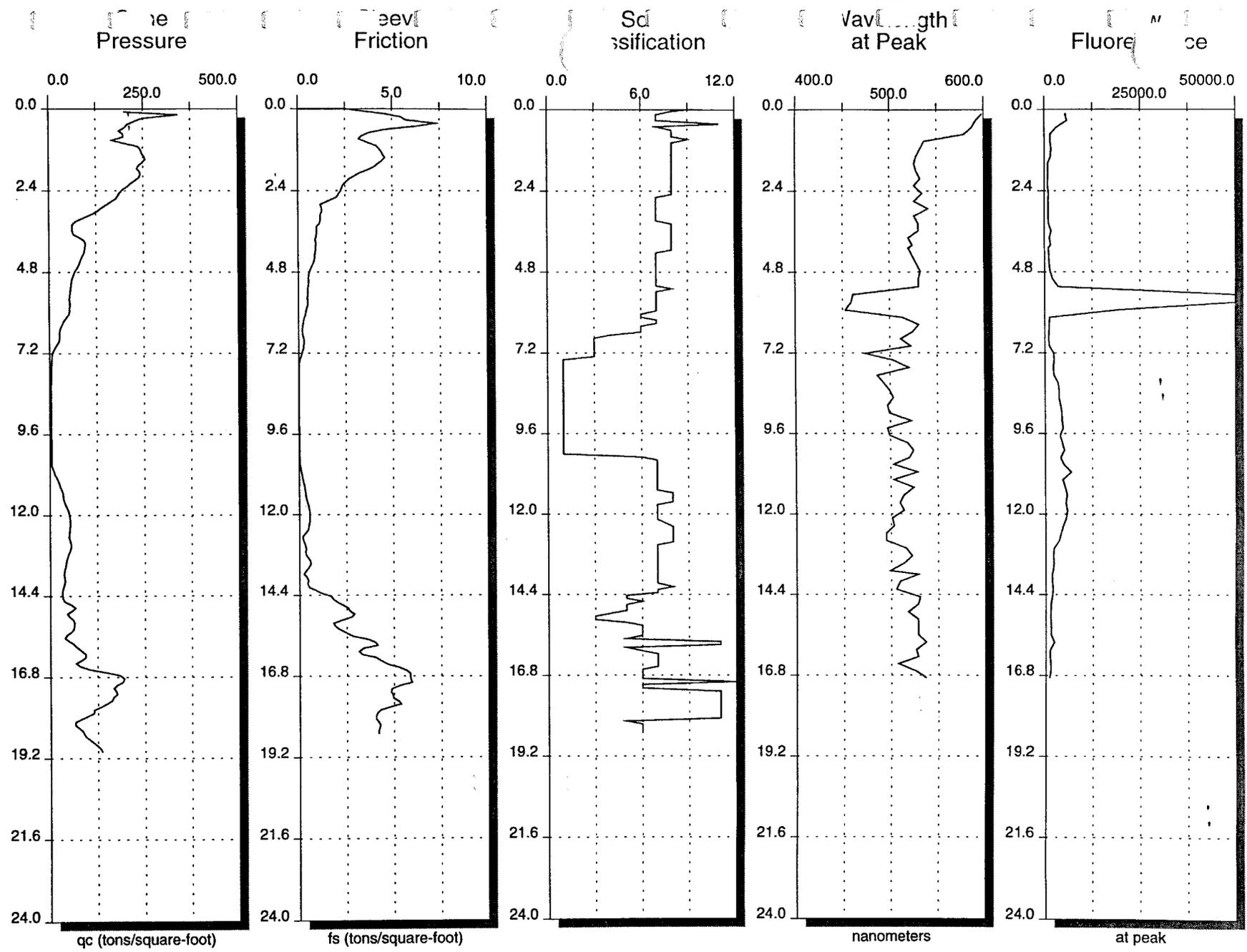
Date: 12-12-1996

Version: 1.0

Main: C:\BASIC71\DATA\IR3-35.PSH

Probe: C:\BASIC71\DATA\PROBE23F.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL



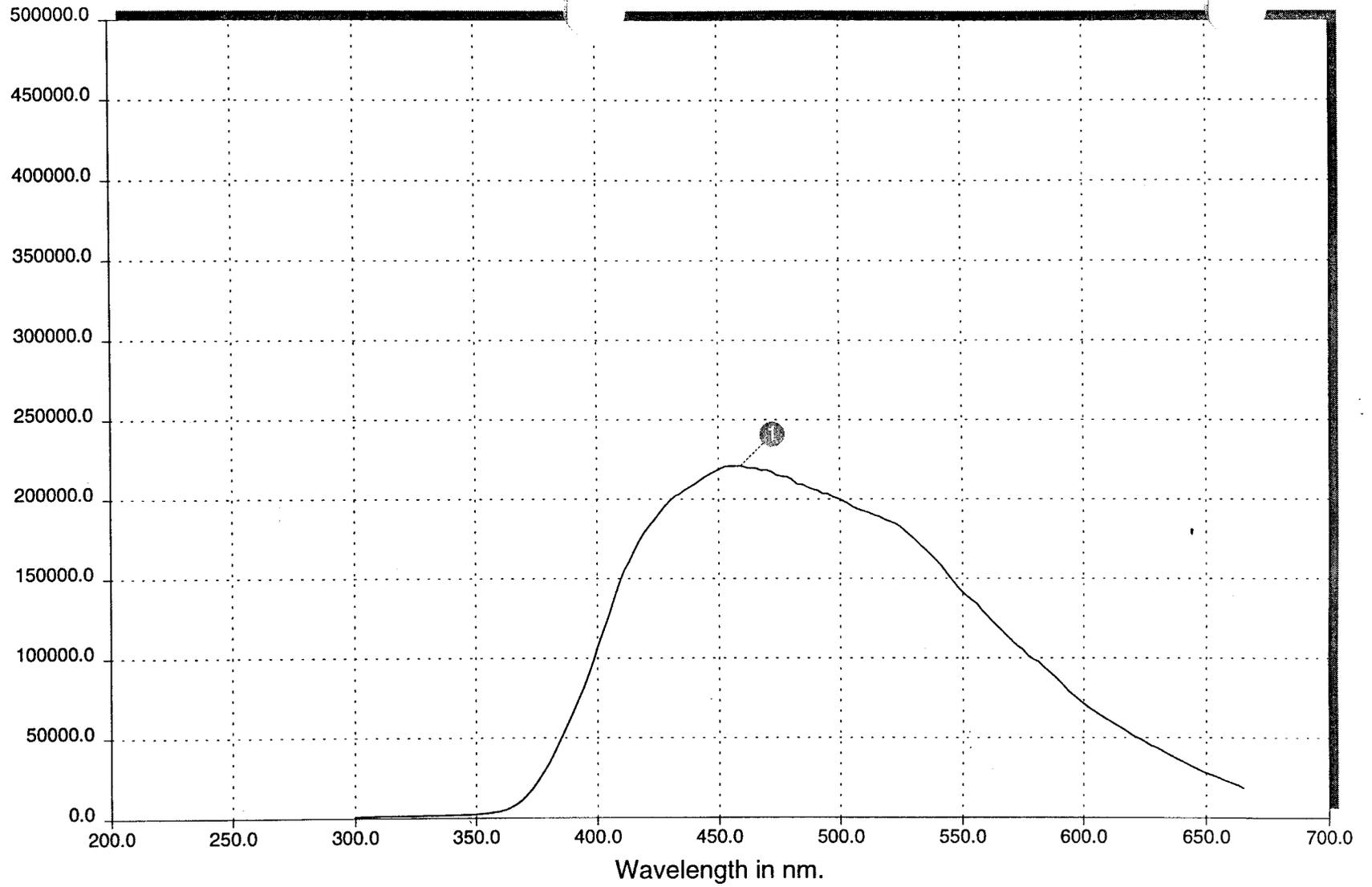
Time: 08:16:21
Date: 12-12-1996
Version: 1.0

Push: C:\BASIC71\DATA\IR3-36.PSH
Probe: C:\BASIC71\DATA\PROBE23F.PR3
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot

Fluorescence Intensity



1: 5.7 ft.; 220878 @ 459.3 nm

Time: 08:16:21

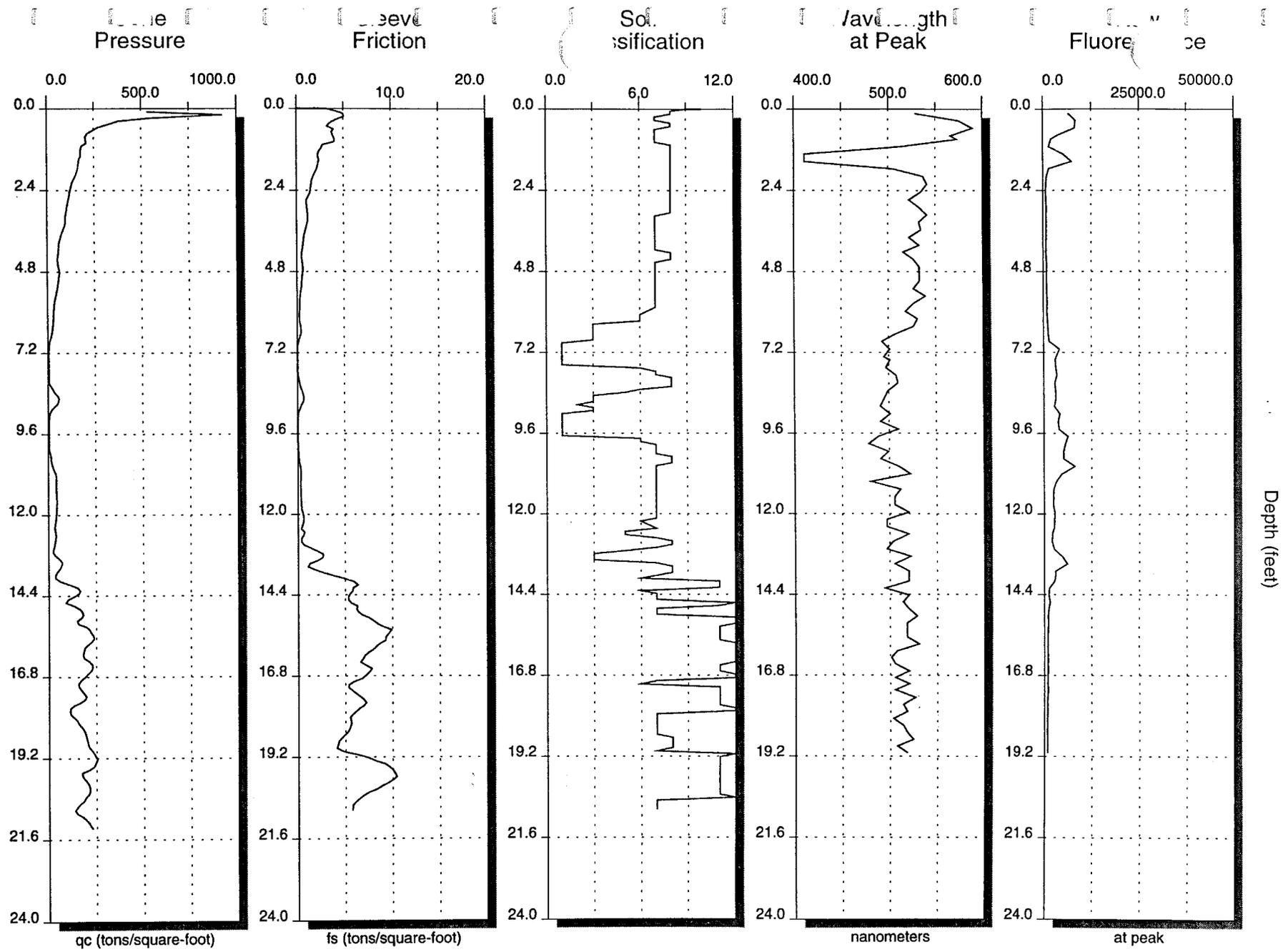
Date: 12-12-1996

Version: 1.0

Main: C:\BASIC71\DATA\IR3-36.PSH

Probe: C:\BASIC71\DATA\PROBE23F.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL

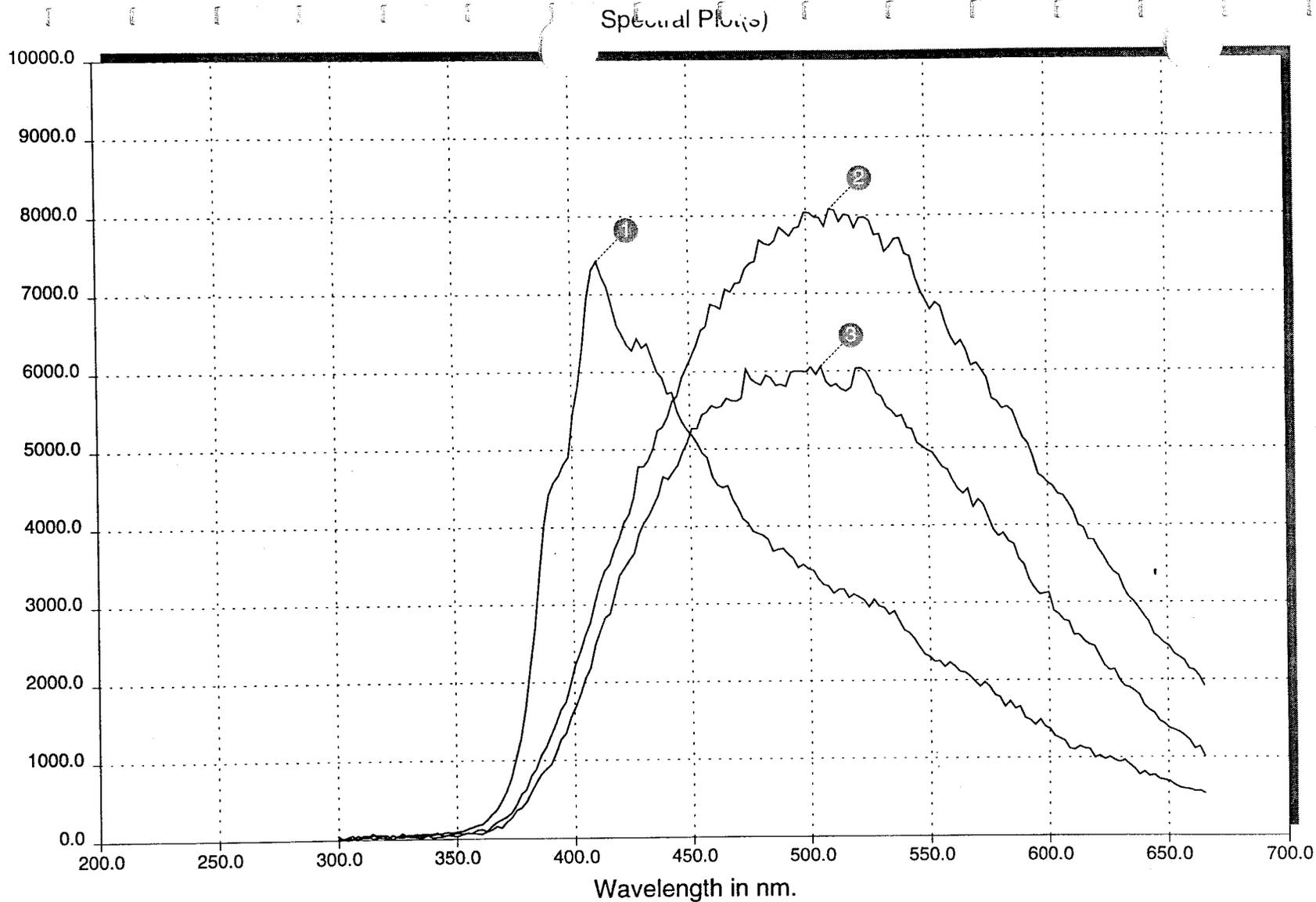


Time: 08:58:20
Date: 12-12-1996
Version: 1.0

Push: C:\BASIC71\DATA\IR3-37.PSH
Probe: C:\BASIC71\DATA\PROBE23F.PR3
Calibration: C:\BASIC71\DATA\1213DFM.CAL



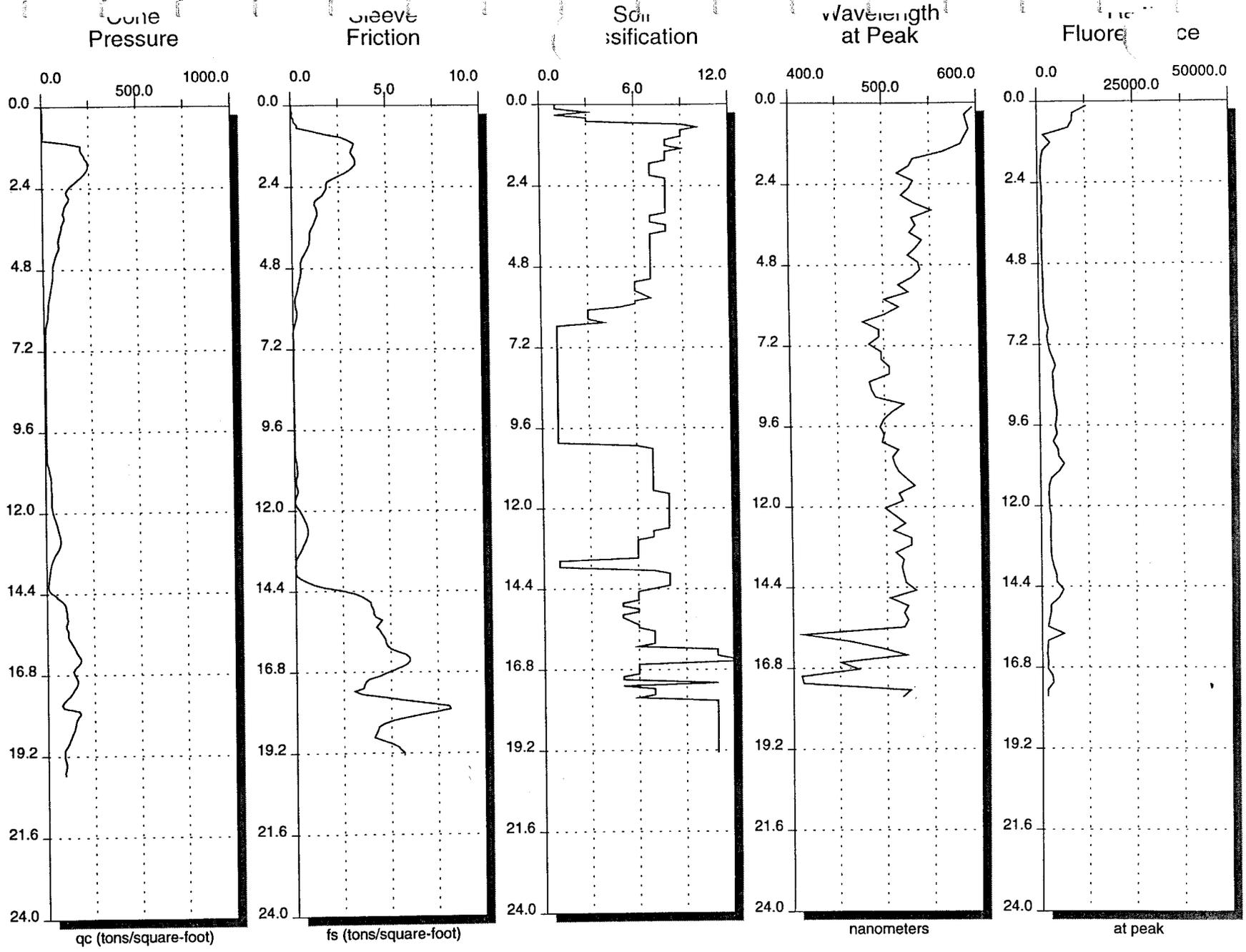
Fluorescence Intensity



Time: 08:58:20
Date: 12-12-1996
Version: 1.0

1: 1.5 ft.; 7423 @ 411.0 nm
2: 10.6 ft.; 8076 @ 509.7 nm
3: 13.5 ft.; 6060 @ 505.5 nm

Main: C:\BASIC71\DATA\IR3-37.PSH
Probe: C:\BASIC71\DATA\PROBE23F.PR8
Calibration: C:\BASIC71\DATA\1213DFM.CAL



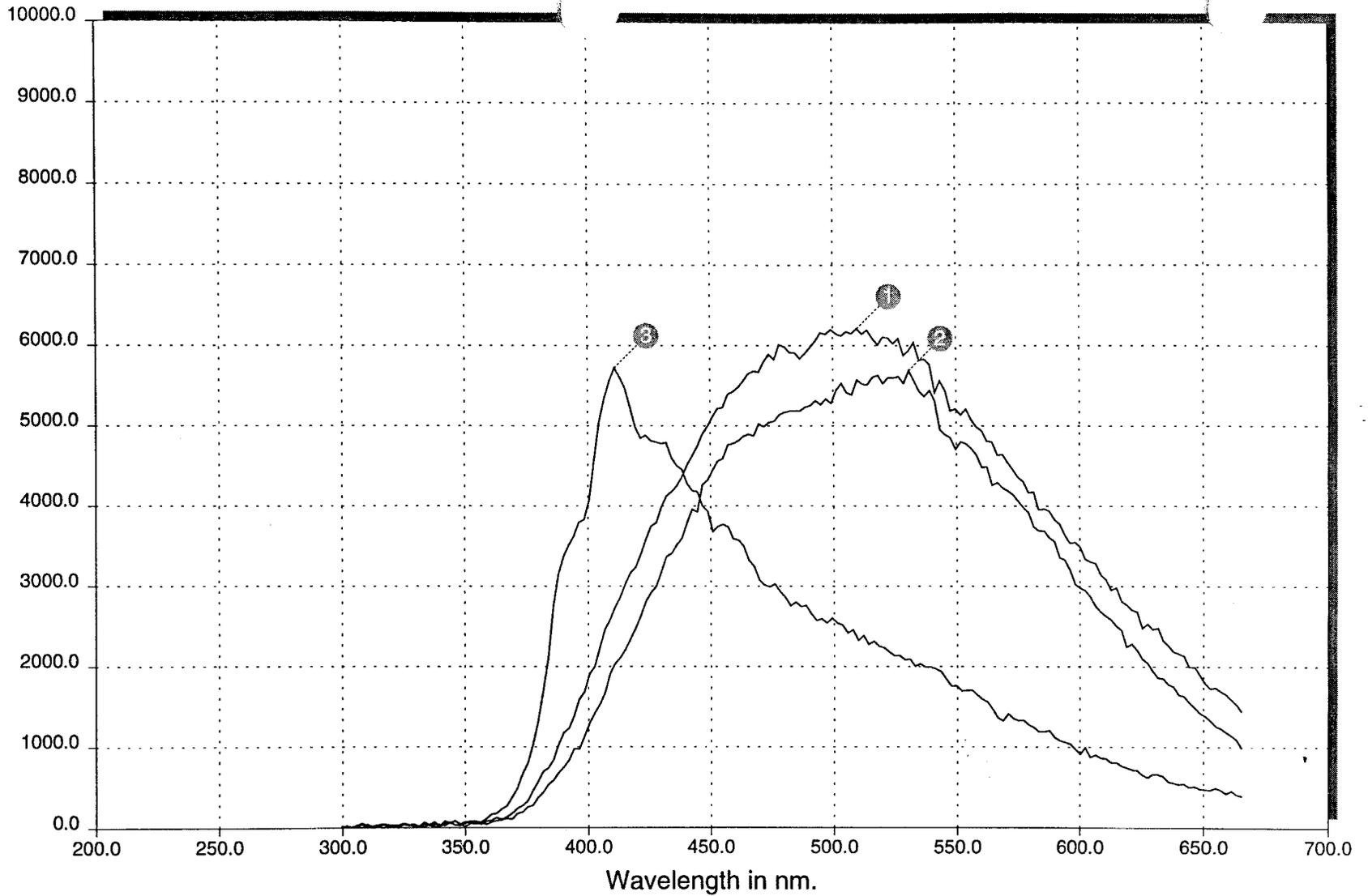
Time: 09:32:32
Date: 12-12-1996
Version: 1.0

Push: C:\BASIC71\DATA\IR3-38.PSH
Probe: C:\BASIC71\DATA\PROBE23F.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Physics

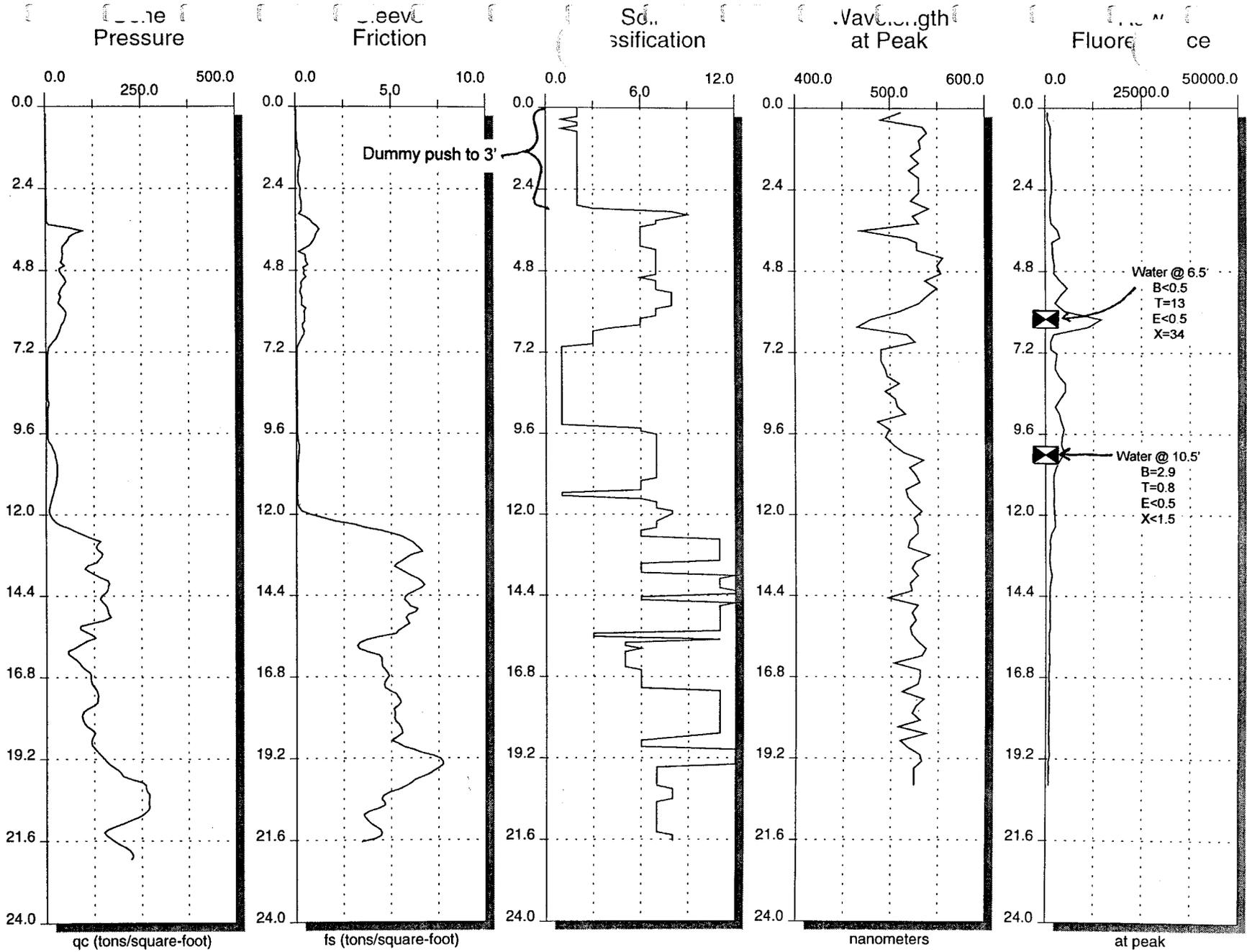
Fluorescence Intensity



Time: 09:32:32
Date: 12-12-1996
Version: 1.0

1: 10.7 ft.; 6210 @ 509.7 nm
2: 14.5 ft.; 5686 @ 530.7 nm
3: 15.8 ft.; 5721 @ 411.0 nm

Main: C:\BASIC71\DATA\IR3-38.PSH
Probe: C:\BASIC71\DATA\PROBE23F.PR8
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Time: 09:37:38

Date: 12-05-1996

Version: 1.0

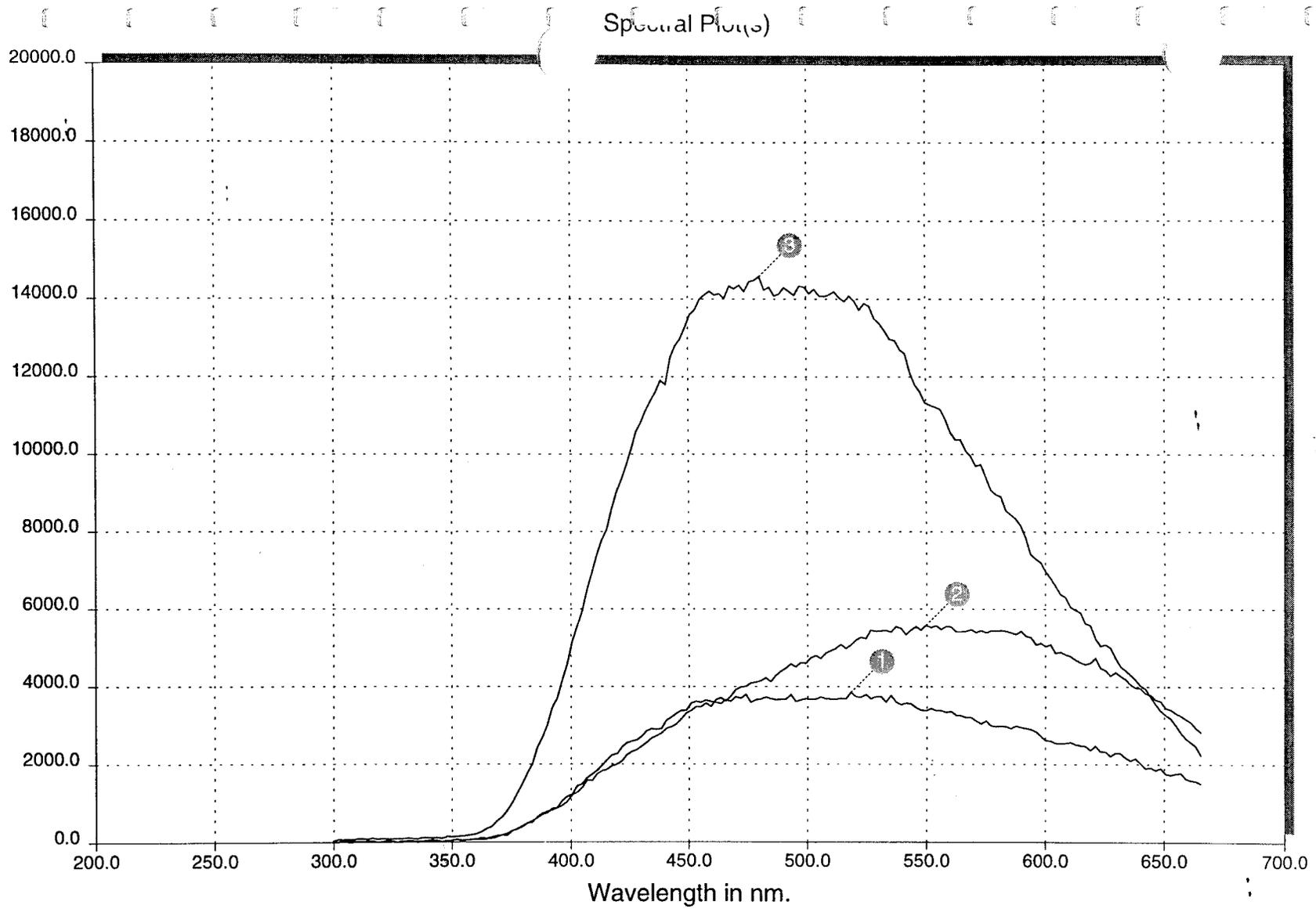
Push: C:\BASIC71\DATA\B162-01.PSH

Probe: C:\BASIC71\DATA\PROBE23E.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Fluorescence Intensity



Wavelength in nm.

1: 3.8 ft.; 3853 @ 518.1 nm
2: 5.3 ft.; 5581 @ 549.7 nm
3: 6.2 ft.; 14572 @ 480.3 nm

Time: 09:37:38

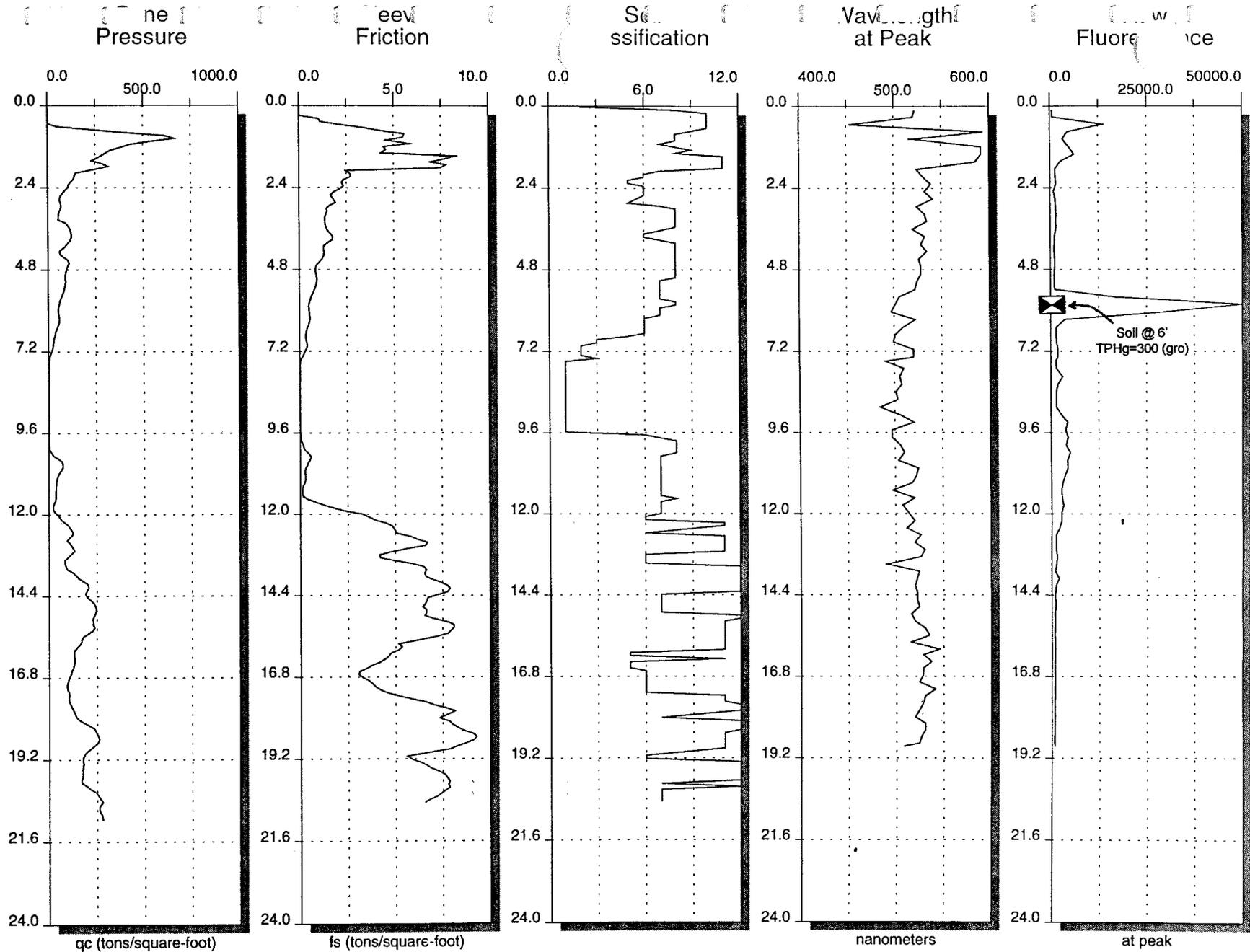
Date: 12-05-1996

Version: 1.0

Main: C:\BASIC71\DATA\B162-01.PSH

Probe: C:\BASIC71\DATA\PROBE23E.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL

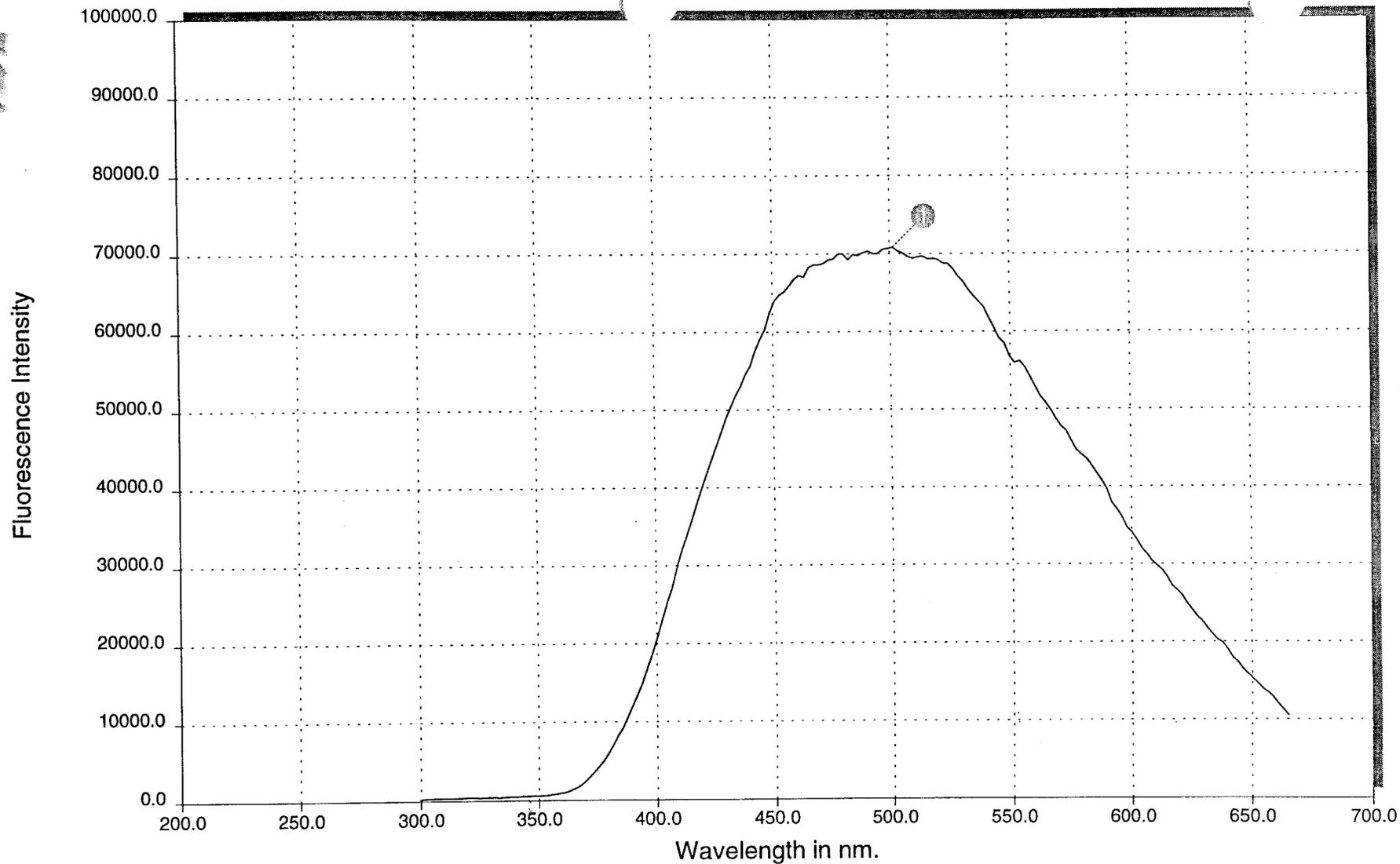


Time: 10:32:57
Date: 12-09-1996
Version: 1.0

Push: C:\BASIC71\DATA\B162-02.PSH
Probe: C:\BASIC71\DATA\PROBE23F.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



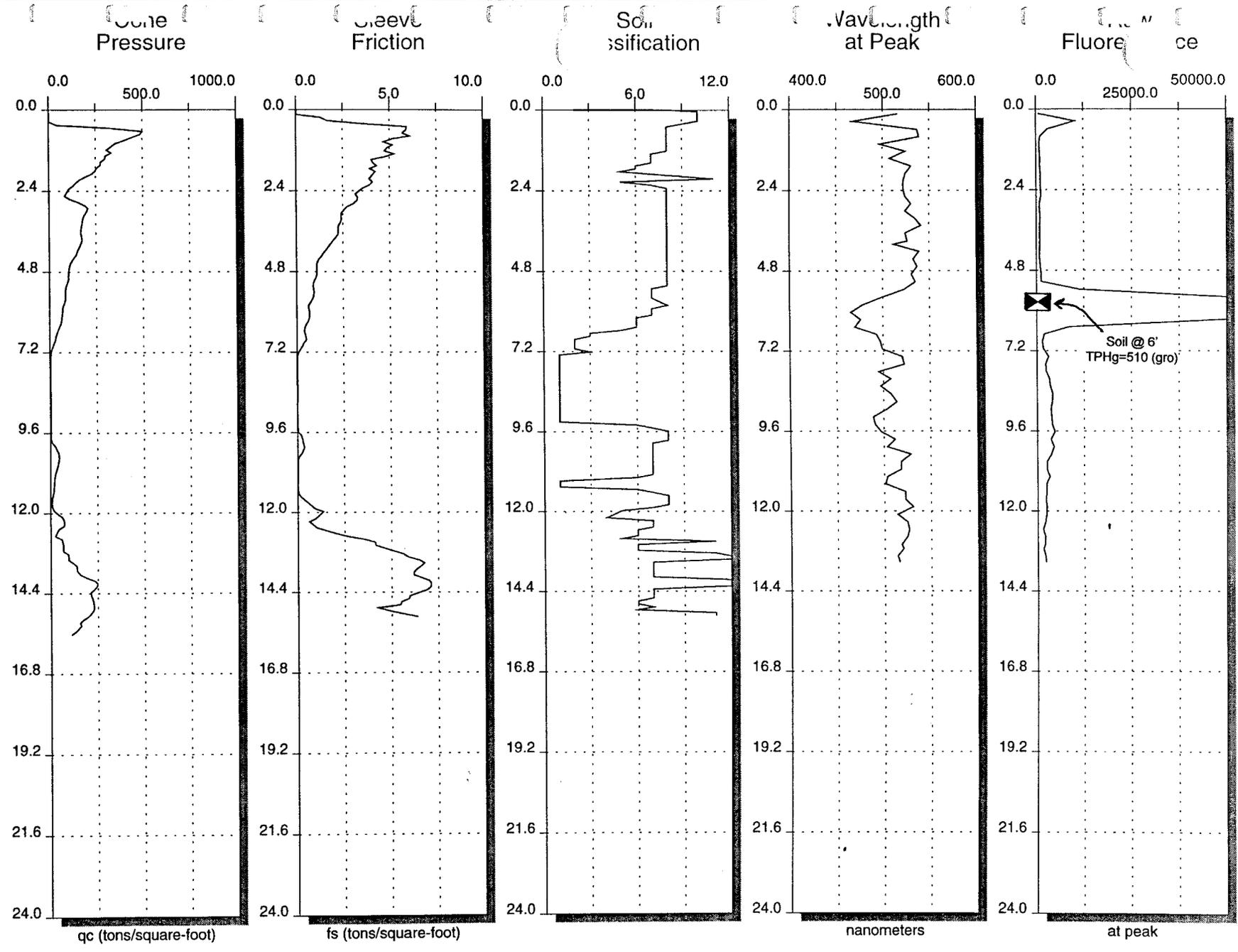
Spectral Plot(s)



1: 5.8 ft.; 70802 @ 501.3 nm

Time: 10:32:57
Date: 12-09-1996
Version: 1.0

Main: C:\BASIC71\DATA\B162-02.PSH
Probe: C:\BASIC71\DATA\PROBE23F.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL

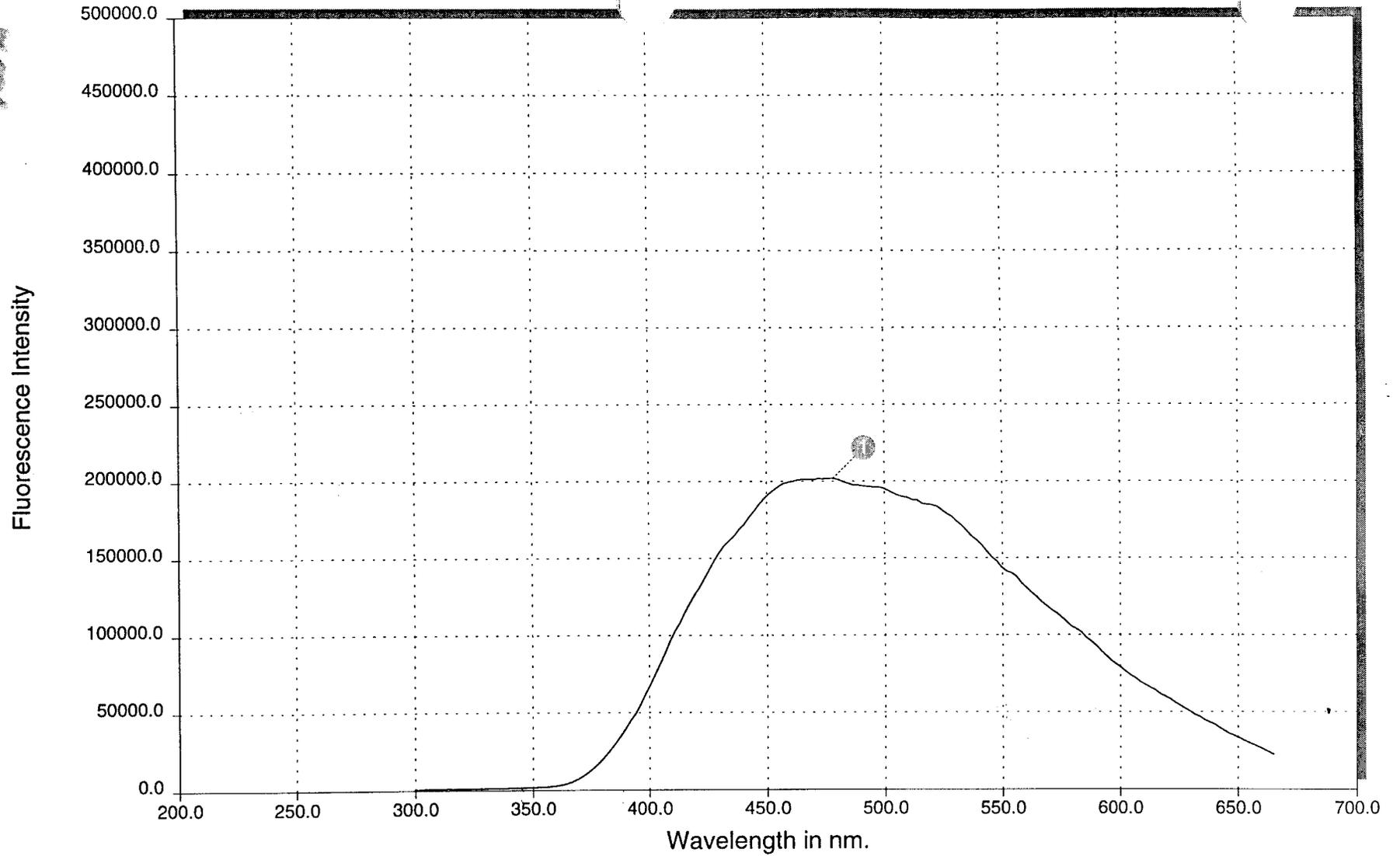


Time: 12:39:03
Date: 12-09-1996
Version: 1.0

Push: C:\BASIC71\DATA\B162-03.PSH
Probe: C:\BASIC71\DATA\PROBE23F.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)



1: 5.8 ft.; 201788 @ 478.2 nm

Time: 12:39:03

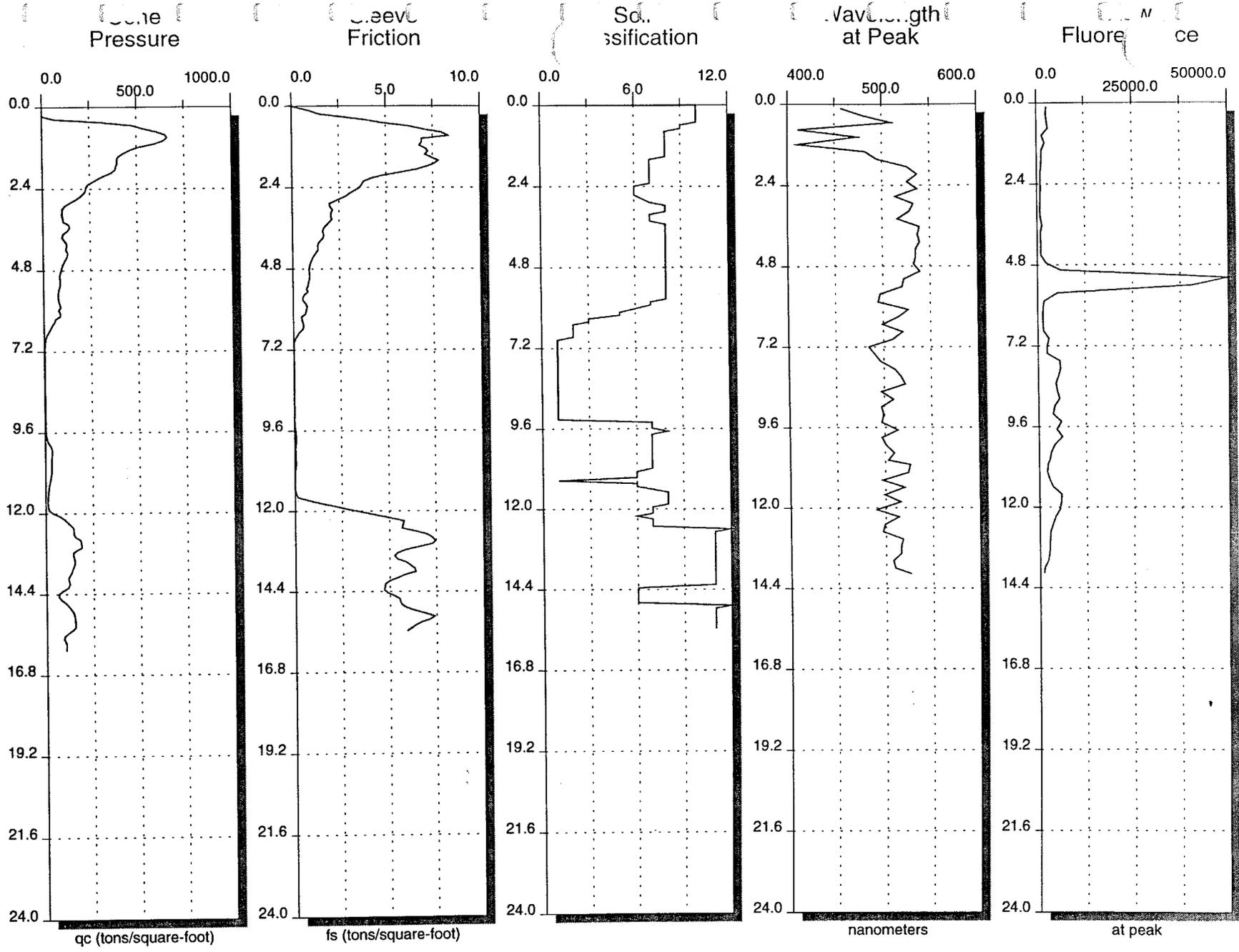
Date: 12-09-1996

Version: 1.0

Main: C:\BASIC71\DATA\B162-03.PSH

Probe: C:\BASIC71\DATA\PROBE23F.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL

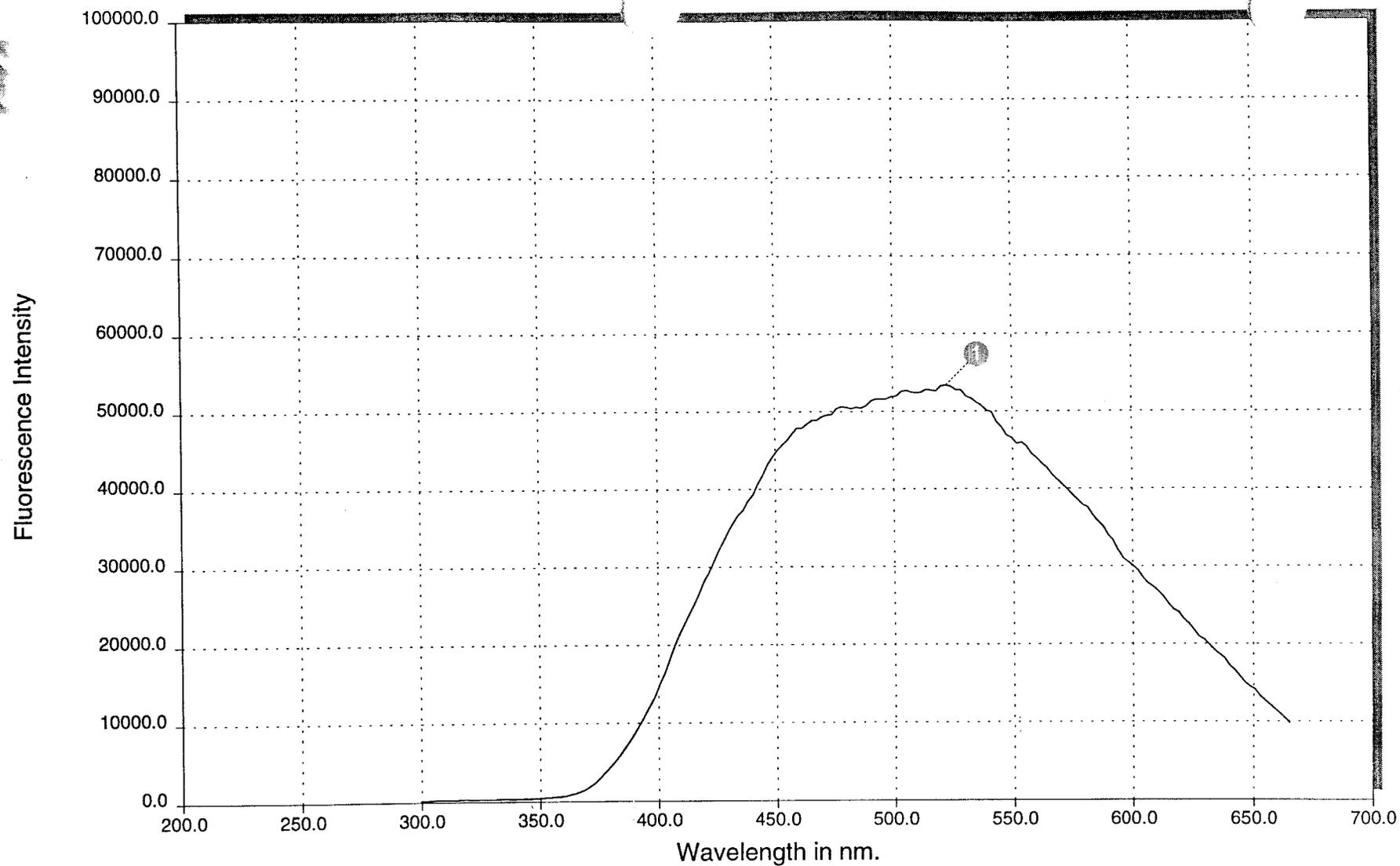


Time: 13:09:17
Date: 12-09-1996
Version: 1.0

Push: C:\BASIC71\DATA\B162-04.PSH
Probe: C:\BASIC71\DATA\PROBE23F.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



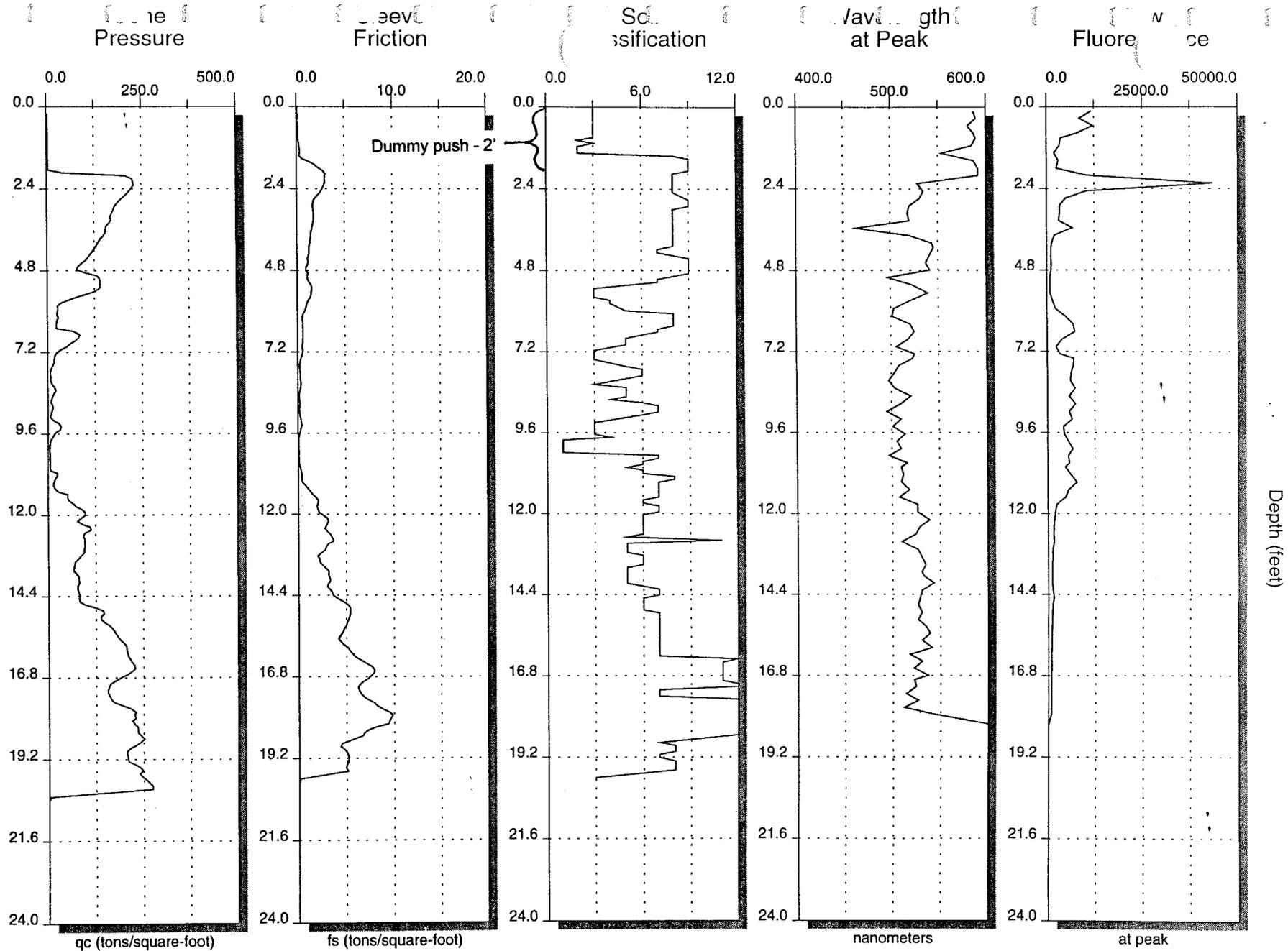
Spectral Plot(s)



1: 5.2 ft.; 53369 @ 522.3 nm

Time: 13:09:17
Date: 12-09-1996
Version: 1.0

Main: C:\BASIC71\DATA\B162-04.PSH
Probe: C:\BASIC71\DATA\PROBE23F.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Time: 10:13:44

Date: 11-22-1996

Version: 1.0

Push: C:\BASIC71\DATA\FF37-01.PSH

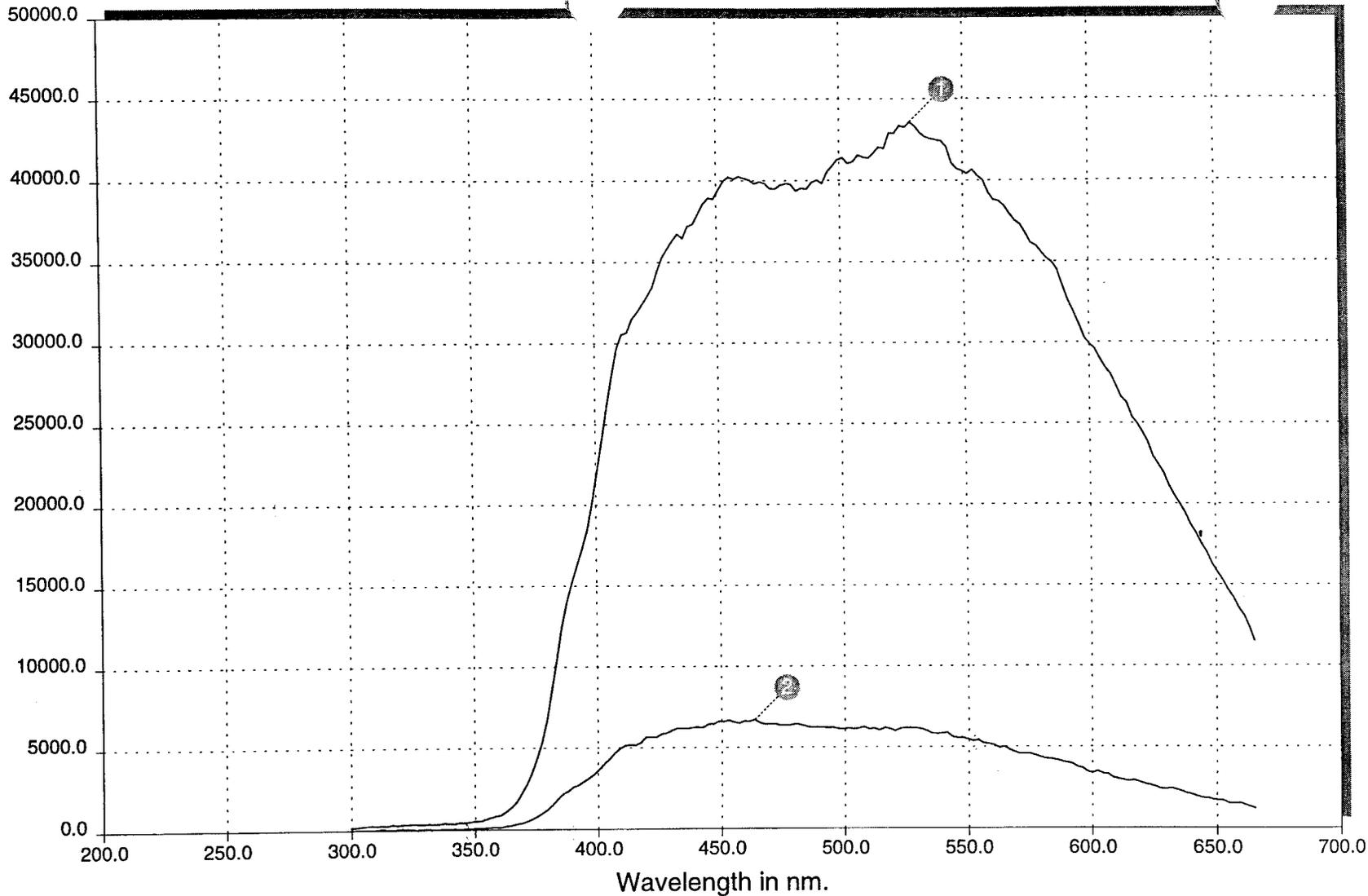
Probe: C:\BASIC71\DATA\PROBE23B.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

Fluorescence Intensity



1: 2.2 ft.; 43573 @ 528.6 nm

2: 3.6 ft.; 6695 @ 463.5 nm

Time: 10:13:44

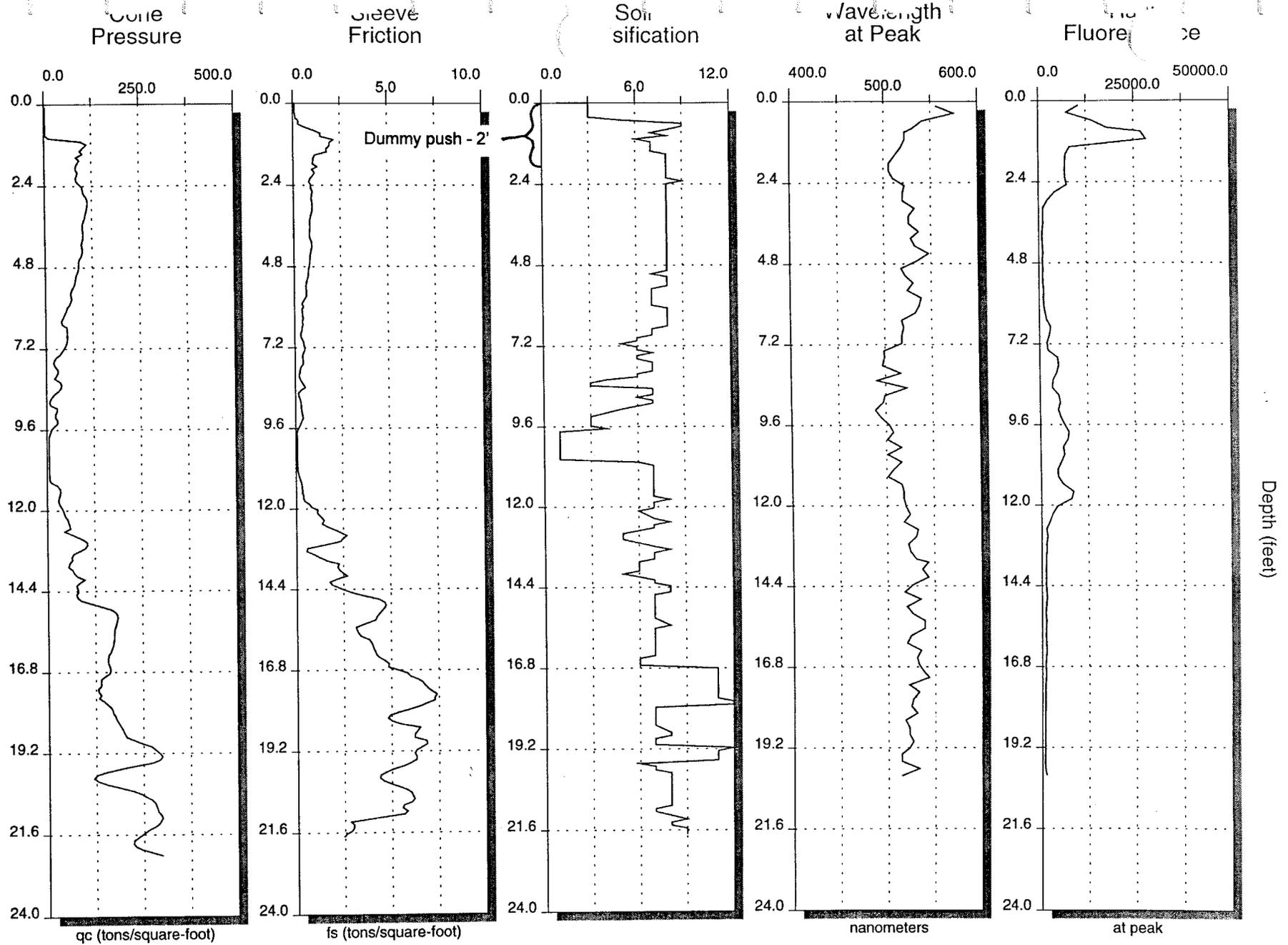
Date: 11-22-1996

Version: 1.0

Main: C:\BASIC71\DATA\FF37-01.PSH

Probe: C:\BASIC71\DATA\PROBE23B.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL



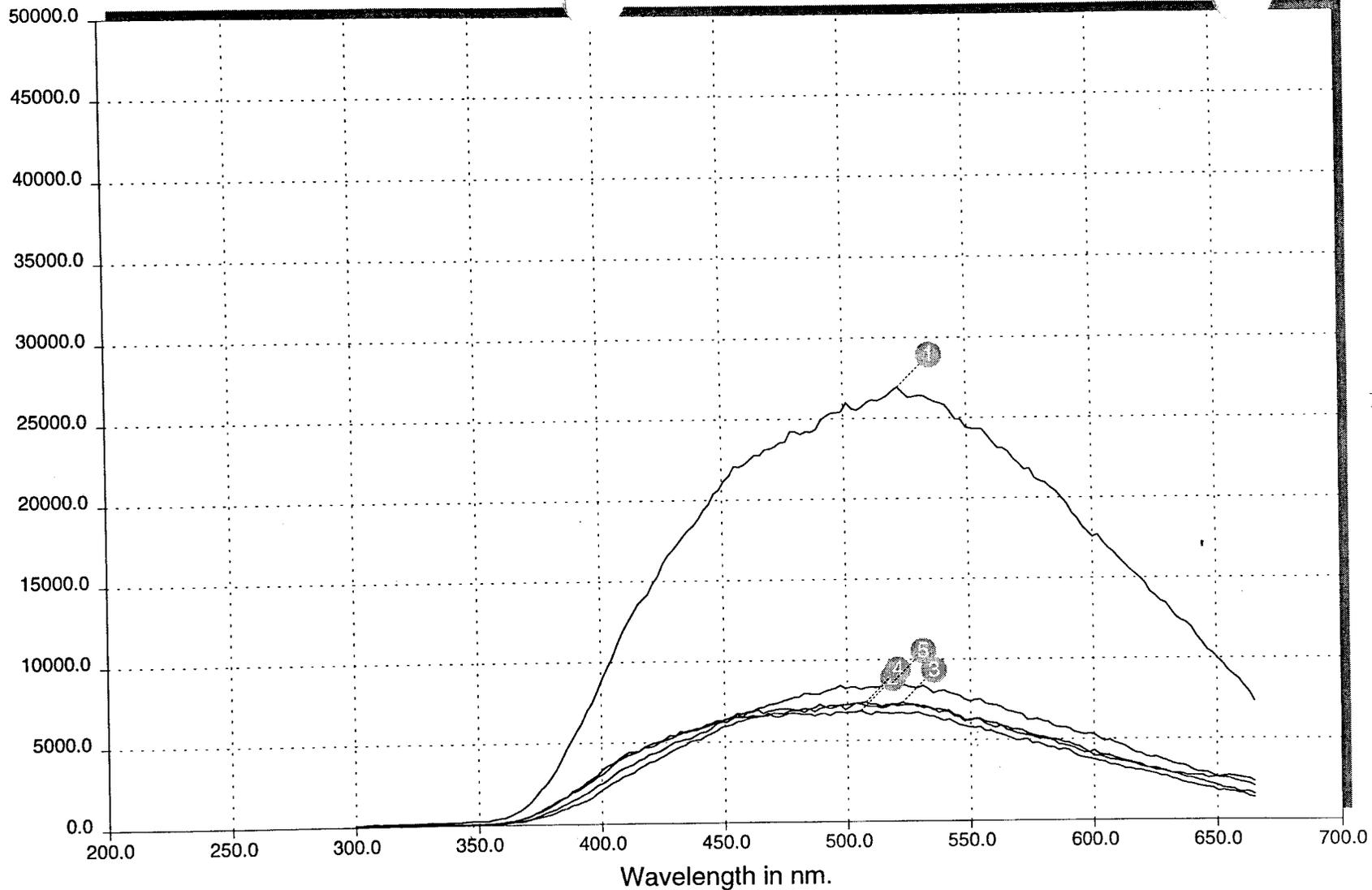
Time: 12:24:30
Date: 11-22-1996
Version: 1.0

Push: C:\BASIC71\DATA\FF37-02.PSH
Probe: C:\BASIC71\DATA\PROBE23B.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

Fluorescence Intensity



1: 0.9 ft.; 26924 @ 522.3 nm

5: 11.6 ft.; 8525 @ 518.1 nm

2: 2.0 ft.; 6851 @ 505.5 nm

3: 2.5 ft.; 7337 @ 522.3 nm

4: 9.8 ft.; 7390 @ 507.6 nm

Main: C:\BASIC71\DATA\FF37-02.PSH

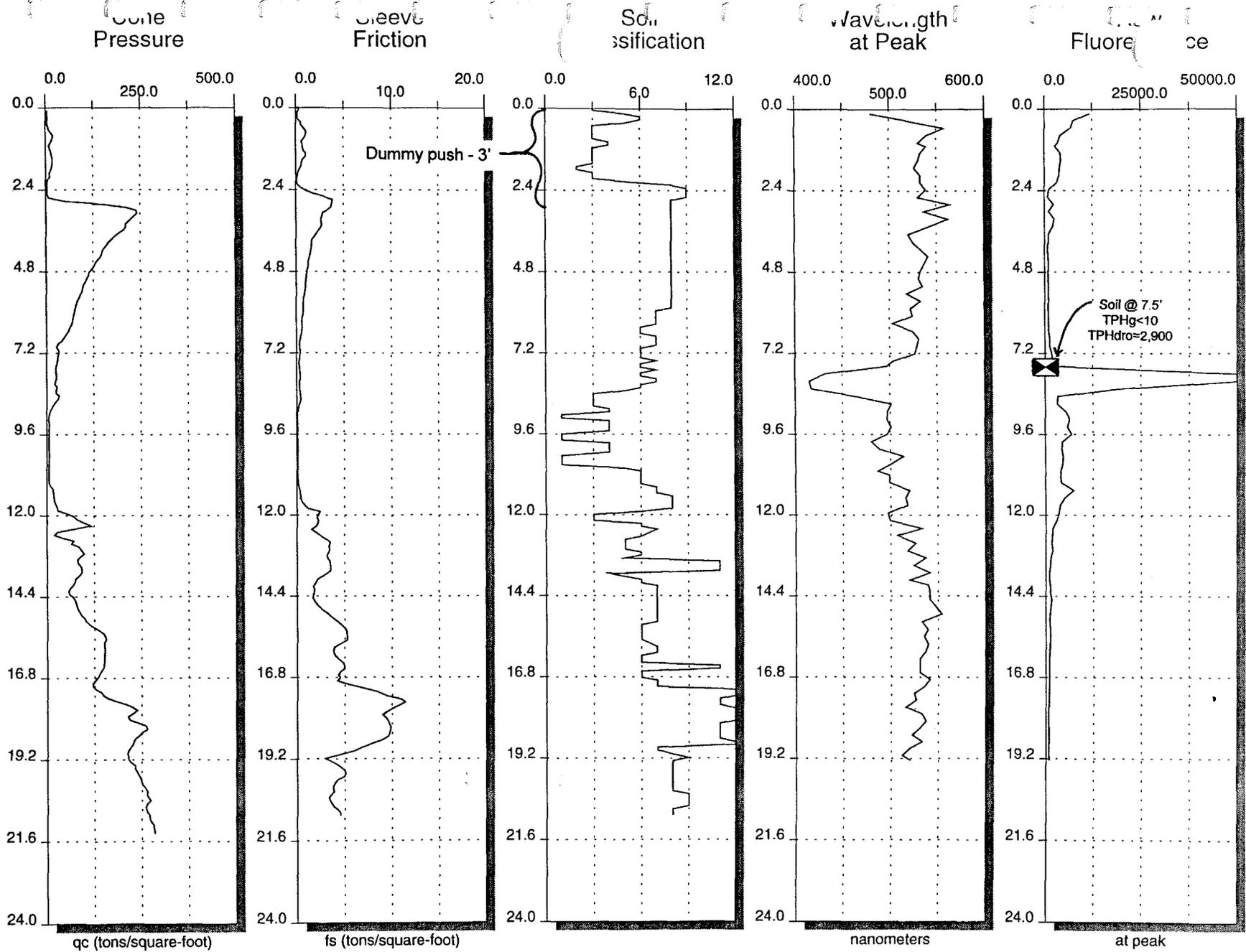
Probe: C:\BASIC71\DATA\PROBE23B.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL

Time: 12:24:30

Date: 11-22-1996

Version: 1.0



Time: 12:55:54

Date: 11-22-1996

Version: 1.0

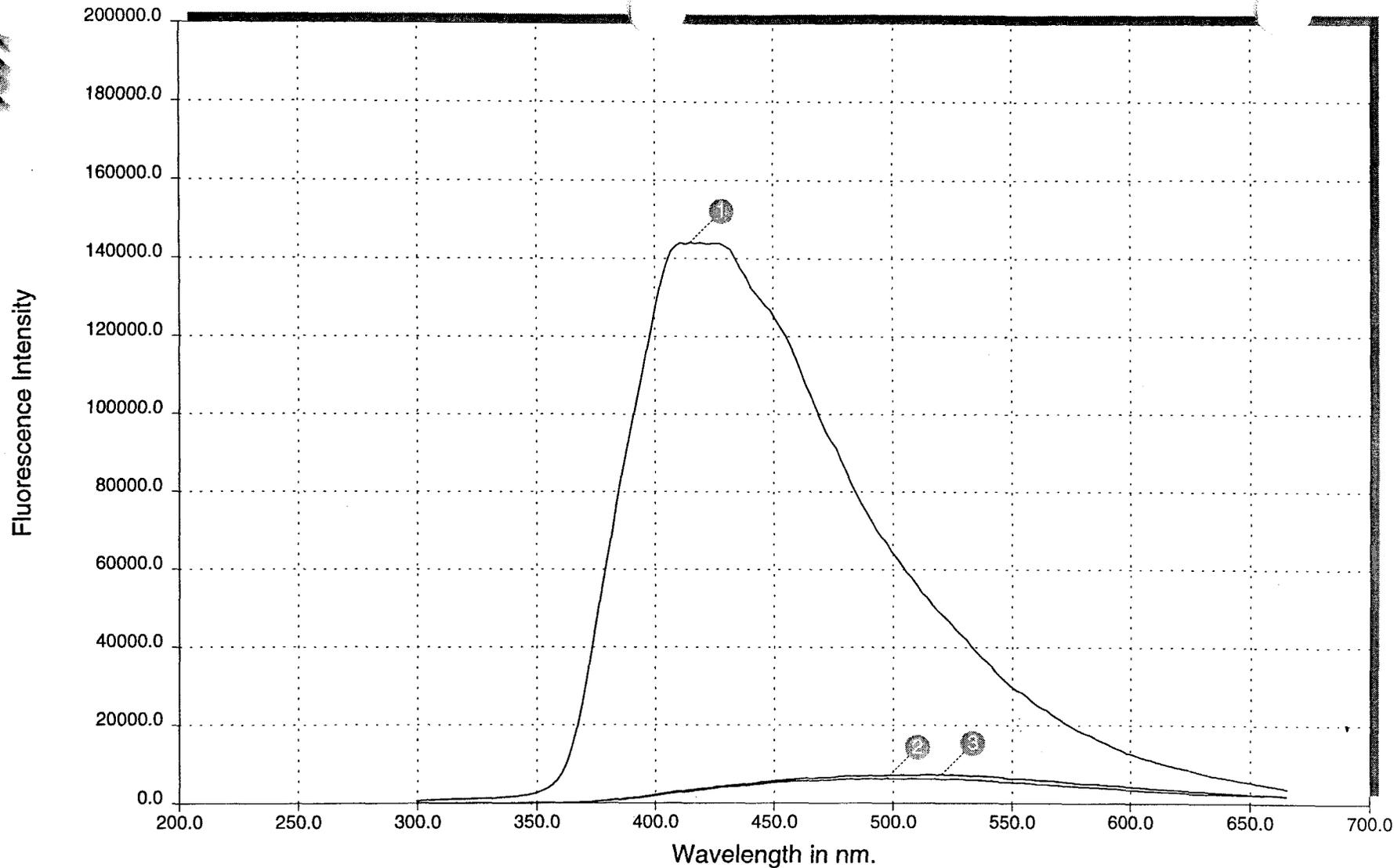
Push: C:\BASIC71\DATA\FF37-03.PSH

Probe: C:\BASIC71\DATA\PROBE23B.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL



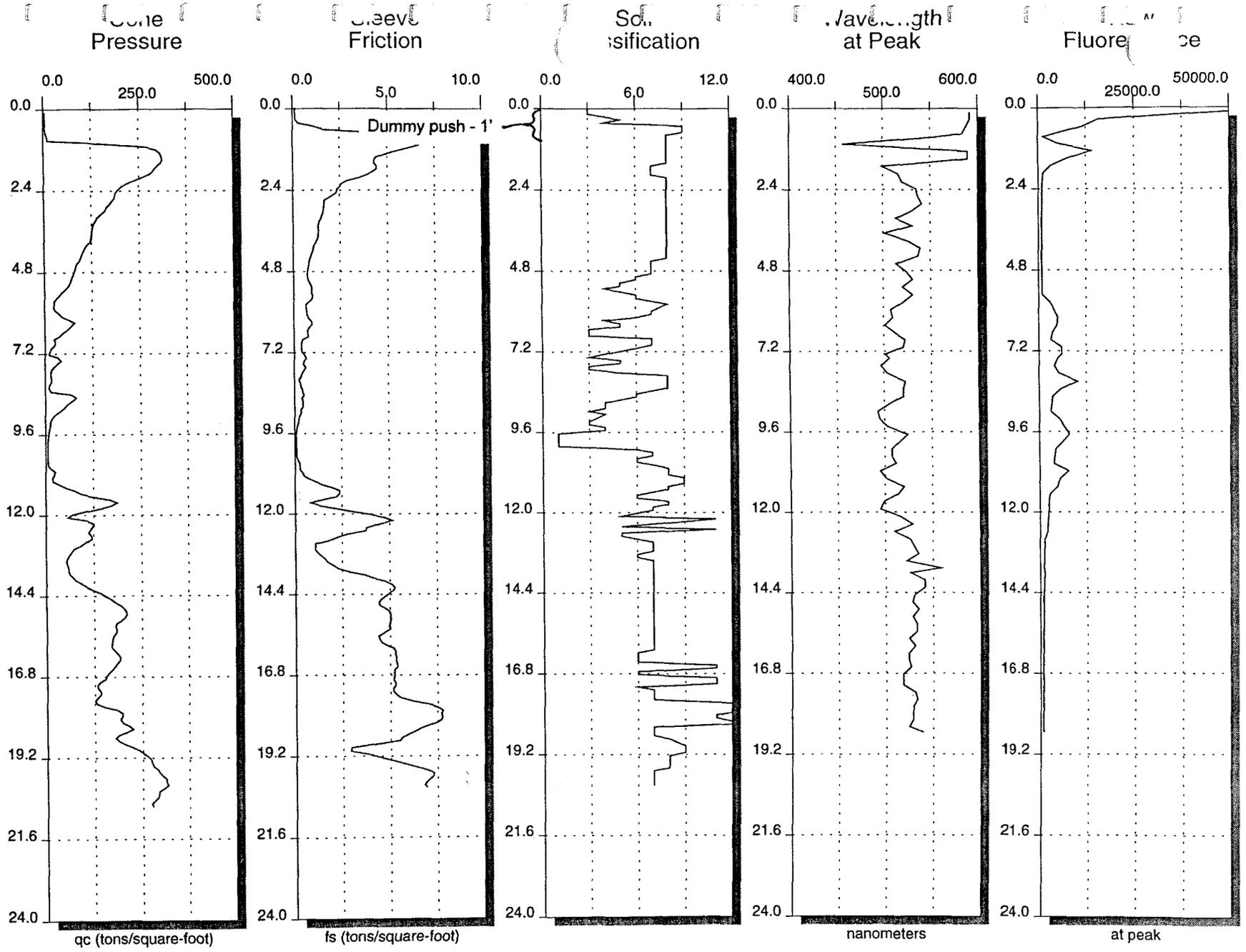
Spectral Plot(s)



Time: 12:55:54
Date: 11-22-1996
Version: 1.0

1: 8.0 ft.; 144188 @ 415.2 nm
2: 9.2 ft.; 6373 @ 497.1 nm
3: 11.3 ft.; 7426 @ 520.2 nm

Main: C:\BASIC71\DATA\FF37-03.PSH
Probe: C:\BASIC71\DATA\PROBE23B.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Depth (feet)

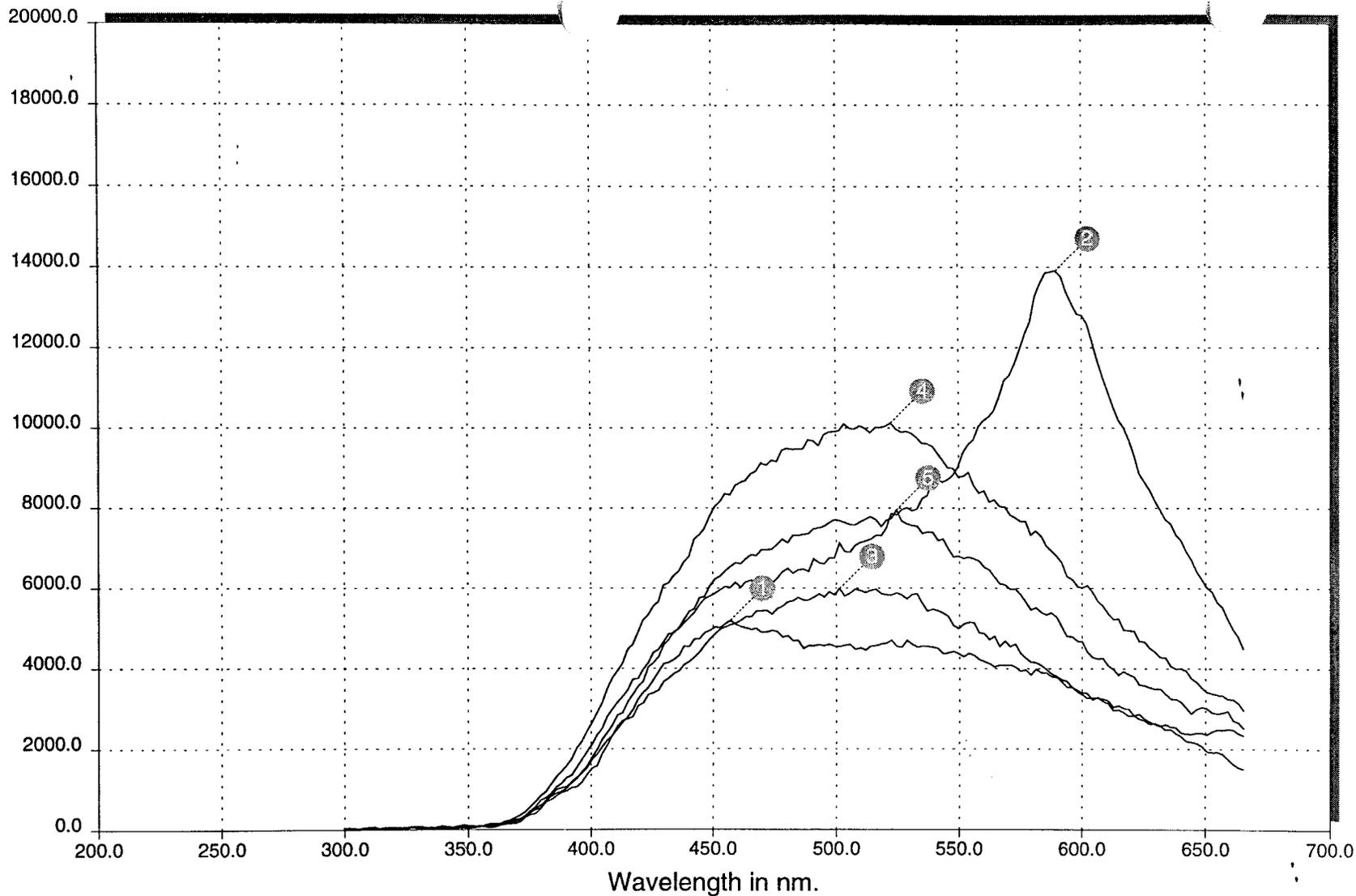
Time: 13:32:38
Date: 11-22-1996
Version: 1.0

Push: C:\BASIC71\DATA\FF37-04.PSH
Probe: C:\BASIC71\DATA\PROBE23B.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

Fluorescence Intensity



1: 1.1 ft.; 5196 @ 457.2 nm

5: 9.7 ft.; 7946 @ 524.4 nm

2: 1.3 ft.; 13904 @ 589.6 nm

3: 7.3 ft.; 5989 @ 501.3 nm

4: 8.1 ft.; 10120 @ 522.3 nm

Main: C:\BASIC71\DATA\FF37-04.PSH

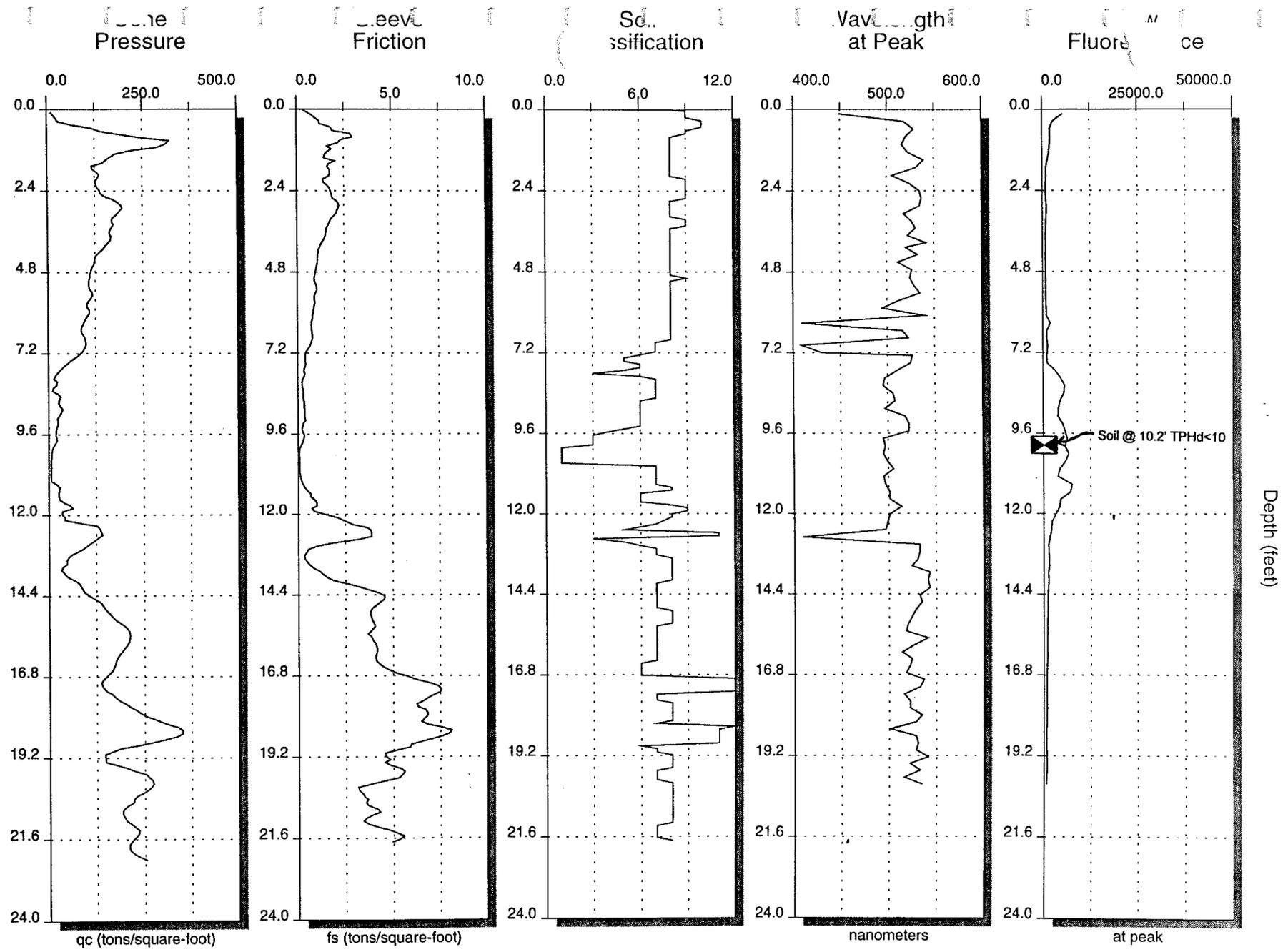
Probe: C:\BASIC71\DATA\PROBE23B.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL

Time: 13:32:38

Date: 11-22-1996

Version: 1.0

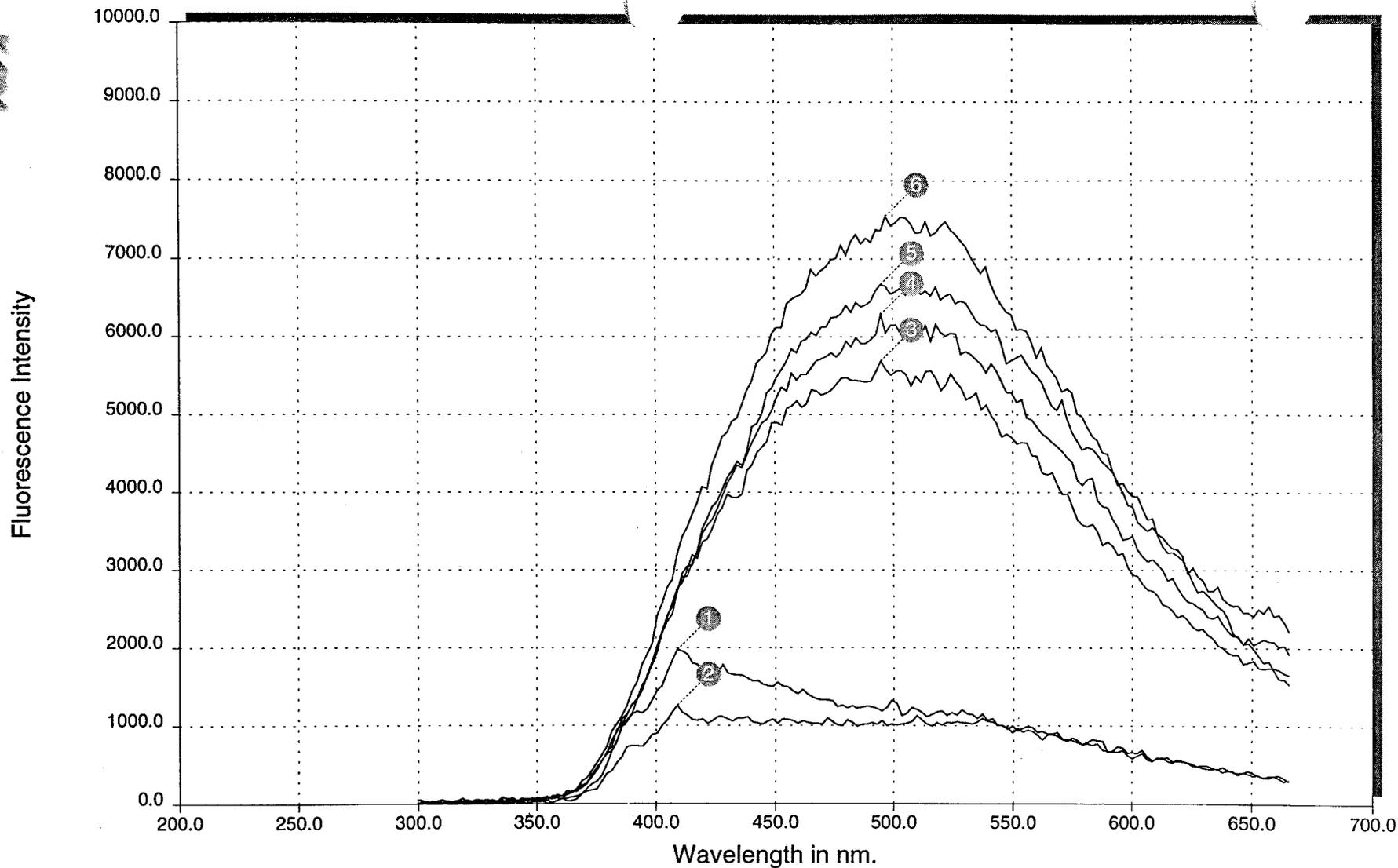


Time: 14:01:30
Date: 11-22-1996
Version: 1.0

Push: C:\BASIC71\DATA\FF37-05.PSH
Probe: C:\BASIC71\DATA\PROBE23B.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)



1: 6.3 ft.; 1974 @ 408.9 nm
2: 7.0 ft.; 1258 @ 408.9 nm
3: 8.2 ft.; 5689 @ 495.0 nm
4: 9.8 ft.; 6286 @ 495.0 nm

5: 10.2 ft.; 6673 @ 495.0 nm
6: 11.1 ft.; 7544 @ 497.1 nm

Main: C:\BASIC71\DATA\FF37-05.PSH

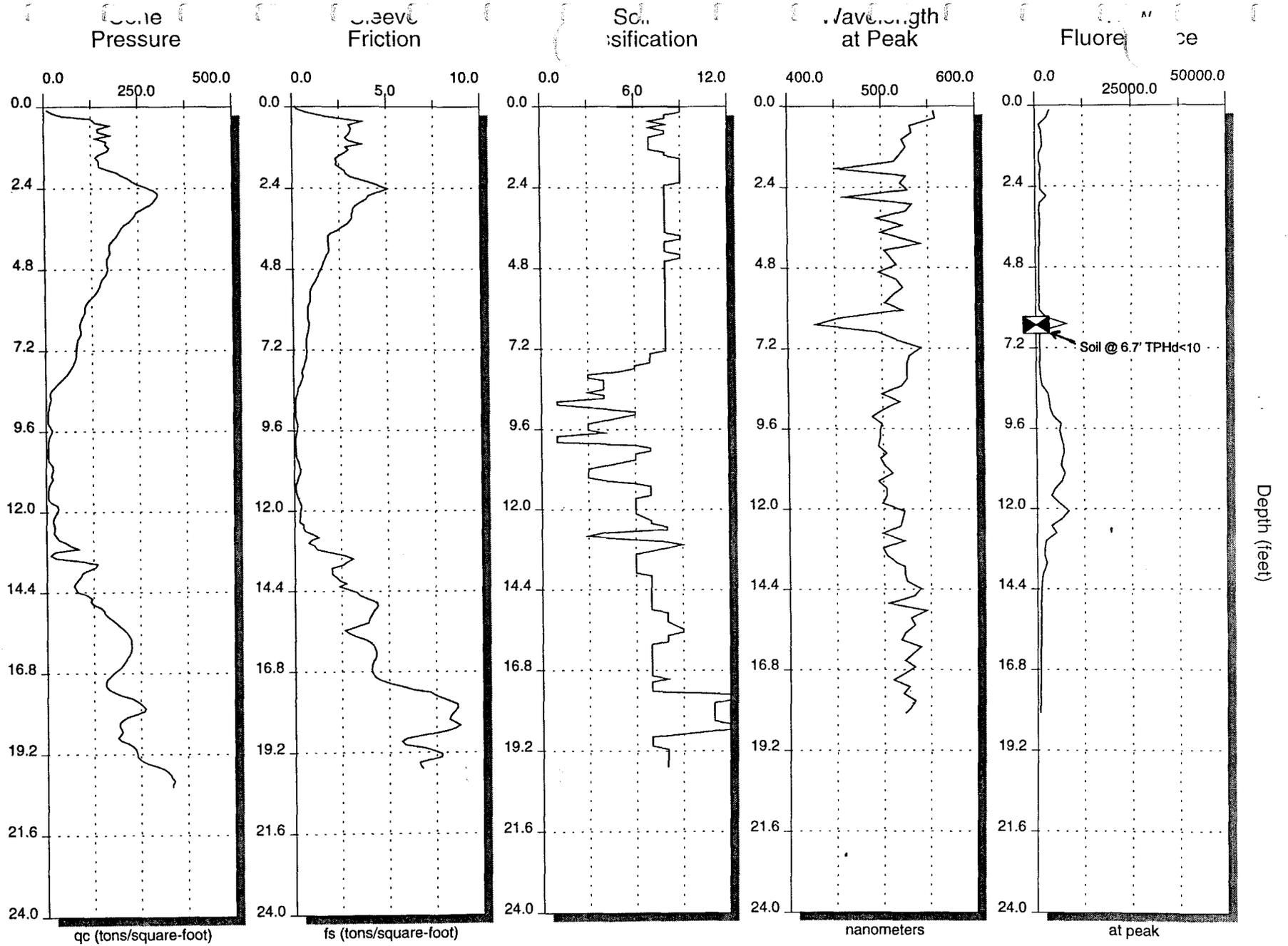
Probe: C:\BASIC71\DATA\PROBE23B.PR8

Calibration: C:\BASIC71\DATA\1213DFM.CAL

Time: 14:01:30

Date: 11-22-1996

Version: 1.0



Time: 14:31:45

Date: 11-22-1996

Version: 1.0

Push: C:\BASIC71\DATA\IFF37-06.PSH

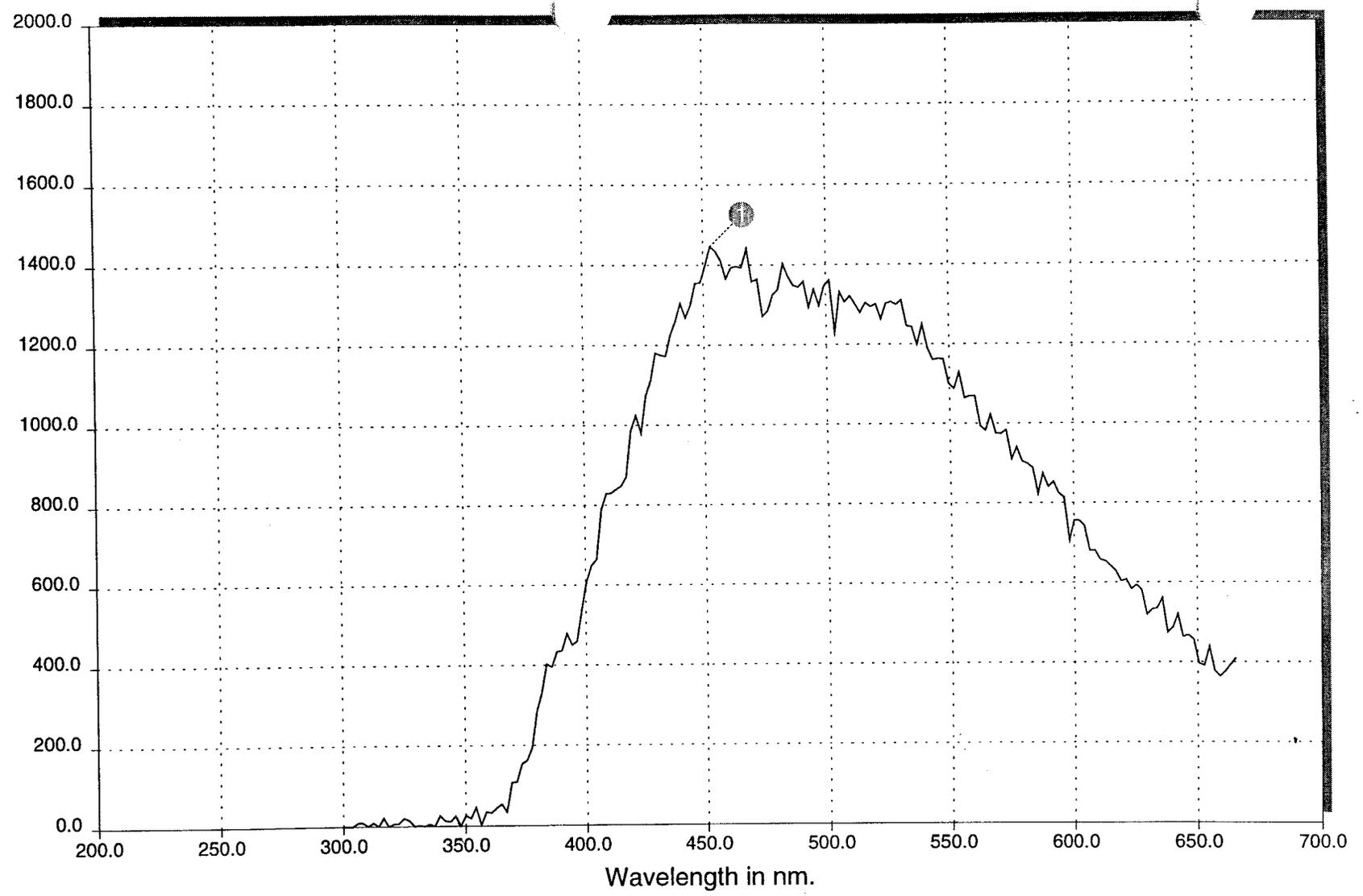
Probe: C:\BASIC71\DATA\PROBE23B.PR8

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

Fluorescence Intensity



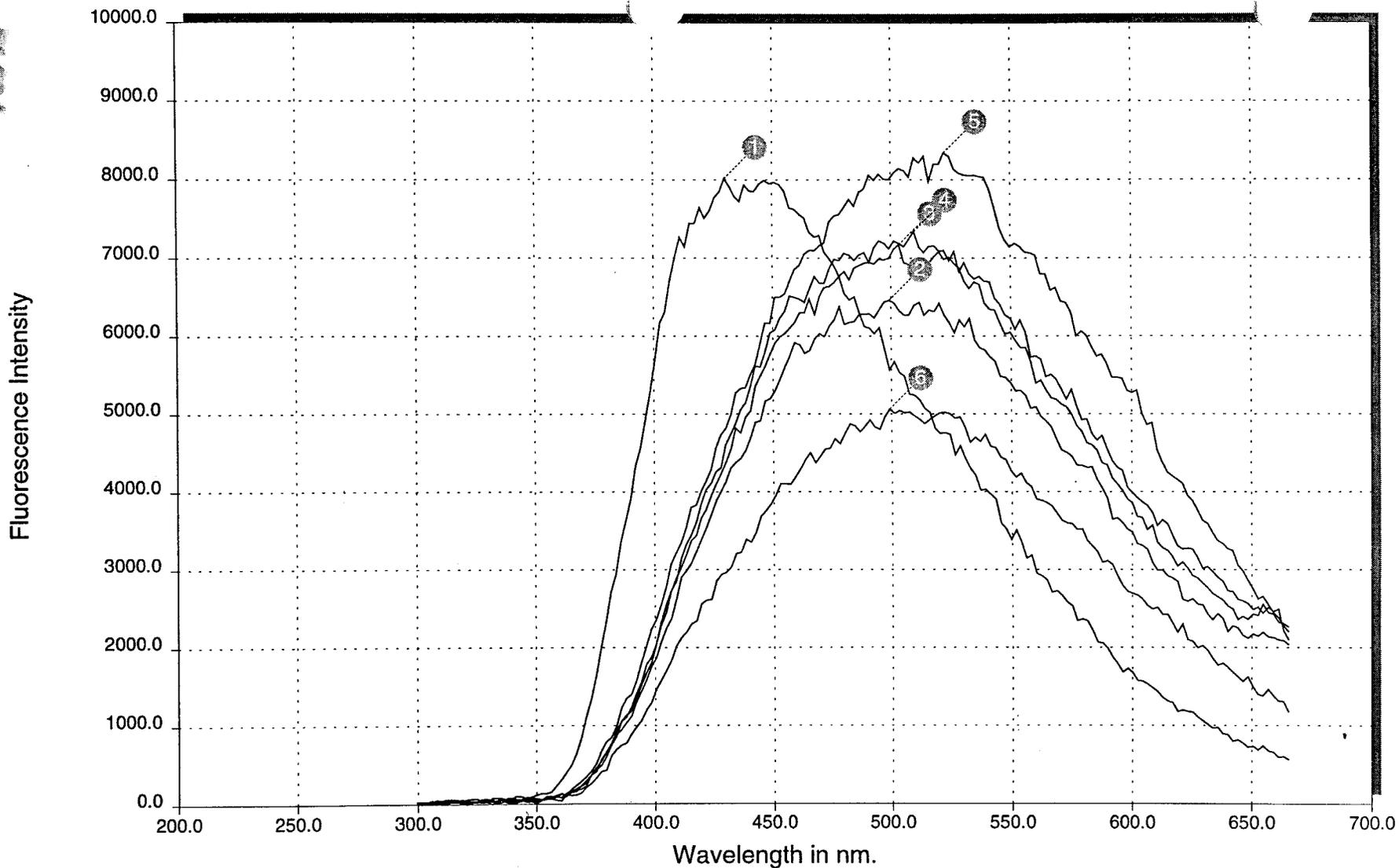
1: 1.9 ft.; 1446 @ 453.0 nm

Time: 14:31:45
Date: 11-22-1996
Version: 1.0

Main: C:\BASIC71\DATA\FF37-06.PSH
Probe: C:\BASIC71\DATA\PROBE23B.PR8
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)



1: 6.5 ft.; 8013 @ 429.9 nm

5: 12.1 ft.; 8339 @ 522.3 nm

2: 9.5 ft.; 6456 @ 499.2 nm

6: 12.7 ft.; 5062 @ 499.2 nm

3: 10.3 ft.; 7168 @ 503.4 nm

4: 10.9 ft.; 7337 @ 509.7 nm

Time: 14:31:45

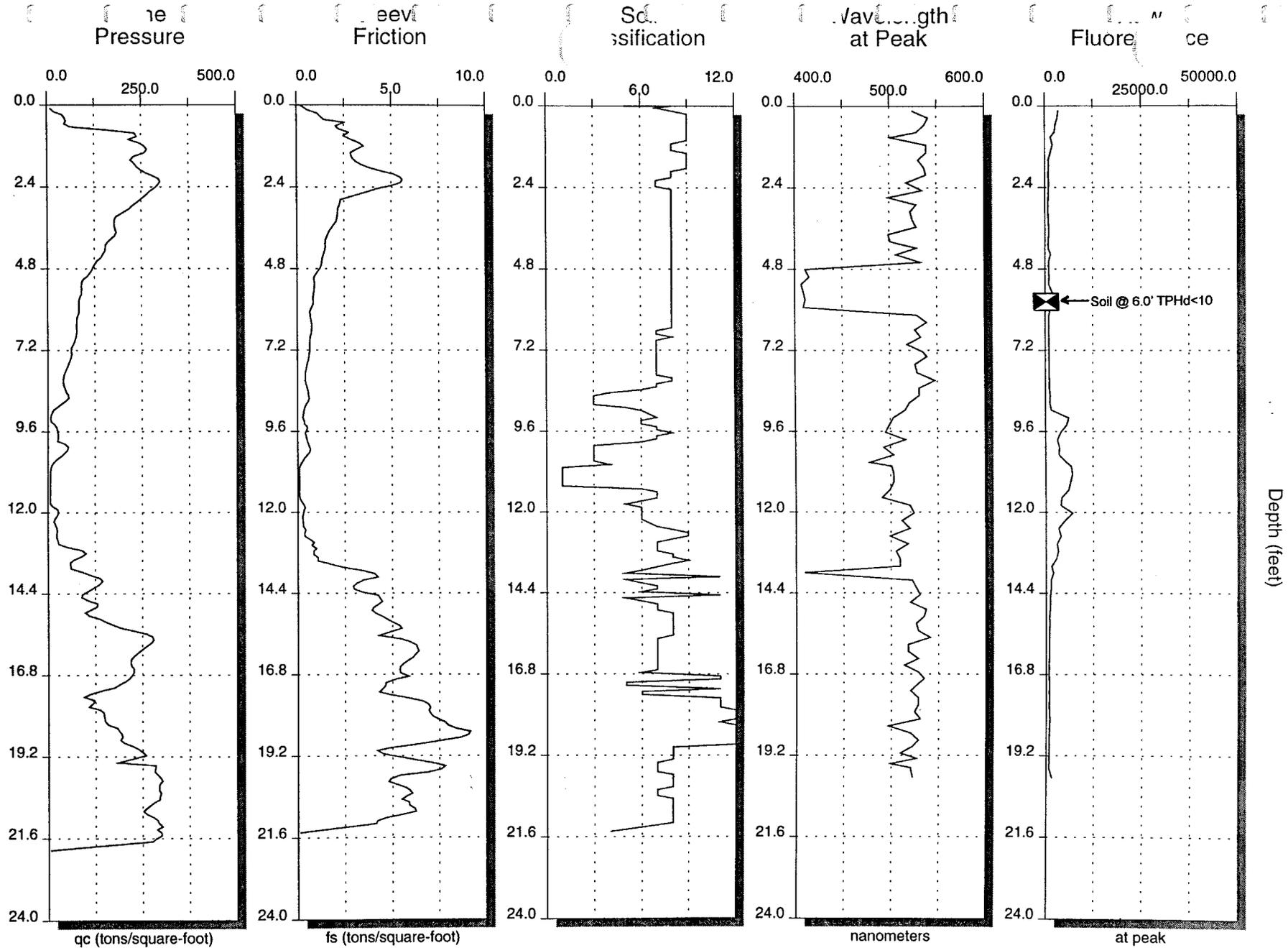
Date: 11-22-1996

Version: 1.0

Main: C:\BASIC71\DATA\FF37-06.PSH

Probe: C:\BASIC71\DATA\PROBE23B.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Time: 15:09:31

Date: 11-22-1996

Version: 1.0

Push: C:\BASIC71\DATA\FF37-07.PSH

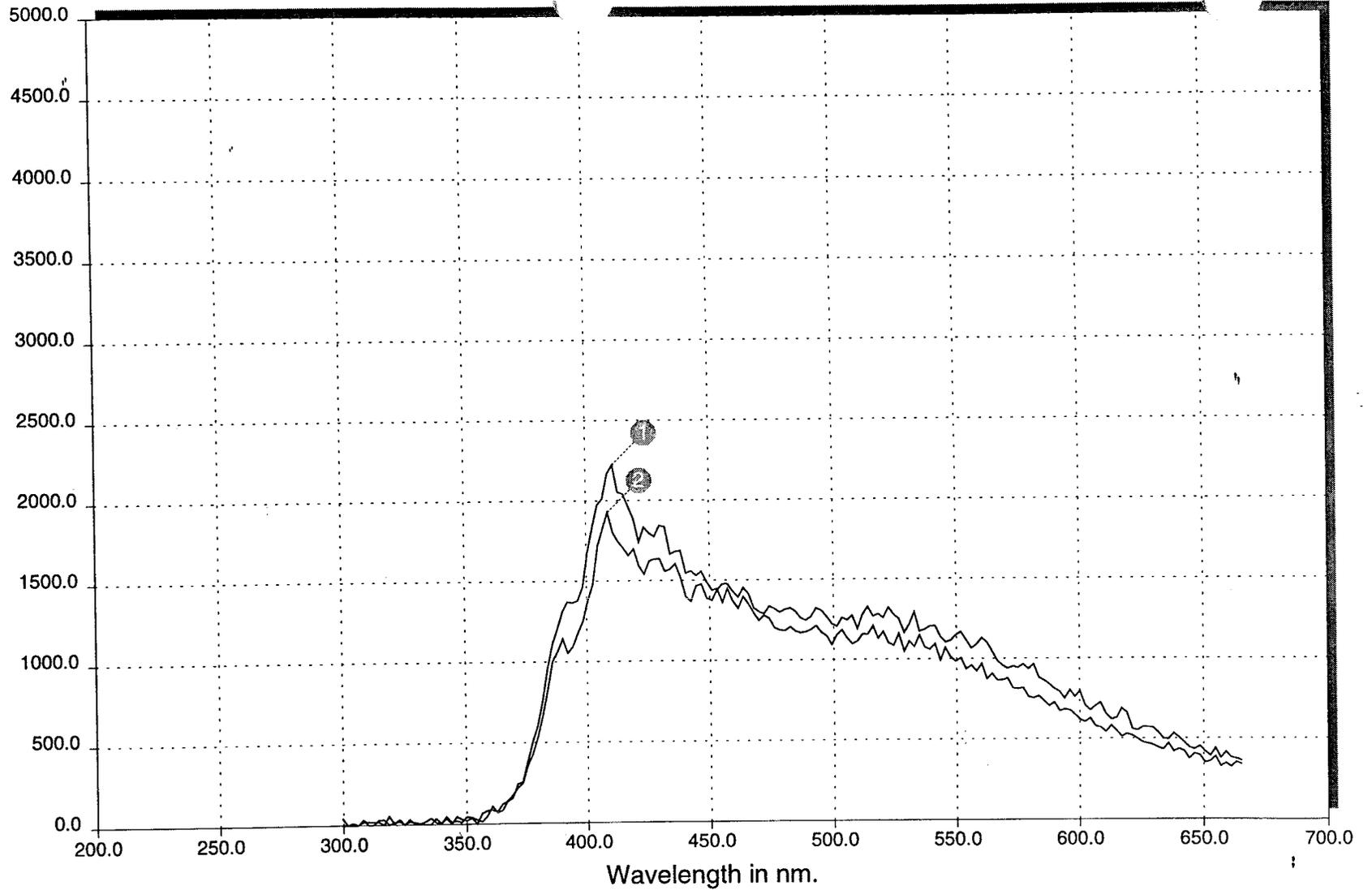
Probe: C:\BASIC71\DATA\PROBE23B.PR

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

Fluorescence Intensity



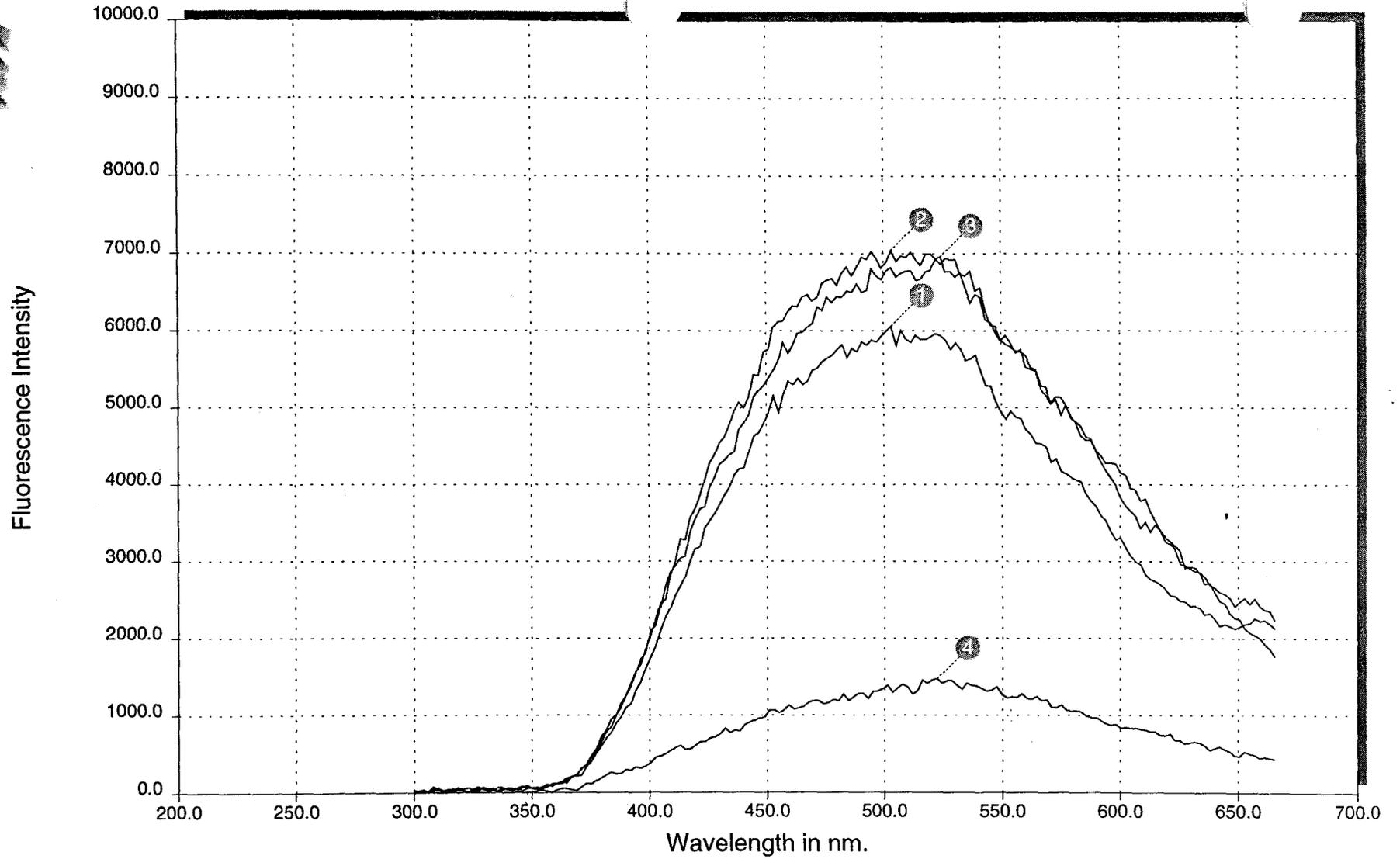
1: 5.7 ft.; 2221 @ 411.0 nm
2: 13.8 ft.; 1925 @ 408.9 nm

Time: 15:09:31
Date: 11-22-1996
Version: 1.0

Main: C:\BASIC71\DATA\FF37-07.PSH
Probe: C:\BASIC71\DATA\PROBE23B.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)



Time: 15:09:31

Date: 11-22-1996

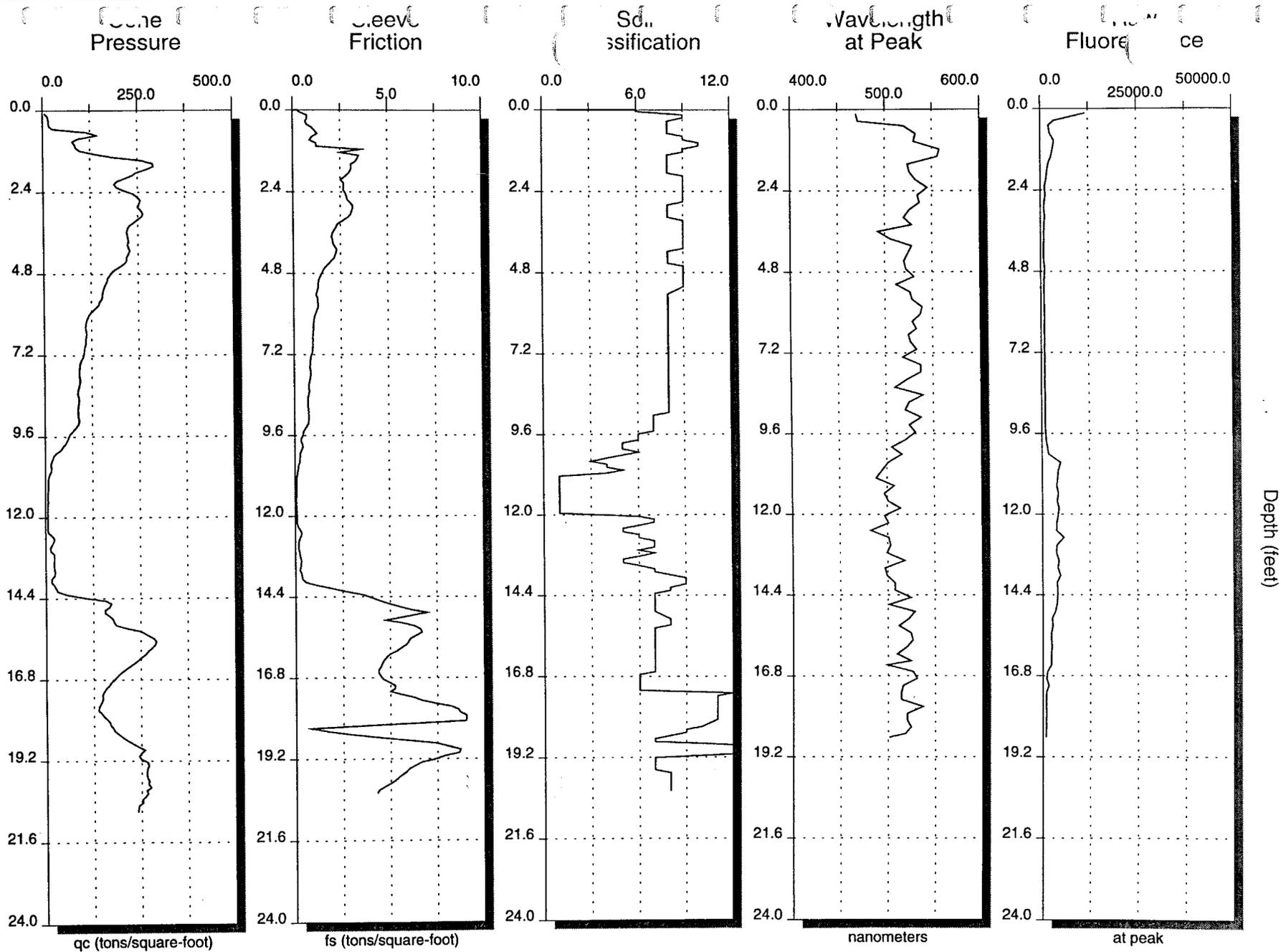
Version: 1.0

1: 9.2 ft.; 6061 @ 503.4 nm
2: 10.9 ft.; 7040 @ 503.4 nm
3: 12.0 ft.; 6957 @ 524.4 nm
4: 19.9 ft.; 1474 @ 522.3 nm

Main: C:\BASIC71\DATA\FF37-07.PSH

Probe: C:\BASIC71\DATA\PROBE23B.PR8

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Time: 15:41:07

Date: 11-22-1996

Version: 1.0

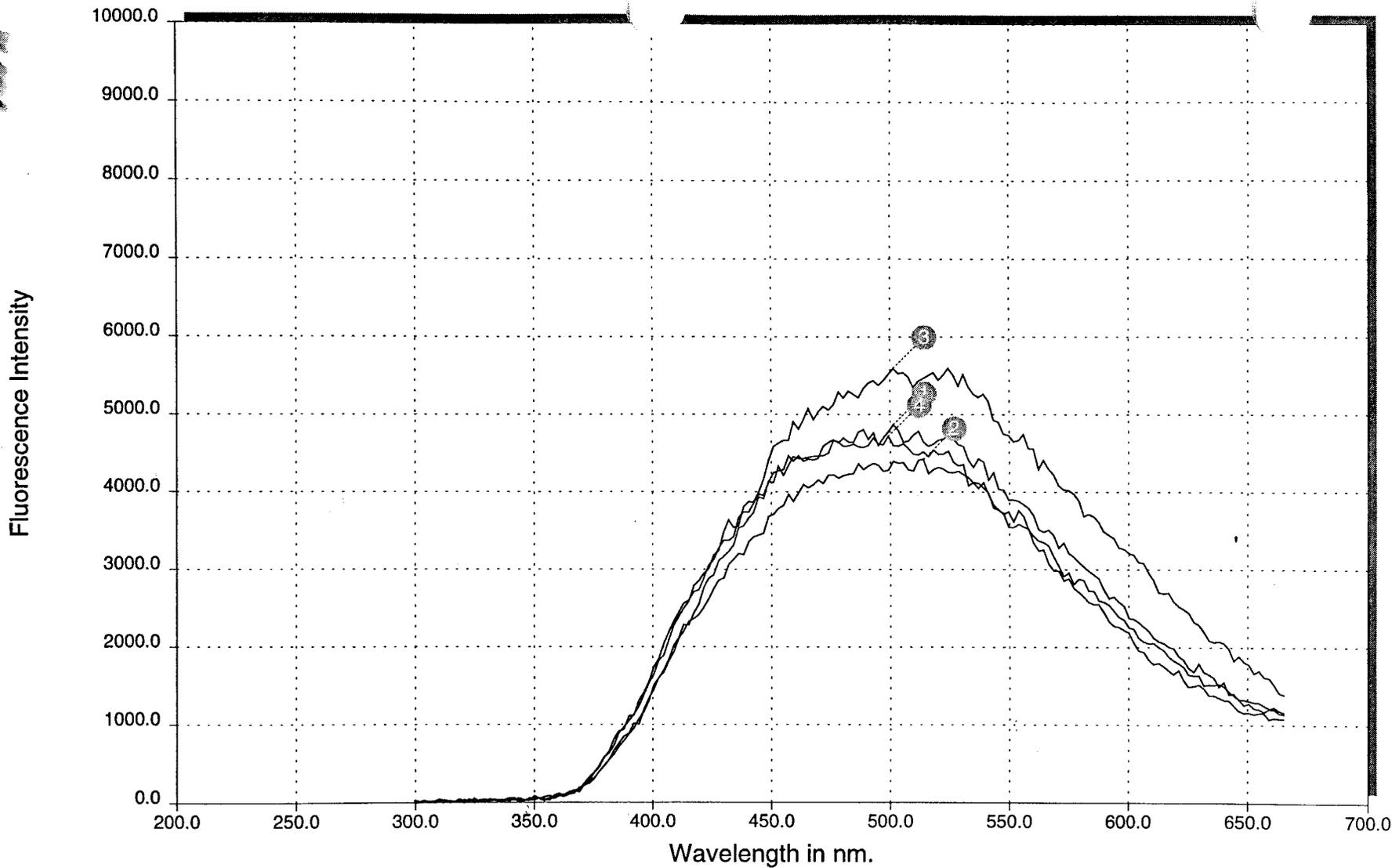
Push: C:\BASIC71\DATA\FF37-08.PSH

Probe: C:\BASIC71\DATA\PROBE23B.PR

Calibration: C:\BASIC71\DATA\1213DFM.CAL



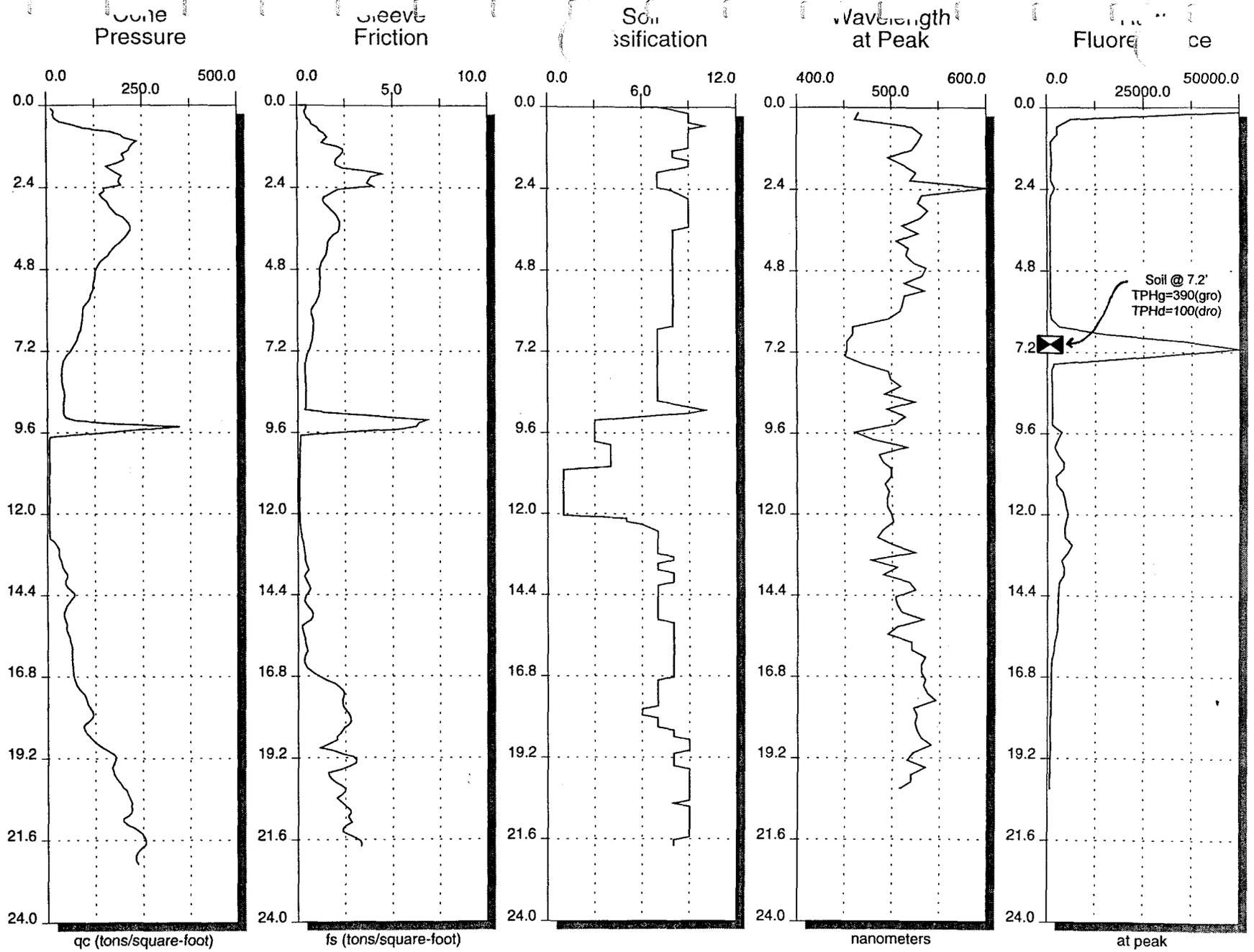
Spectral Plot(s)



Time: 15:41:07
Date: 11-22-1996
Version: 1.0

1: 10.5 ft.; 4867 @ 501.3 nm
2: 11.8 ft.; 4419 @ 513.9 nm
3: 12.7 ft.; 5594 @ 501.3 nm
4: 13.8 ft.; 4719 @ 499.2 nm

Main: C:\BASIC71\DATA\FF37-08.PSH
Probe: C:\BASIC71\DATA\PROBE23B.PR8
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Depth (feet)

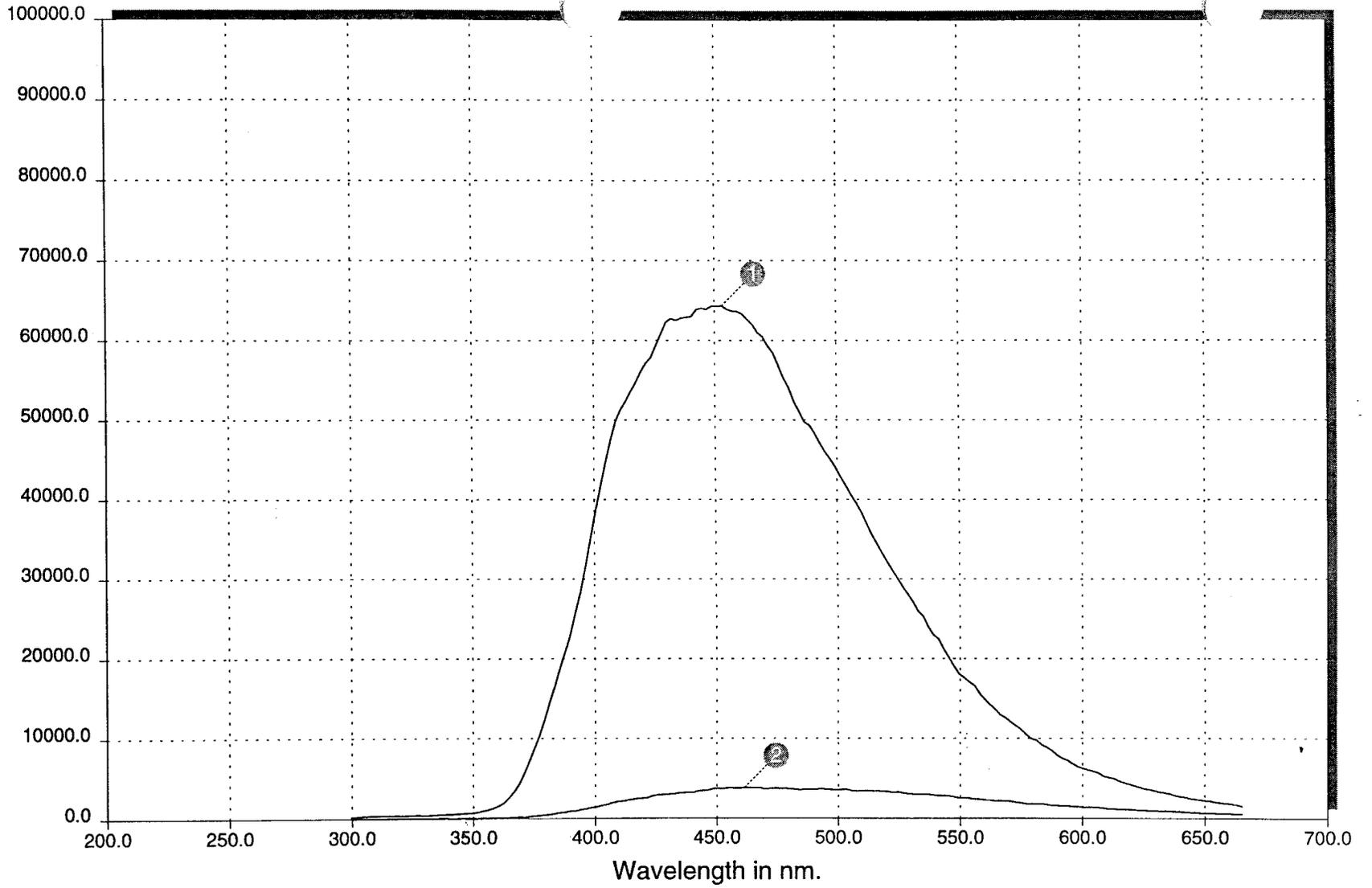
Time: 16:14:02
Date: 11-22-1996
Version: 1.0

Push: C:\BASIC71\DATA\FF37-09.PSH
Probe: C:\BASIC71\DATA\PROBE23C.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

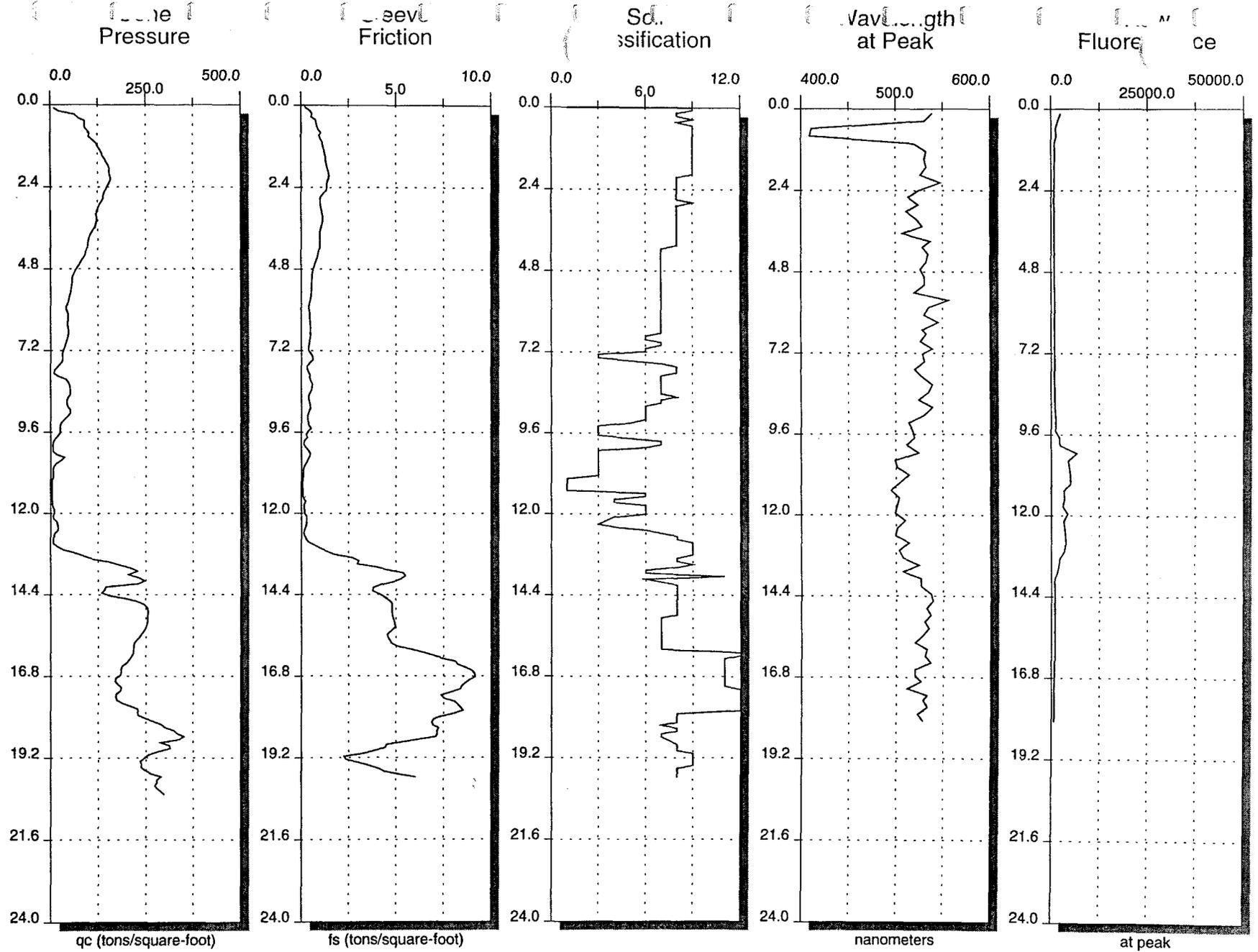
Fluorescence Intensity



1: 7.1 ft.; 64324 @ 453.0 nm
2: 9.6 ft.; 3842 @ 461.4 nm

Time: 16:14:02
Date: 11-22-1996
Version: 1.0

Main: C:\BASIC71\DATA\FF37-09.PSH
Probe: C:\BASIC71\DATA\PROBE23C.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Time: 07:44:18

Date: 11-23-1996

Version: 1.0

Push: C:\BASIC71\DATA\FF37-10.PSH

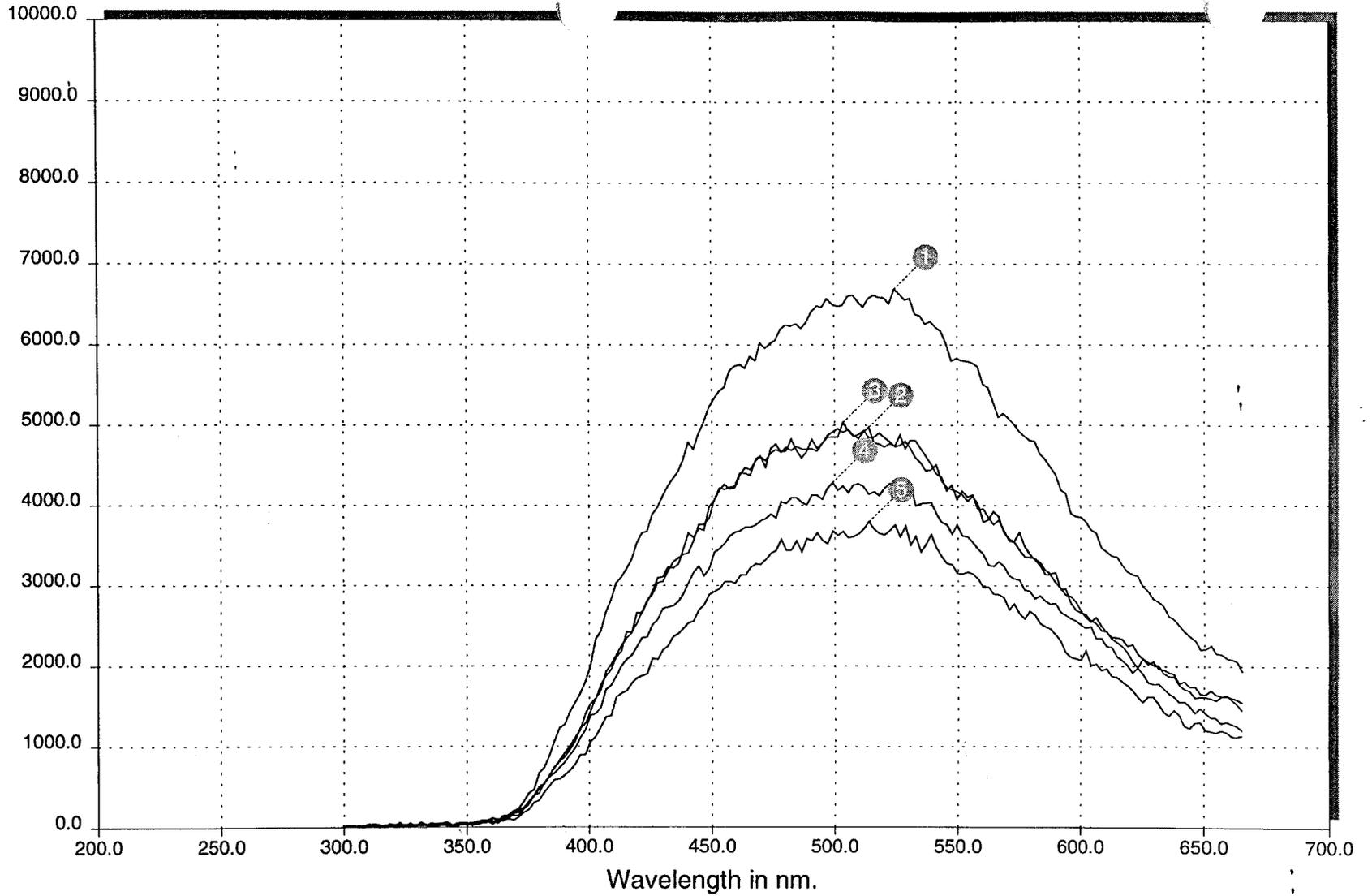
Probe: C:\BASIC71\DATA\PROBE23C.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

Fluorescence Intensity



1: 10.2 ft.; 6689 @ 524.4 nm

5: 12.8 ft.; 3795 @ 513.9 nm

Time: 07:44:18

2: 10.8 ft.; 4972 @ 513.9 nm

Main: C:\BASIC71\DATA\FF37-10.PSH

Date: 11-23-1996

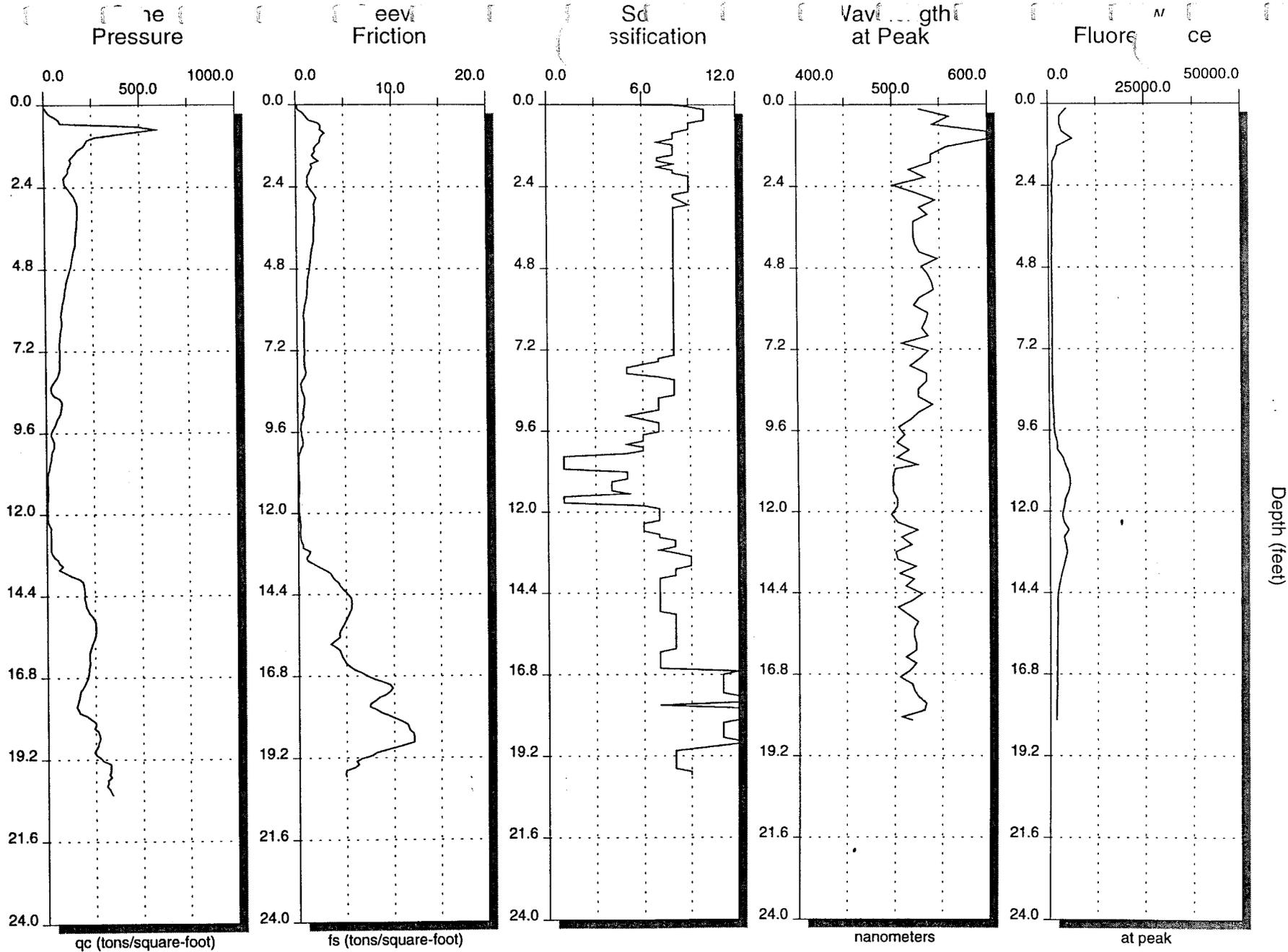
3: 11.1 ft.; 5030 @ 503.4 nm

Probe: C:\BASIC71\DATA\PROBE23C.PRB

Version: 1.0

4: 12.0 ft.; 4283 @ 499.2 nm

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Time: 09:04:04

Date: 11-23-1996

Version: 1.0

Push: C:\BASIC71\DATA\FF37-11.PSH

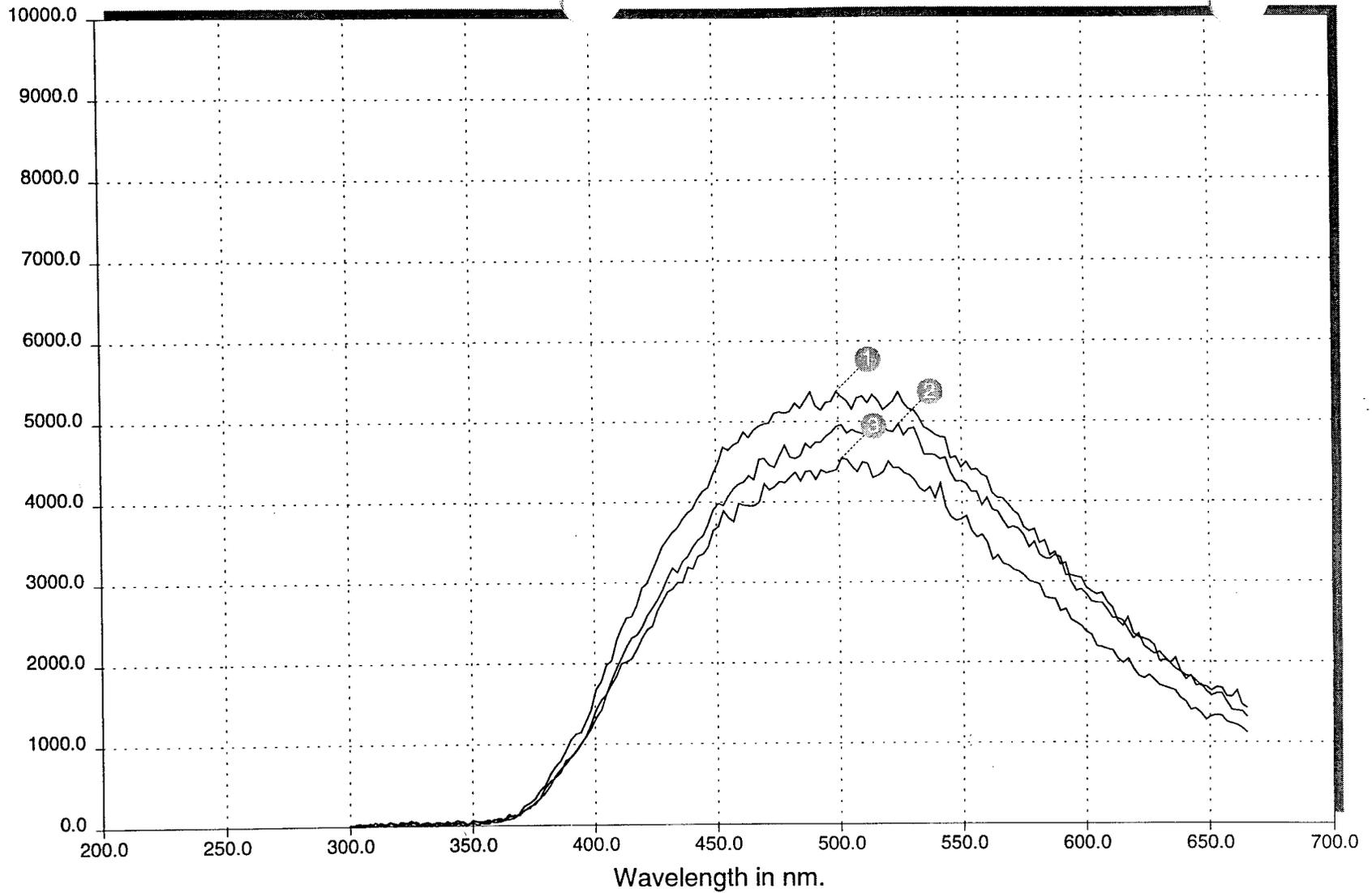
Probe: C:\BASIC71\DATA\PROBE23C.PR

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

Fluorescence Intensity



1: 11.2 ft.; 5370 @ 499.2 nm
2: 12.5 ft.; 4966 @ 524.4 nm
3: 13.2 ft.; 4540 @ 501.3 nm

Time: 09:04:04

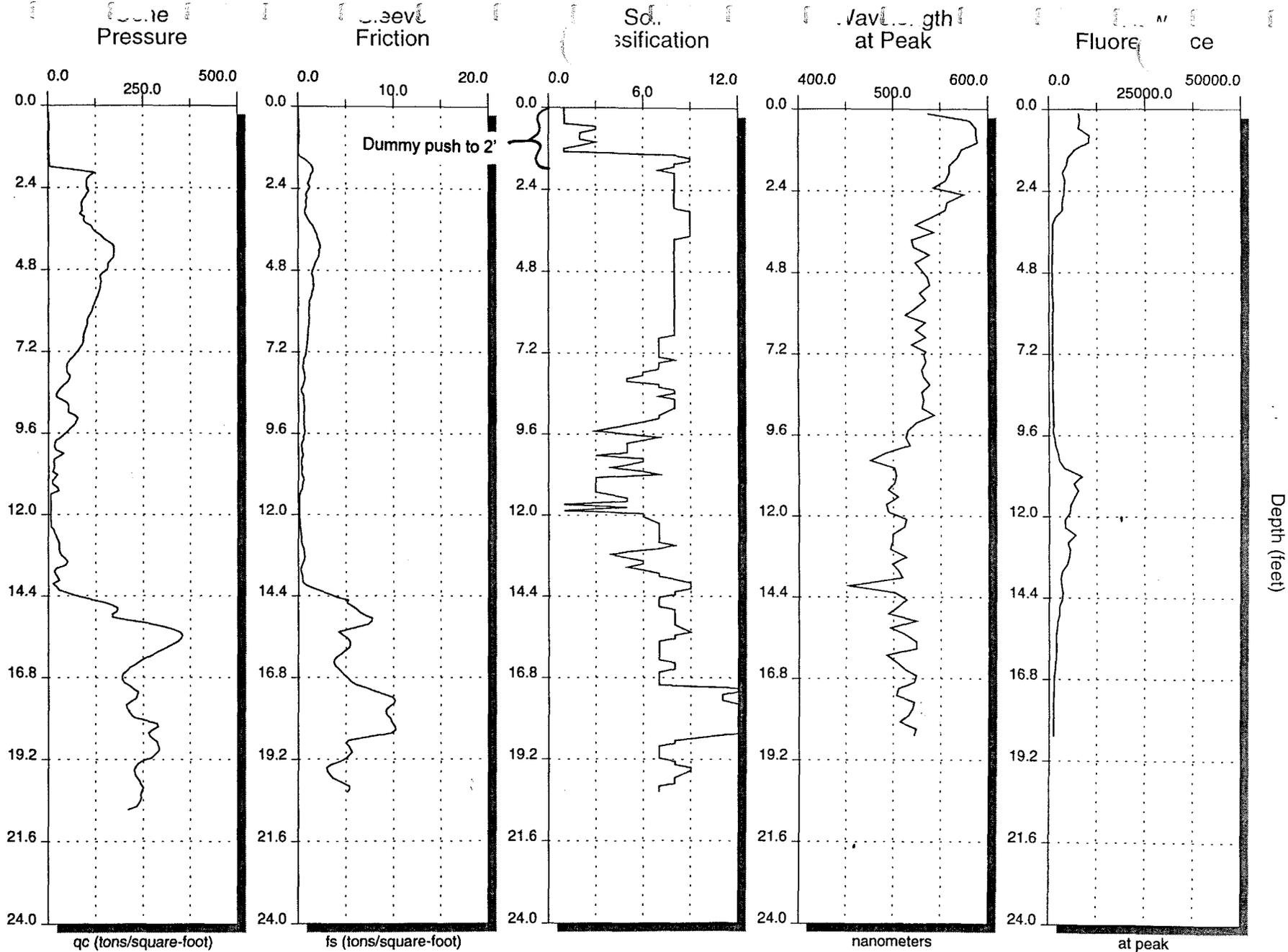
Date: 11-23-1996

Version: 1.0

Main: C:\BASIC71\DATA\FF37-11.PSH

Probe: C:\BASIC71\DATA\PROBE23C.PRB

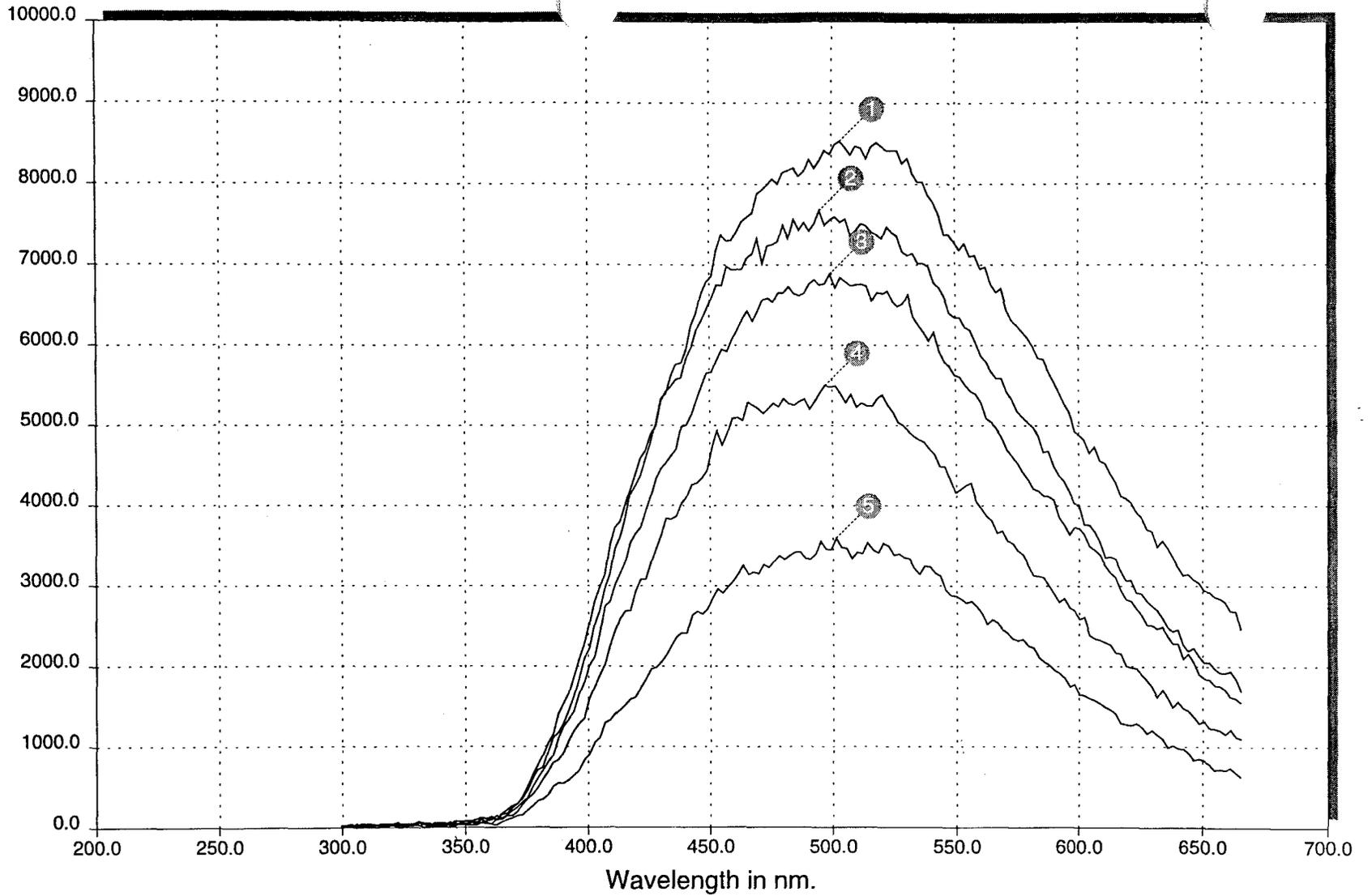
Calibration: C:\BASIC71\DATA\1213DFM.CAL





Spectral Plot(s)

Fluorescence Intensity



1: 10.8 ft.; 8528 @ 503.4 nm	5: 14.3 ft.; 3593 @ 501.3 nm
2: 11.2 ft.; 7671 @ 495.0 nm	
3: 12.5 ft.; 6884 @ 499.2 nm	
4: 13.0 ft.; 5499 @ 497.1 nm	

Time: 09:38:10

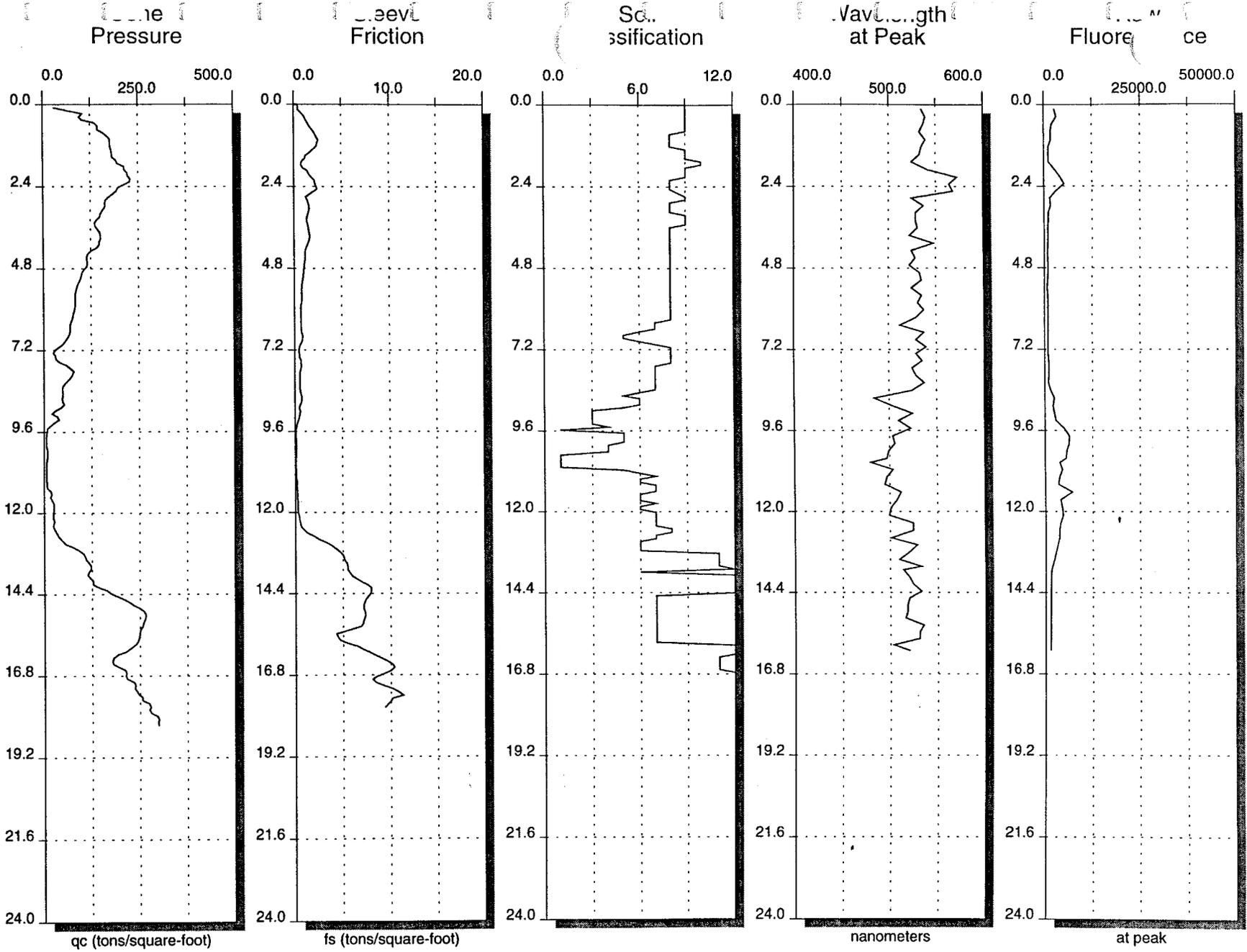
Date: 11-23-1996

Version: 1.0

Main: C:\BASIC71\DATA\FF37-12.PSH

Probe: C:\BASIC71\DATA\PROBE23C.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL



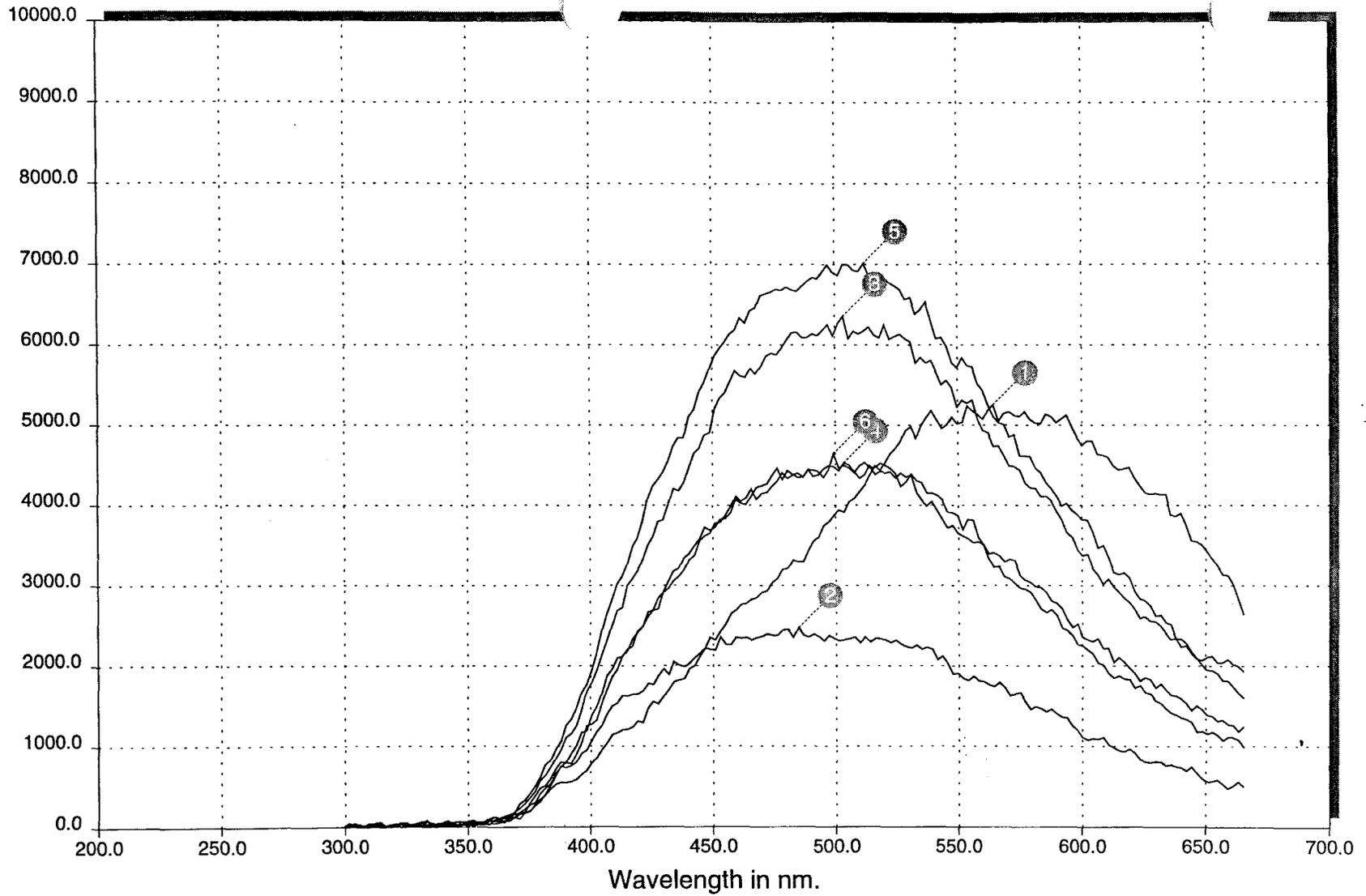
Depth (feet)

Time: 10:07:50
Date: 11-23-1996
Version: 1.0

Push: C:\BASIC71\DATA\FF37-13.PSH
Probe: C:\BASIC71\DATA\PROBE23C.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Fluorescence Intensity

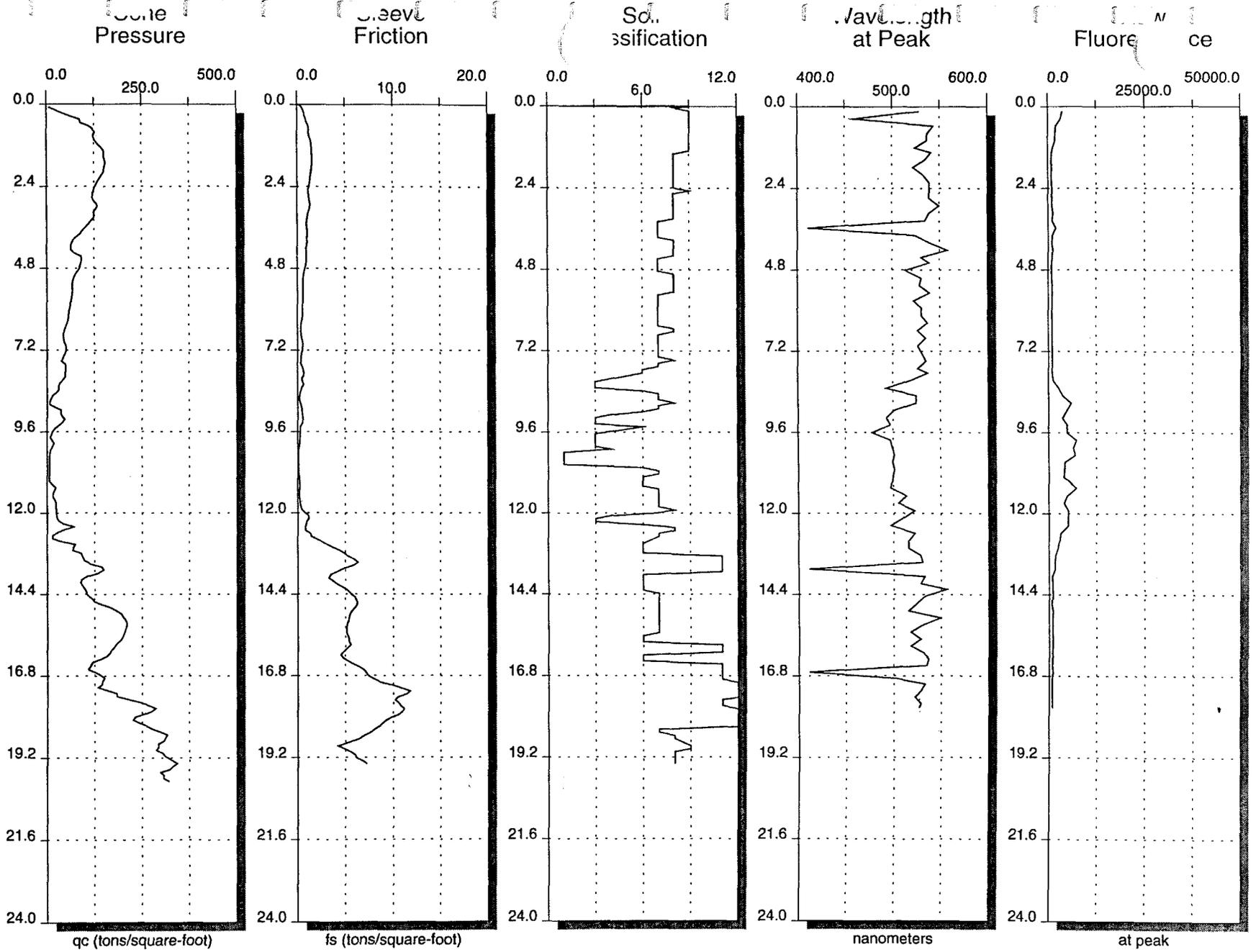


1: 2.3 ft.; 5251 @ 564.4 nm
2: 8.6 ft.; 2474 @ 484.5 nm
3: 9.8 ft.; 6355 @ 503.4 nm
4: 10.8 ft.; 4528 @ 503.4 nm

5: 11.4 ft.; 7007 @ 511.8 nm
6: 12.1 ft.; 4641 @ 499.2 nm

Main: C:\BASIC71\DATA\FF37-13.PSH
Probe: C:\BASIC71\DATA\PROBE23C.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL

Time: 10:07:50
Date: 11-23-1996
Version: 1.0



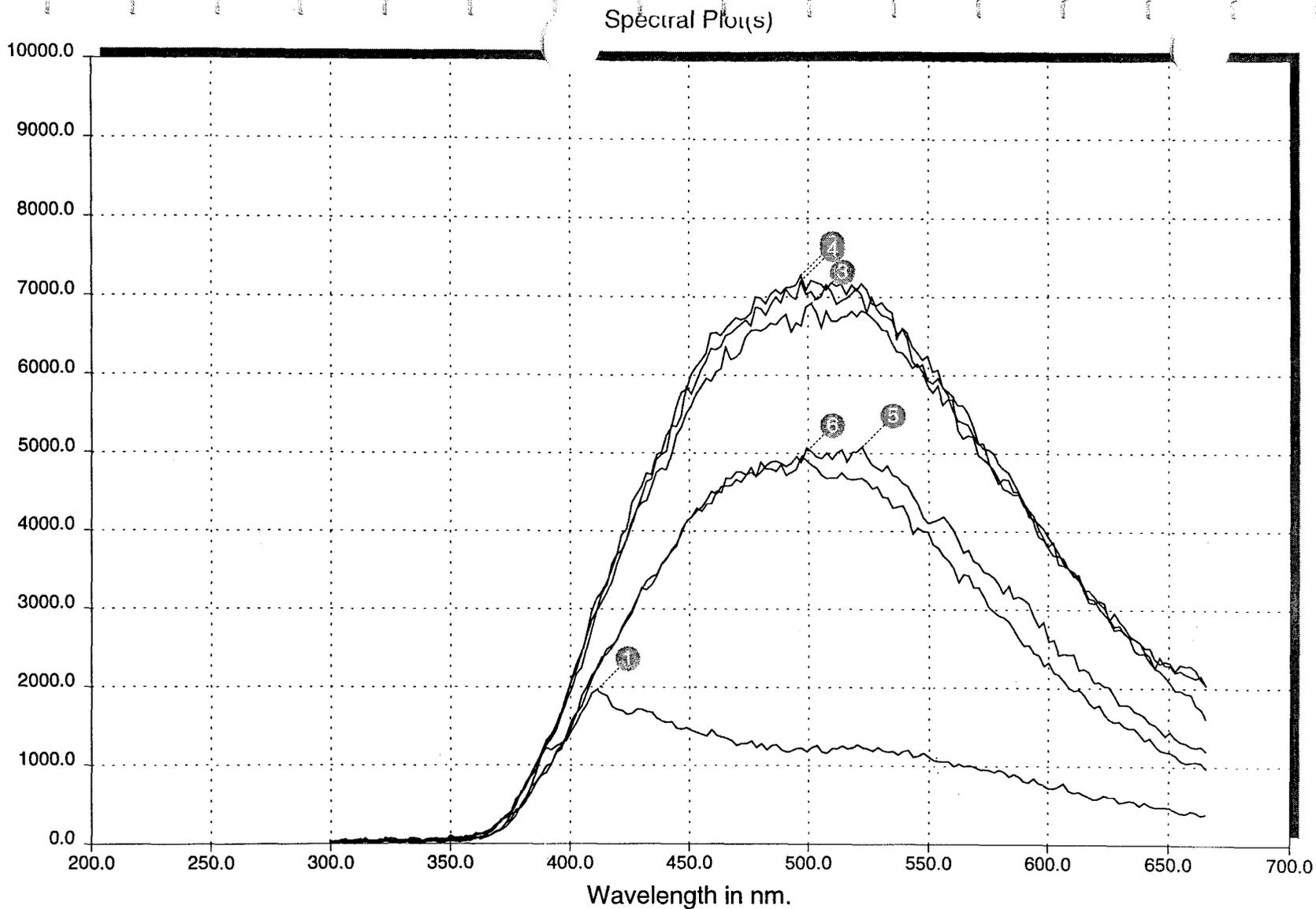
Depth (feet)

Time: 10:32:21
Date: 11-23-1996
Version: 1.0

Push: C:\BASIC71\DATA\FF37-14.PSH
Probe: C:\BASIC71\DATA\PROBE23C.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



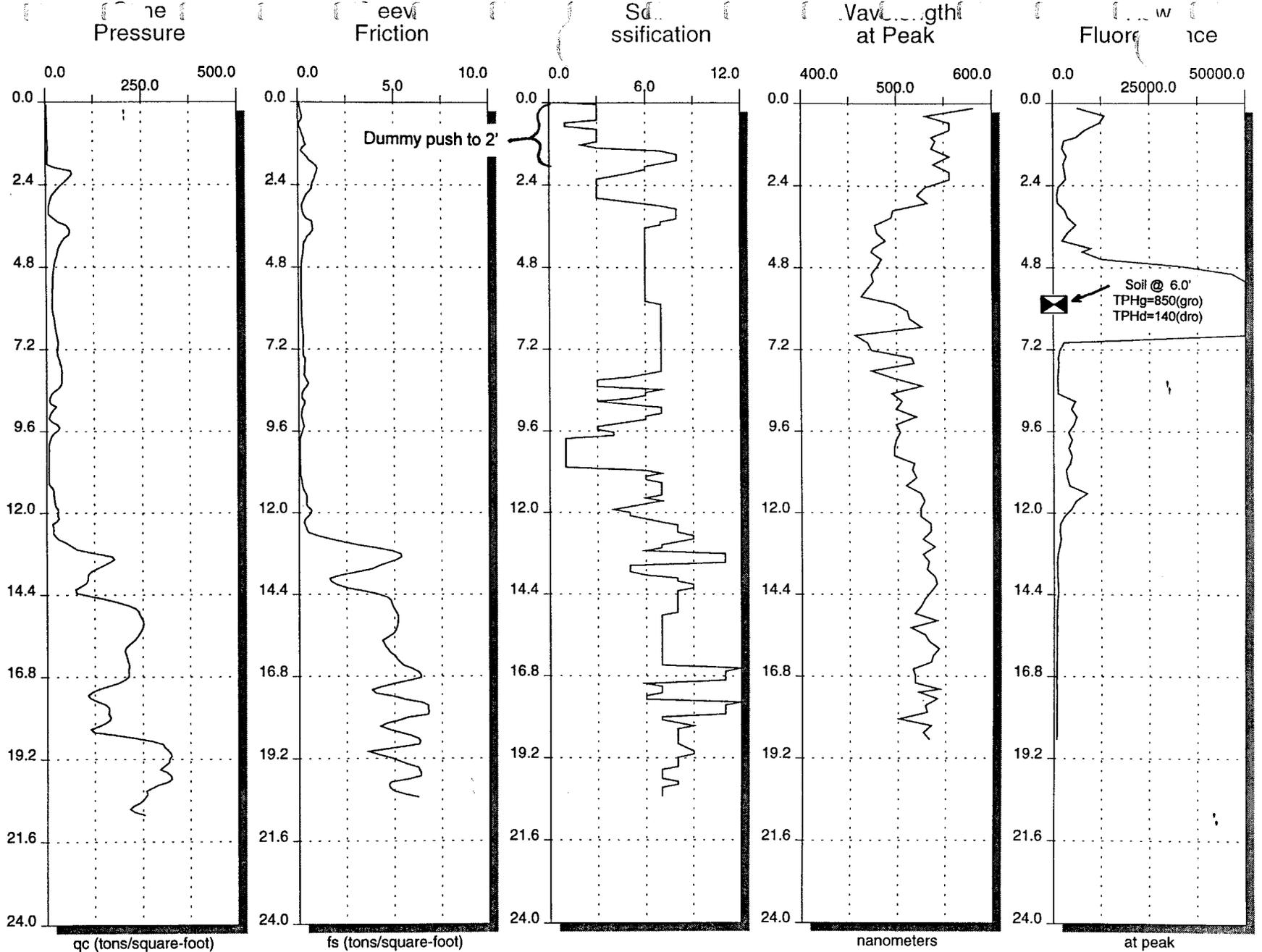
Fluorescence Intensity



Time: 10:32:21
Date: 11-23-1996
Version: 1.0

1: 3.6 ft.; 1962 @ 411.0 nm	5: 11.9 ft.; 5084 @ 522.3 nm
2: 9.8 ft.; 7277 @ 497.1 nm	6: 12.4 ft.; 4957 @ 497.1 nm
3: 10.3 ft.; 6917 @ 501.3 nm	
4: 11.3 ft.; 7204 @ 497.1 nm	

Main: C:\BASIC71\DATA\FF37-14.PSH
Probe: C:\BASIC71\DATA\PROBE23C.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



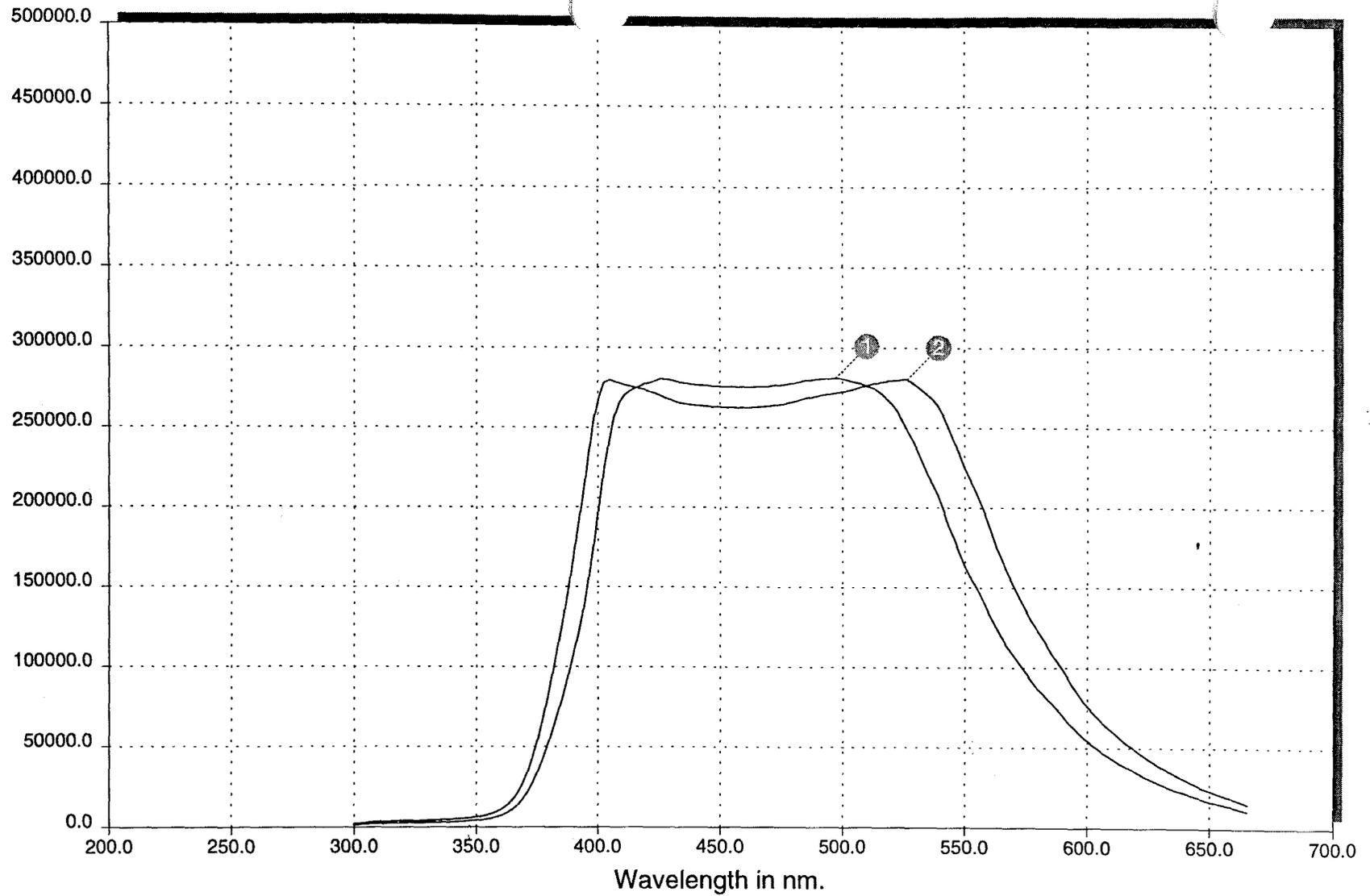
Time: 12:54:02
Date: 11-23-1996
Version: 1.0

Push: C:\BASIC71\DATA\FF37-15.PSH
Probe: C:\BASIC71\DATA\PROBE23C.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

Fluorescence Intensity



1: 5.9 ft.; 280970 @ 497.1 nm

2: 6.5 ft.; 280163 @ 526.5 nm

Time: 12:54:02

Date: 11-23-1996

Version: 1.0

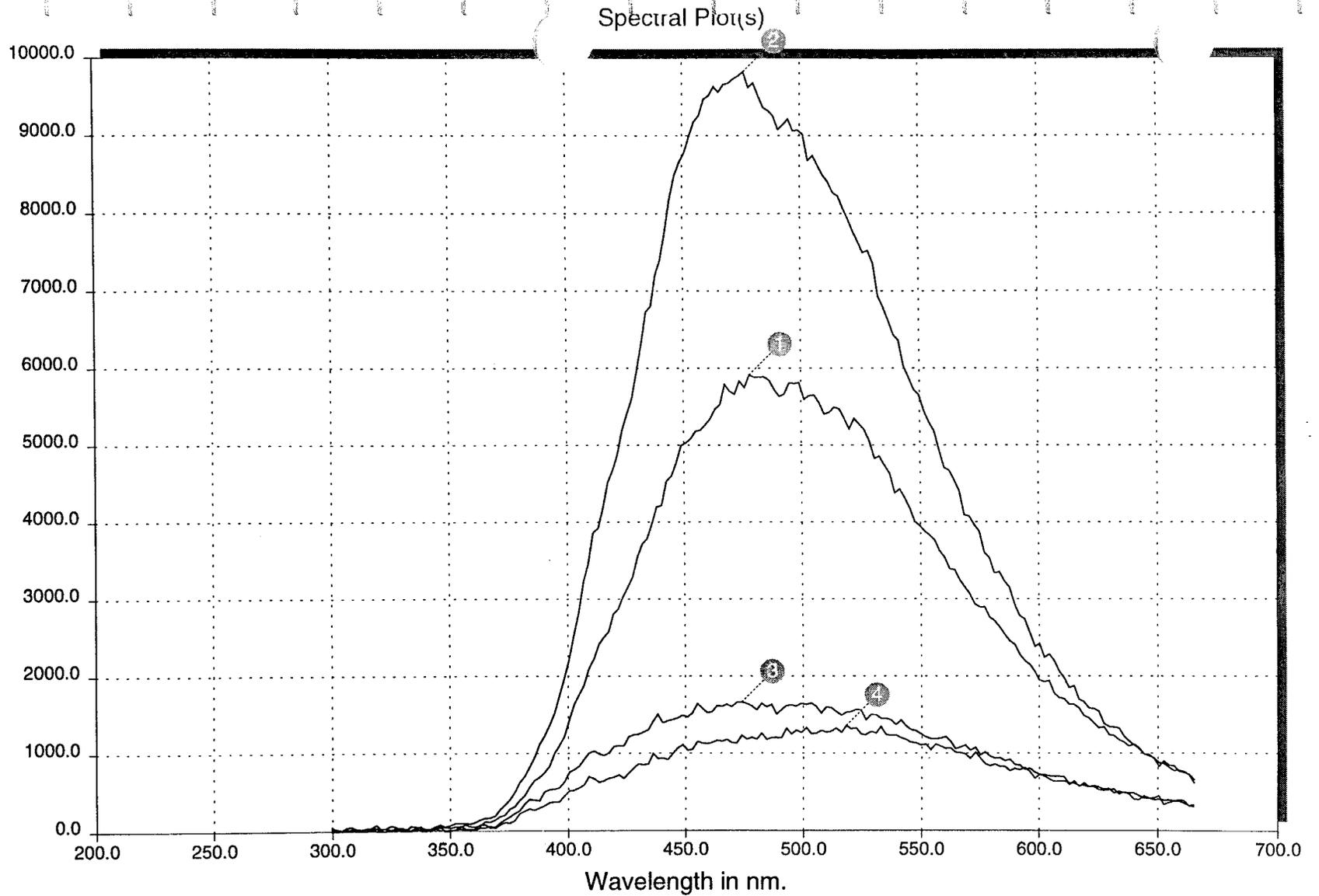
Main: C:\BASIC71\DATA\FF37-15.PSH

Probe: C:\BASIC71\DATA\PROBE23C.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Fluorescence Intensity



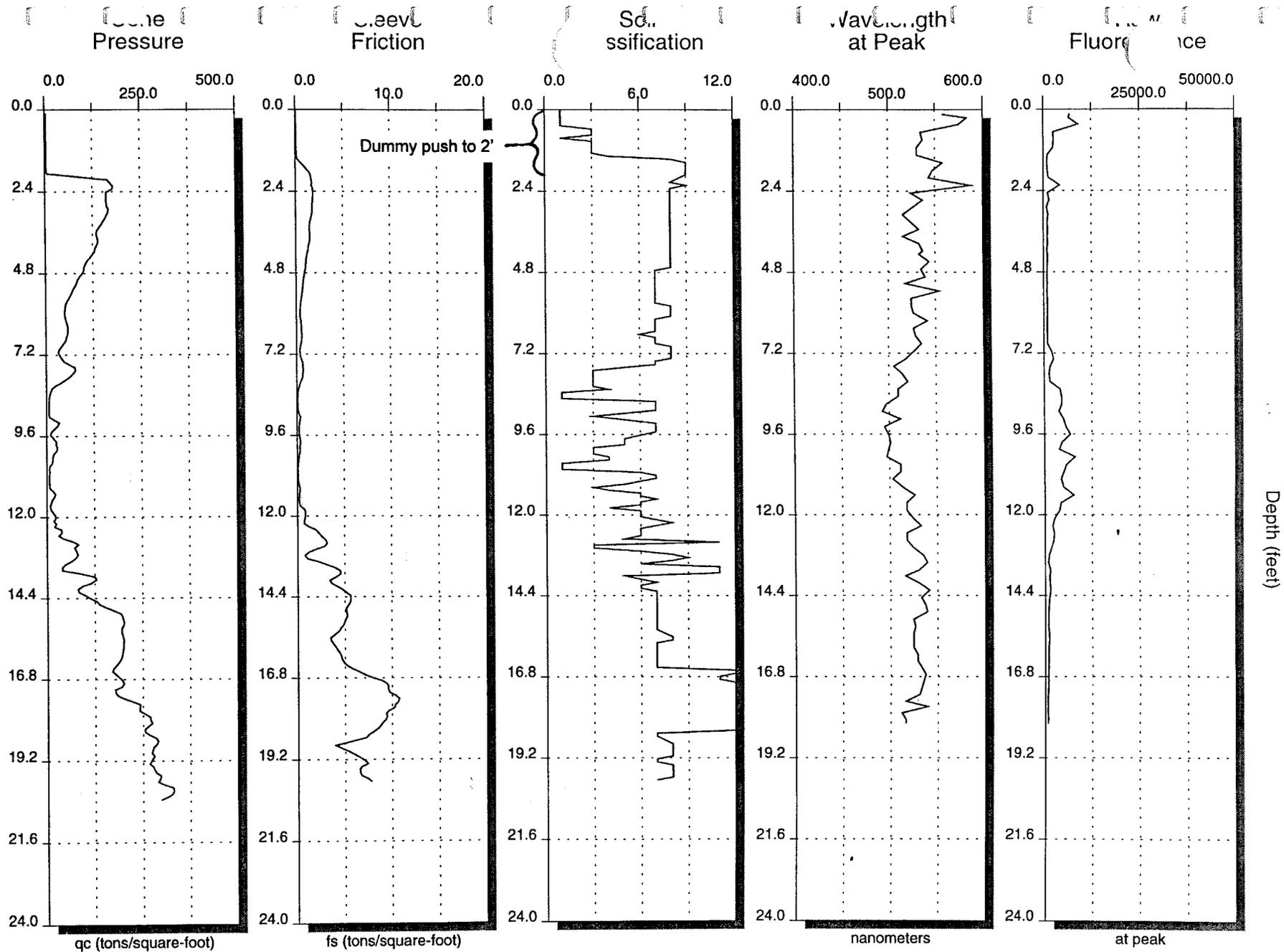
200.0 250.0 300.0 350.0 400.0 450.0 500.0 550.0 600.0 650.0 700.0

Wavelength in nm.

Time: 12:54:02
Date: 11-23-1996
Version: 1.0

1: 3.6 ft.; 5912 @ 478.2 nm
2: 4.2 ft.; 9821 @ 476.1 nm
3: 7.2 ft.; 1661 @ 474.0 nm
4: 7.6 ft.; 1357 @ 518.1 nm

Main: C:\BASIC71\DATA\FF37-15.PSH
Probe: C:\BASIC71\DATA\PROBE23C.PR8
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Time: 13:46:09

Date: 11-23-1996

Version: 1.0

Push: C:\BASIC71\DATA\FF37-16.PSH

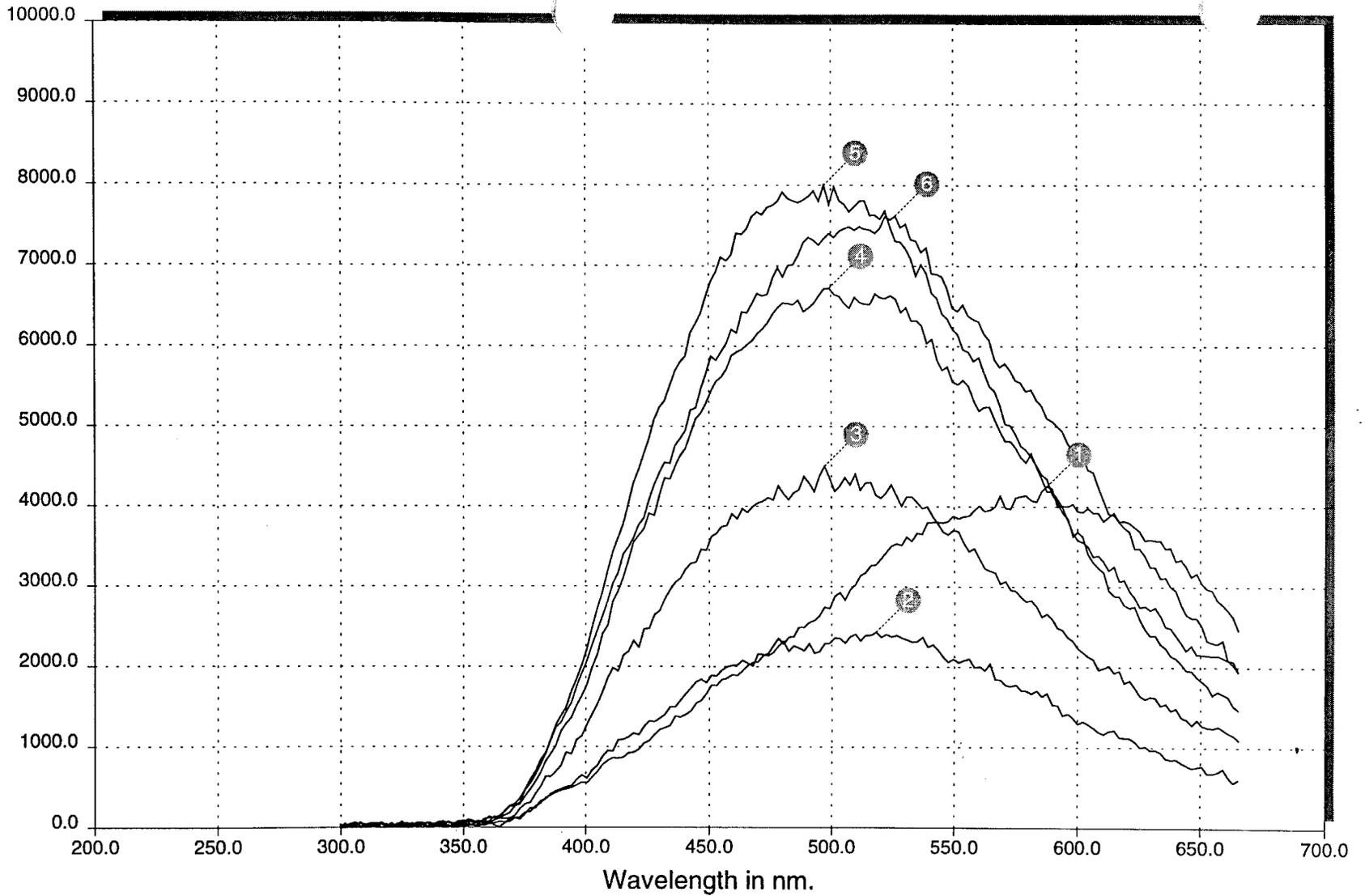
Probe: C:\BASIC71\DATA\PROBE23C.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

Fluorescence Intensity

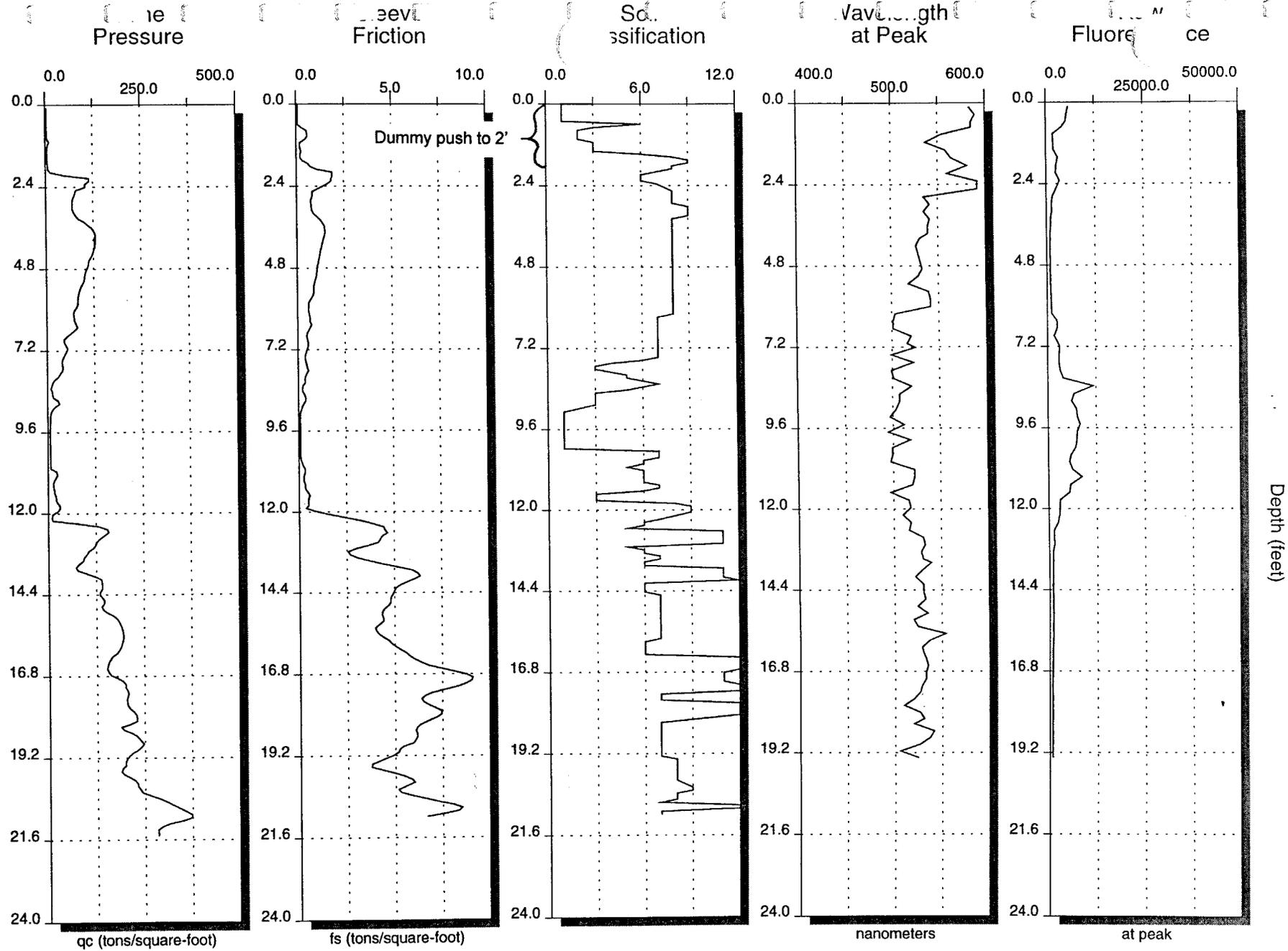


Time: 13:46:09
Date: 11-23-1996
Version: 1.0

1: 2.2 ft.; 4253 @ 587.5 nm
2: 7.4 ft.; 2432 @ 518.1 nm
3: 8.7 ft.; 4500 @ 497.1 nm
4: 9.6 ft.; 6722 @ 499.2 nm

5: 10.3 ft.; 7998 @ 497.1 nm
6: 11.4 ft.; 7619 @ 526.5 nm

Main: C:\BASIC71\DATA\FF37-16.PSH
Probe: C:\BASIC71\DATA\PROBE23C.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



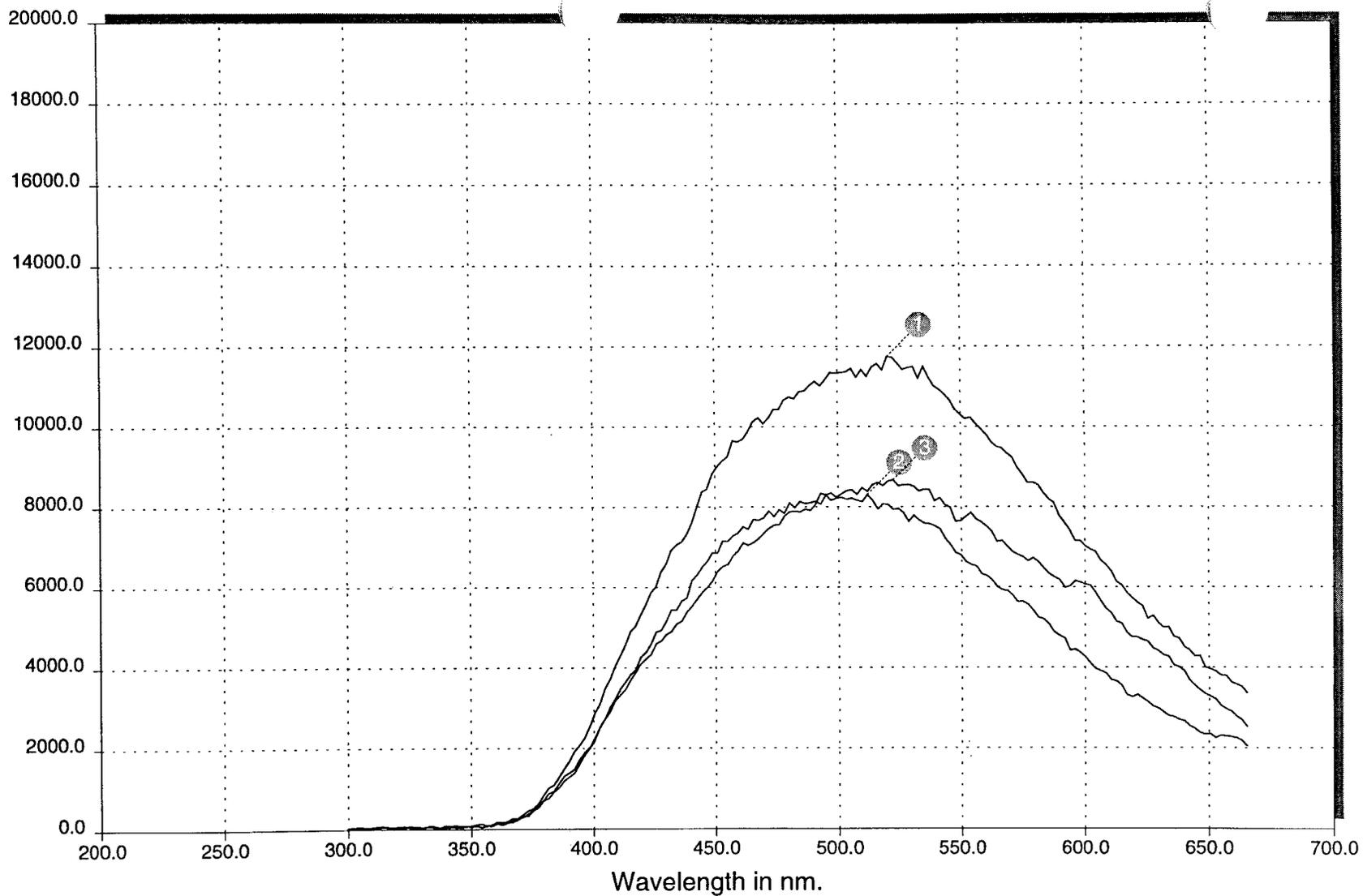
Time: 14:16:18
Date: 11-23-1996
Version: 1.0

Push: C:\BASIC71\DATA\FF37-17.PSH
Probe: C:\BASIC71\DATA\PROBE23C.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

Fluorescence Intensity



1: 8.4 ft.; 11738 @ 520.2 nm
2: 9.5 ft.; 8303 @ 511.8 nm
3: 11.1 ft.; 8665 @ 522.3 nm

Time: 14:16:18

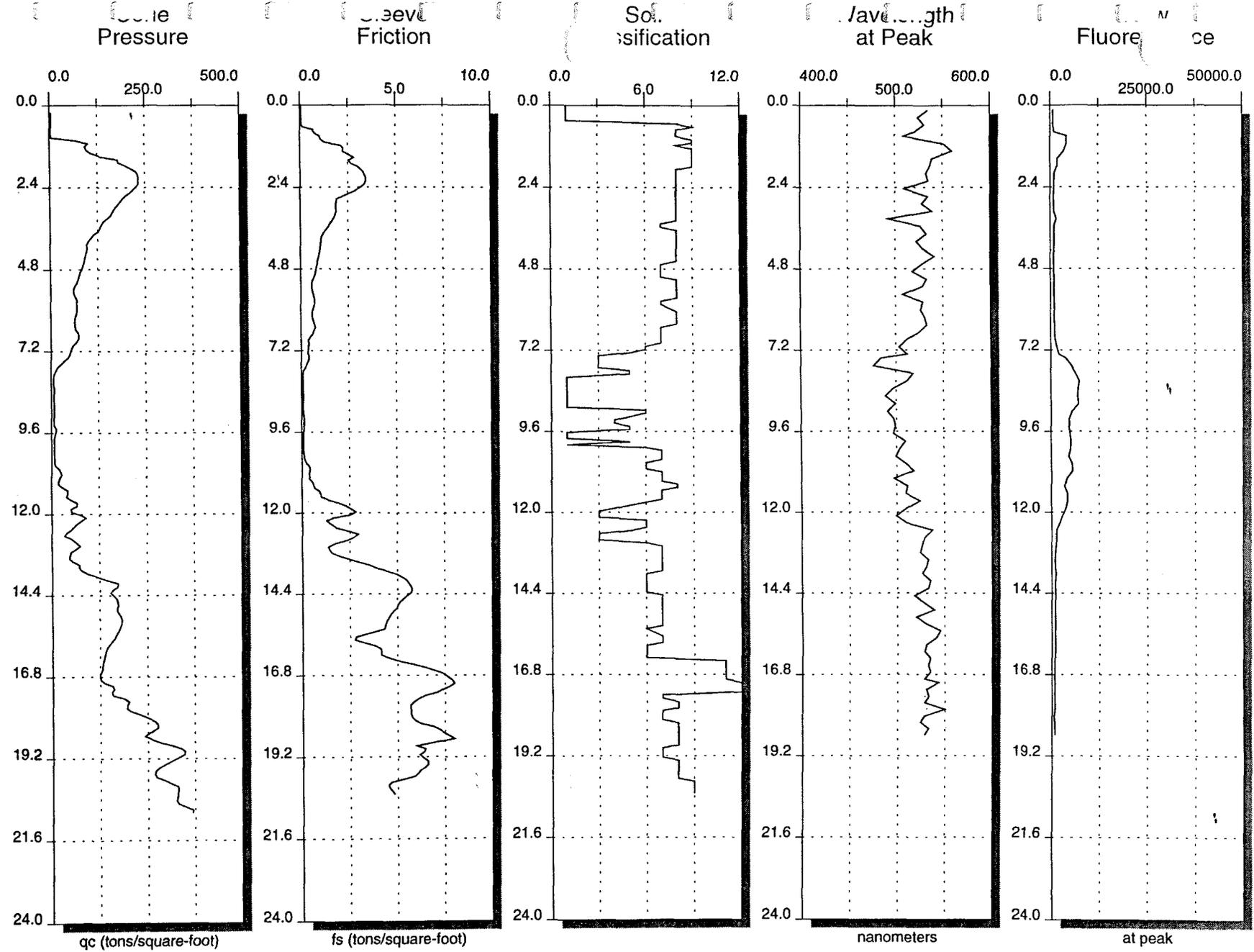
Date: 11-23-1996

Version: 1.0

Main: C:\BASIC71\DATA\FF37-17.PSH

Probe: C:\BASIC71\DATA\PROBE23C.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL

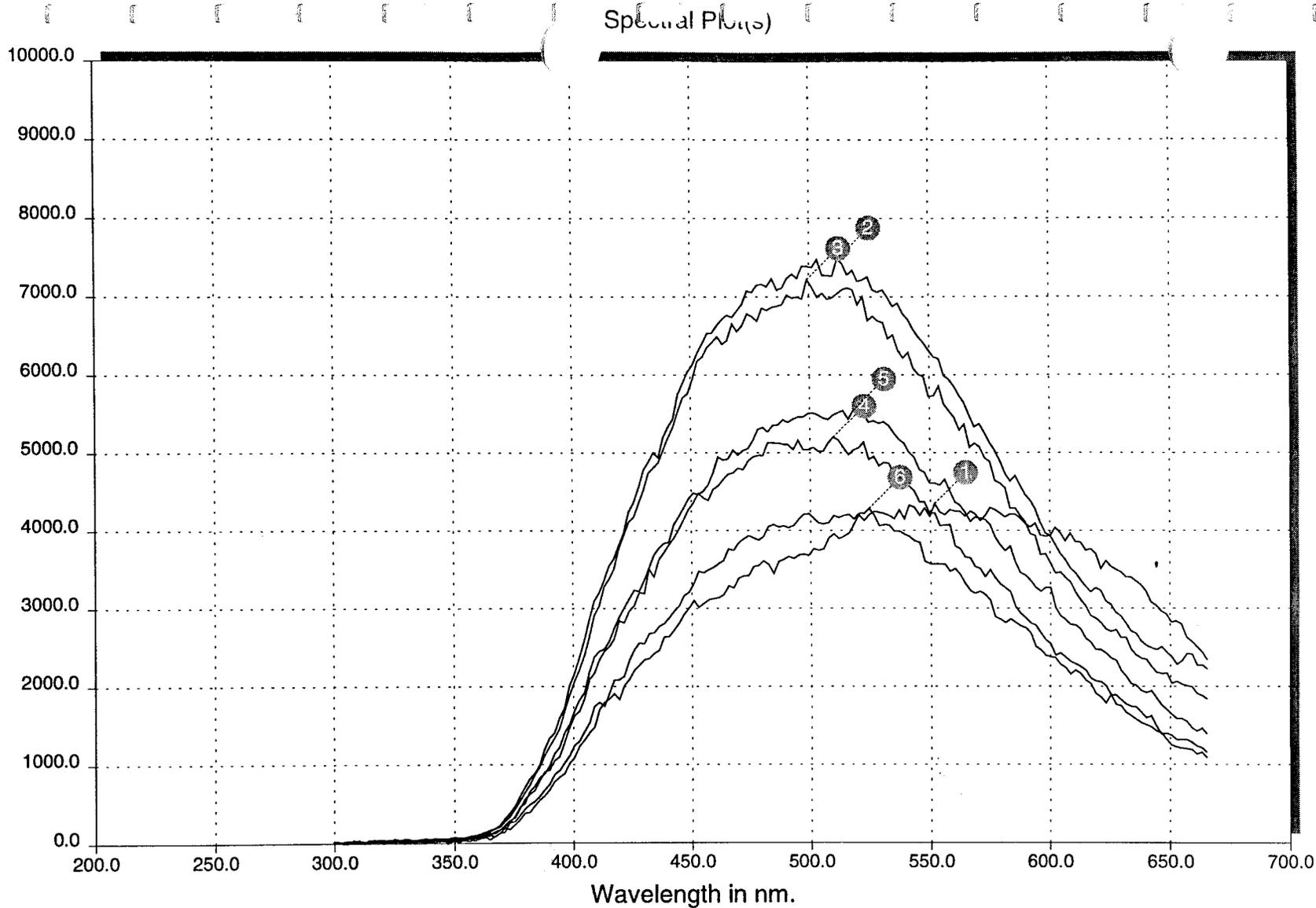


Time: 15:07:07
Date: 11-23-1996
Version: 1.0

Push: C:\BASIC71\DATA\FF37-18.PSH
Probe: C:\BASIC71\DATA\PROBE23C.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Fluorescence Intensity

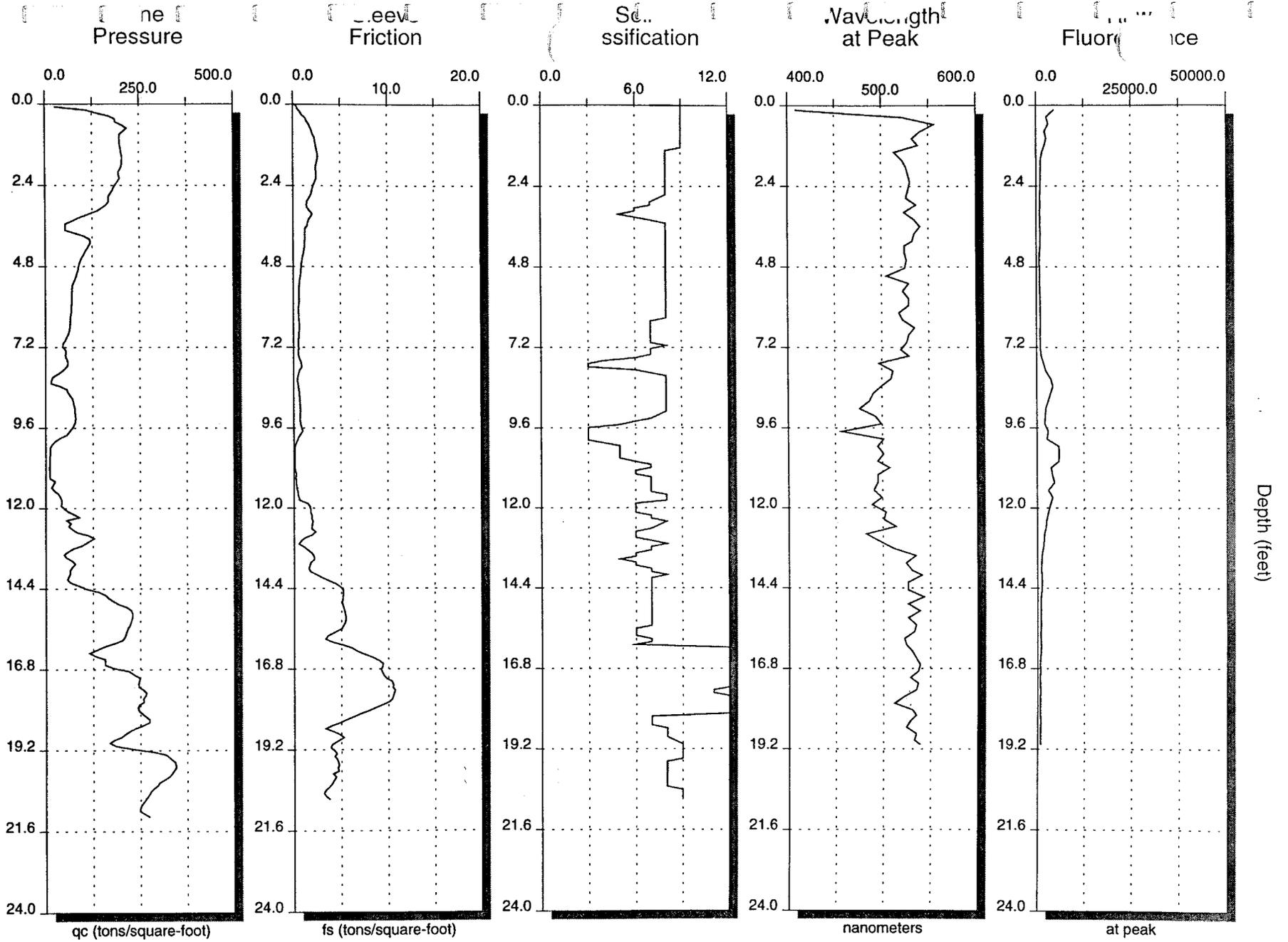


Time: 15:07:07
Date: 11-23-1996
Version: 1.0

1: 1.1 ft.; 4343 @ 551.8 nm
2: 8.1 ft.; 7478 @ 511.8 nm
3: 8.8 ft.; 7219 @ 499.2 nm
4: 9.9 ft.; 5199 @ 509.7 nm

5: 10.8 ft.; 5548 @ 518.1 nm
6: 11.7 ft.; 4283 @ 524.4 nm

Main: C:\BASIC71\DATA\FF37-18.PSH
Probe: C:\BASIC71\DATA\PROBE23C.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Time: 15:47:05

Date: 11-23-1996

Version: 1.0

Push: C:\BASIC71\DATA\FF37-19.PSH

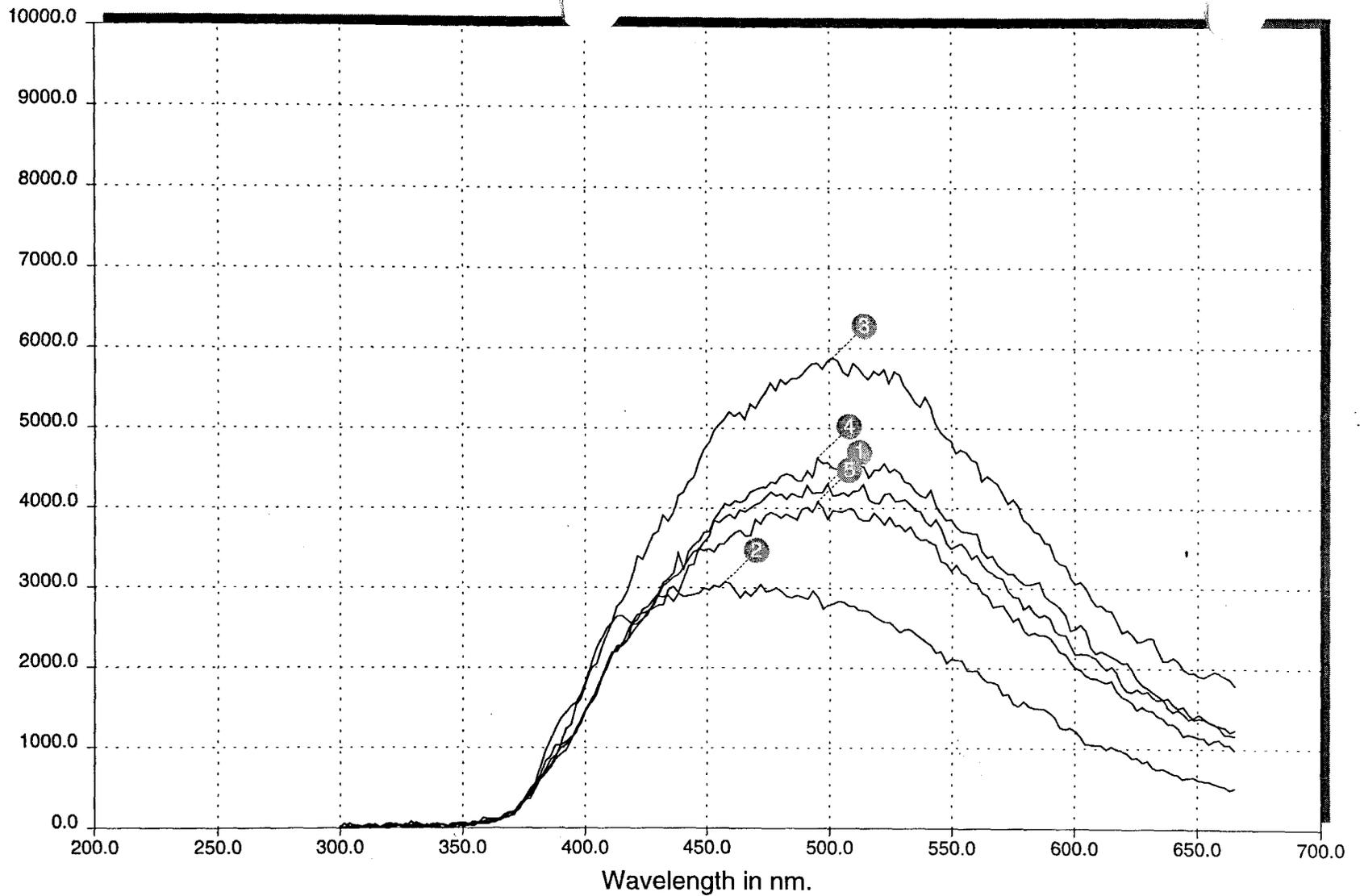
Probe: C:\BASIC71\DATA\PROBE23C.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

Fluorescence Intensity



1: 8.4 ft.; 4301 @ 499.2 nm

5: 11.0 ft.; 4077 @ 495.0 nm

2: 9.7 ft.; 3067 @ 457.2 nm

3: 10.4 ft.; 5884 @ 501.3 nm

4: 11.2 ft.; 4626 @ 495.0 nm

Main: C:\BASIC71\DATA\FF37-19.PSH

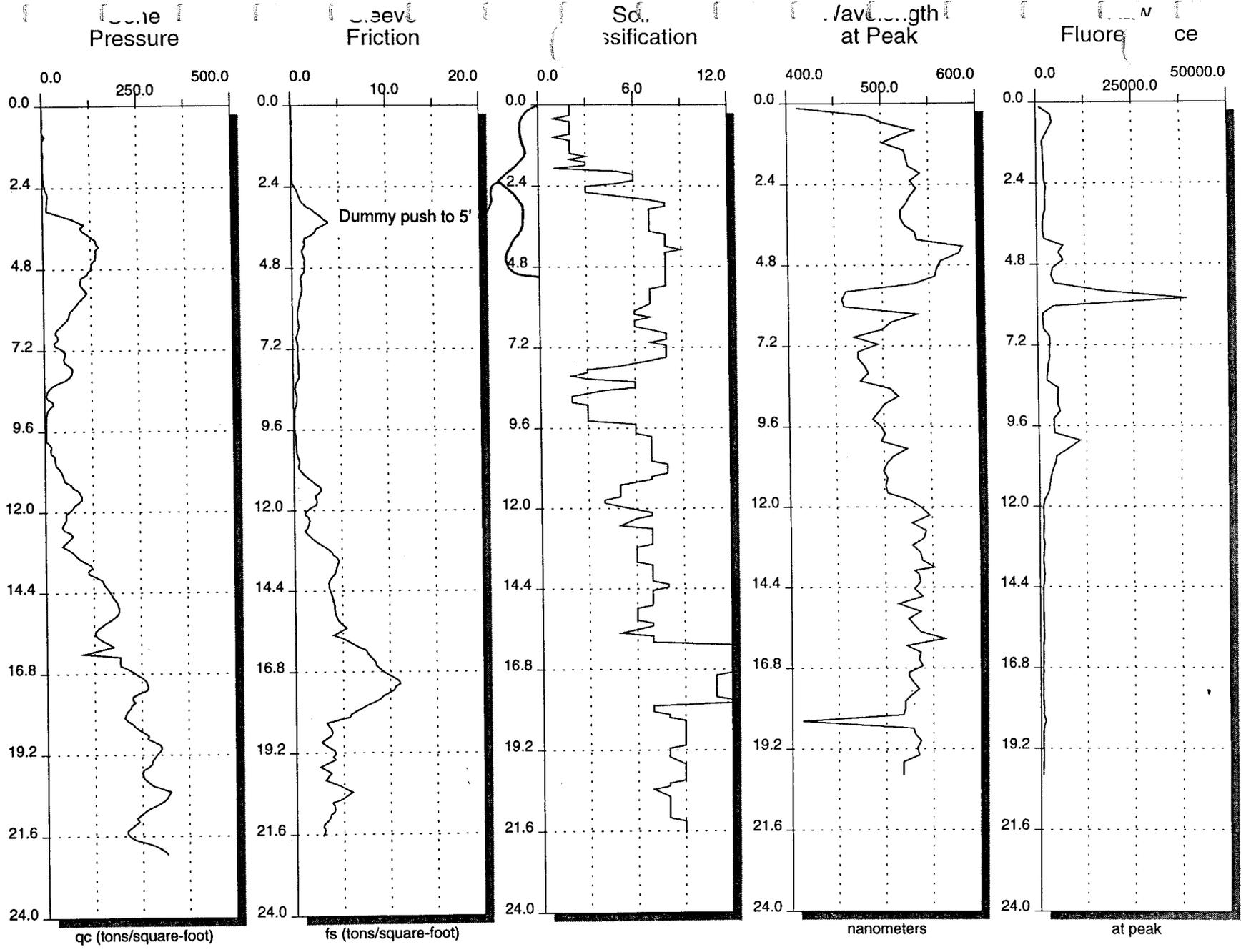
Probe: C:\BASIC71\DATA\PROBE23C.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL

Time: 15:47:05

Date: 11-23-1996

Version: 1.0



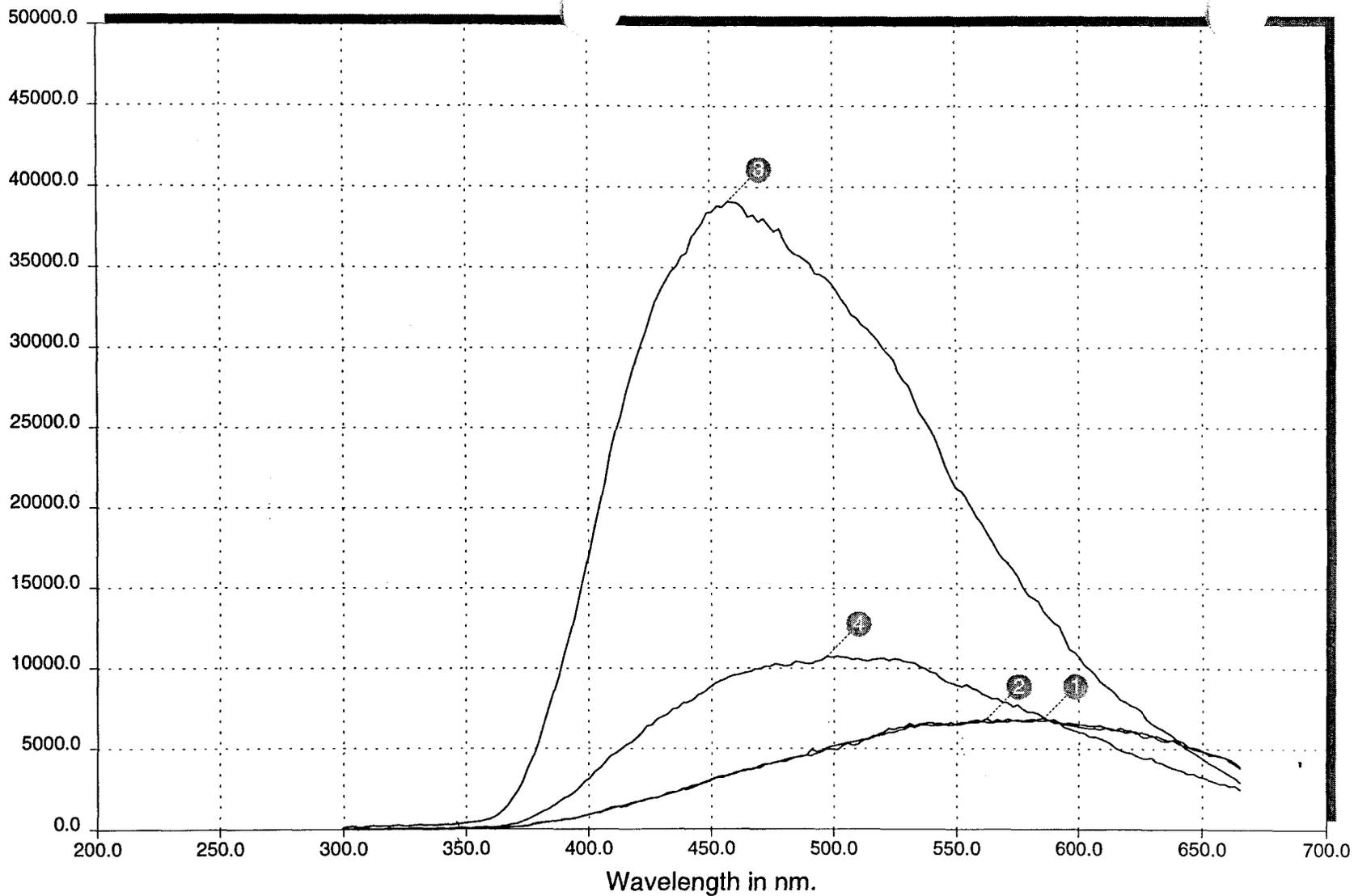
Time: 07:28:33
Date: 11-24-1996
Version: 1.0

Push: C:\BASIC71\DATA\FF37-20.PSH
Probe: C:\BASIC71\DATA\PROBE23D.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

Fluorescence Intensity



- 1: 4.2 ft.; 6882 @ 585.4 nm
- 2: 4.7 ft.; 6876 @ 562.3 nm
- 3: 5.8 ft.; 39075 @ 457.2 nm
- 4: 10.0 ft.; 10750 @ 497.1 nm

Time: 07:28:33

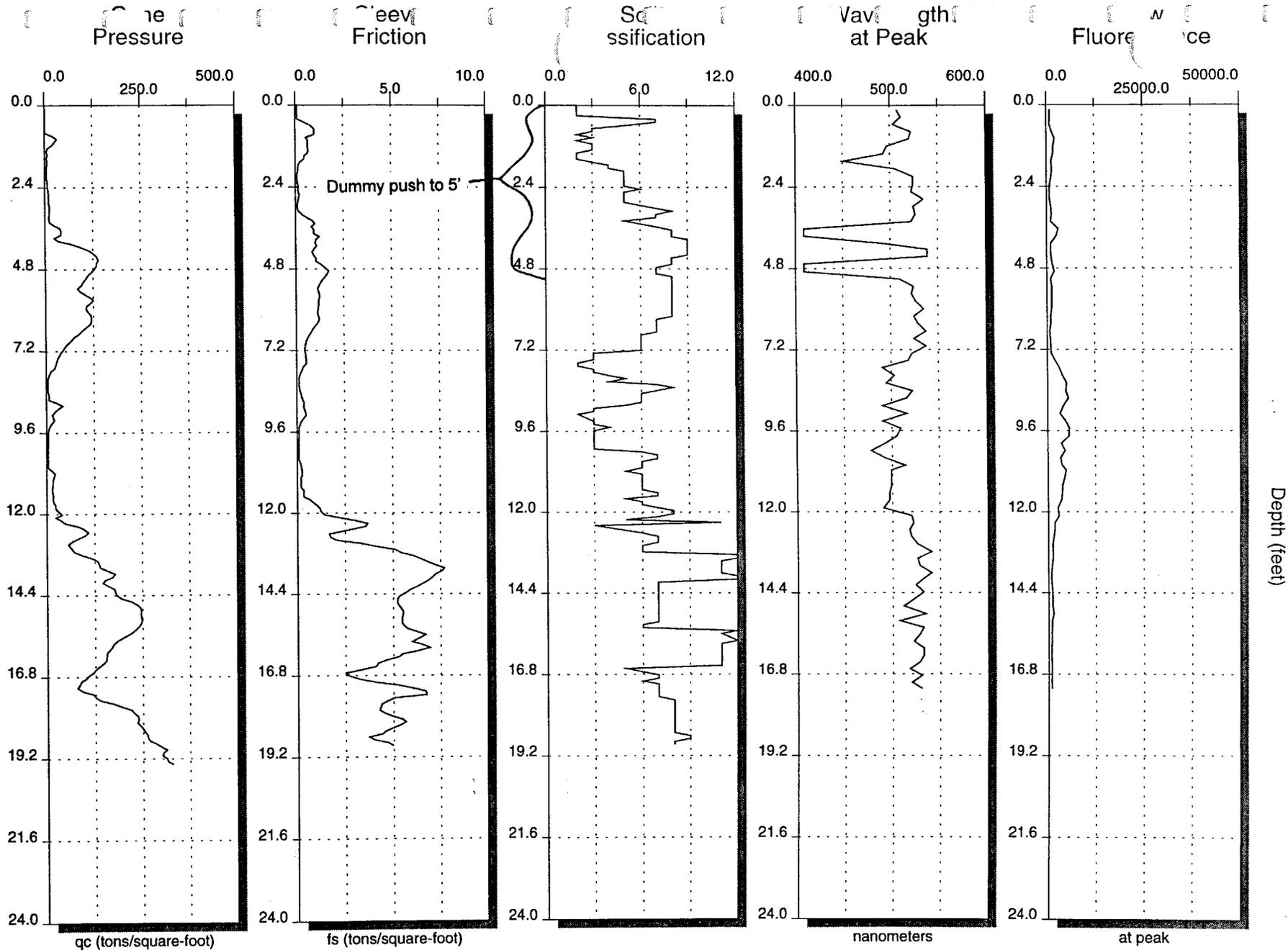
Date: 11-24-1996

Version: 1.0

Main: C:\BASIC71\DATA\FF37-20.PSH

Probe: C:\BASIC71\DATA\PROBE23D.PR8

Calibration: C:\BASIC71\DATA\1213DFM.CAL



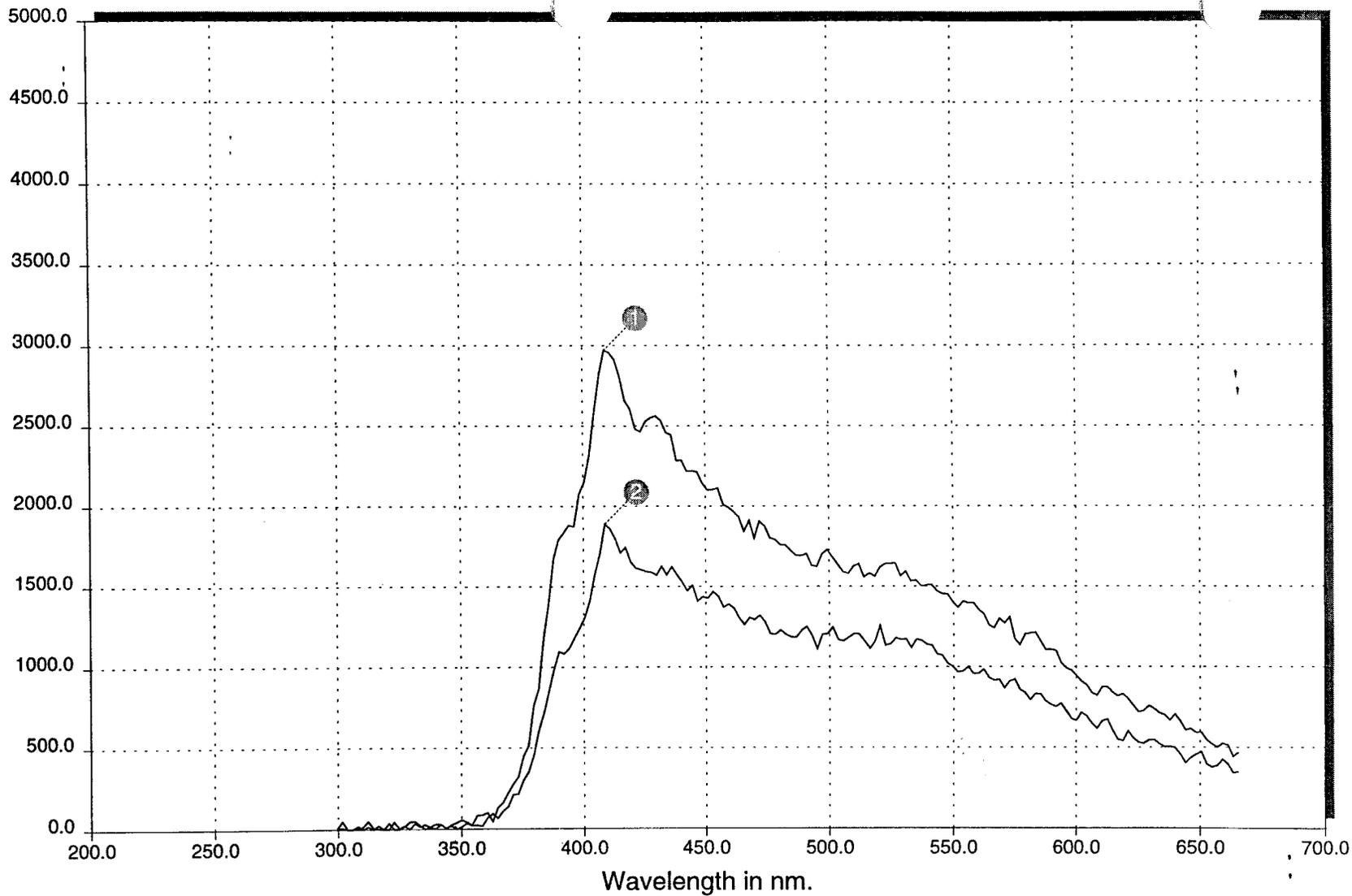
Time: 08:02:46
Date: 11-24-1996
Version: 1.0

Push: C:\BASIC71\DATA\FF37-21.PSH
Probe: C:\BASIC71\DATA\PROBE23D.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

Fluorescence Intensity



1: 3.6 ft.; 2969 @ 408.9 nm

2: 4.9 ft.; 1888 @ 408.9 nm

Time: 08:02:46

Date: 11-24-1996

Version: 1.0

Main: C:\BASIC71\DATA\FF37-21.PSH

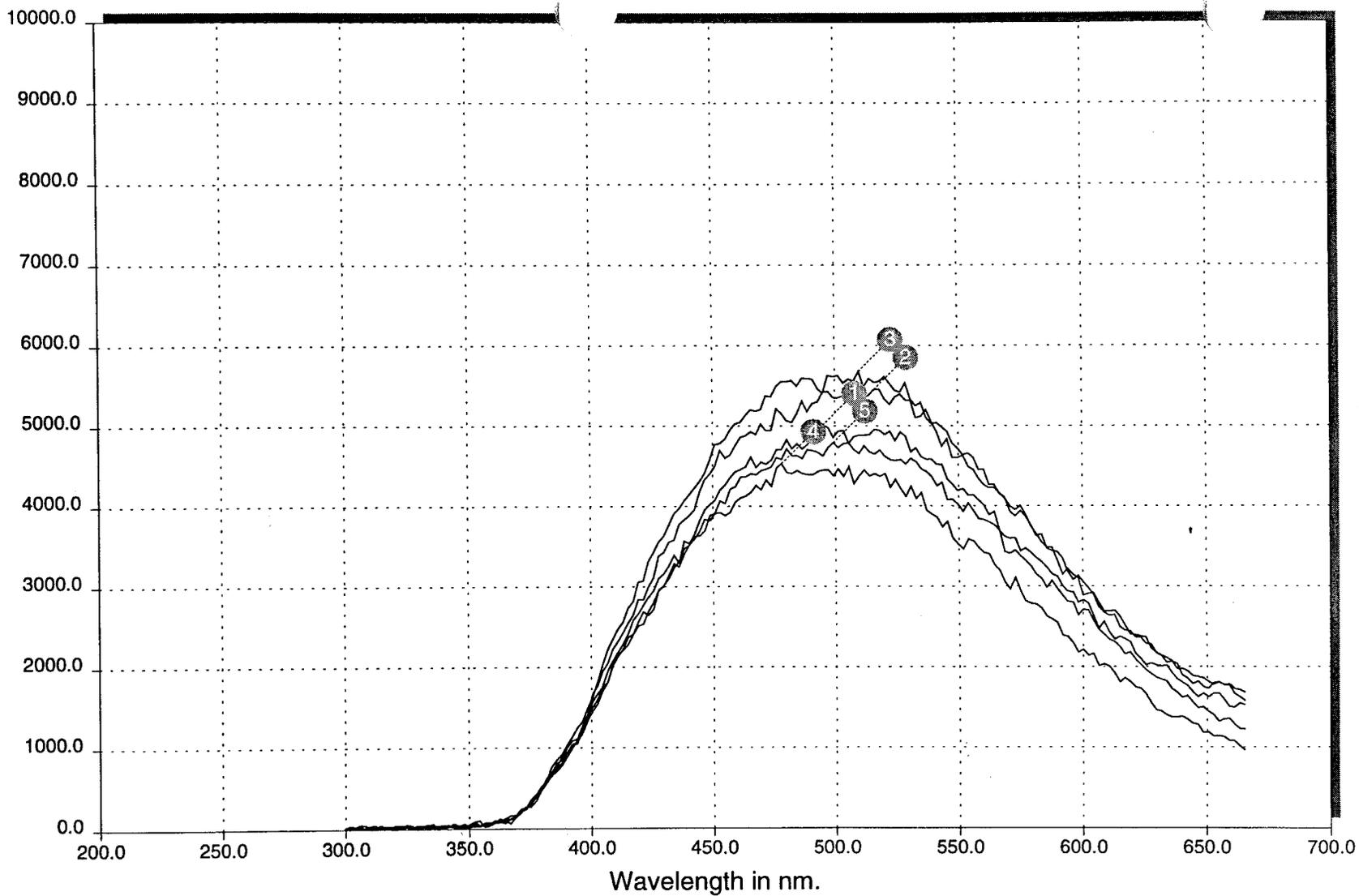
Probe: C:\BASIC71\DATA\PROBE23D.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plus

Fluorescence Intensity



1: 8.2 ft.; 5005 @ 495.0 nm

5: 10.8 ft.; 4787 @ 499.2 nm

Time: 08:02:46

2: 8.6 ft.; 5452 @ 516.0 nm

Date: 11-24-1996

3: 9.5 ft.; 5675 @ 509.7 nm

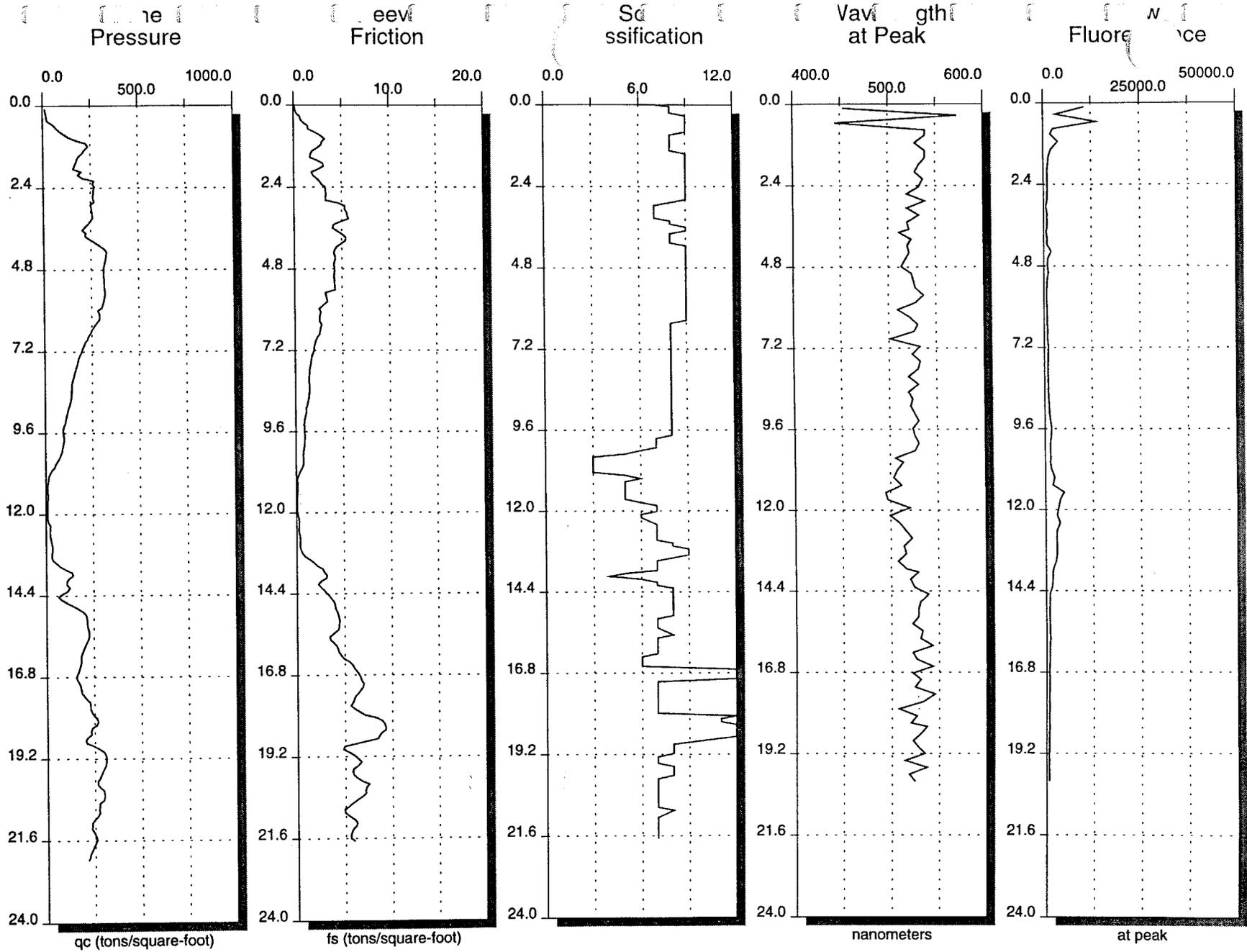
Version: 1.0

4: 10.2 ft.; 4527 @ 478.2 nm

Main: C:\BASIC71\DATA\FF37-21.PSH

Probe: C:\BASIC71\DATA\PROBE23D.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL

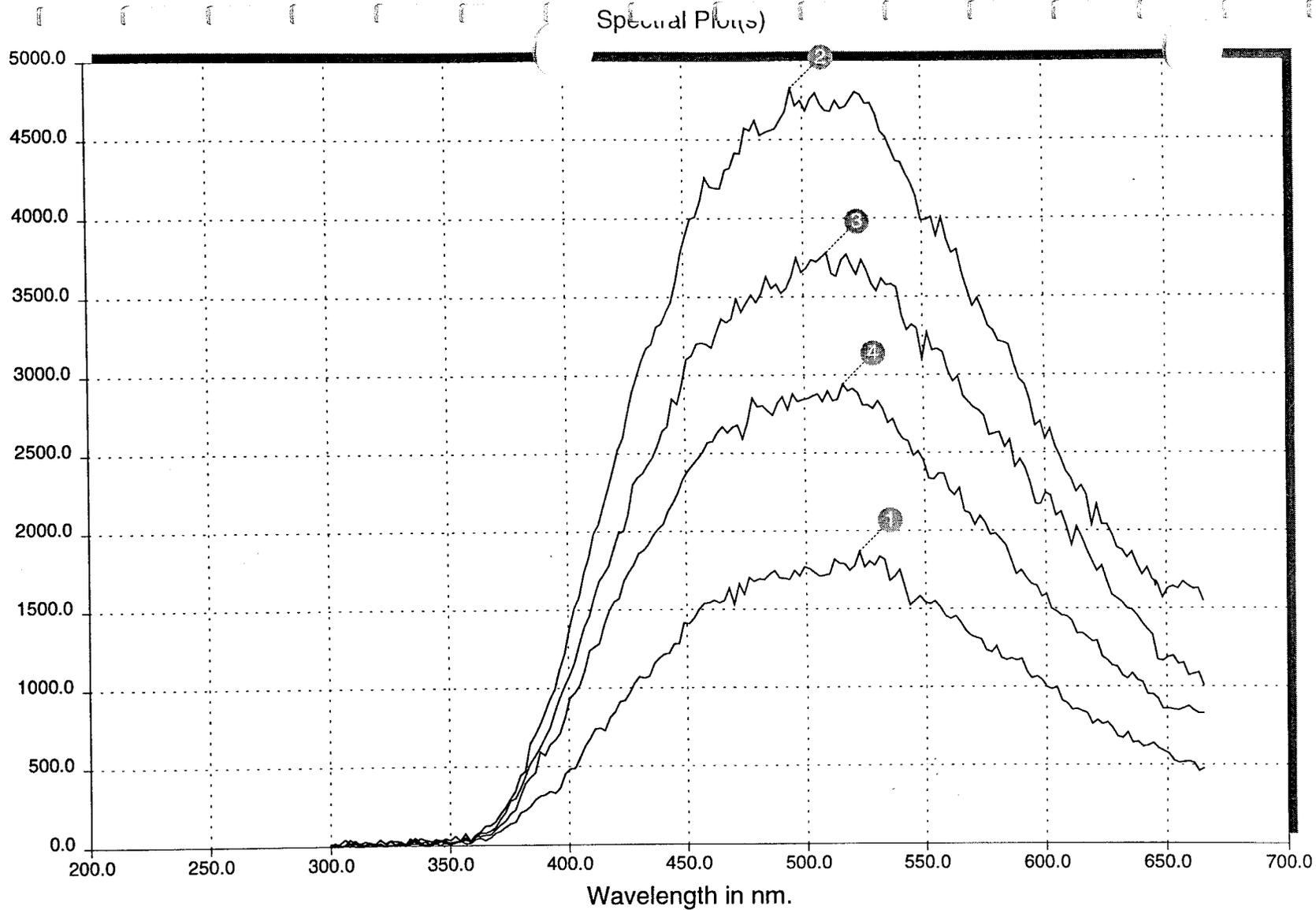


Time: 08:22:27
Date: 12-07-1996
Version: 1.0

Push: C:\BASIC71\DATA\FF37-22.PSH
Probe: C:\BASIC71\DATA\PROBE23E.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Fluorescence Intensity



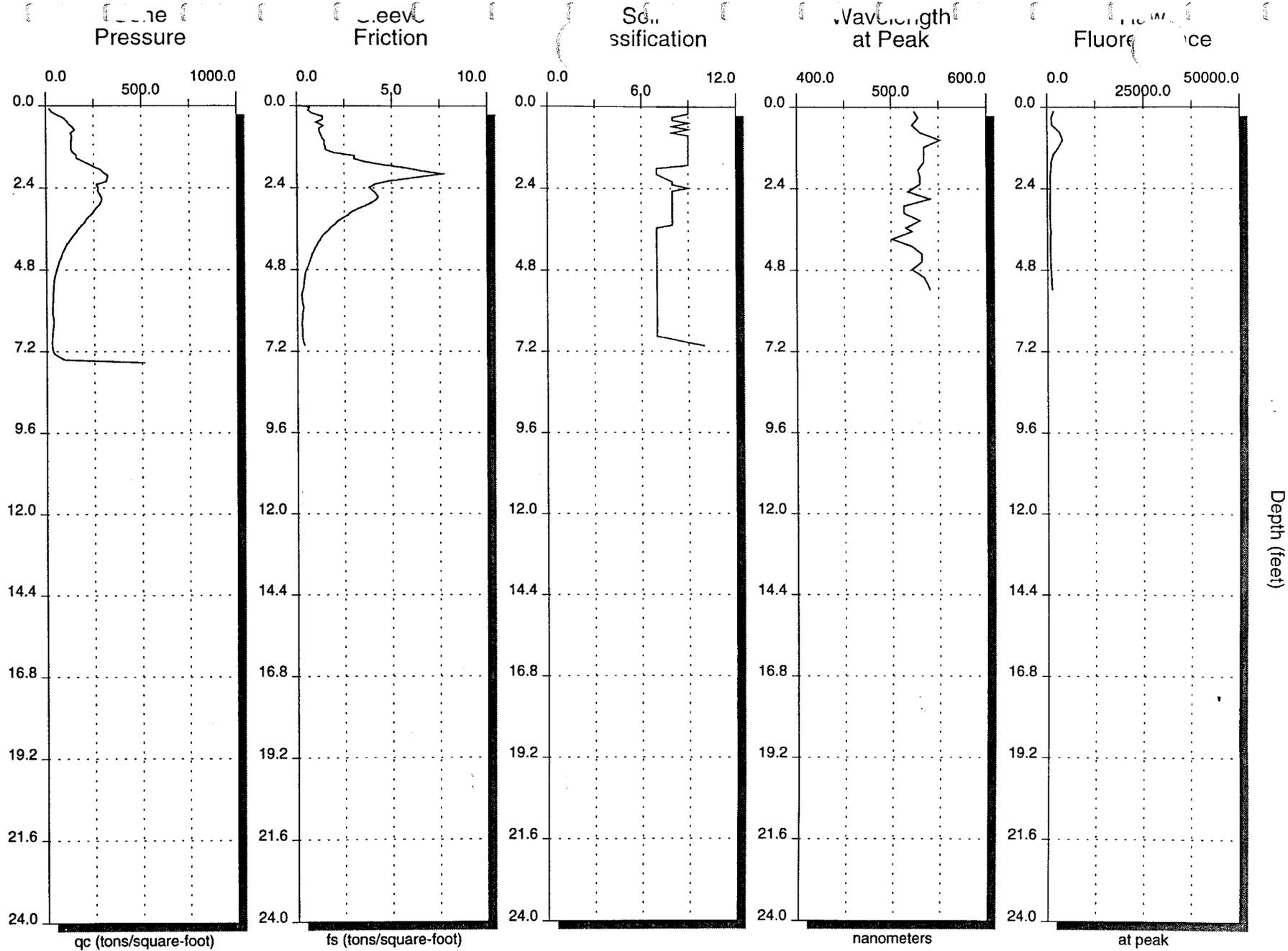
200.0 250.0 300.0 350.0 400.0 450.0 500.0 550.0 600.0 650.0 700.0

Wavelength in nm.

Time: 08:22:27
Date: 12-07-1996
Version: 1.0

1: 4.4 ft.; 1867 @ 522.3 nm
2: 11.5 ft.; 4823 @ 495.0 nm
3: 12.4 ft.; 3779 @ 509.7 nm
4: 13.3 ft.; 2939 @ 516.0 nm

Main: C:\BASIC71\DATA\IFF37-22.PSH
Probe: C:\BASIC71\DATA\PROBE23E.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Time: 12:07:56

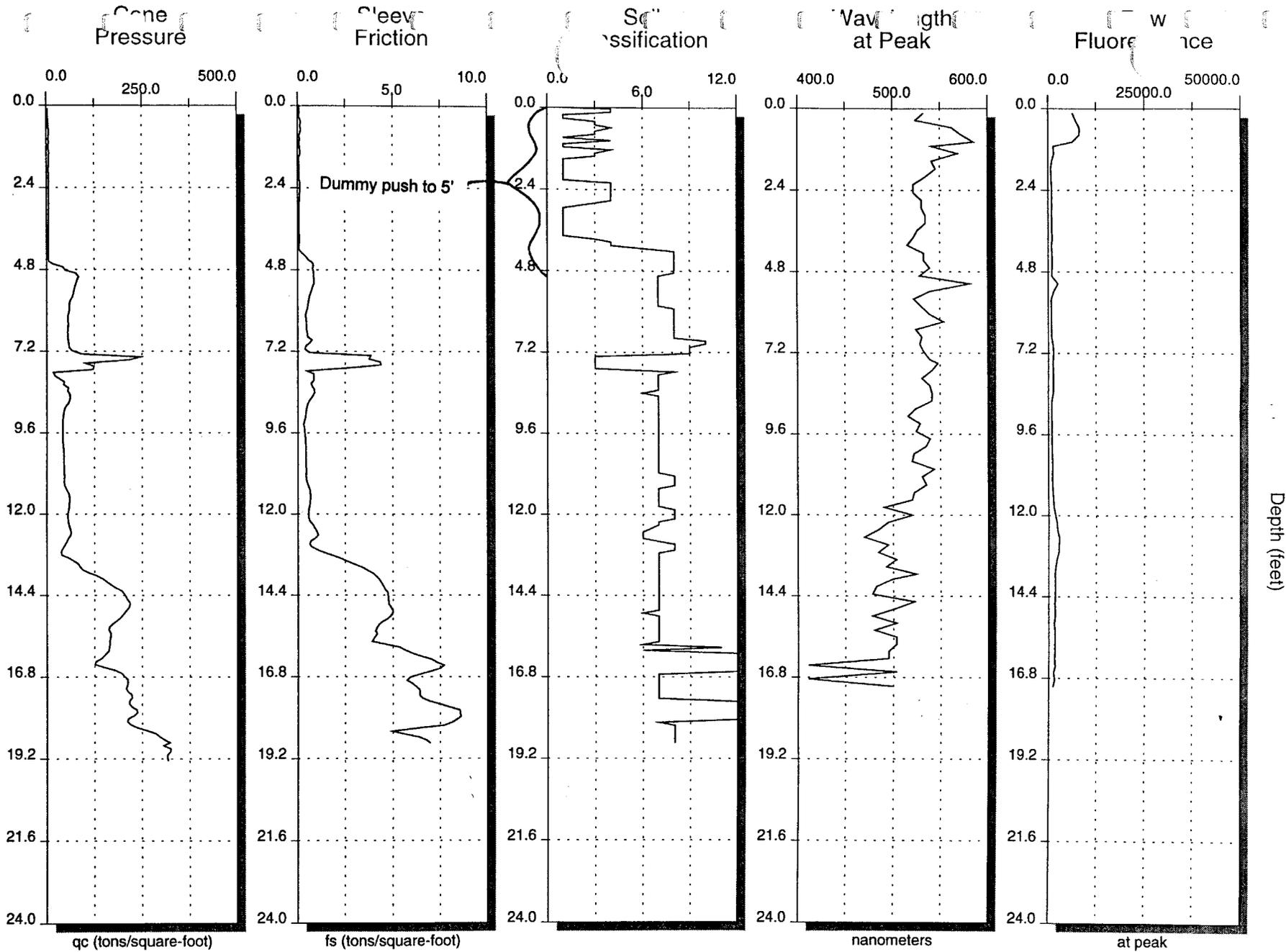
Date: 12-07-1996

Version: 1.0

Push: C:\BASIC71\DATA\FF37-23.PSH

Probe: C:\BASIC71\DATA\PROBE23E.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Time: 12:36:48

Date: 12-07-1996

Version: 1.0

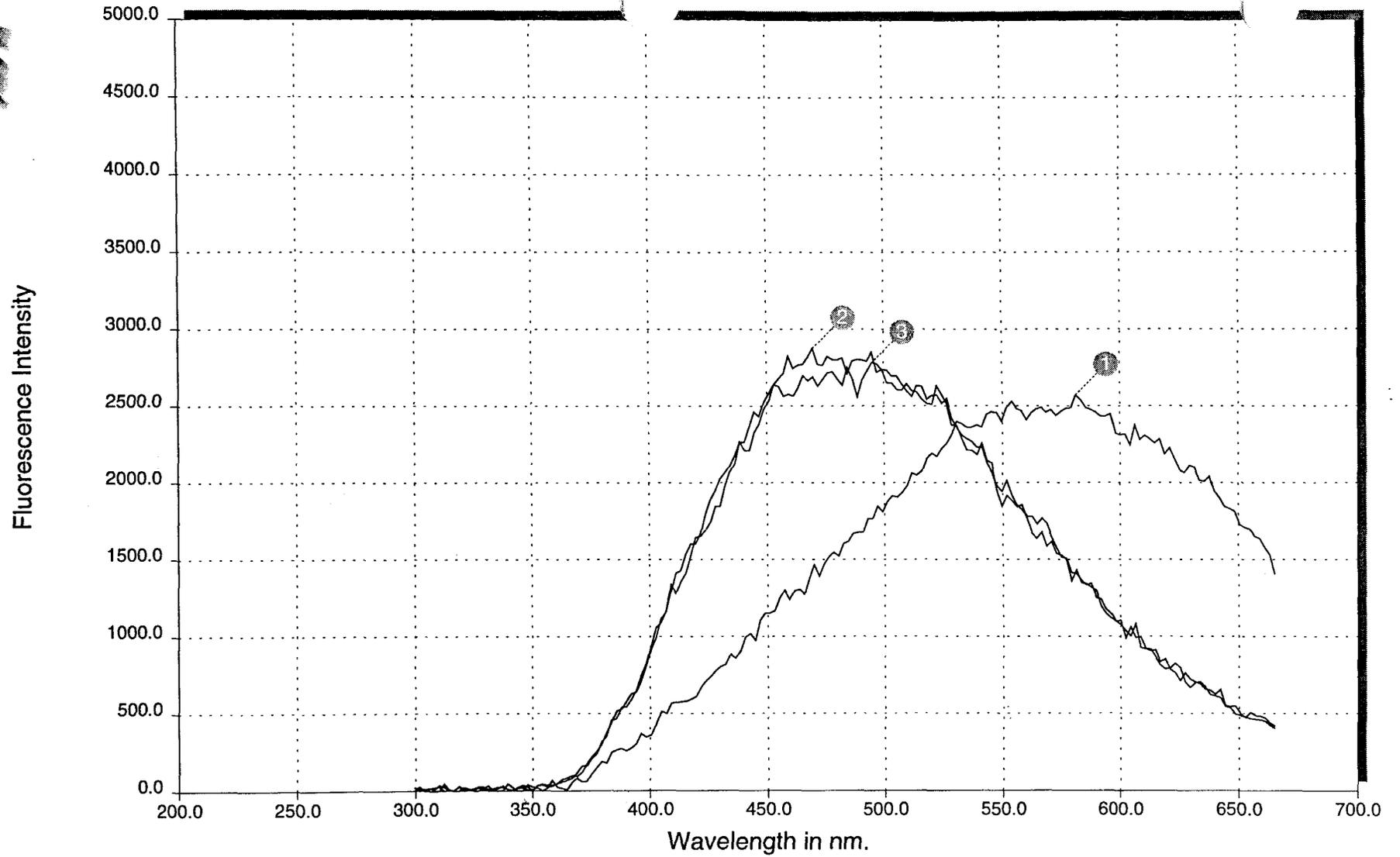
Push: C:\BASIC71\DATA\FF37-24.PSH

Probe: C:\BASIC71\DATA\PROBE23E.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL



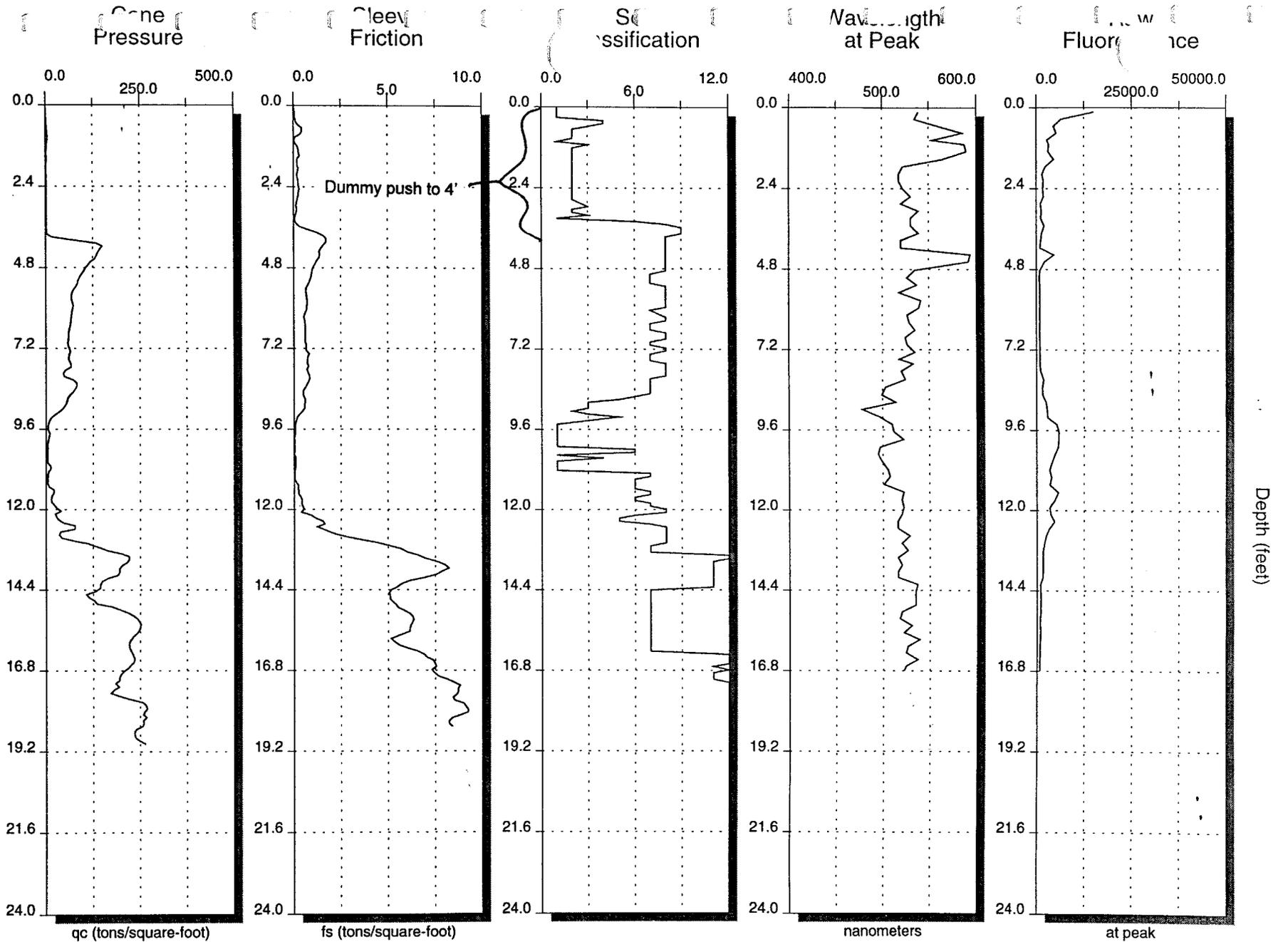
Spectral Plot(s)



Time: 12:36:48
Date: 12-07-1996
Version: 1.0

1: 5.2 ft.; 2570 @ 581.2 nm
2: 12.7 ft.; 2876 @ 469.8 nm
3: 12.9 ft.; 2781 @ 495.0 nm

Main: C:\BASIC71\DATA\FF37-24.PSH
Probe: C:\BASIC71\DATA\PROBE23E.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL

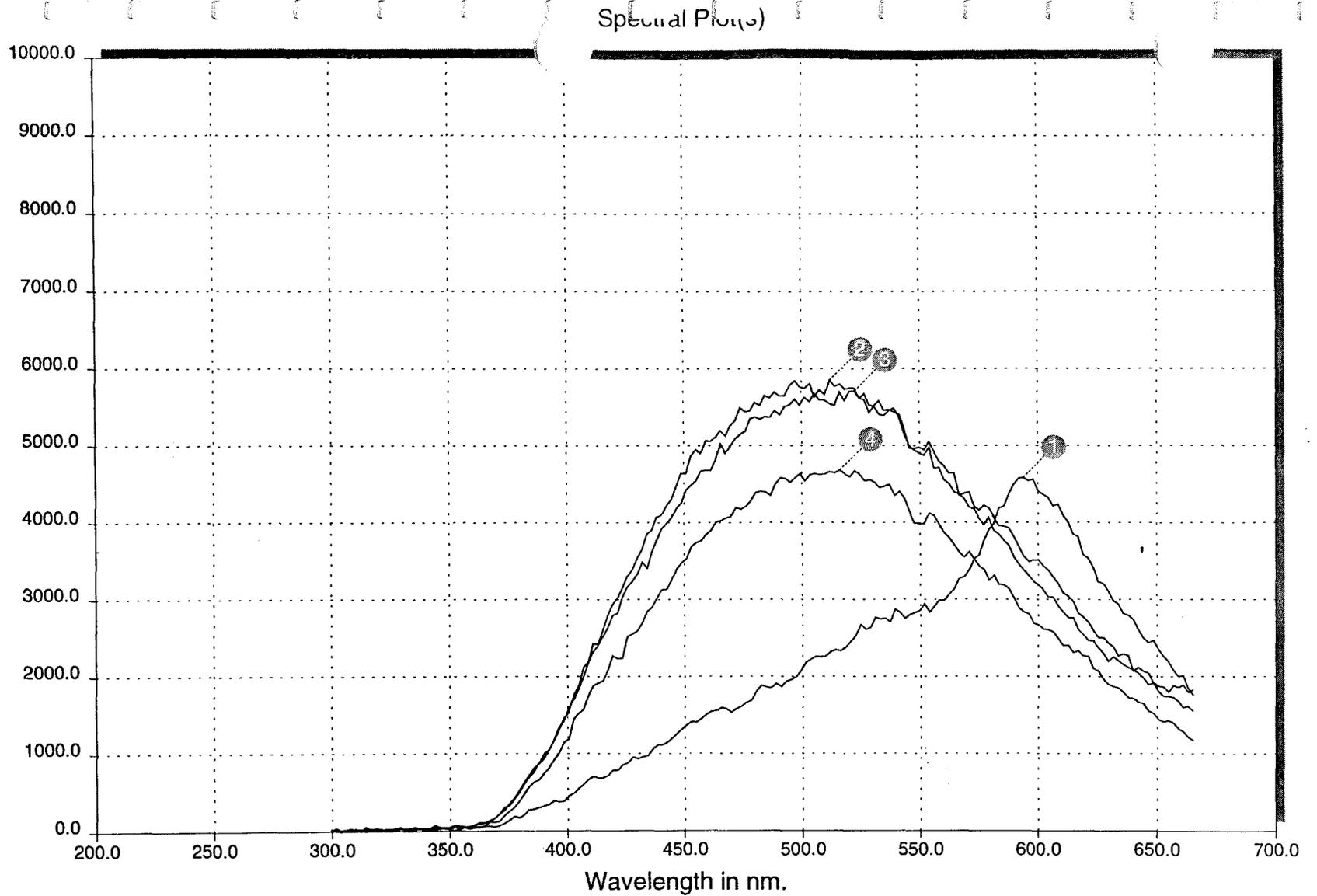


Time: 12:41:34
Date: 12-11-1996
Version: 1.0

Push: C:\BASIC71\DATA\FF37-25.PSH
Probe: C:\BASIC71\DATA\PROBE23F.PR3
Calibration: C:\BASIC71\DATA\1213DFM.CAL



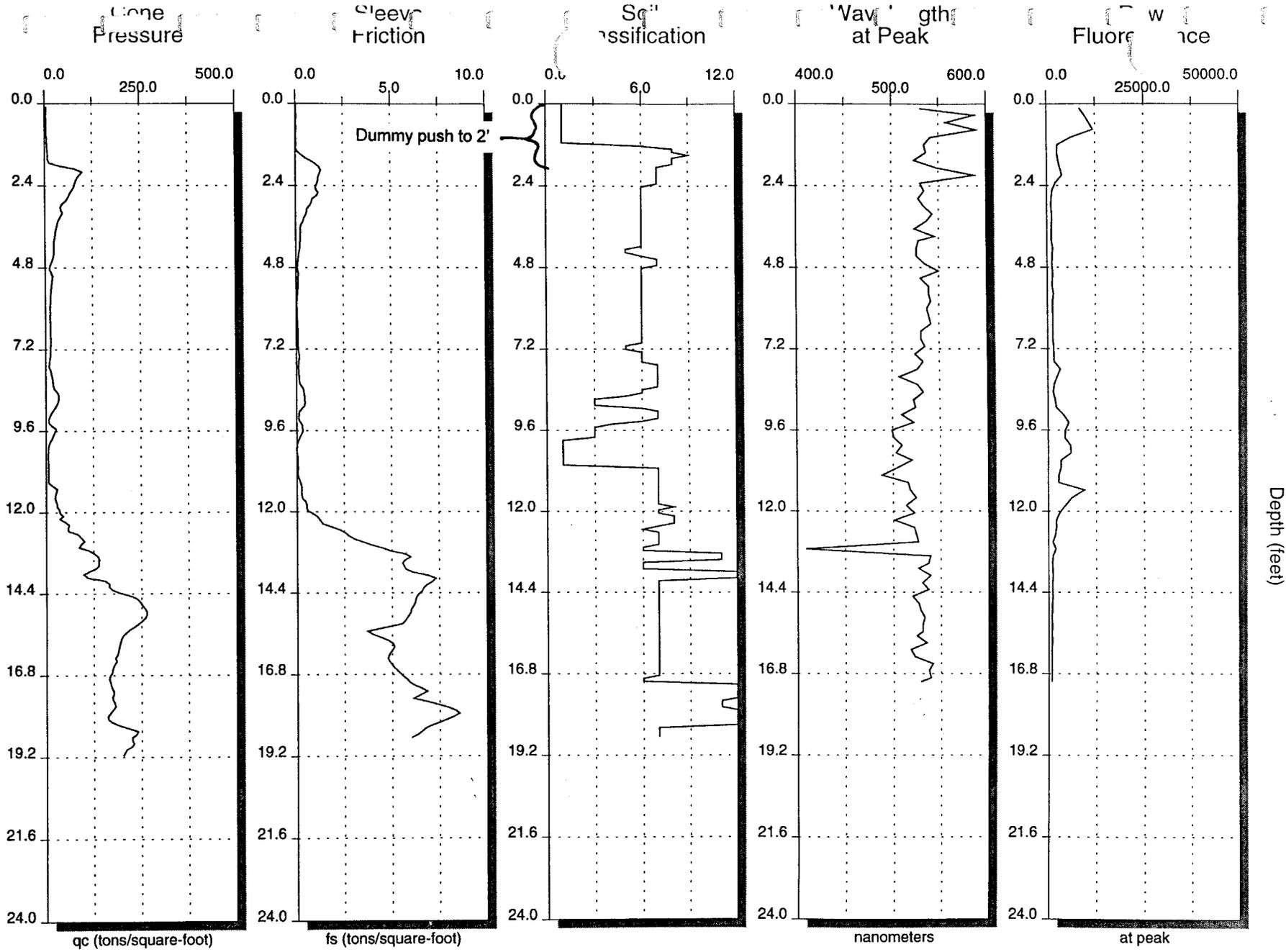
Fluorescence Intensity



Time: 12:41:34
Date: 12-11-1996
Version: 1.0

1: 4.4 ft.; 4580 @ 593.8 nm
2: 9.7 ft.; 5848 @ 511.8 nm
3: 11.5 ft.; 5710 @ 522.3 nm
4: 12.3 ft.; 4680 @ 516.0 nm

Main: C:\BASIC71\DATA\FF37-25.PSH
Probe: C:\BASIC71\DATA\PROBE23F.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Time: 13:08:26

Date: 12-11-1996

Version: 1.0

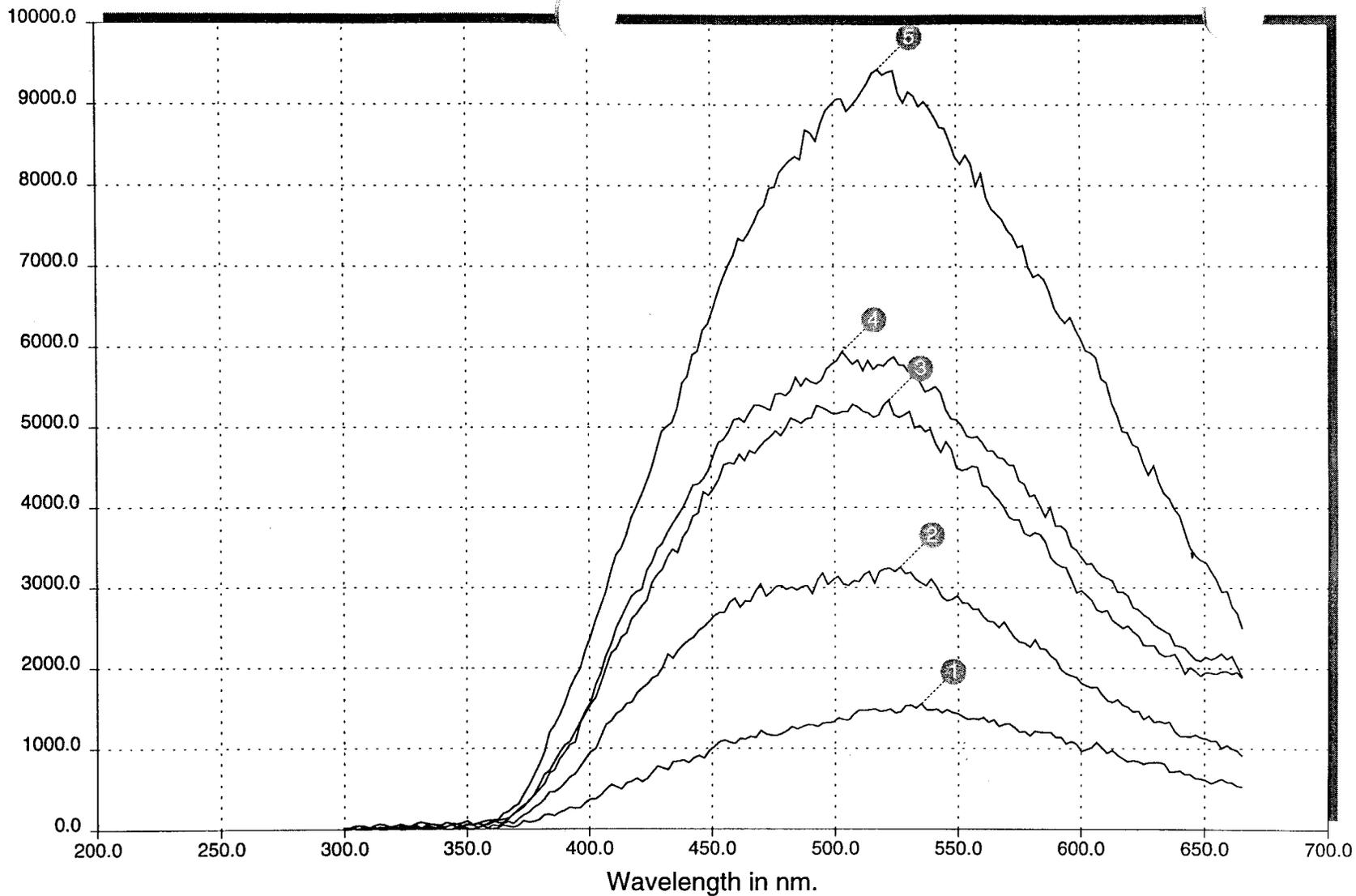
Push: C:\BASIC71\DATA\FF37-26.PSH

Probe: C:\BASIC71\DATA\PROBE23F.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Fluorescence Intensity



1: 7.1 ft.; 1554 @ 534.9 nm

5: 11.4 ft.; 9443 @ 518.1 nm

2: 7.8 ft.; 3254 @ 526.5 nm

3: 9.4 ft.; 5338 @ 522.3 nm

4: 10.3 ft.; 5942 @ 503.4 nm

Main: C:\BASIC71\DATA\FF37-26.PSH

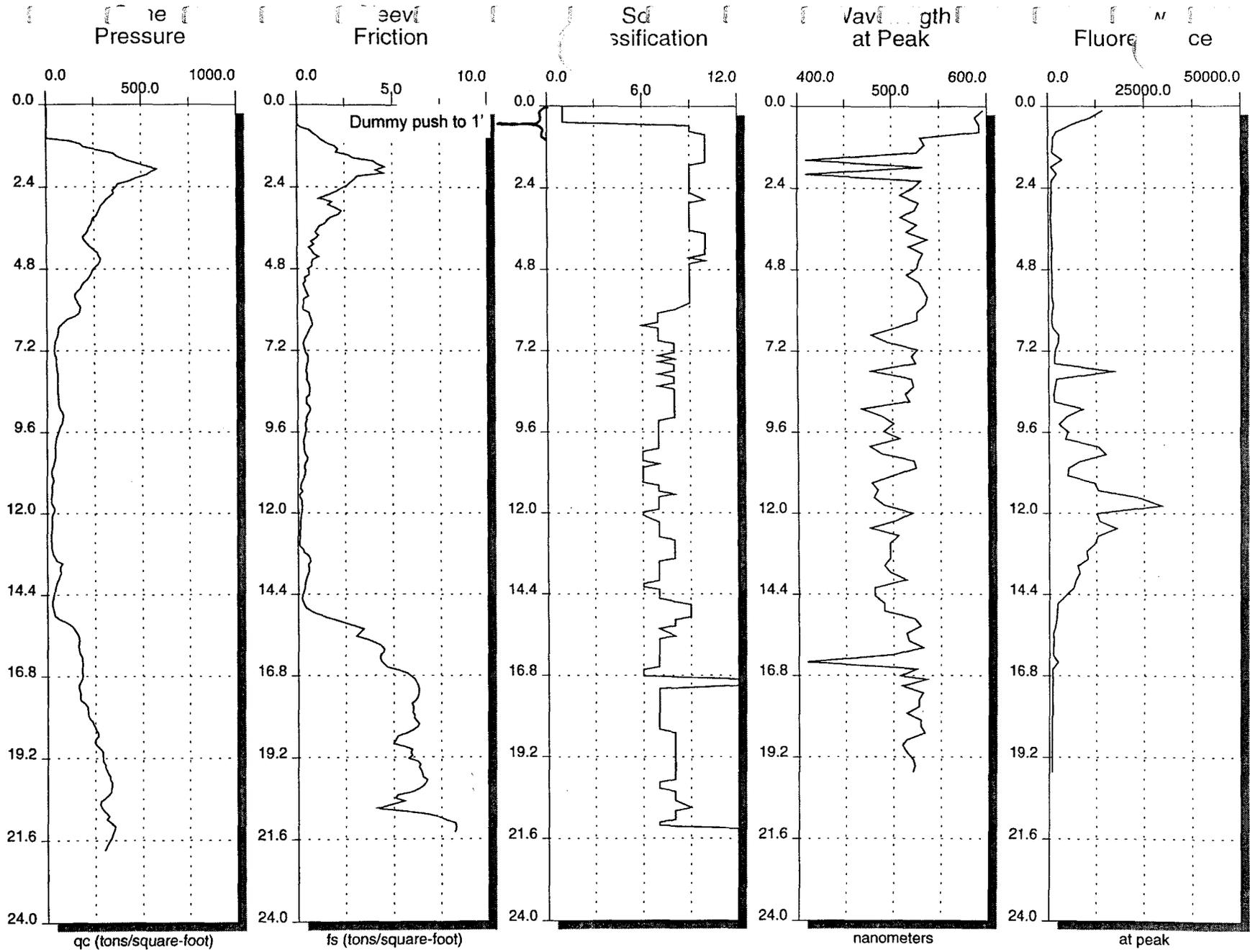
Probe: C:\BASIC71\DATA\PROBE23F.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL

Time: 13:08:26

Date: 12-11-1996

Version: 1.0



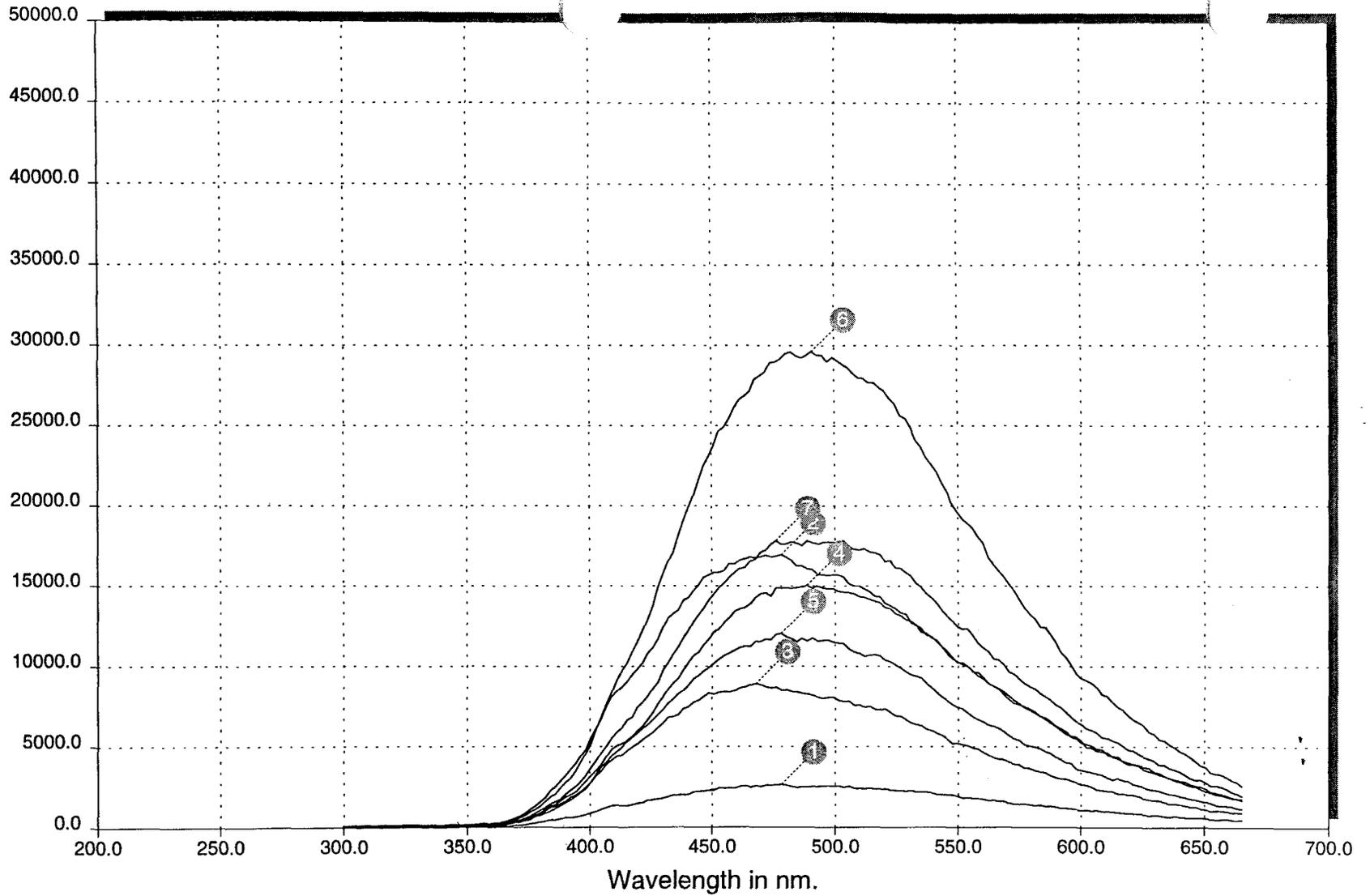
Time: 13:34:54
Date: 12-11-1996
Version: 1.0

Push: C:\BASIC71\DATA\FF37-27.PSH
Probe: C:\BASIC71\DATA\PROBE23F.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

Fluorescence Intensity



1: 6.7 ft.; 2657 @ 478.2 nm

5: 11.1 ft.; 12045 @ 478.2 nm

2: 7.8 ft.; 16943 @ 478.2 nm

6: 11.8 ft.; 29610 @ 490.8 nm

3: 8.9 ft.; 8914 @ 467.7 nm

7: 12.4 ft.; 17822 @ 476.1 nm

4: 10.3 ft.; 15032 @ 488.7 nm

Main: C:\BASIC71\DATA\FF37-27.PSH

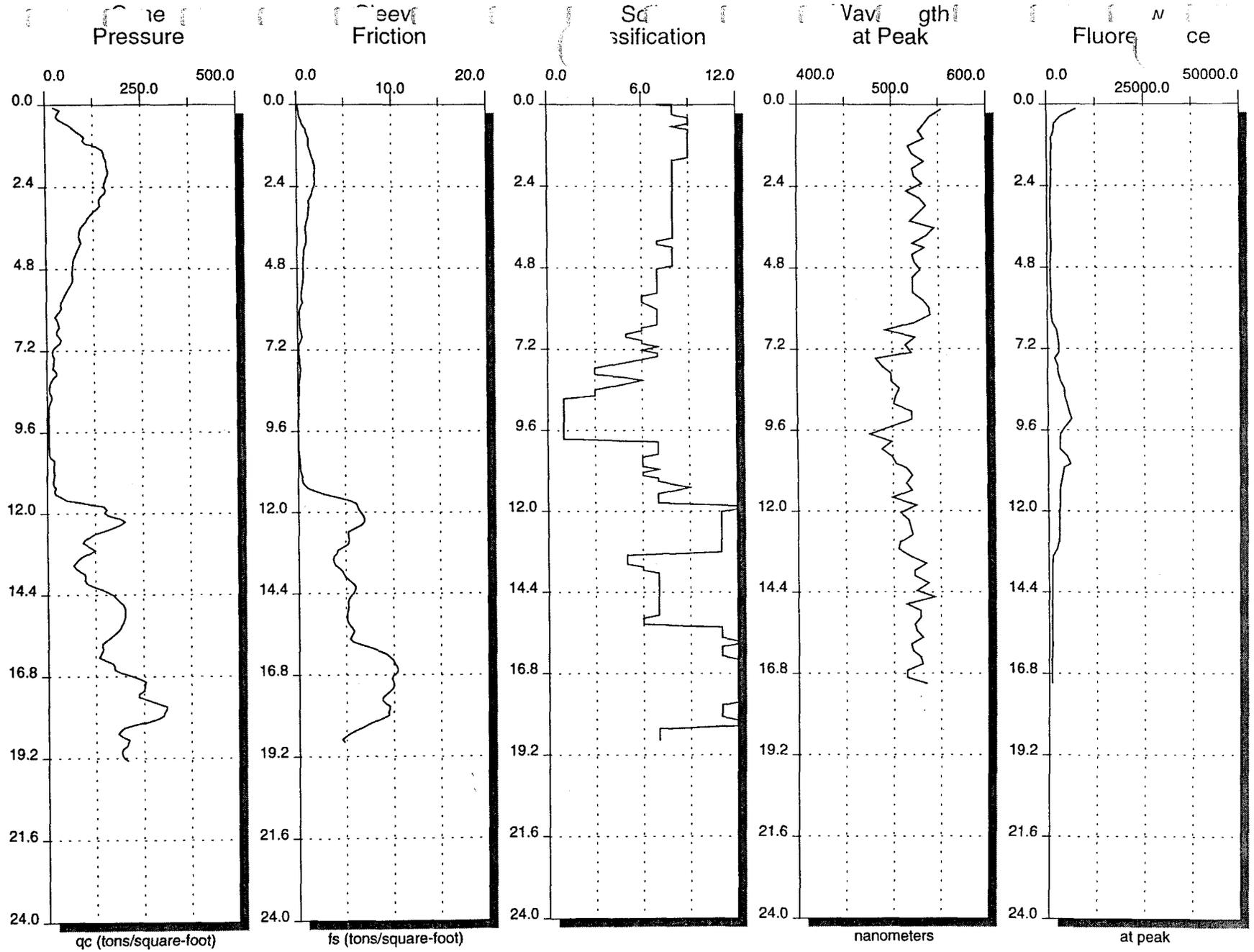
Probe: C:\BASIC71\DATA\PROBE23F.PR8

Calibration: C:\BASIC71\DATA\1213DFM.CAL

Time: 13:34:54

Date: 12-11-1996

Version: 1.0



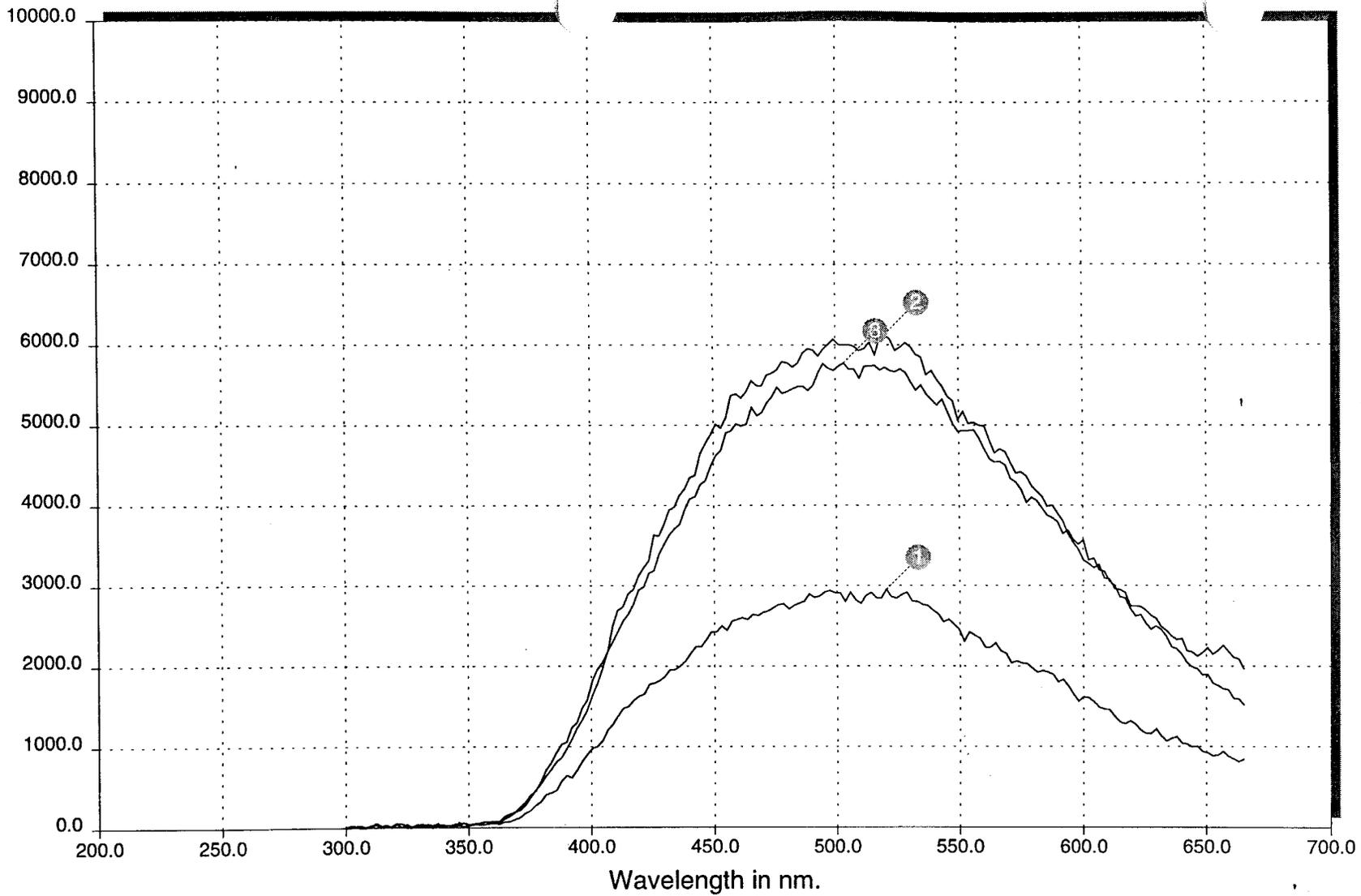
Time: 14:04:58
Date: 12-11-1996
Version: 1.0

Push: C:\BASIC71\DATA\FF37-28.PSH
Probe: C:\BASIC71\DATA\PROBE23F.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

Fluorescence Intensity



- 1: 7.3 ft.; 2950 @ 520.2 nm
- 2: 9.3 ft.; 6126 @ 520.2 nm
- 3: 10.6 ft.; 5772 @ 503.4 nm

Time: 14:04:58

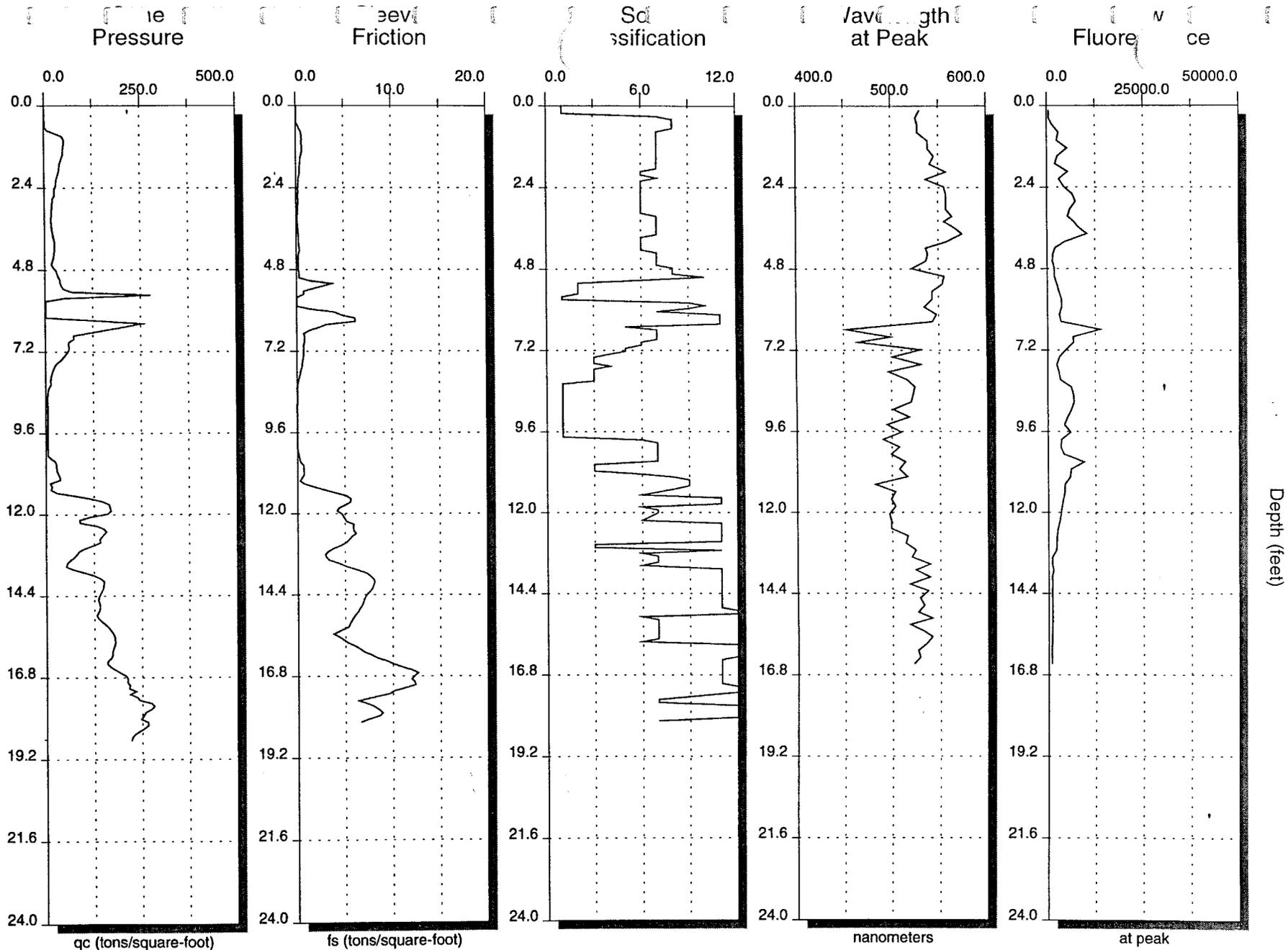
Date: 12-11-1996

Version: 1.0

Main: C:\BASIC71\DATA\FF37-28.PSH

Probe: C:\BASIC71\DATA\PROBE23F.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Depth (feet)

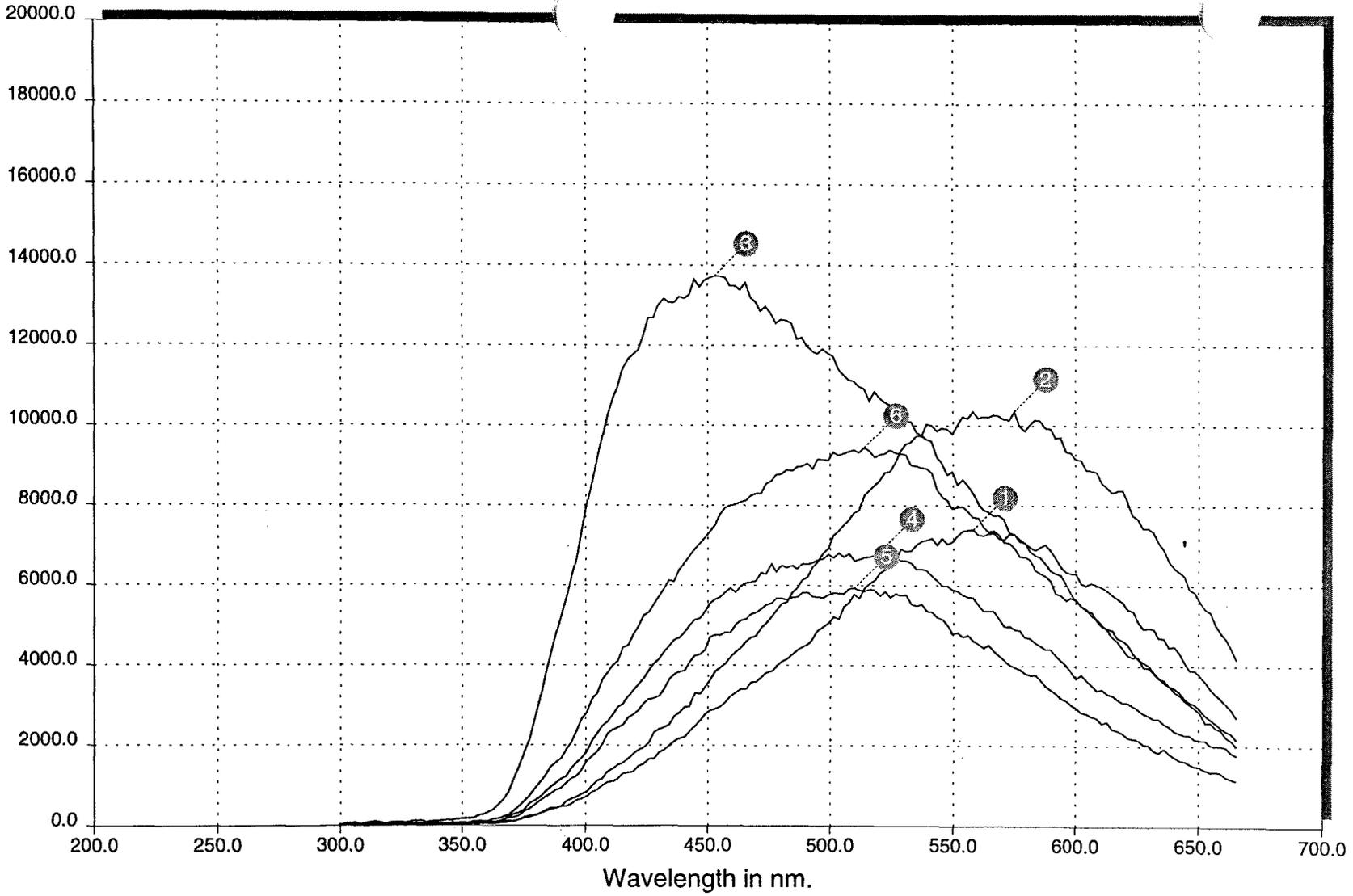
Time: 15:04:31
Date: 12-11-1996
Version: 1.0

Push: C:\BASIC71\DATA\FF37-29.PSH
Probe: C:\BASIC71\DATA\PROBE23F.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

Fluorescence Intensity

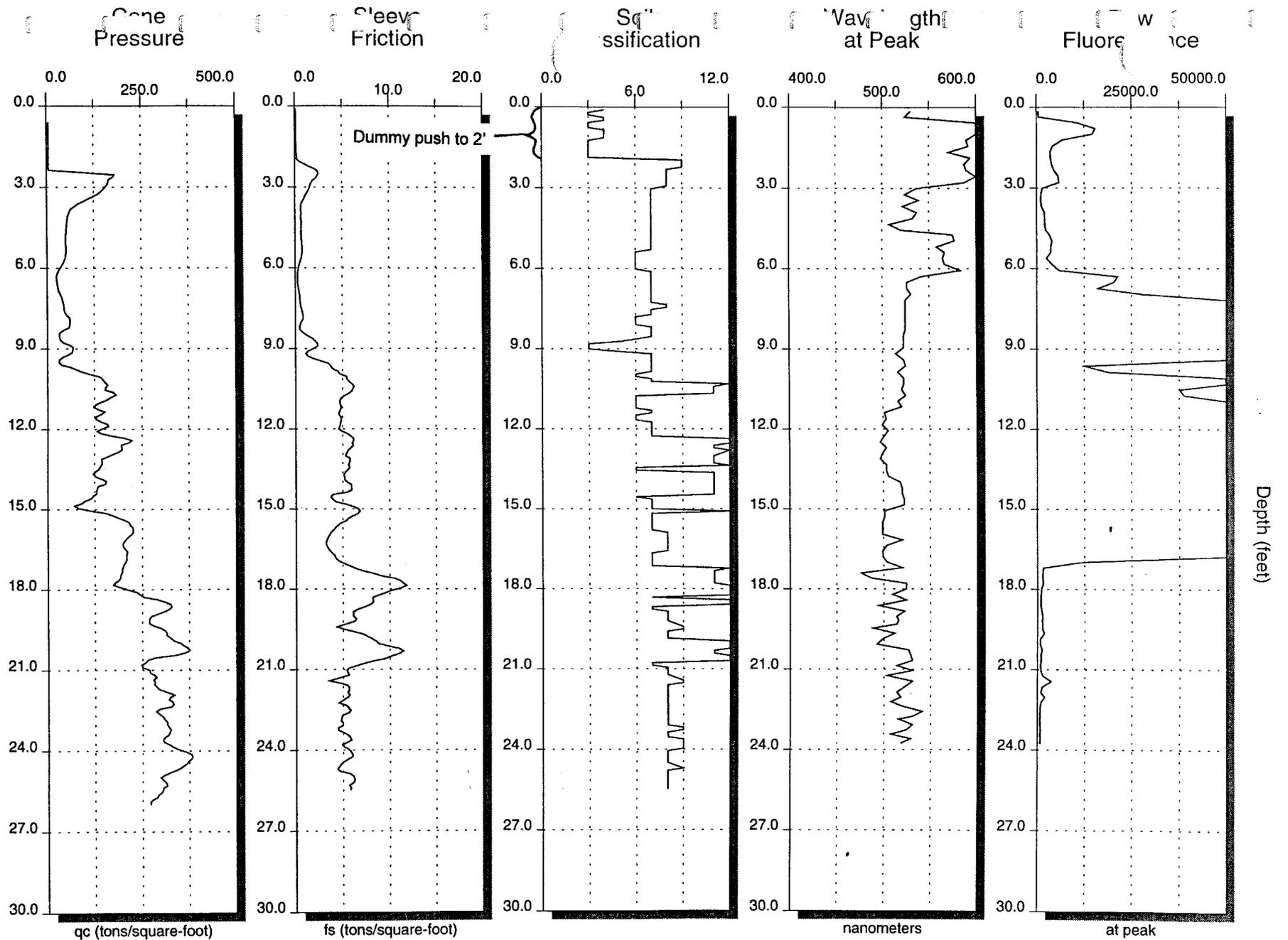


1: 2.8 ft.; 7395 @ 558.1 nm
2: 3.8 ft.; 10365 @ 574.9 nm
3: 6.6 ft.; 13728 @ 453.0 nm
4: 8.7 ft.; 6858 @ 520.2 nm

5: 9.6 ft.; 5926 @ 509.7 nm
6: 10.5 ft.; 9448 @ 513.9 nm

Main: C:\BASIC71\DATA\FF37-29.PSH
Probe: C:\BASIC71\DATA\PROBE23F.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL

Time: 15:04:31
Date: 12-11-1996
Version: 1.0



Time: 13:32:44

Date: 12-02-1996

Version: 1.0

Push: C:\BASIC71\DATA\IR13-01.PSH

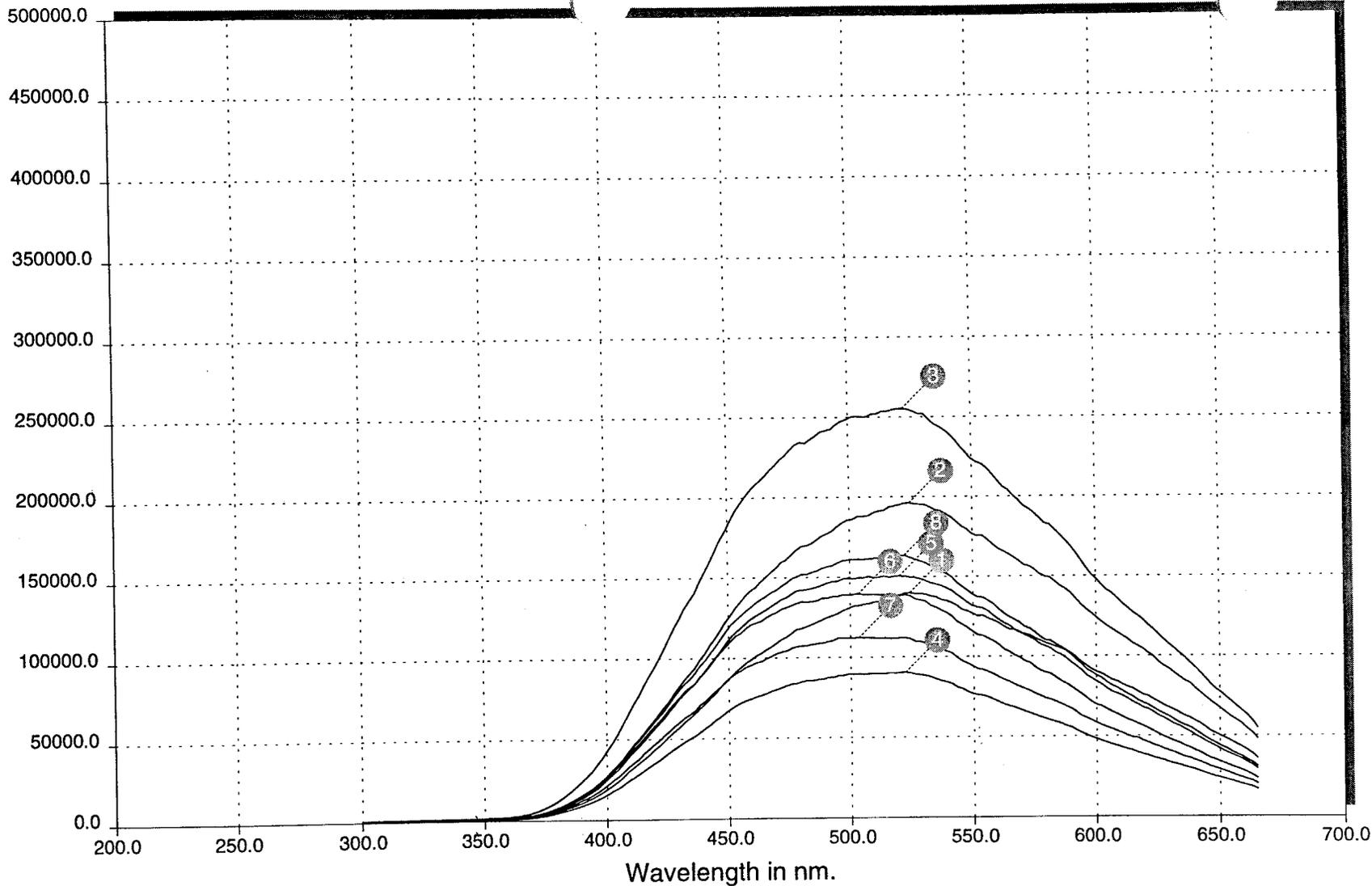
Probe: C:\BASIC71\DATA\PROBE23D.PR3

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

Fluorescence Intensity

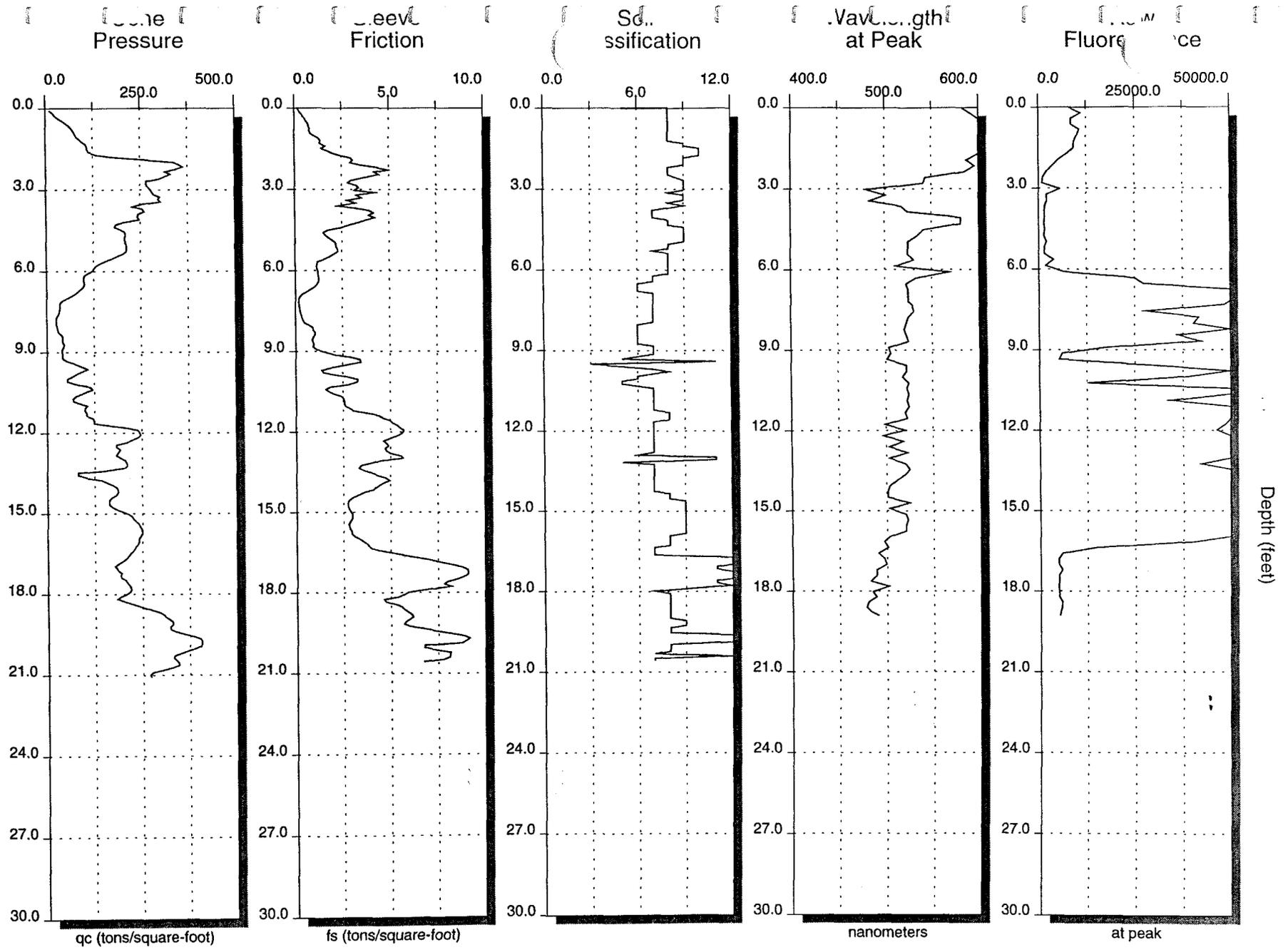


1: 7.6 ft.; 140033 @ 524.4 nm
2: 8.3 ft.; 196142 @ 524.4 nm
3: 8.7 ft.; 255247 @ 522.3 nm
4: 10.3 ft.; 90390 @ 522.3 nm

5: 11.2 ft.; 150645 @ 520.2 nm
6: 11.6 ft.; 139581 @ 503.4 nm
7: 13.3 ft.; 112167 @ 503.4 nm
8: 14.8 ft.; 163414 @ 522.3 nm

Main: C:\BASIC71\DATA\IR13-01.PSH
Probe: C:\BASIC71\DATA\PROBE23D.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL

Time: 13:32:44
Date: 12-02-1996
Version: 1.0

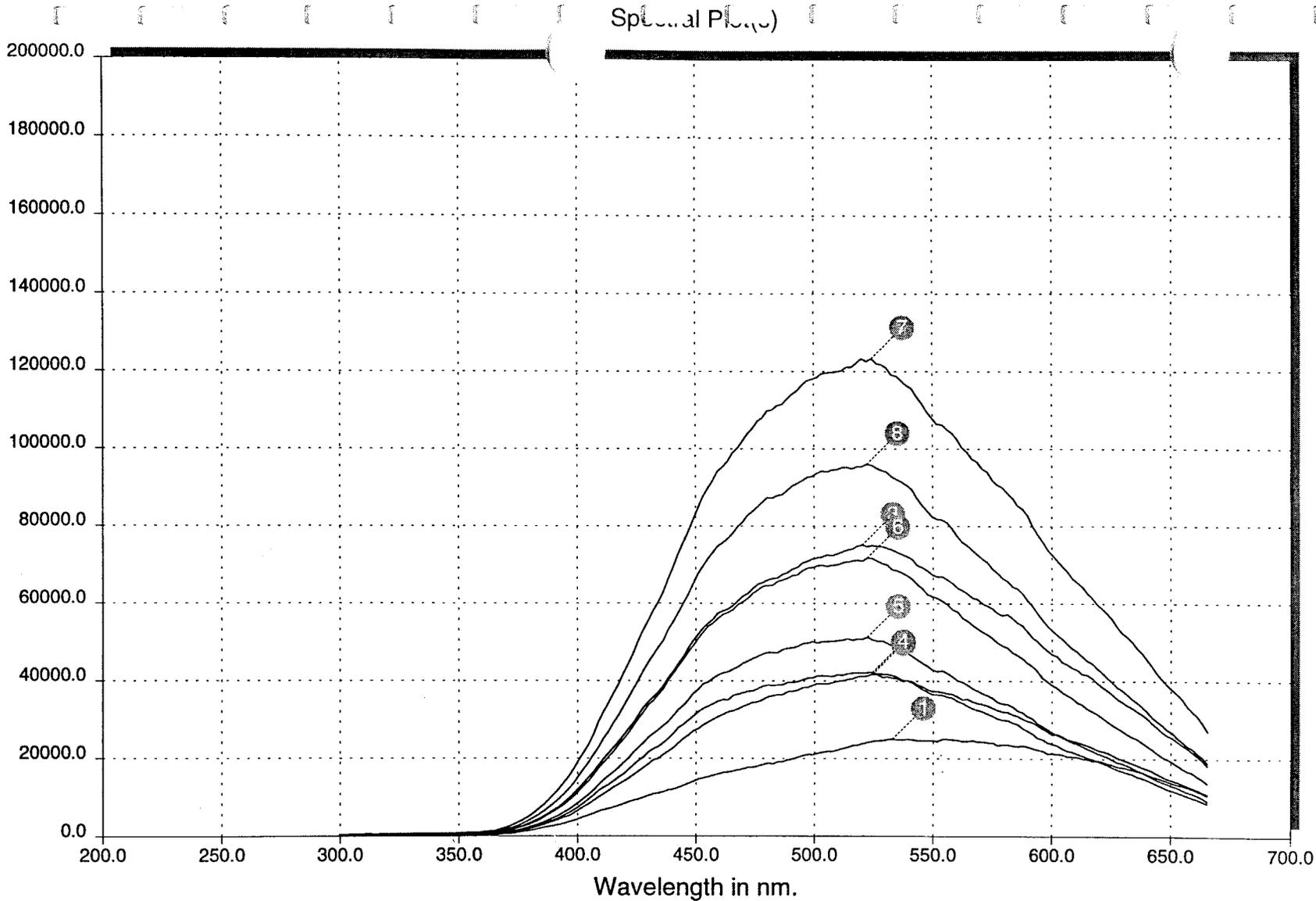


Time: 14:53:09
Date: 12-02-1996
Version: 1.0

Push: C:\BASIC71\DATA\AIR13-02.PSH
Probe: C:\BASIC71\DATA\PROBE23D.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Fluorescence Intensity



Wavelength in nm.

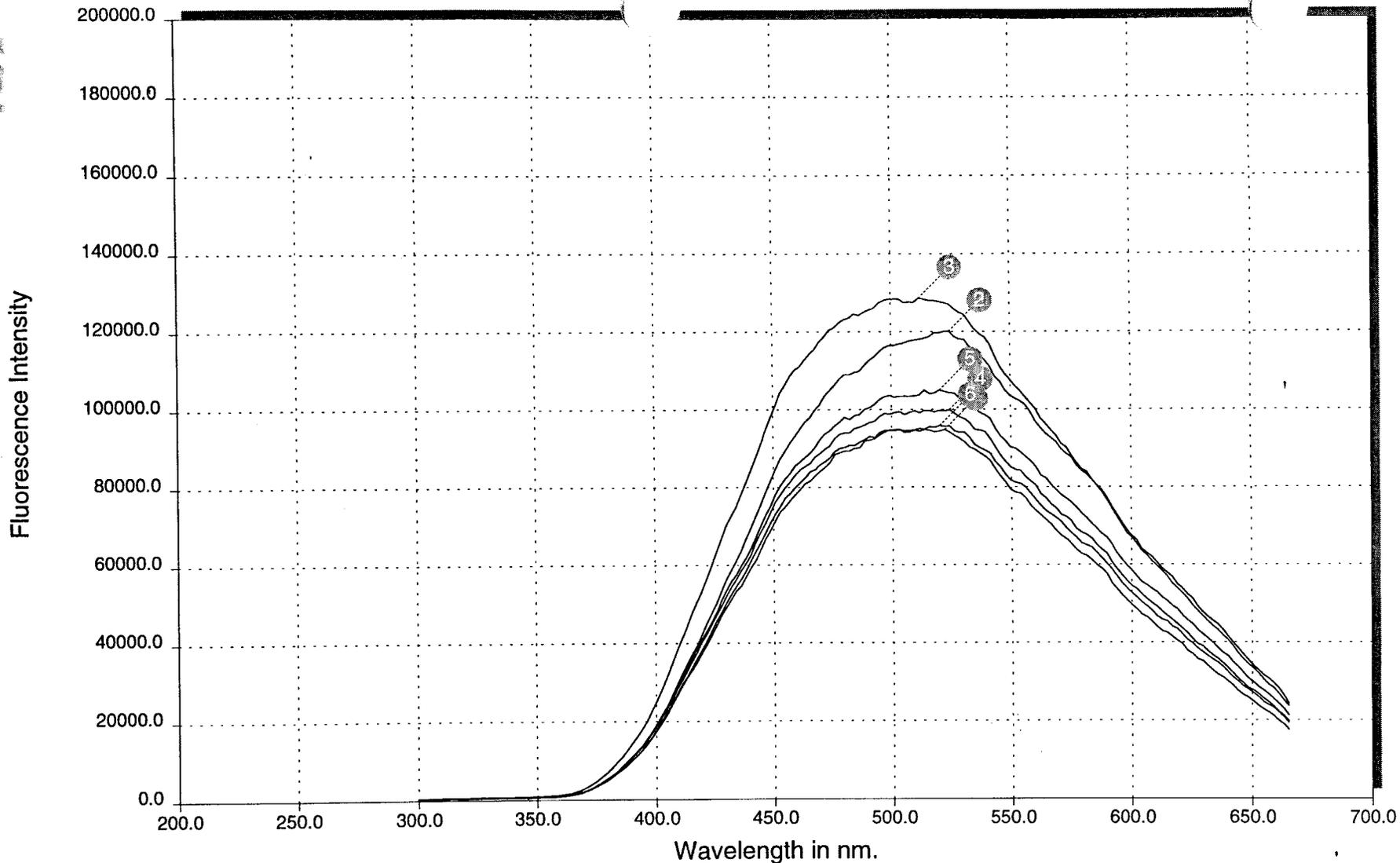
1: 6.3 ft.; 25015 @ 532.8 nm	5: 9.8 ft.; 51272 @ 522.3 nm
2: 7.8 ft.; 41721 @ 524.4 nm	6: 10.4 ft.; 71745 @ 522.3 nm
3: 8.2 ft.; 75085 @ 520.2 nm	7: 11.1 ft.; 123325 @ 524.4 nm
4: 8.7 ft.; 42192 @ 524.4 nm	8: 11.5 ft.; 96011 @ 522.3 nm

Time: 14:53:09
Date: 12-02-1996
Version: 1.0

Main: C:\BASIC71\DATA\IR13-02.PSH
Probe: C:\BASIC71\DATA\PROBE23D.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



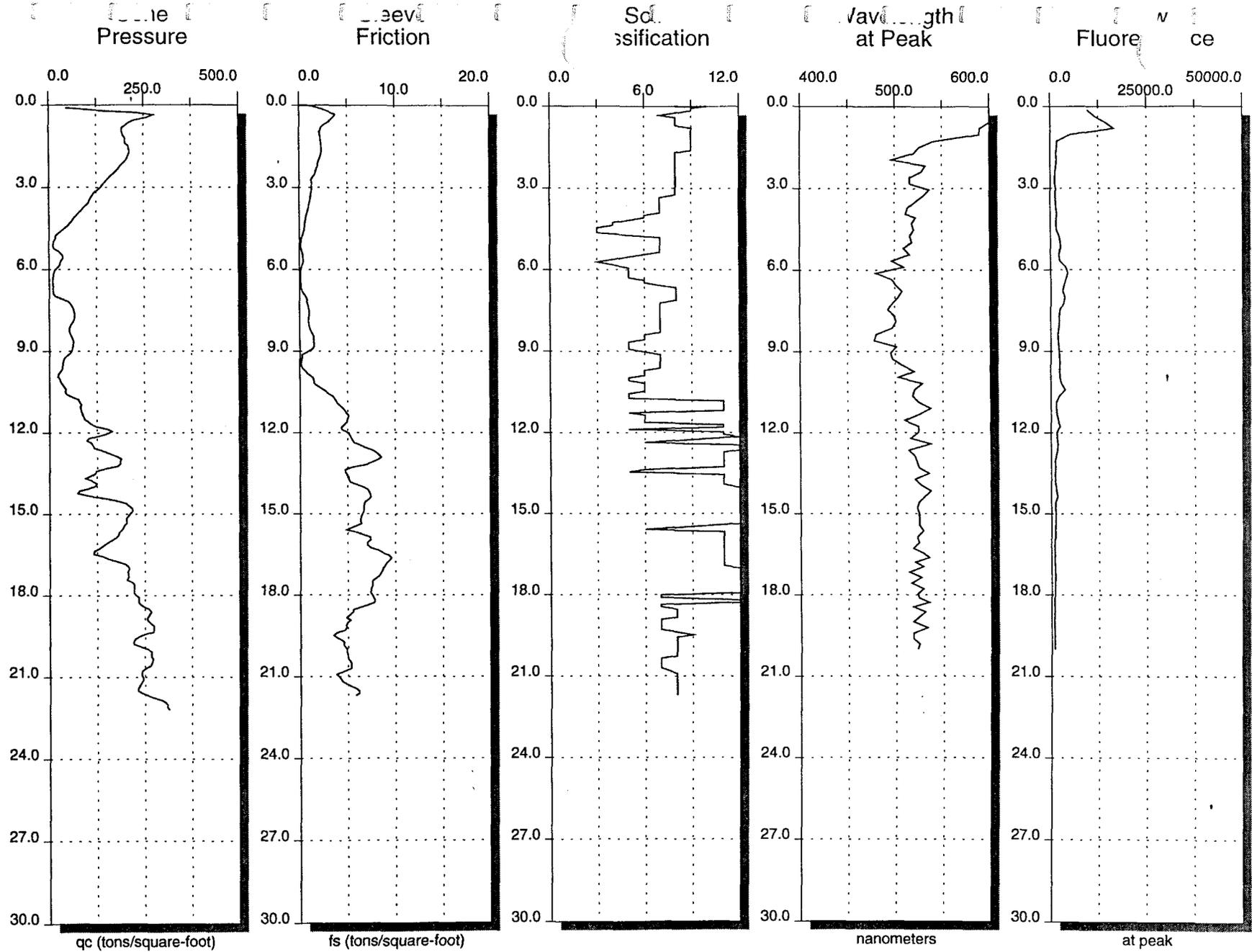
Spectral Plot(s)



1: 12.8 ft.; 94801 @ 522.3 nm	5: 15.1 ft.; 104947 @ 520.2 nm
2: 13.5 ft.; 120091 @ 524.4 nm	6: 15.8 ft.; 95793 @ 520.2 nm
3: 13.8 ft.; 128572 @ 511.8 nm	
4: 14.7 ft.; 99911 @ 524.4 nm	

Main: C:\BASIC71\DATA\IR13-02.PSH
Probe: C:\BASIC71\DATA\PROBE23D.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL

Time: 14:53:09
Date: 12-02-1996
Version: 1.0



Time: 07:37:09

Date: 12-03-1996

Version: 1.0

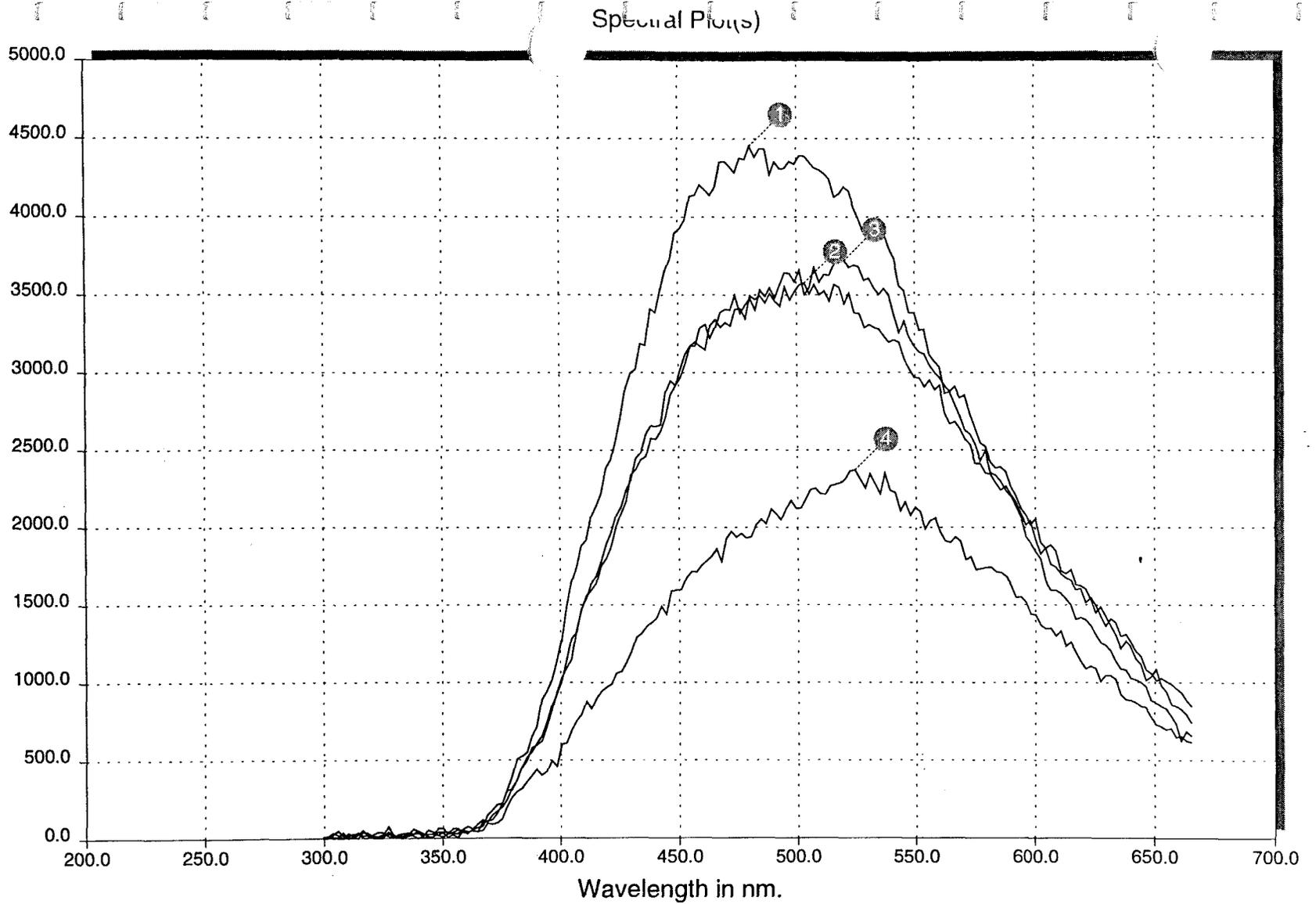
Push: C:\BASIC71\DATA\IR13-03.PSH

Probe: C:\BASIC71\DATA\PROBE23D.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Fluorescence Intensity



Wavelength in nm.

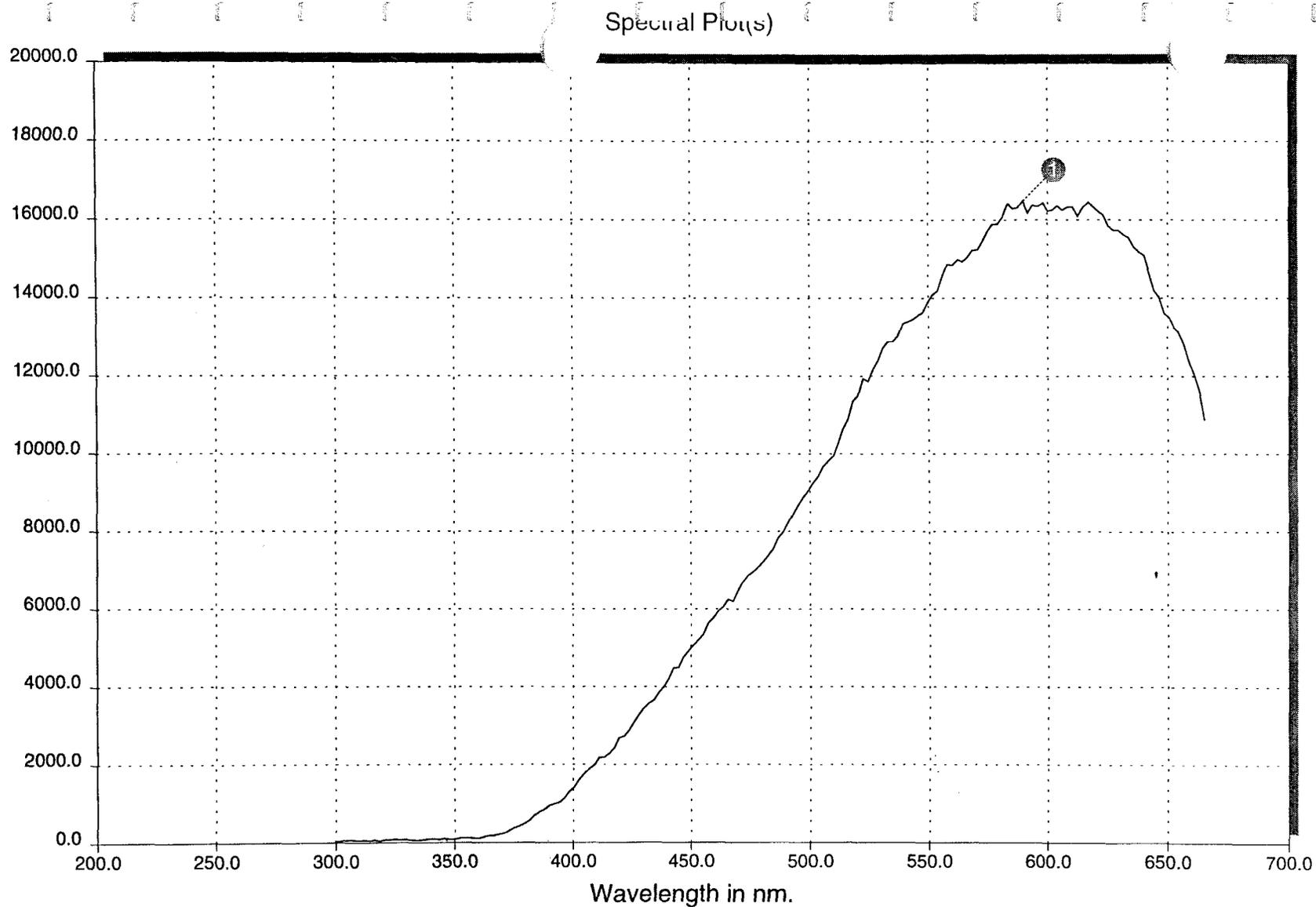
Time: 07:37:09
Date: 12-03-1996
Version: 1.0

1: 6.1 ft.; 4452 @ 480.3 nm
2: 7.0 ft.; 3575 @ 503.4 nm
3: 10.4 ft.; 3718 @ 520.2 nm
4: 11.8 ft.; 2371 @ 524.4 nm

Main: C:\BASIC71\DATA\IR13-03.PSH
Probe: C:\BASIC71\DATA\PROBE23D.PR8
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Fluorescence Intensity



1: 0.8 ft.; 16479 @ 589.6 nm

Time: 07:37:09

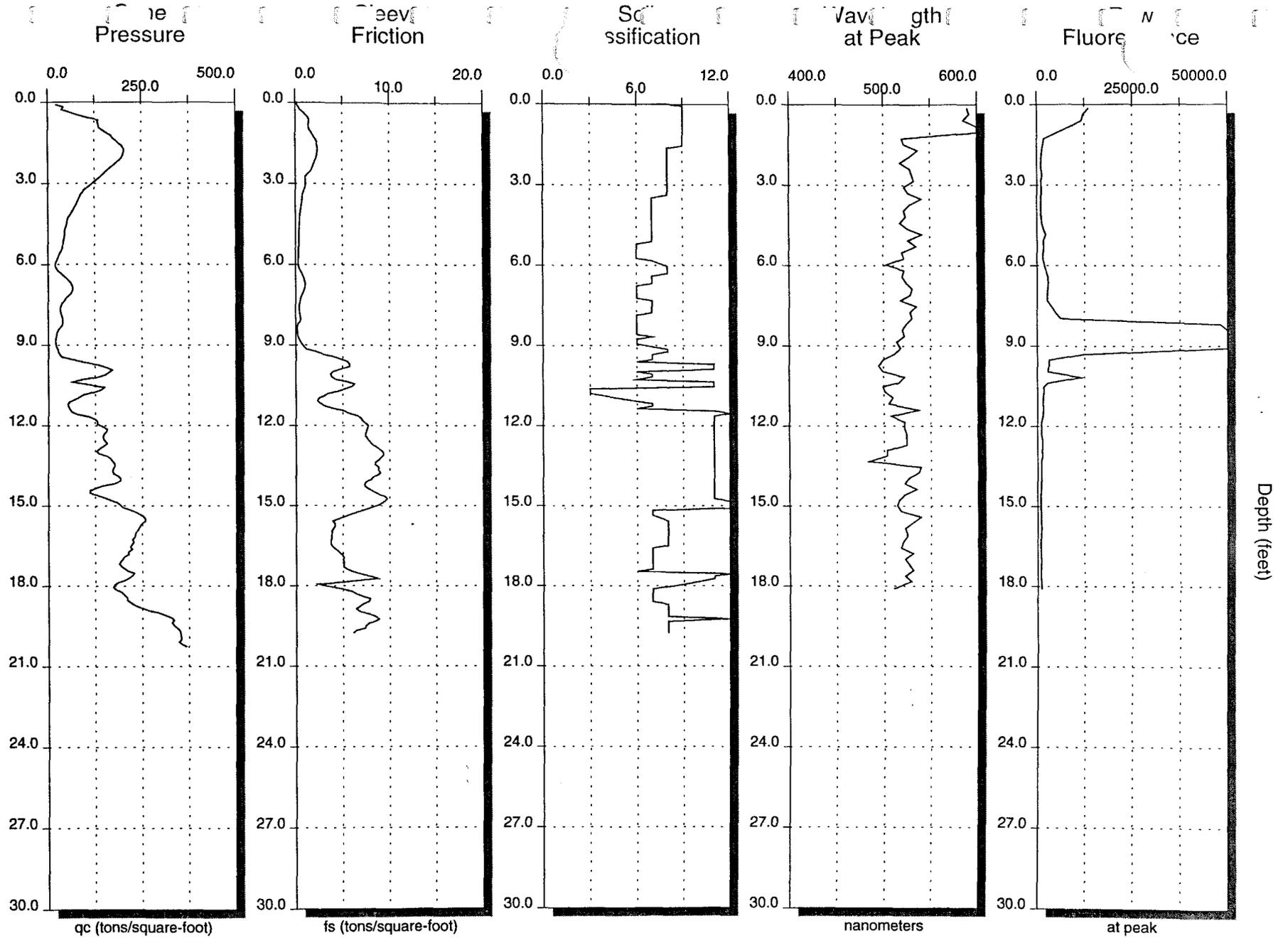
Date: 12-03-1996

Version: 1.0

Main: C:\BASIC71\DATA\IR13-03.PSH

Probe: C:\BASIC71\DATA\PROBE23D.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Time: 08:09:54

Date: 12-03-1996

Version: 1.0

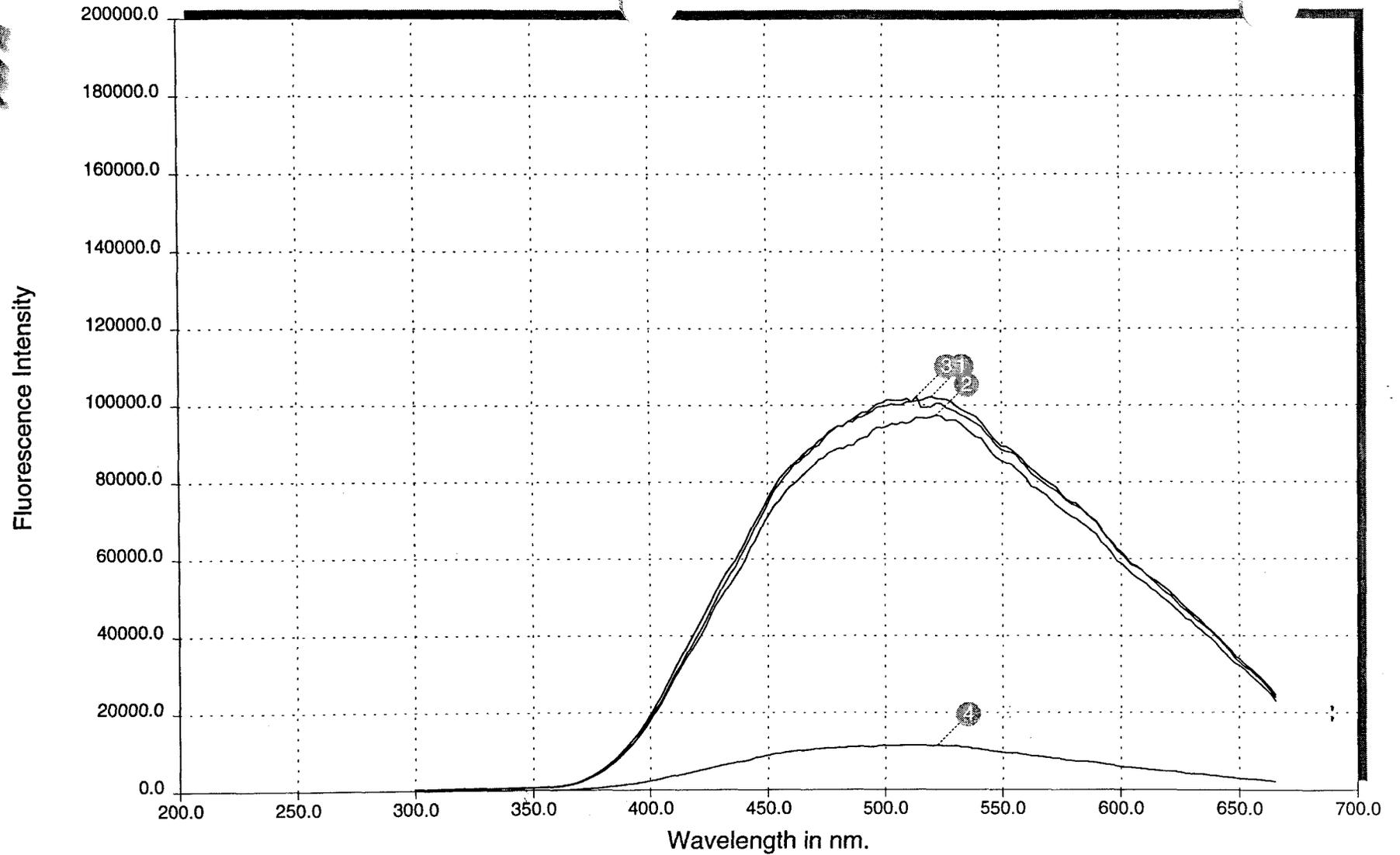
Push: C:\BASIC71\DATA\IR13-04.PSH

Probe: C:\BASIC71\DATA\PROBE23D.PR

Calibration: C:\BASIC71\DATA\1213DFM.CAL



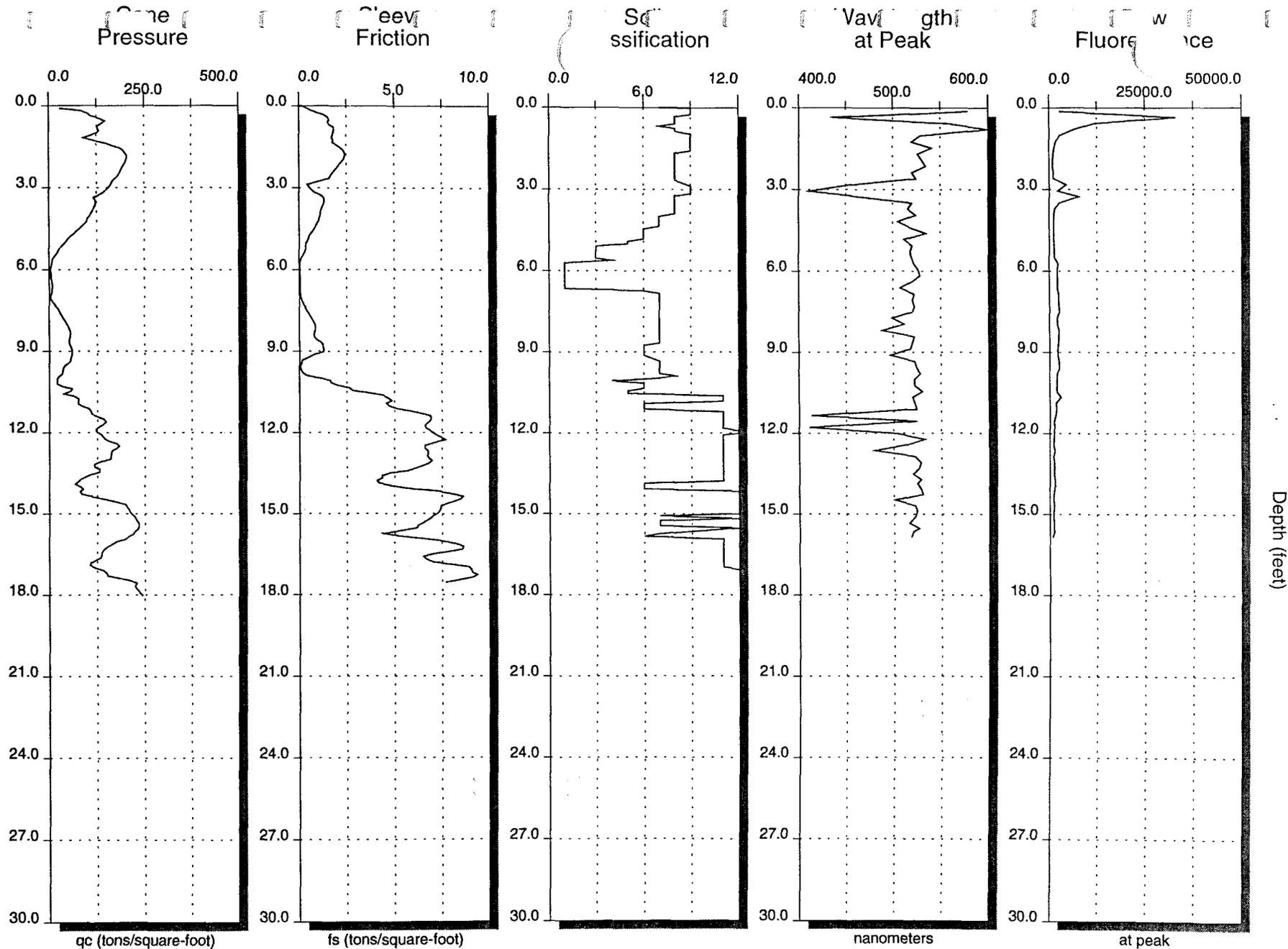
Spectral Plot(s)



Time: 08:09:54
Date: 12-03-1996
Version: 1.0

1: 8.4 ft.; 102194 @ 520.2 nm
2: 8.6 ft.; 97358 @ 522.3 nm
3: 8.9 ft.; 102156 @ 513.9 nm
4: 10.2 ft.; 11541 @ 522.3 nm

Main: C:\BASIC71\DATA\IR13-04.PSH
Probe: C:\BASIC71\DATA\PROBE23D.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Time: 06:58:27

Date: 12-05-1996

Version: 1.0

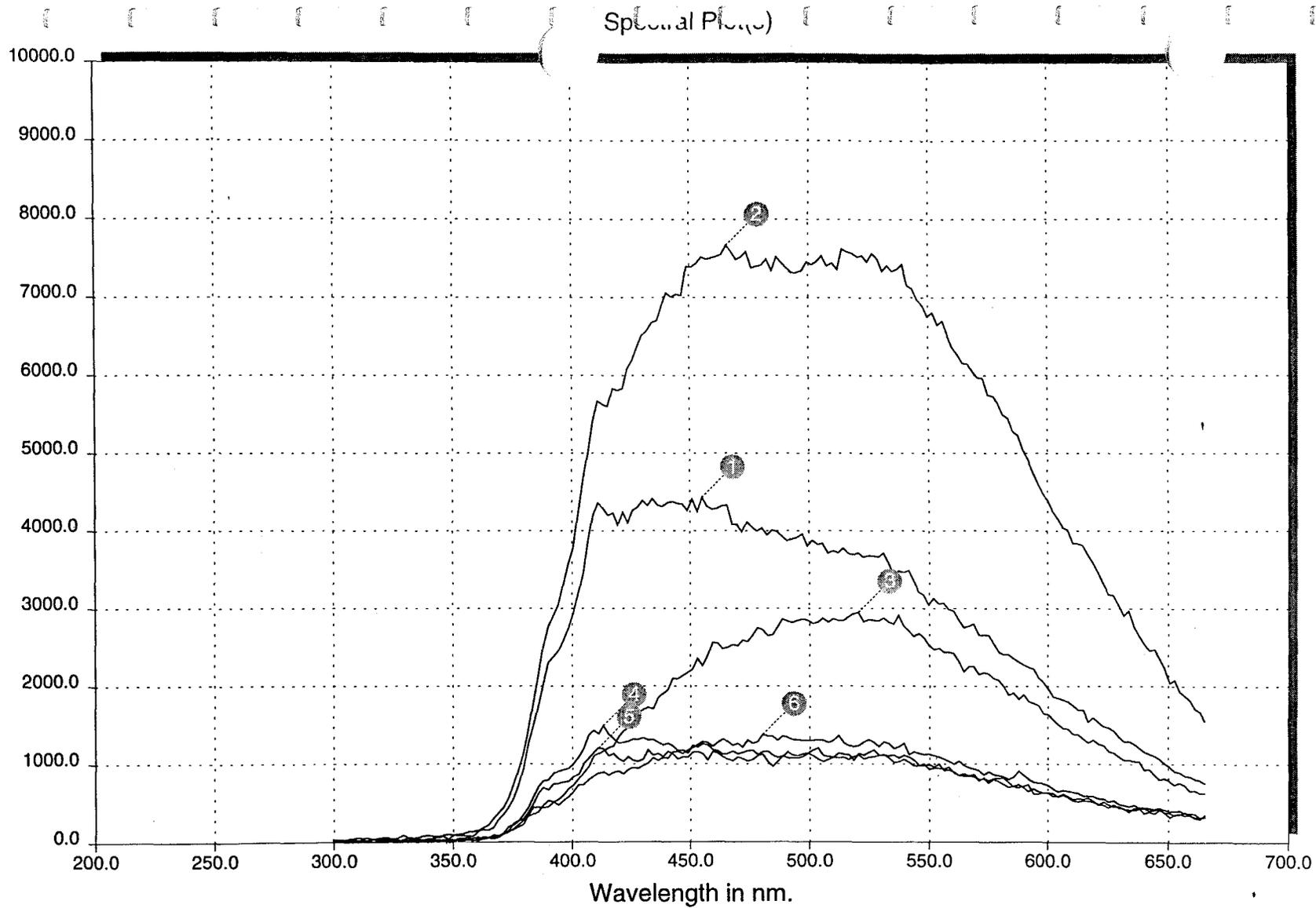
Push: C:\BASIC71\DATA\IR13-05.PSH

Probe: C:\BASIC71\DATA\PROBE23E.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Fluorescence Intensity

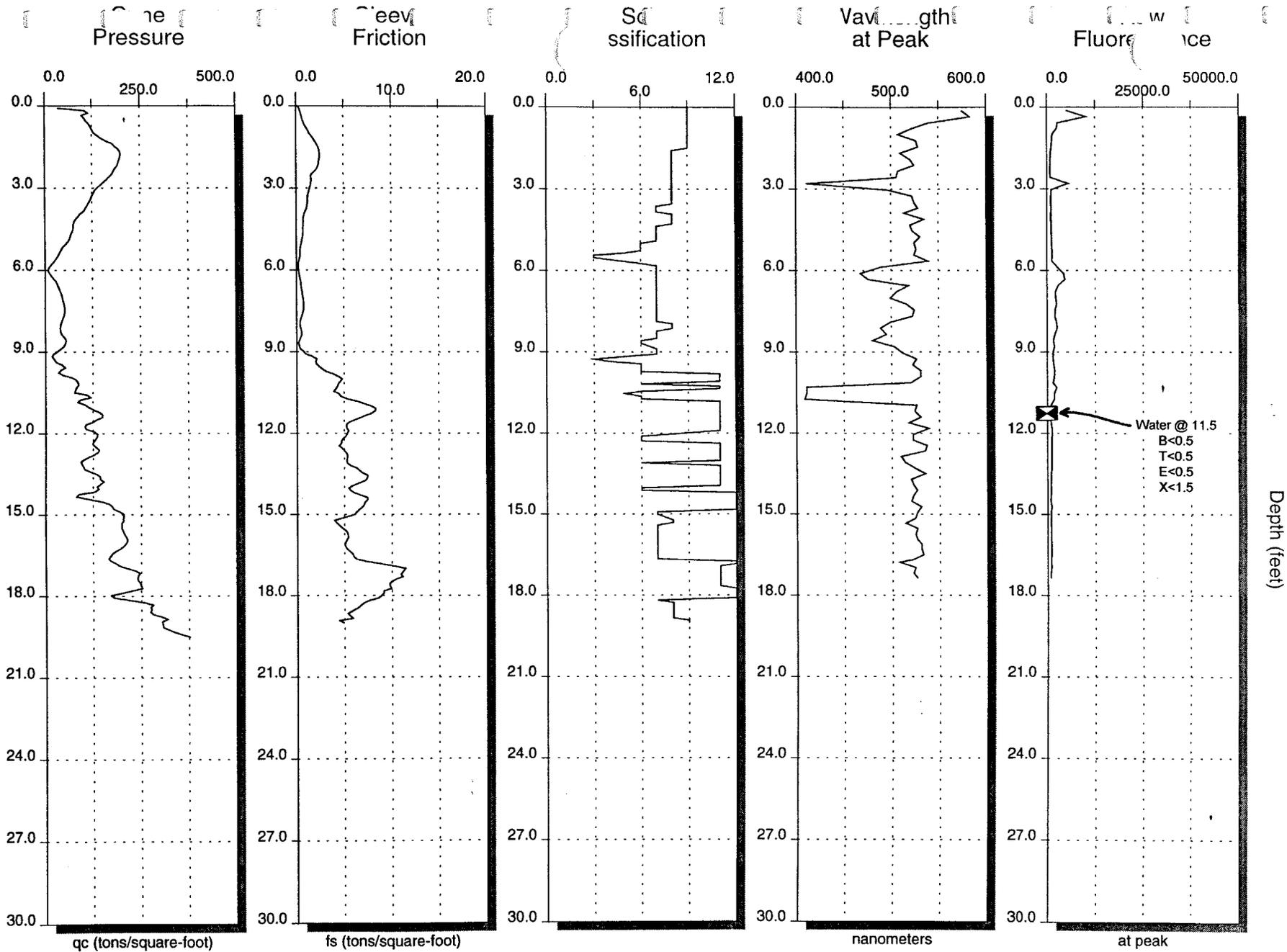


1: 2.8 ft.; 4426 @ 455.1 nm
2: 3.3 ft.; 7665 @ 465.6 nm
3: 10.7 ft.; 2951 @ 520.2 nm
4: 11.3 ft.; 1492 @ 413.1 nm

5: 11.8 ft.; 1207 @ 411.0 nm
6: 12.6 ft.; 1376 @ 480.3 nm

Main: C:\BASIC71\DATA\IR13-05.PSH
Probe: C:\BASIC71\DATA\PROBE23E.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL

Time: 06:58:27
Date: 12-05-1996
Version: 1.0



Time: 07:52:40

Date: 12-05-1996

Version: 1.0

Push: C:\BASIC71\DATA\IR13-06.PSH

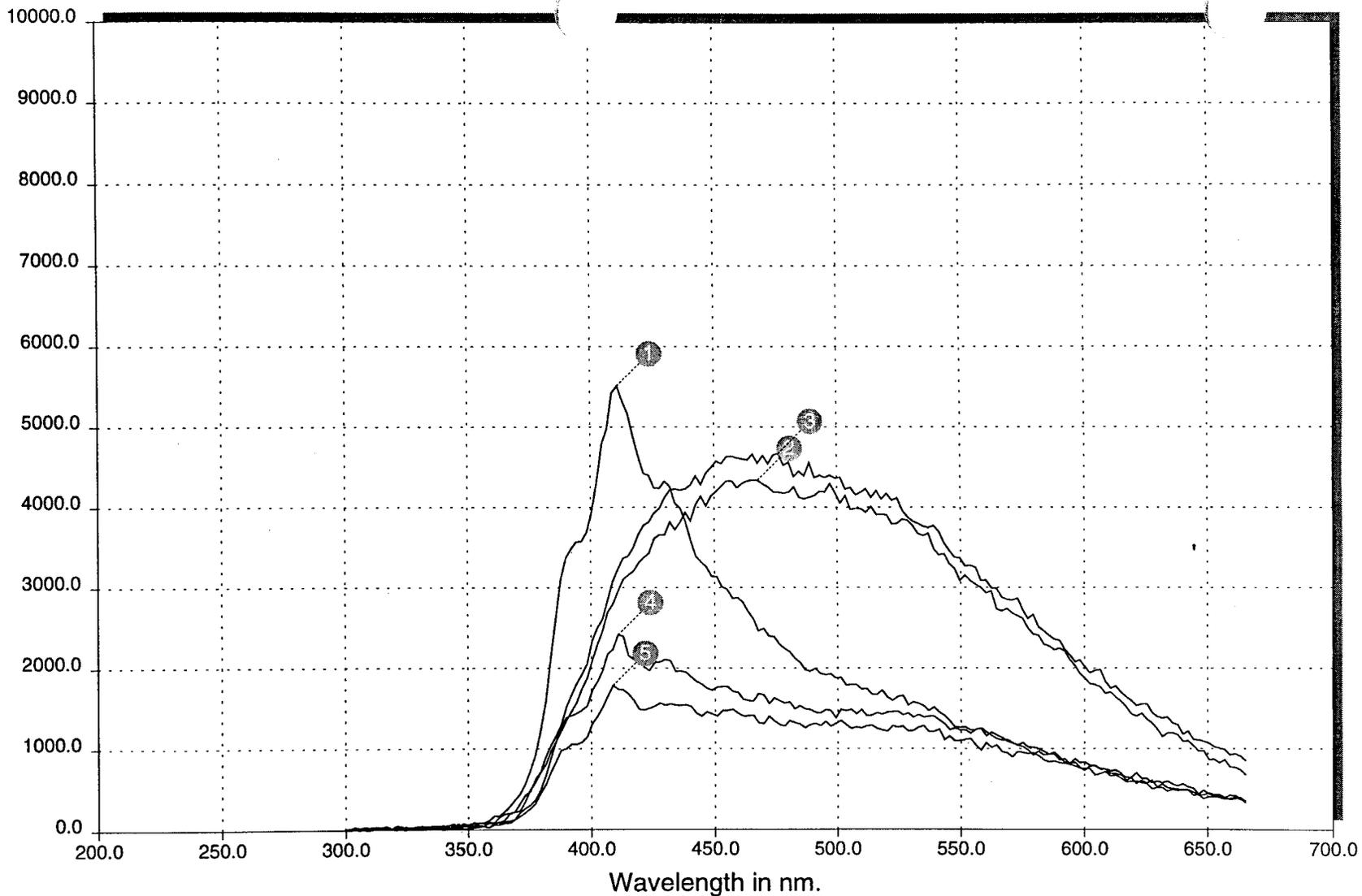
Probe: C:\BASIC71\DATA\PROBE23E.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

Fluorescence Intensity



1: 2.8 ft.; 5508 @ 411.0 nm

5: 10.7 ft.; 1783 @ 408.9 nm

2: 6.1 ft.; 4335 @ 467.7 nm

3: 6.3 ft.; 4668 @ 476.1 nm

4: 10.3 ft.; 2413 @ 411.0 nm

Time: 07:52:40

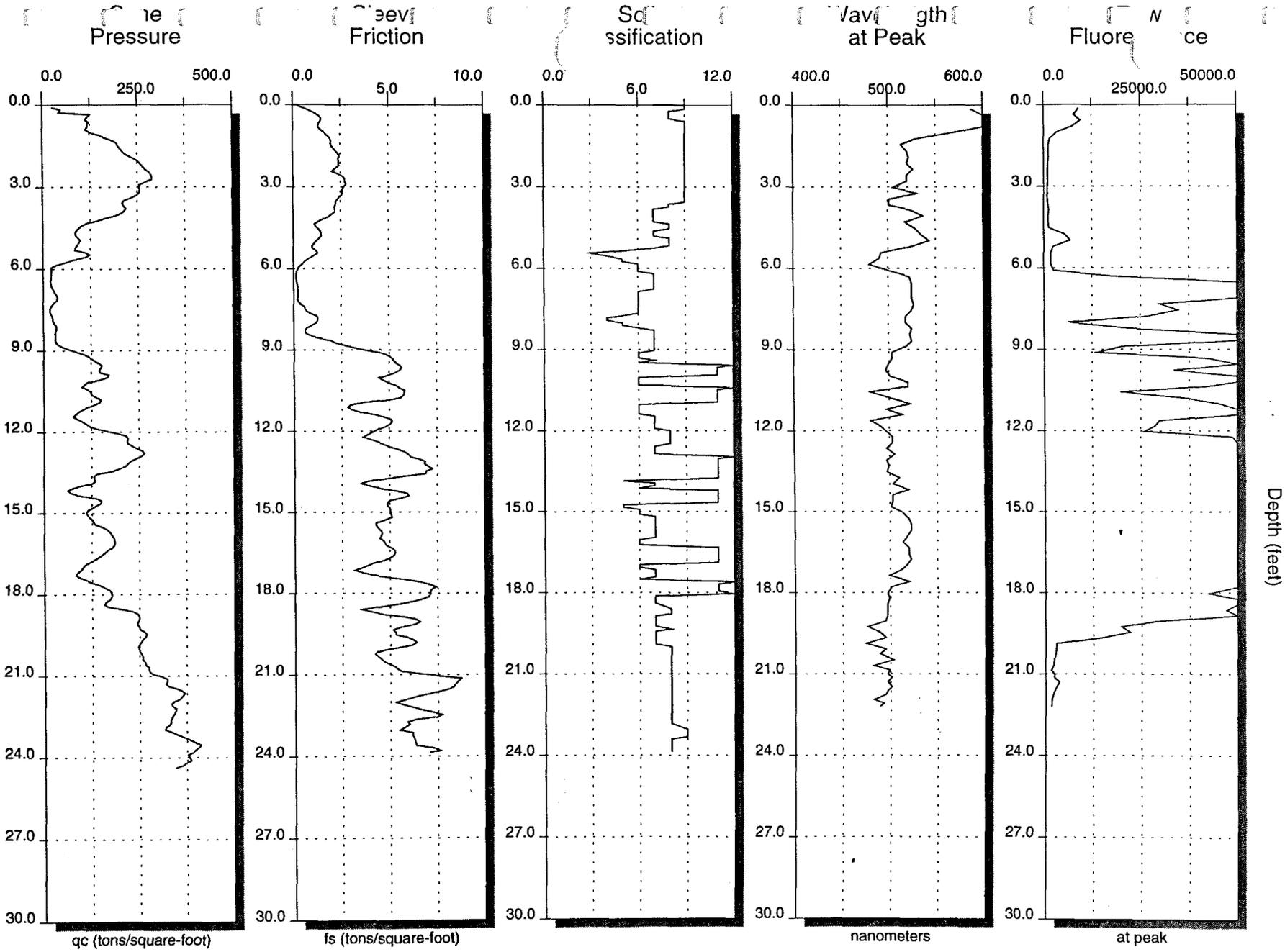
Date: 12-05-1996

Version: 1.0

Main: C:\BASIC71\DATA\IR13-06.PSH

Probe: C:\BASIC71\DATA\PROBE23E.PR

Calibration: C:\BASIC71\DATA\1213DFM.CAL

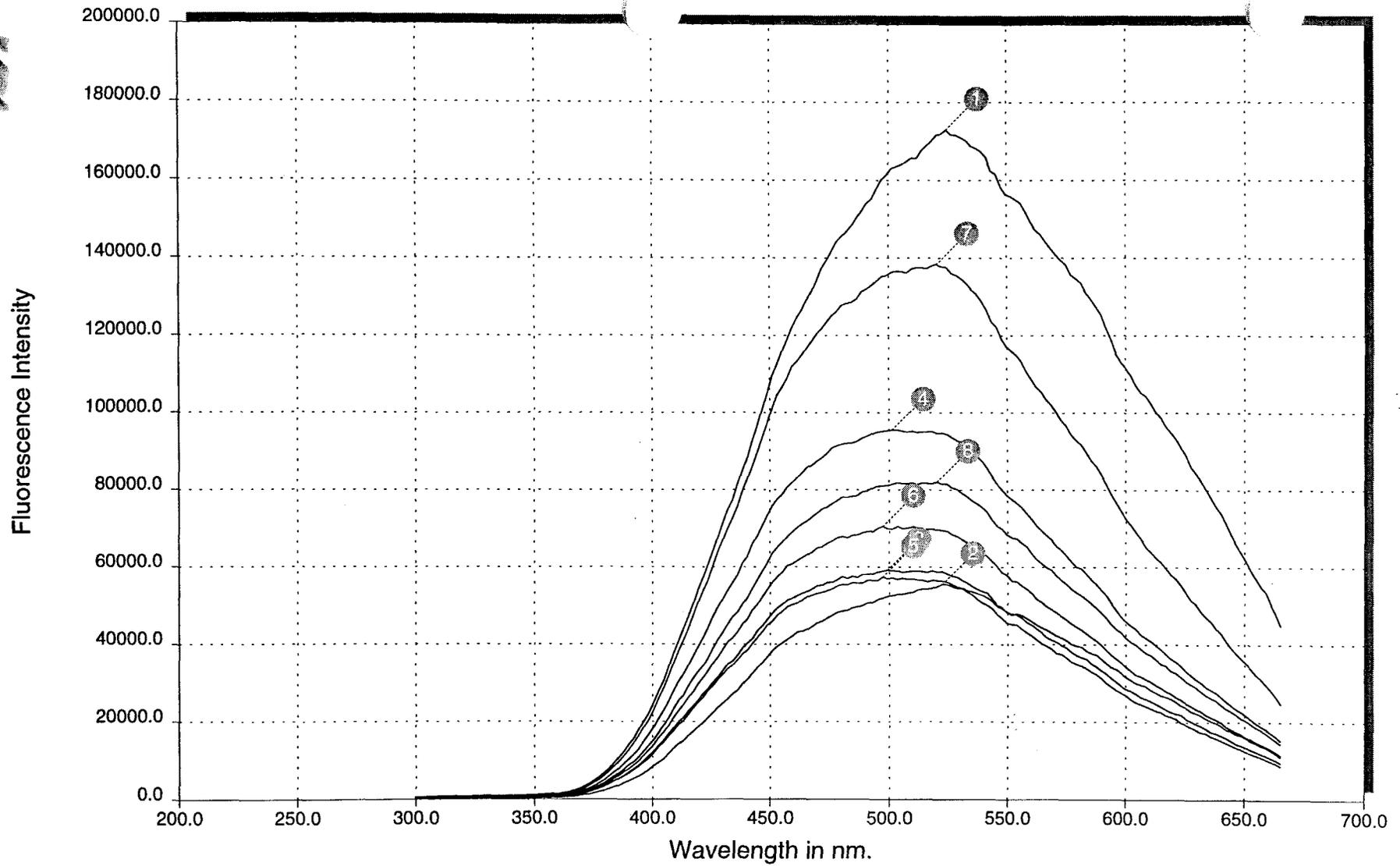


Time: 08:21:10
Date: 12-05-1996
Version: 1.0

Push: C:\BASIC71\DATA\IR13-07.PSH
Probe: C:\BASIC71\DATA\PROBE23E.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plots



1: 7.0 ft.; 172935 @ 524.4 nm
2: 8.4 ft.; 55553 @ 522.3 nm
3: 9.5 ft.; 59201 @ 499.2 nm
4: 10.0 ft.; 95509 @ 501.3 nm

5: 11.2 ft.; 57392 @ 497.1 nm
6: 12.7 ft.; 70482 @ 497.1 nm
7: 14.2 ft.; 138299 @ 520.2 nm
8: 15.3 ft.; 82064 @ 520.2 nm

Main: C:\BASIC71\DATA\IR13-07.PSH
Probe: C:\BASIC71\DATA\PROBE23E.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL

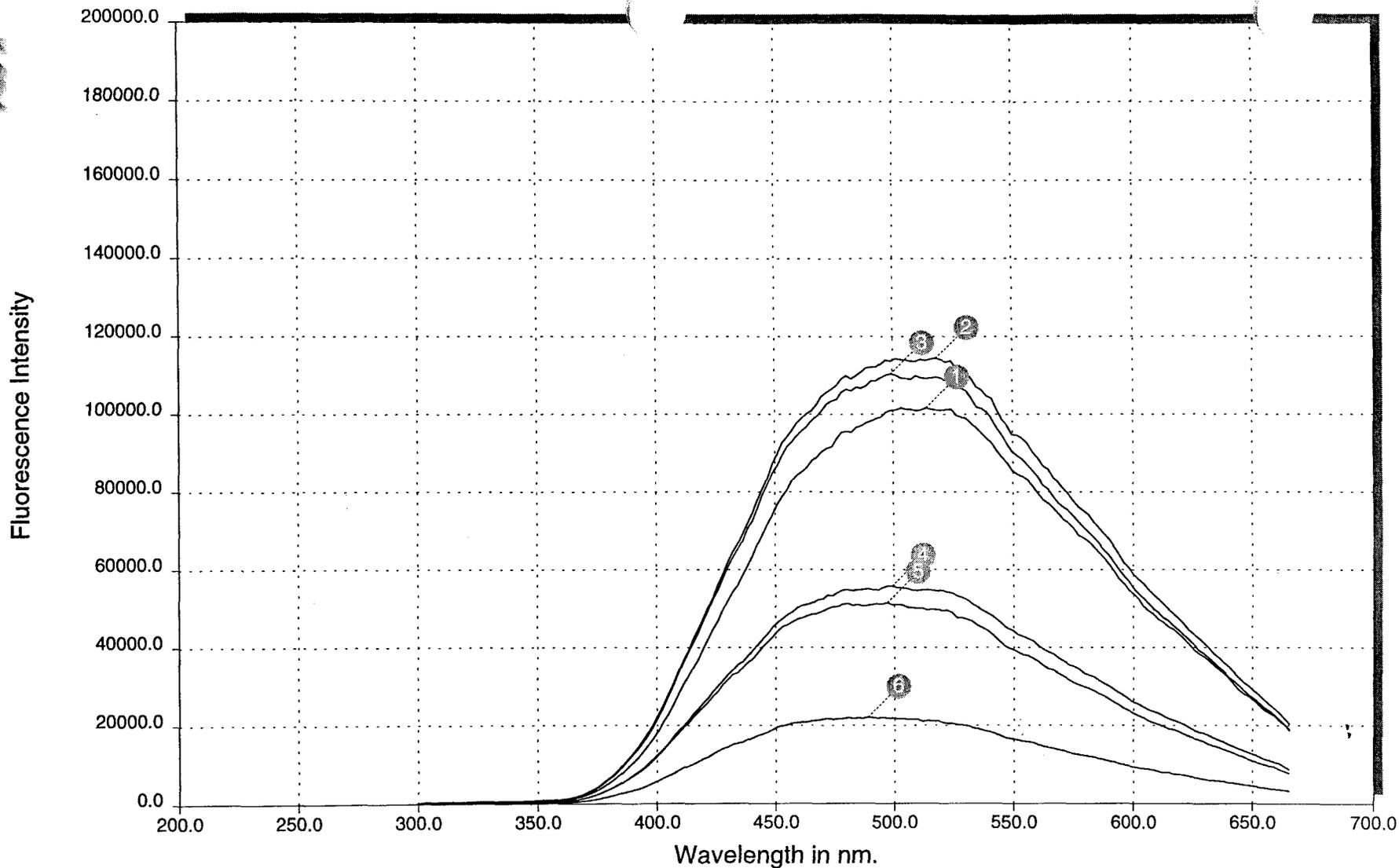
Time: 08:21:10

Date: 12-05-1996

Version: 1.0



Spectral Plot(s)

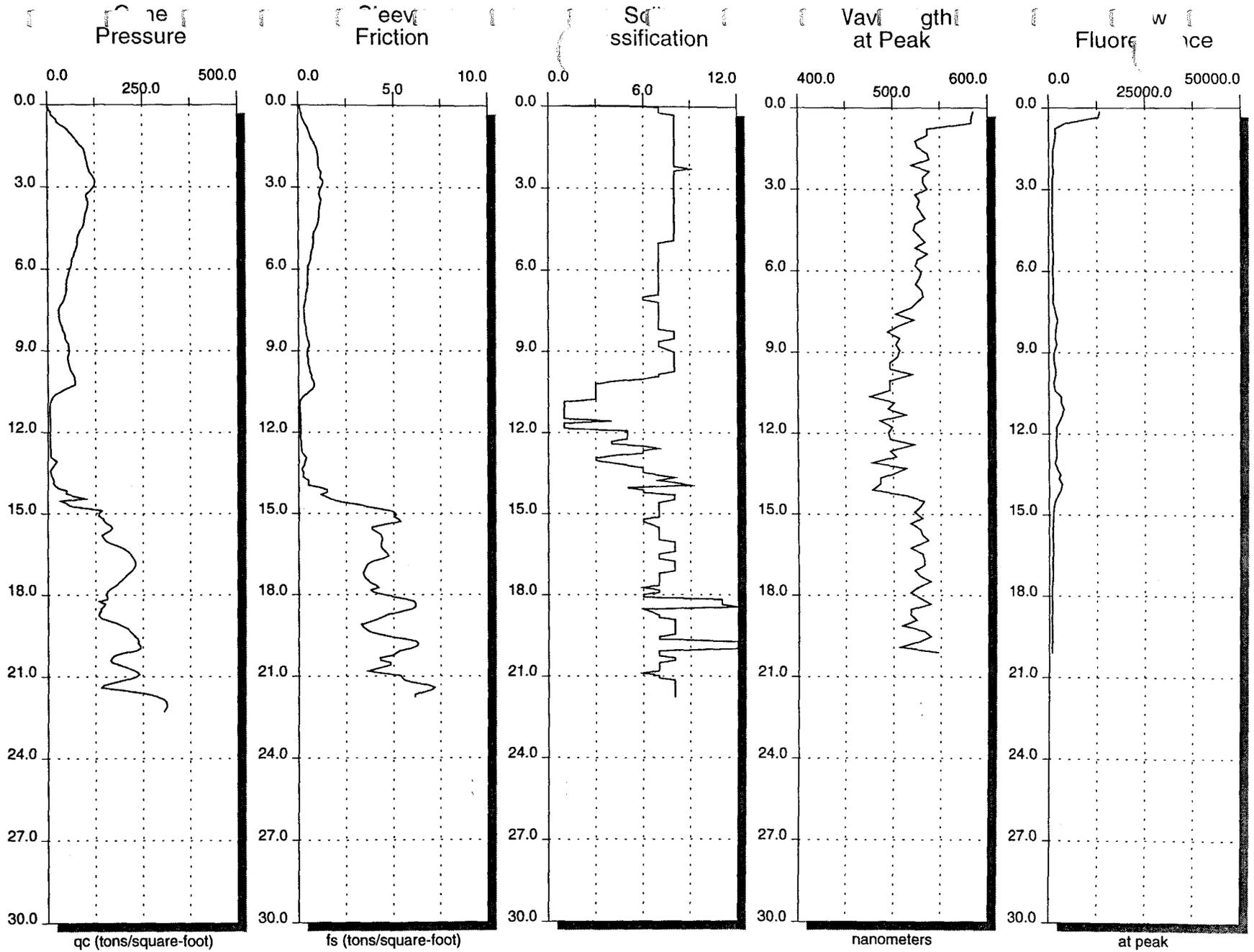


1: 16.1 ft.; 101627 @ 513.9 nm
2: 17.0 ft.; 114342 @ 518.1 nm
3: 17.4 ft.; 110363 @ 499.2 nm
4: 18.2 ft.; 55731 @ 499.2 nm

5: 18.8 ft.; 51510 @ 497.1 nm
6: 19.5 ft.; 22069 @ 488.7 nm

Time: 08:21:10
Date: 12-05-1996
Version: 1.0

Main: C:\BASIC71\DATA\IR13-07.PSH
Probe: C:\BASIC71\DATA\PROBE23E.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Time: 16:32:03

Date: 12-06-1996

Version: 1.0

Push: C:\BASIC71\DATA\IR13-08.PSH

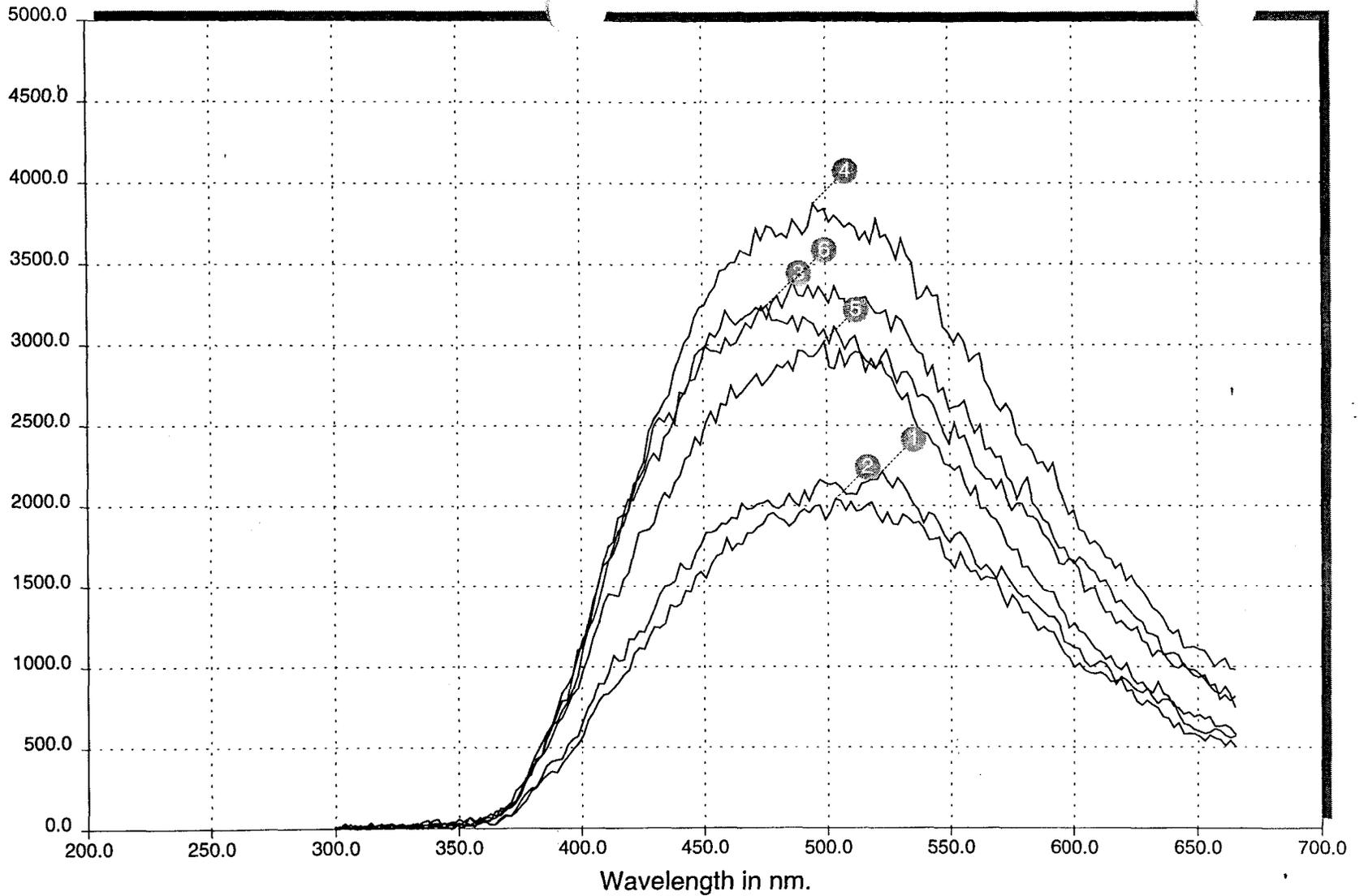
Probe: C:\BASIC71\DATA\PROBE23E.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plots(s)

Fluorescence Intensity

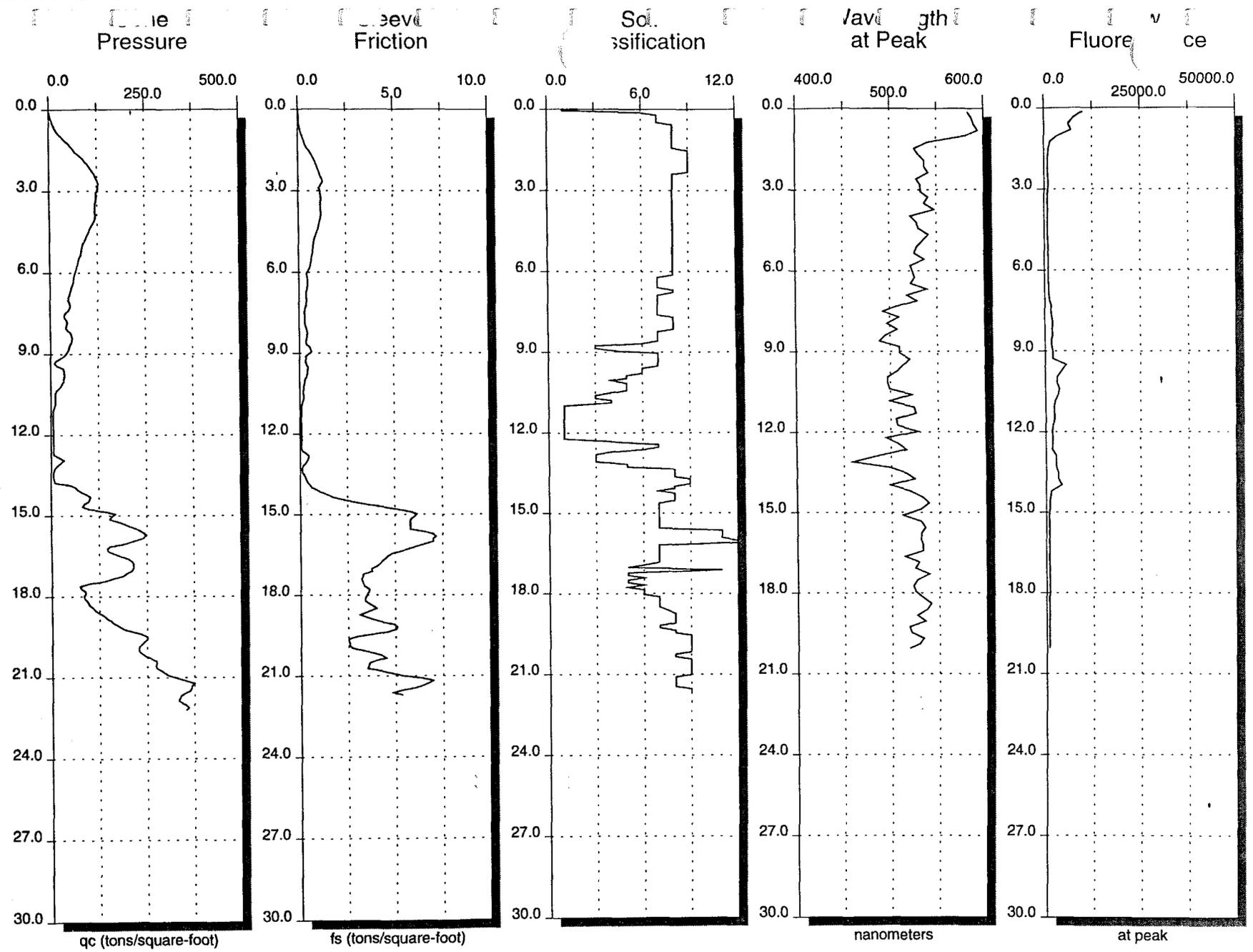


1: 7.8 ft.; 2214 @ 522.3 nm
2: 8.7 ft.; 2041 @ 503.4 nm
3: 10.6 ft.; 3245 @ 476.1 nm
4: 11.1 ft.; 3876 @ 495.0 nm

5: 13.5 ft.; 3020 @ 499.2 nm
6: 13.9 ft.; 3389 @ 486.6 nm

Main: C:\BASIC71\DATA\IR13-08.PSH
Probe: C:\BASIC71\DATA\PROBE23E.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL

Time: 16:32:03
Date: 12-06-1996
Version: 1.0



Depth (feet)

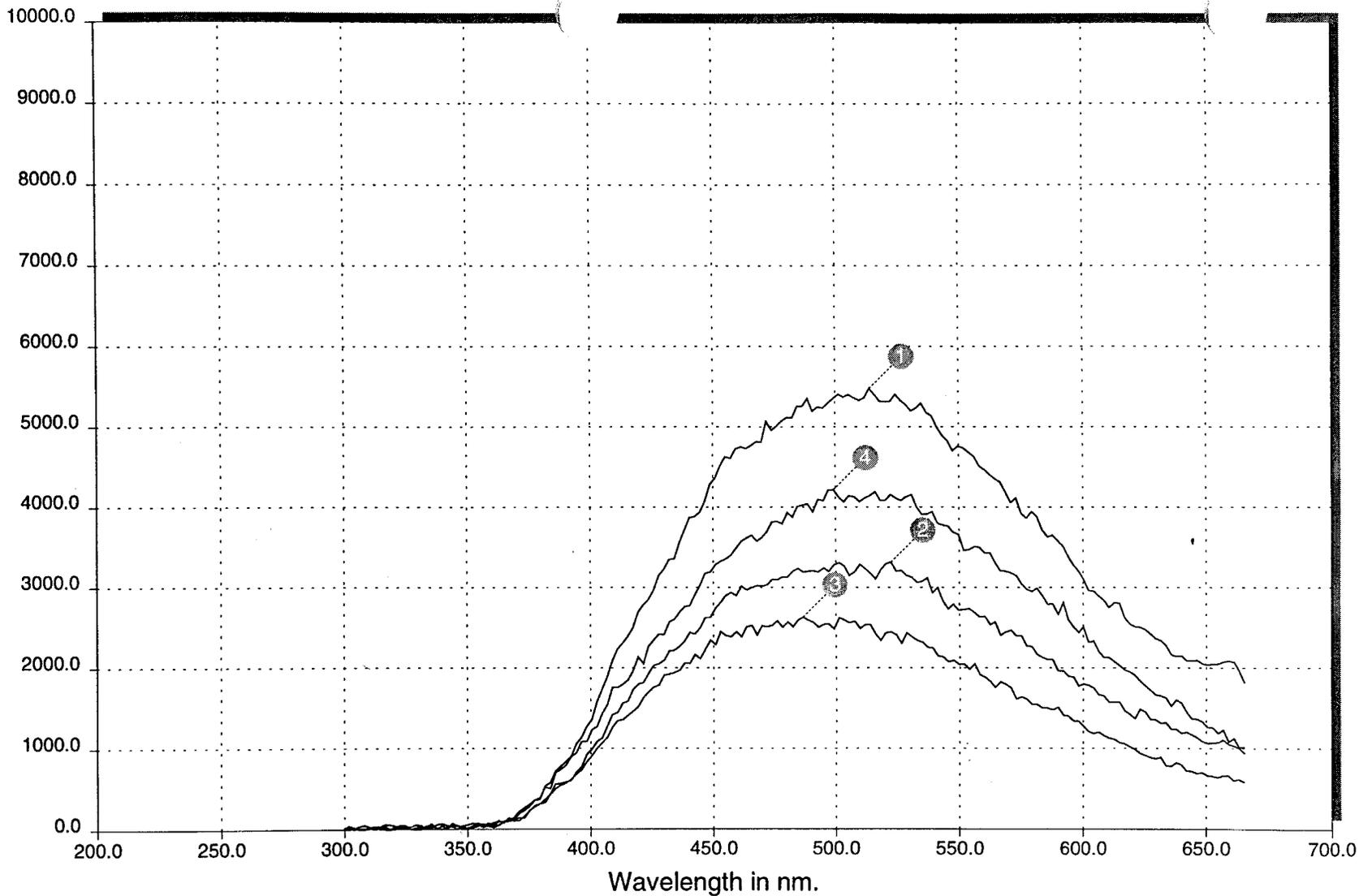
Time: 07:03:07
Date: 12-07-1996
Version: 1.0

Push: C:\BASIC71\DATA\IR13-09.PSH
Probe: C:\BASIC71\DATA\PROBE23E.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

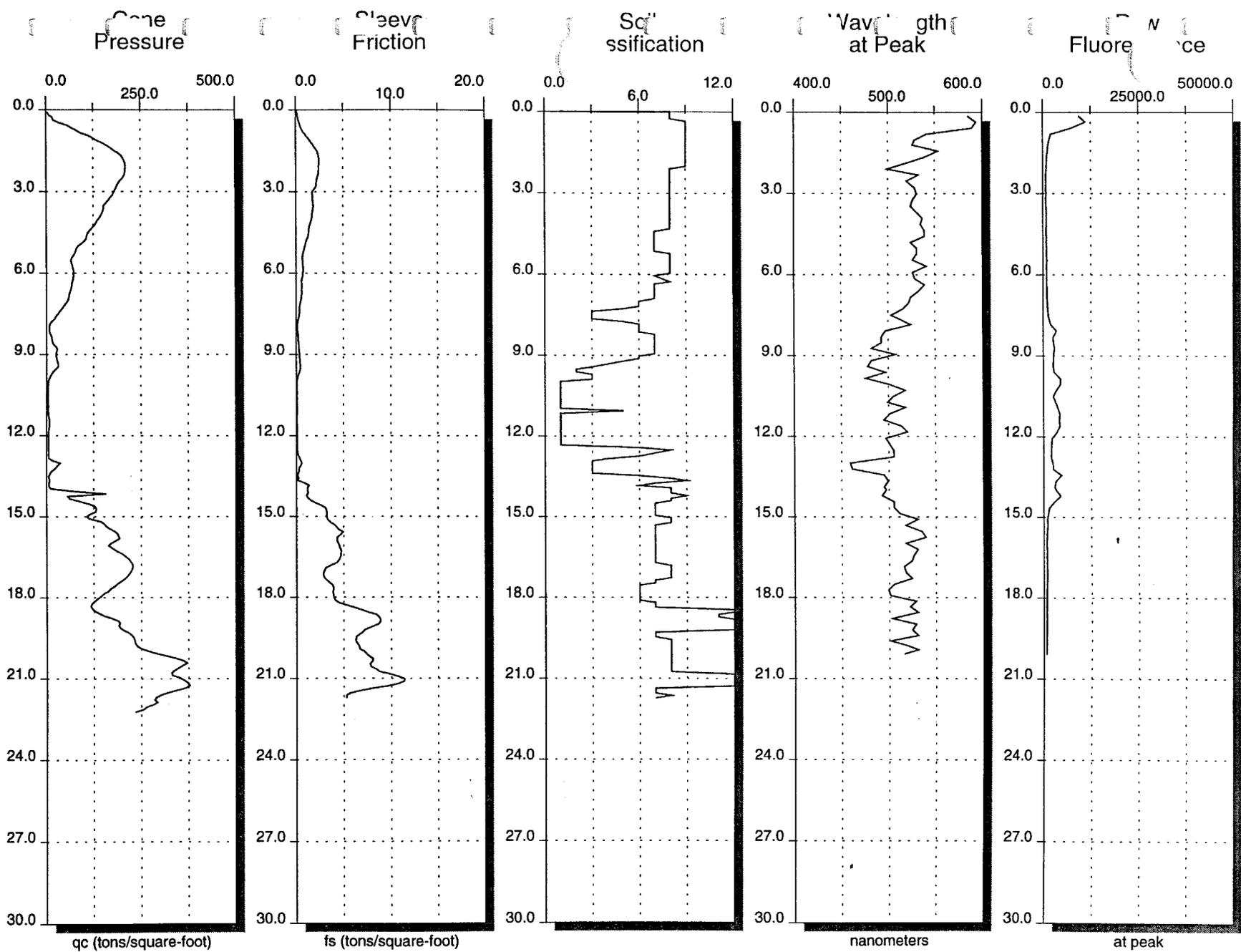
Fluorescence Intensity



Time: 07:03:07
Date: 12-07-1996
Version: 1.0

1: 9.5 ft.; 5475 @ 513.9 nm
2: 10.6 ft.; 3312 @ 522.3 nm
3: 12.9 ft.; 2629 @ 486.6 nm
4: 14.0 ft.; 4214 @ 499.2 nm

Main: C:\BASIC71\DATA\IR13-09.PSH
Probe: C:\BASIC71\DATA\PROBE23E.PR8
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Time: 07:34:32

Date: 12-07-1996

Version: 1.0

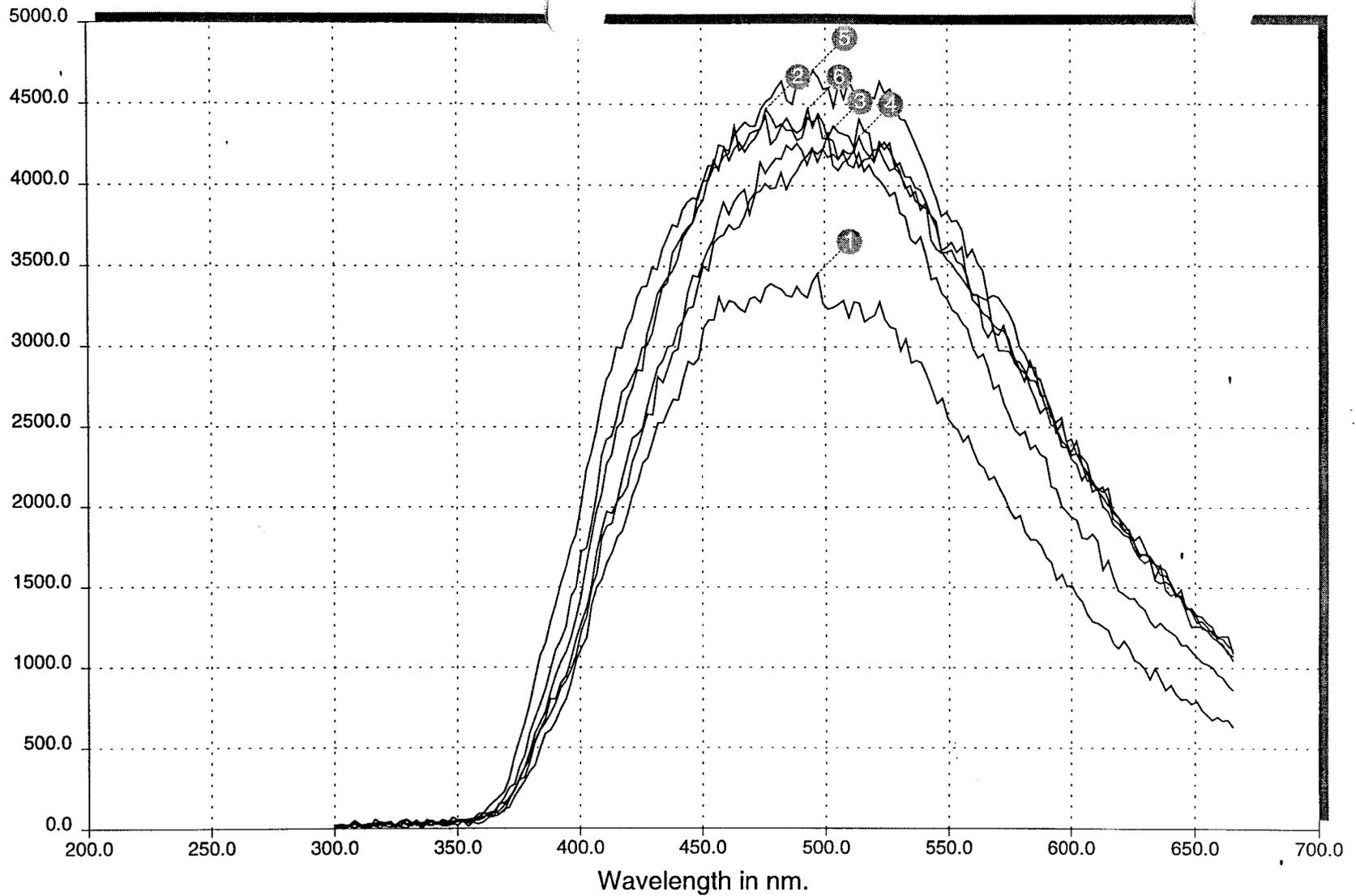
Push: C:\BASIC71\DATA\IR13-10.PSH

Probe: C:\BASIC71\DATA\PROBE23E.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Fluorescence Intensity



1: 8.1 ft.; 3455 @ 497.1 nm

5: 13.4 ft.; 4710 @ 495.0 nm

2: 9.8 ft.; 4471 @ 476.1 nm

6: 14.2 ft.; 4469 @ 492.9 nm

3: 11.2 ft.; 4319 @ 501.3 nm

4: 11.6 ft.; 4301 @ 513.9 nm

Main: C:\BASIC71\DATA\IR13-10.PSH

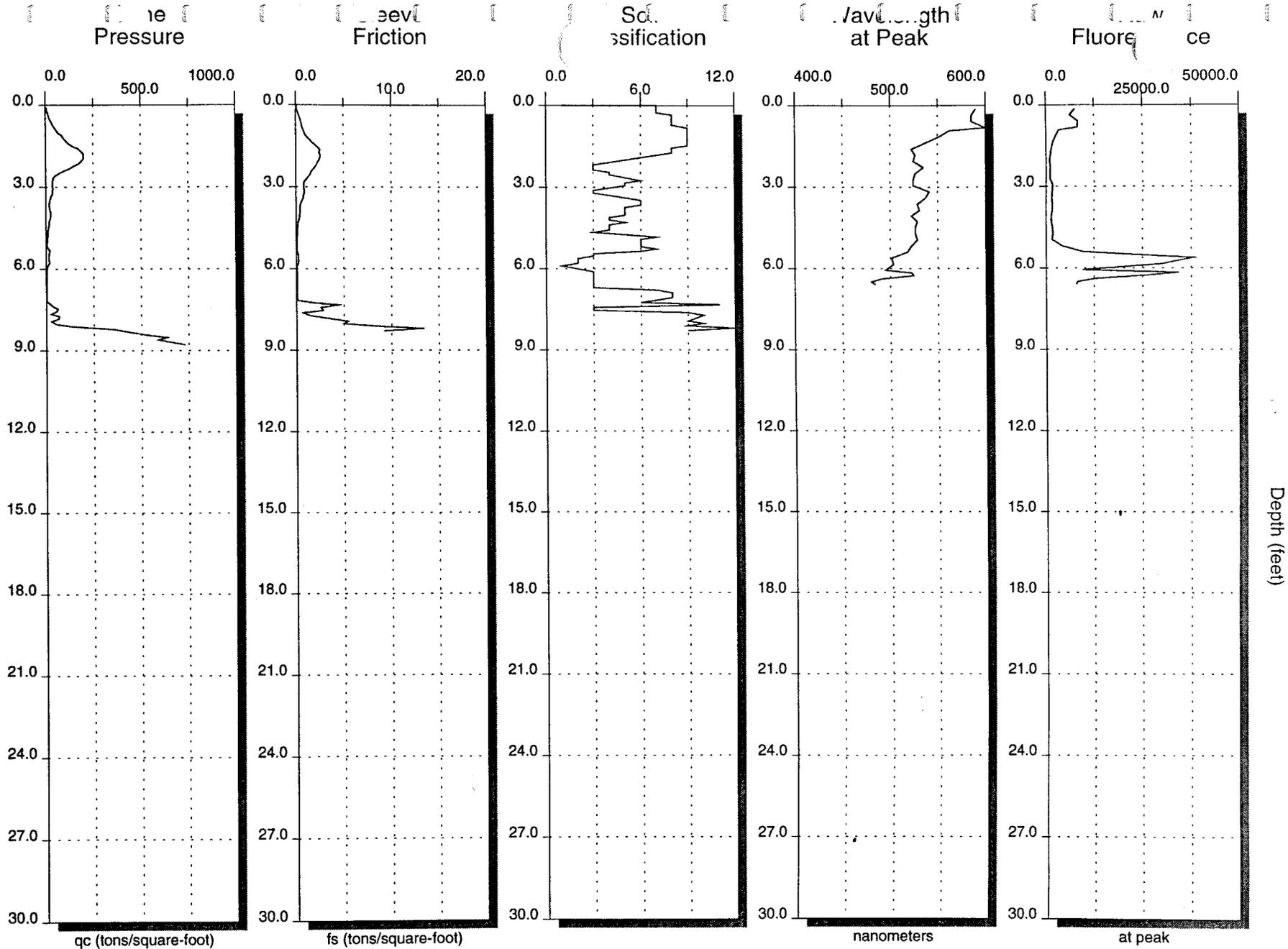
Probe: C:\BASIC71\DATA\PROBE23E.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL

Time: 07:34:32

Date: 12-07-1996

Version: 1.0



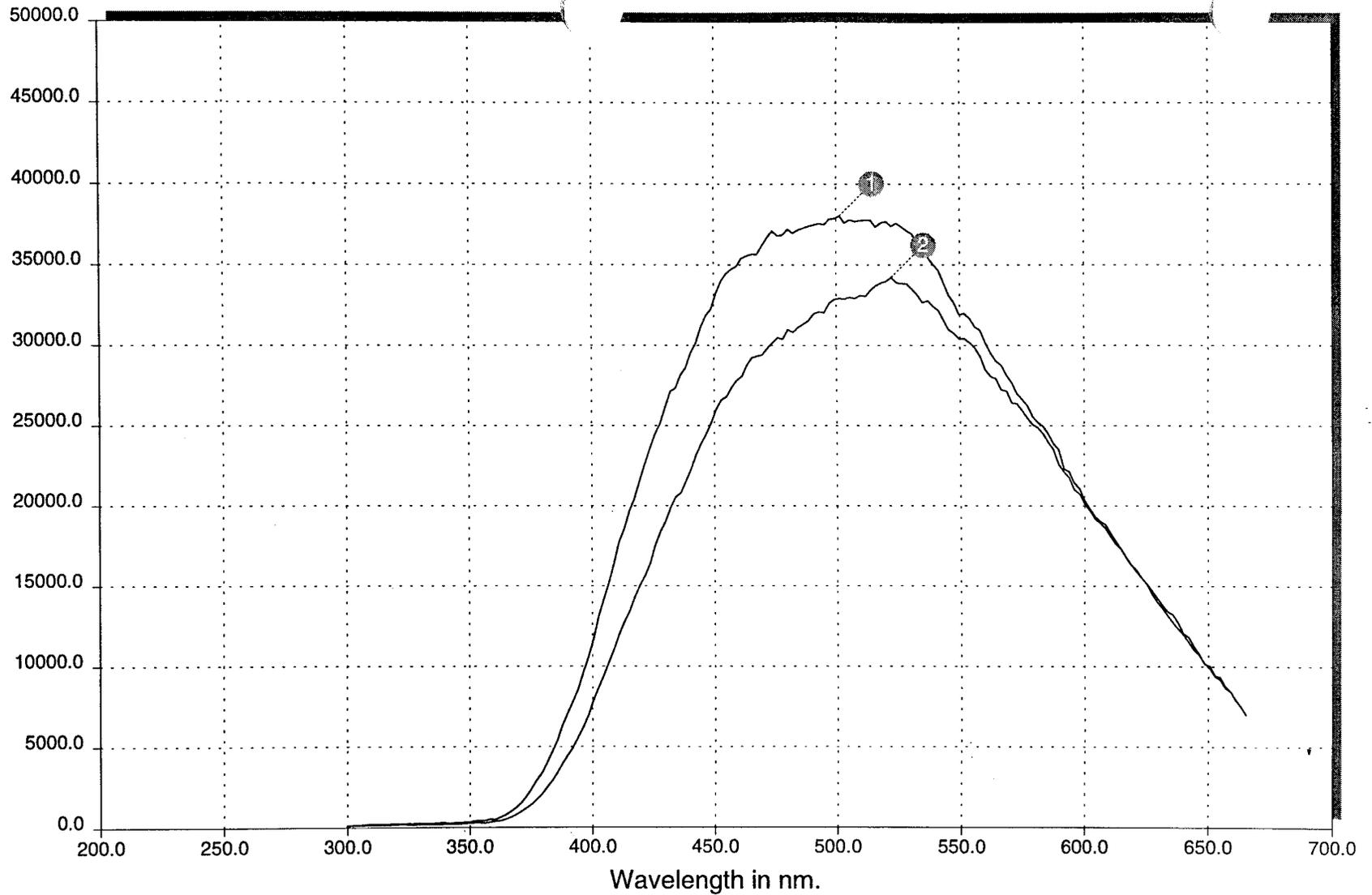
Time: 07:59:24
Date: 12-07-1996
Version: 1.0

Push: C:\BASIC71\DATA\IR13-11.PSH
Probe: C:\BASIC71\DATA\PROBE23E.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot

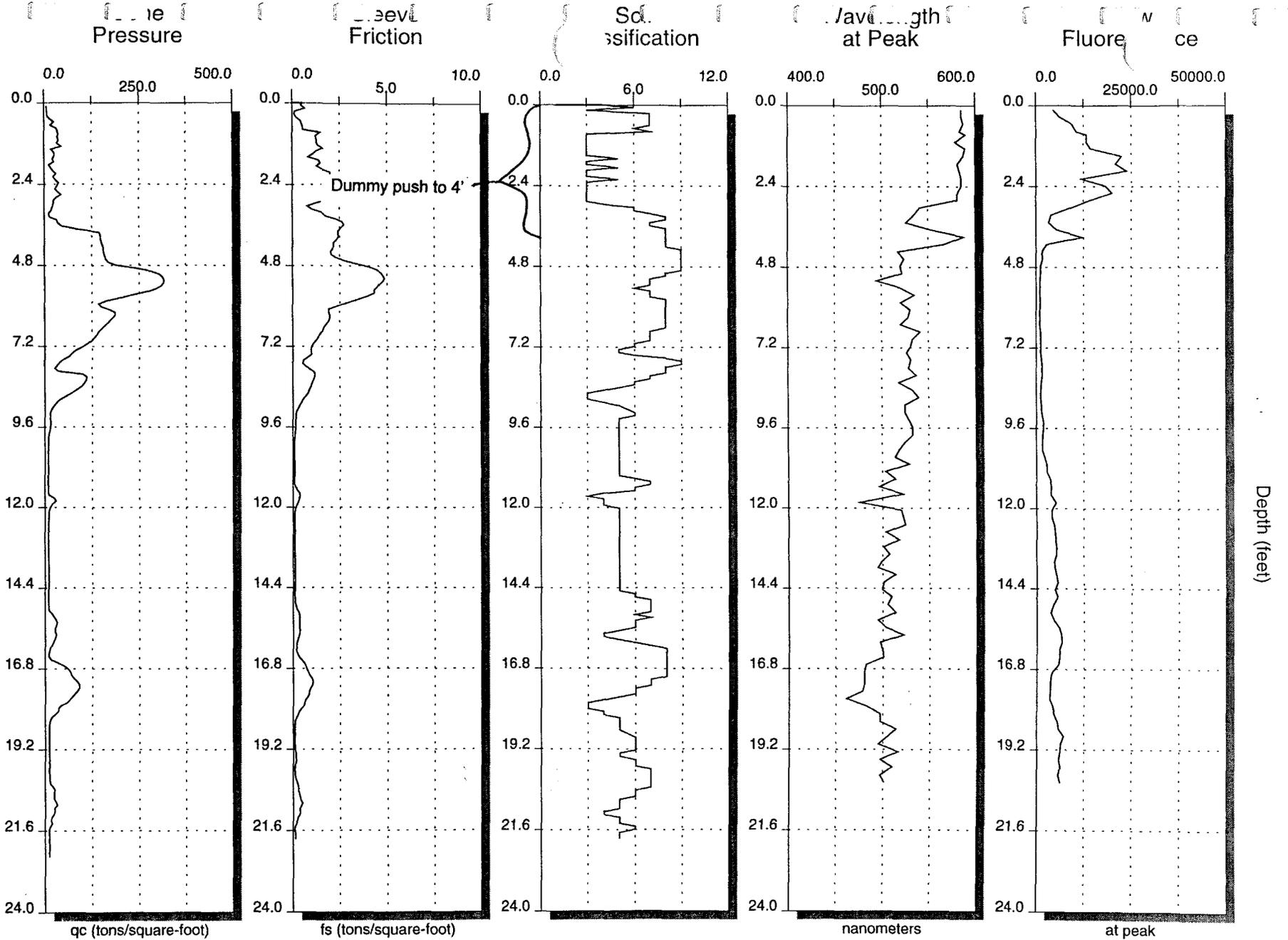
Fluorescence Intensity



1: 5.6 ft.; 38015 @ 501.3 nm
2: 6.2 ft.; 34215 @ 522.3 nm

Time: 07:59:24
Date: 12-07-1996
Version: 1.0

Main: C:\BASIC71\DATA\IR13-11.PSH
Probe: C:\BASIC71\DATA\PROBE23E.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Time: 14:22:43

Date: 12-07-1996

Version: 1.0

Push: C:\BASIC71\DATA\TOW-01.PSH

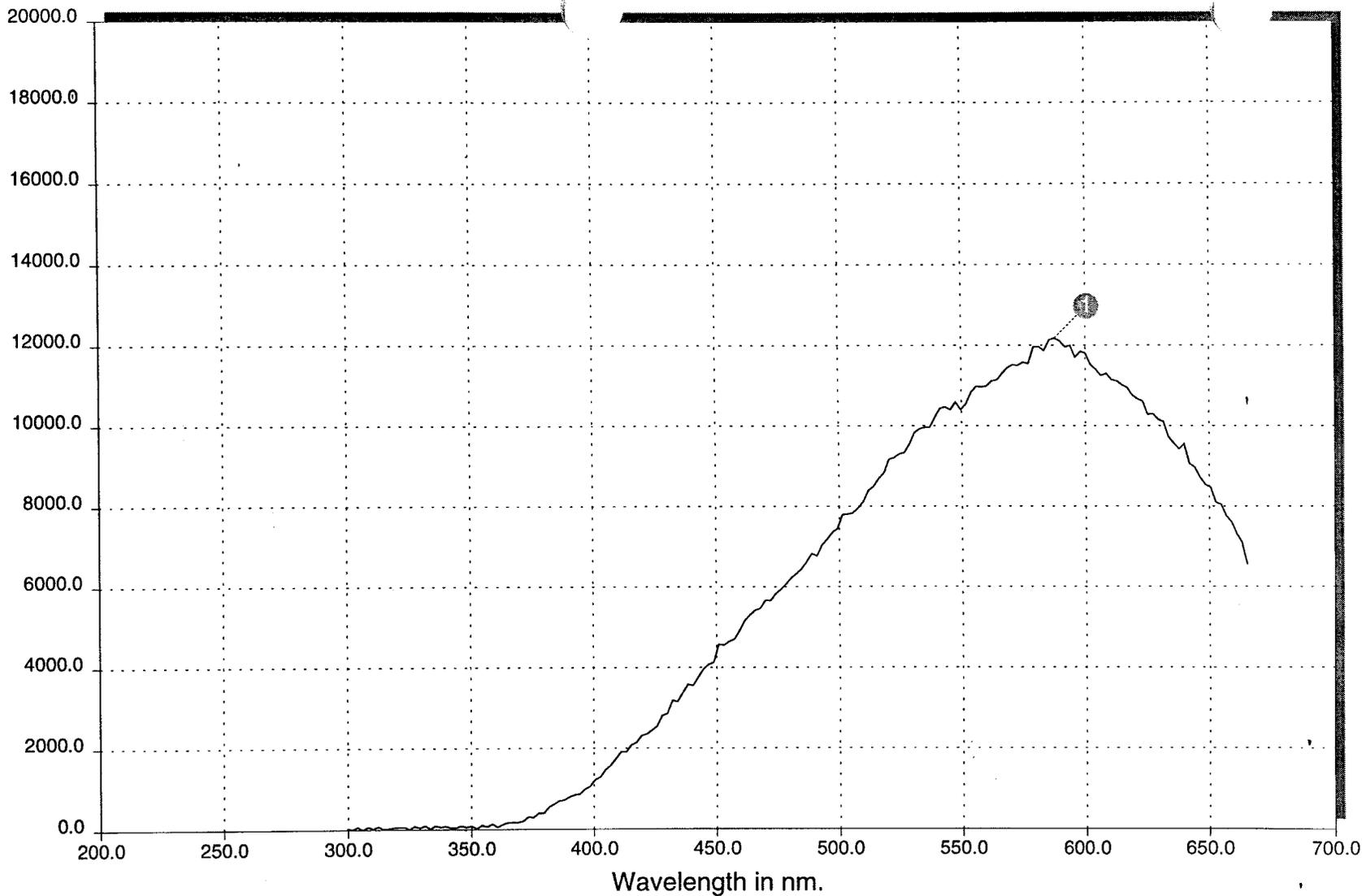
Probe: C:\BASIC71\DATA\PROBE23E.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

Fluorescence Intensity



1: 3.9 ft.; 12171 @ 587.5 nm

Time: 14:22:43

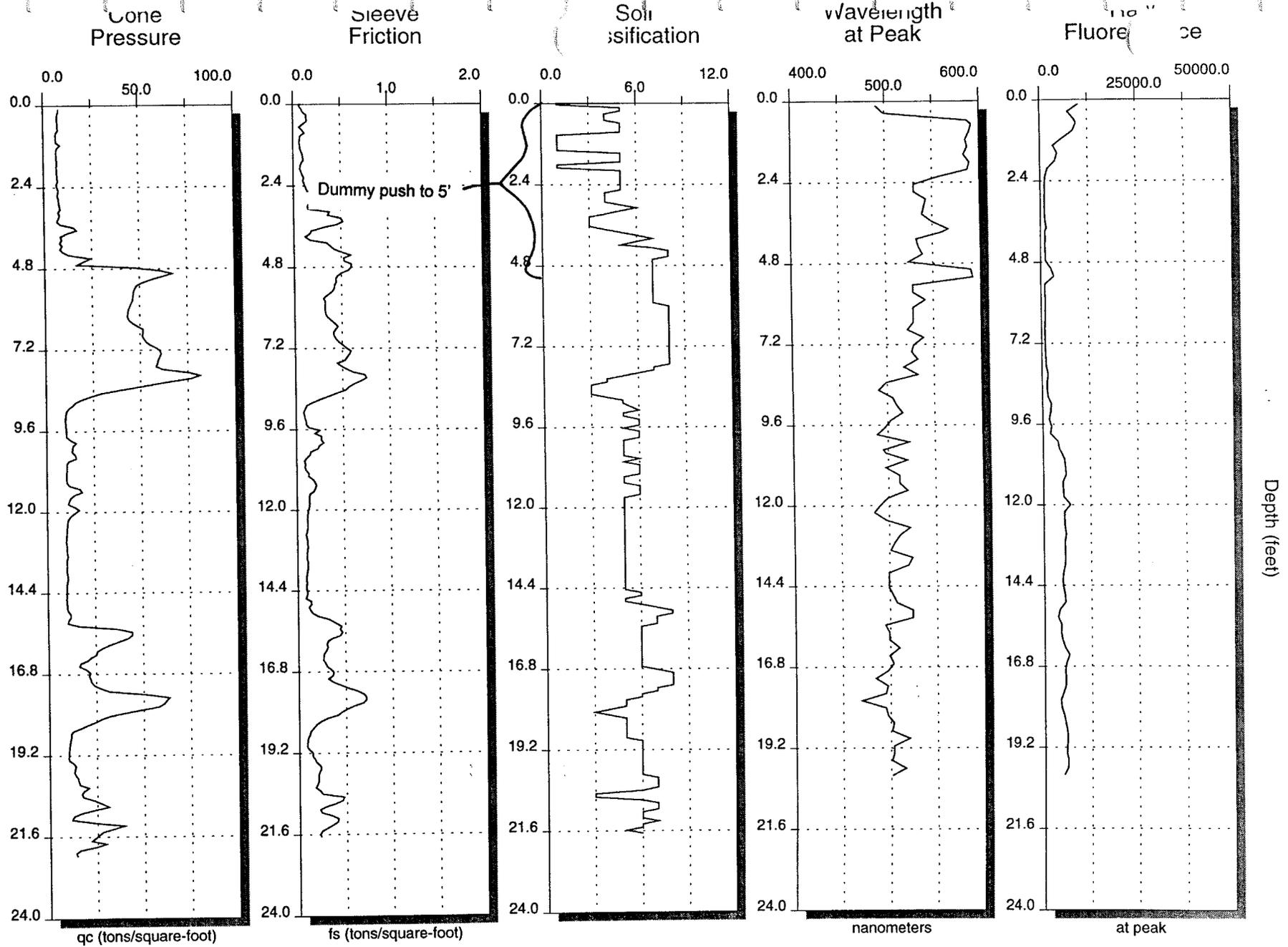
Date: 12-07-1996

Version: 1.0

Main: C:\BASIC71\DATA\TOW-01.PSH

Probe: C:\BASIC71\DATA\PROBE23E.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL

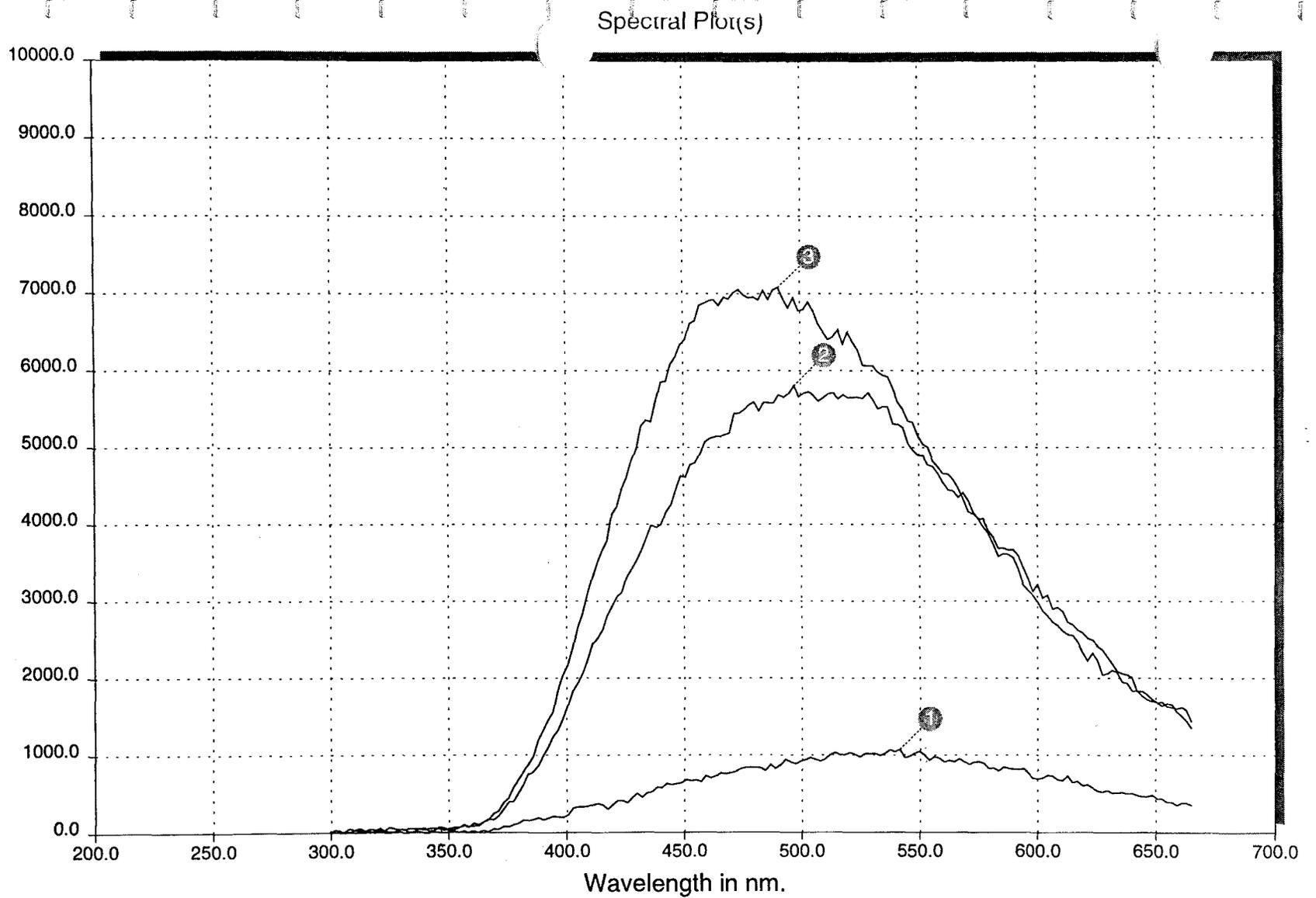


Time: 14:55:33
Date: 12-07-1996
Version: 1.0

Push: C:\BASIC71\DATA\TOW-02.PSH
Probe: C:\BASIC71\DATA\PROBE23E.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



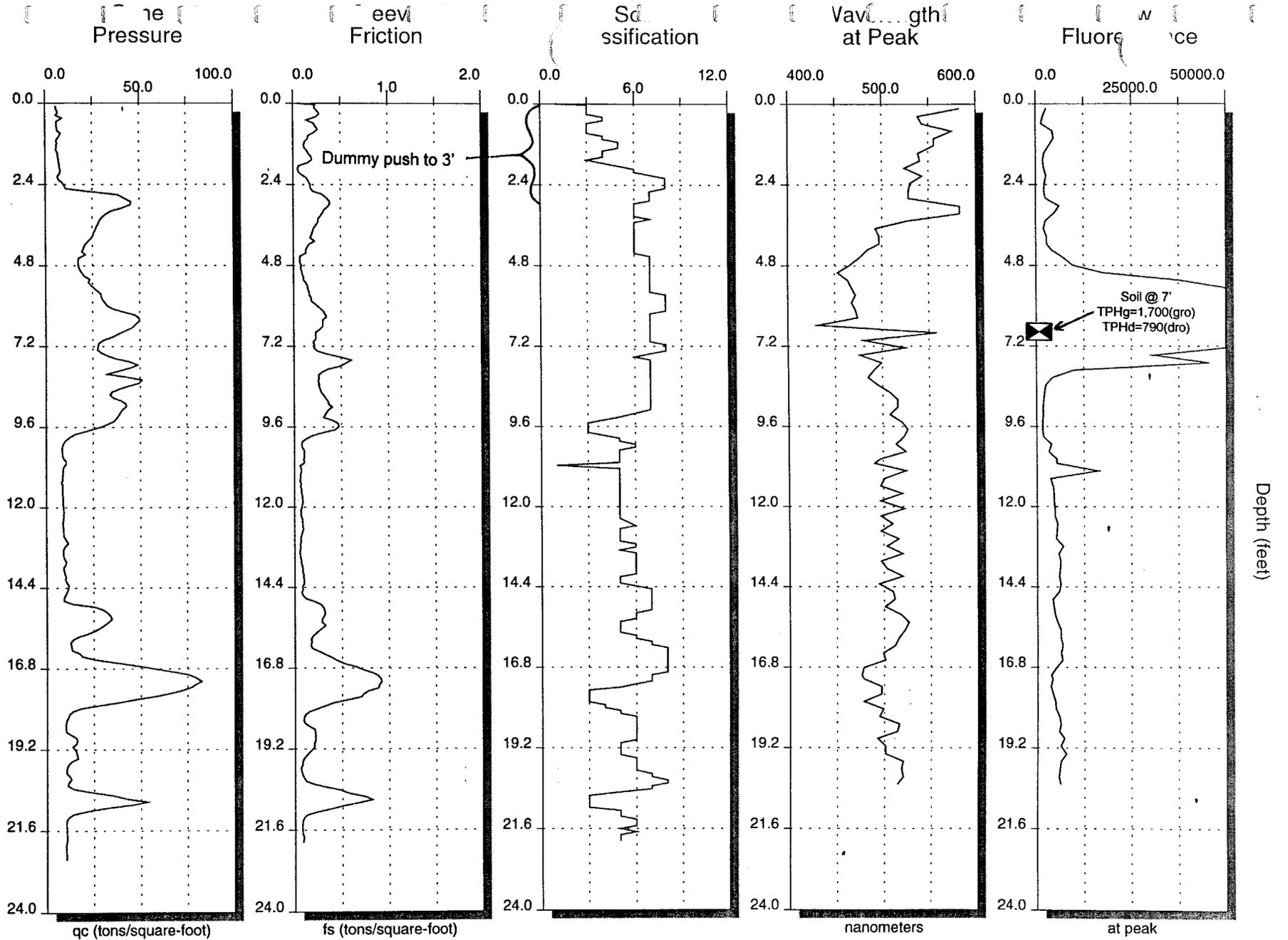
Fluorescence Intensity



Time: 14:55:33
Date: 12-07-1996
Version: 1.0

1: 5.9 ft.; 1072 @ 541.2 nm
2: 10.9 ft.; 5801 @ 497.1 nm
3: 12.0 ft.; 7074 @ 490.8 nm

Main: C:\BASIC71\DATA\TOW-02.PSH
Probe: C:\BASIC71\DATA\PROBE23E.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Time: 15:32:44

Date: 12-07-1996

Version: 1.0

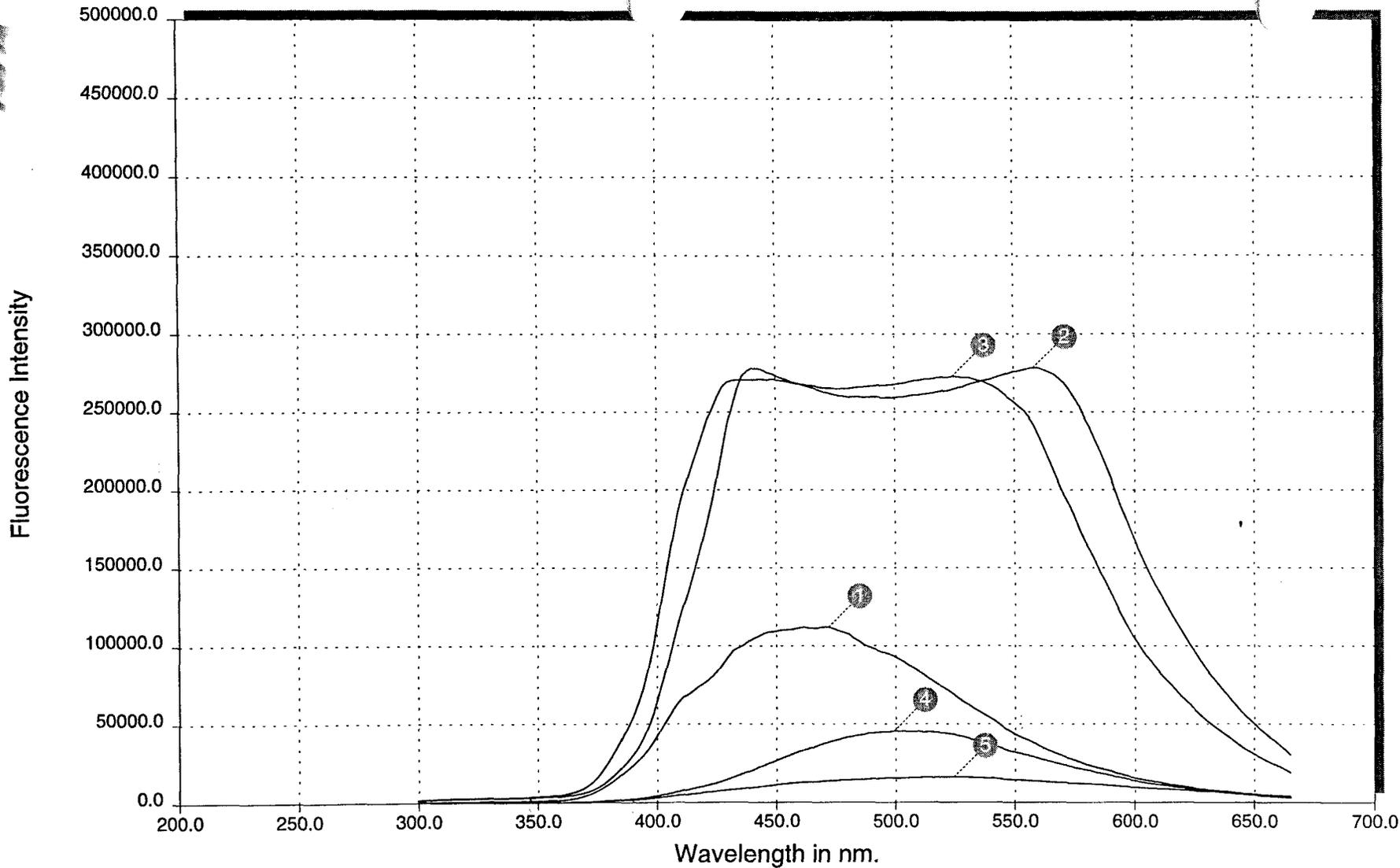
Push: C:\BASIC71\DATA\TOW-03.PSH

Probe: C:\BASIC71\DATA\PROBE23E.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

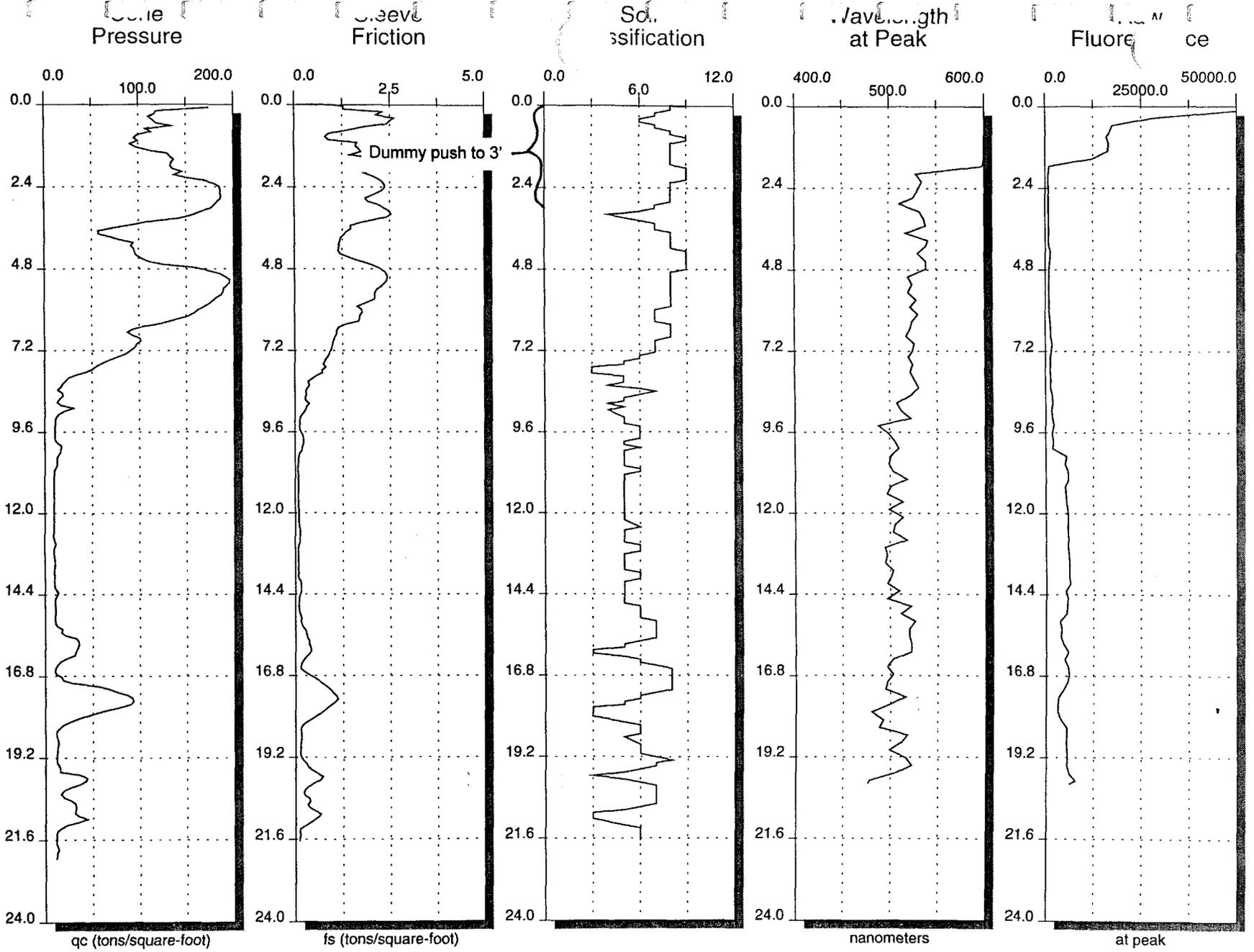


1: 5.7 ft.; 112029 @ 471.9 nm
2: 6.8 ft.; 278246 @ 558.1 nm
3: 7.2 ft.; 272729 @ 524.4 nm
4: 7.7 ft.; 45489 @ 499.2 nm

5: 10.9 ft.; 16263 @ 524.4 nm

Time: 15:32:44
Date: 12-07-1996
Version: 1.0

Main: C:\BASIC71\DATA\TOW-03.PSH
Probe: C:\BASIC71\DATA\PROBE23E.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL

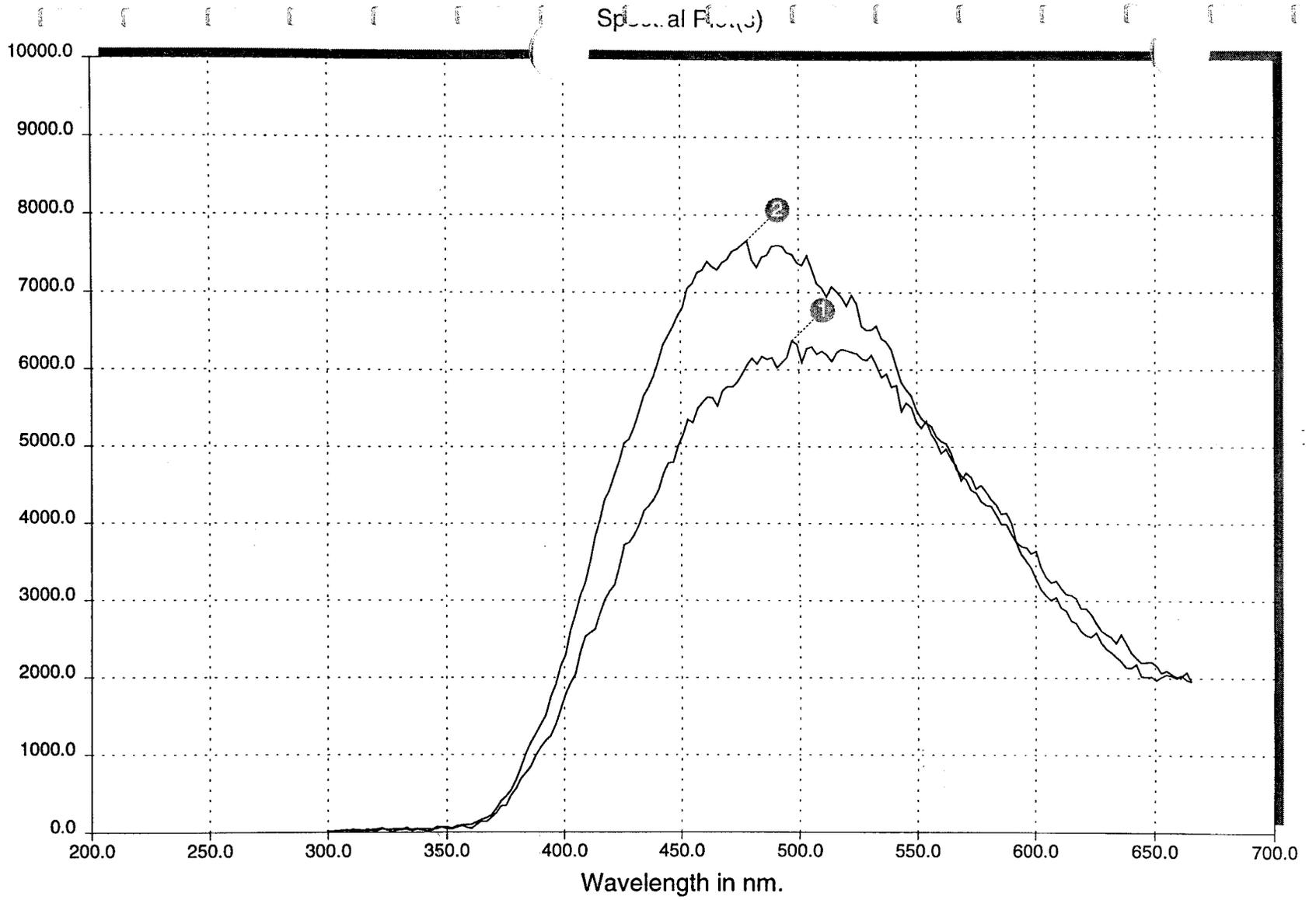


Time: 16:02:40
Date: 12-07-1996
Version: 1.0

Push: C:\BASIC71\DATA\TOW-04.PSH
Probe: C:\BASIC71\DATA\PROBE23E.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Fluorescence Intensity



Time: 16:02:40

Date: 12-07-1996

Version: 1.0

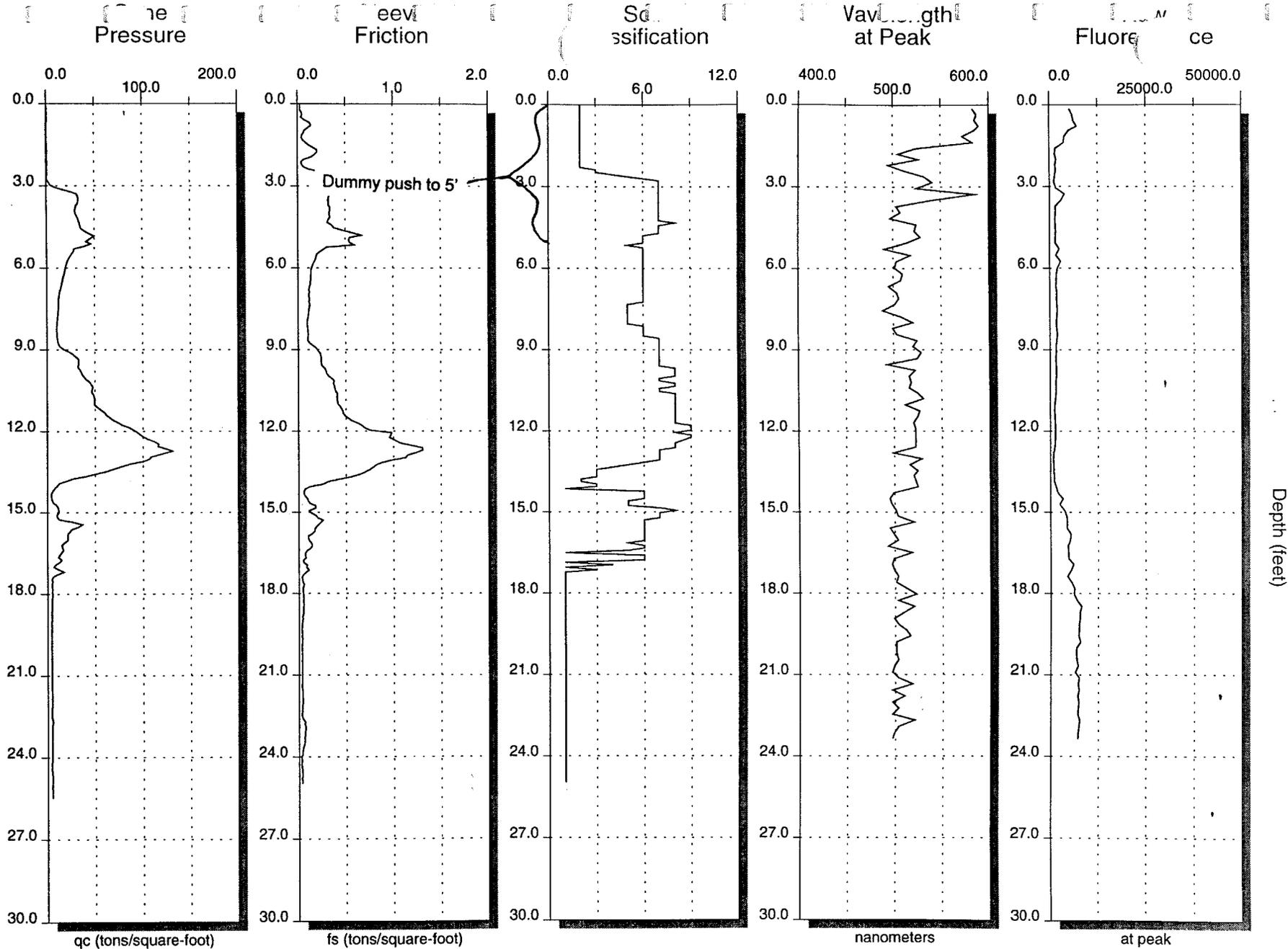
1: 14.1 ft.; 6372 @ 497.1 nm

2: 19.9 ft.; 7666 @ 478.2 nm

Main: C:\BASIC71\DATA\TOW-04.PSH

Probe: C:\BASIC71\DATA\PROBE23E.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Time: 15:38:05

Date: 12-03-1996

Version: 1.0

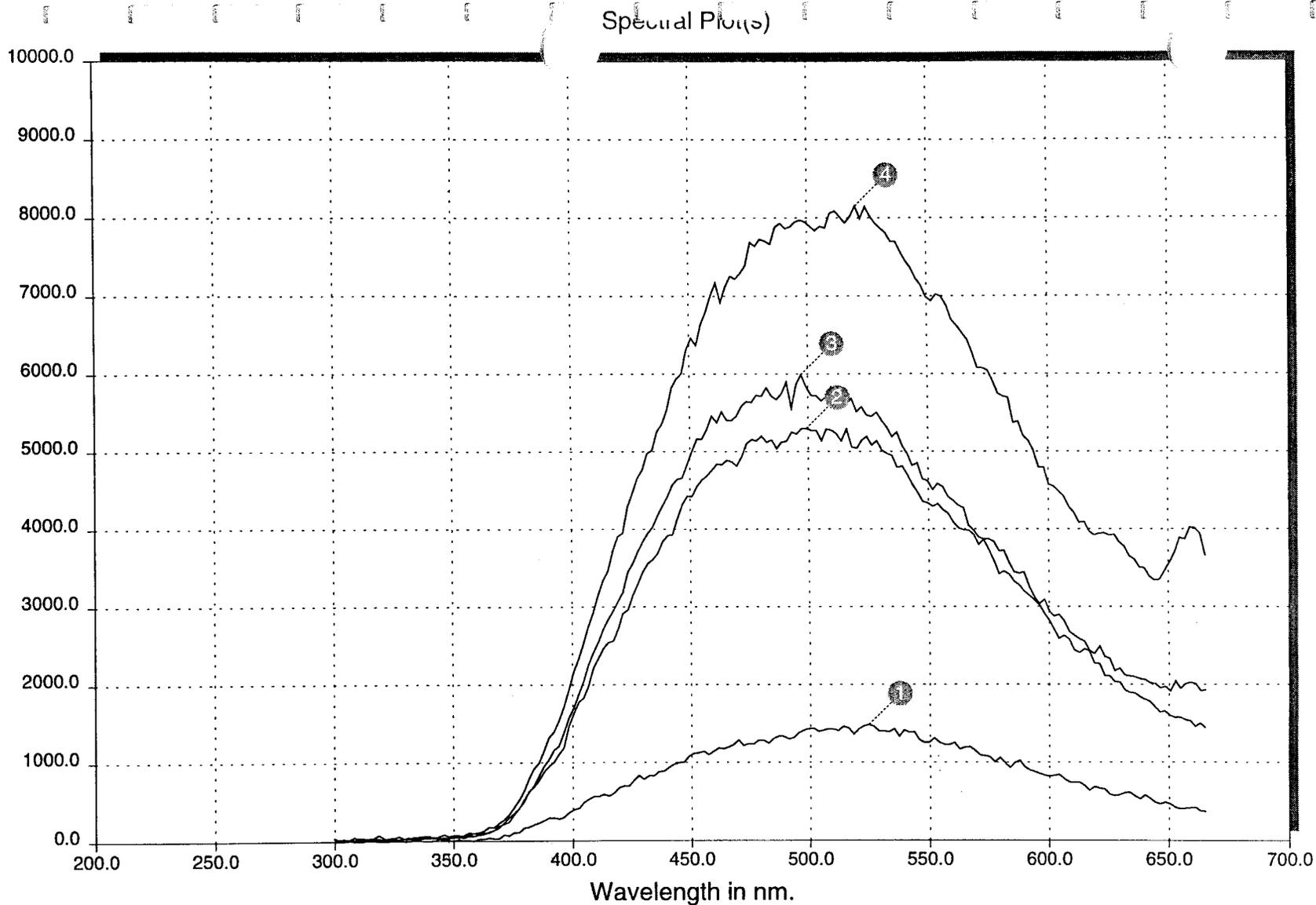
Push: C:\BASIC71\DATA\SPL-01.PSH

Probe: C:\BASIC71\DATA\PROBE23E.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Fluorescence Intensity



Time: 15:38:05

Date: 12-03-1996

Version: 1.0

1: 14.1 ft.; 1484 @ 524.4 nm

2: 15.8 ft.; 5296 @ 499.2 nm

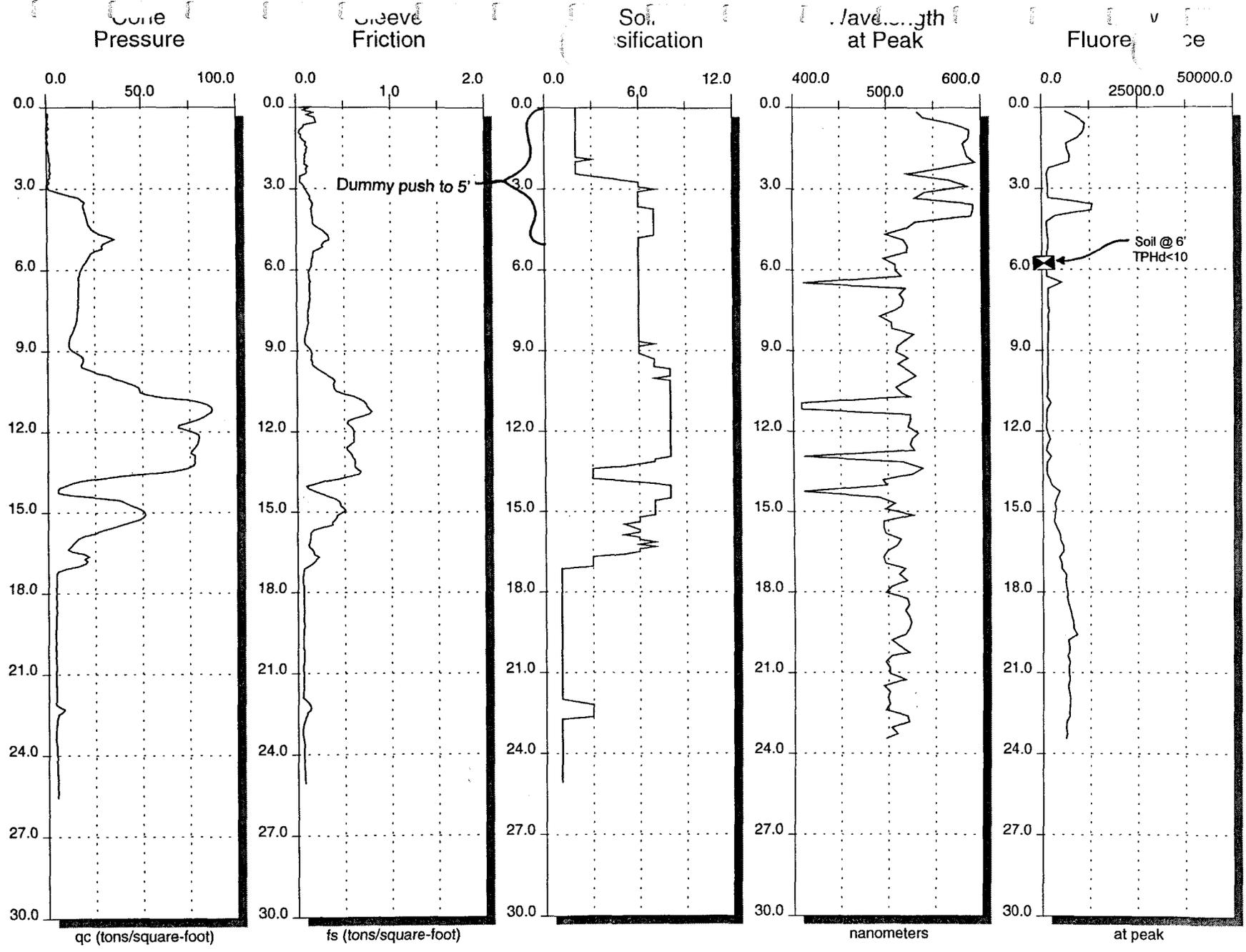
3: 16.9 ft.; 5988 @ 497.1 nm

4: 18.5 ft.; 8149 @ 520.2 nm

Main: C:\BASIC71\DATA\SPL-01.PSH

Probe: C:\BASIC71\DATA\PROBE23E.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL

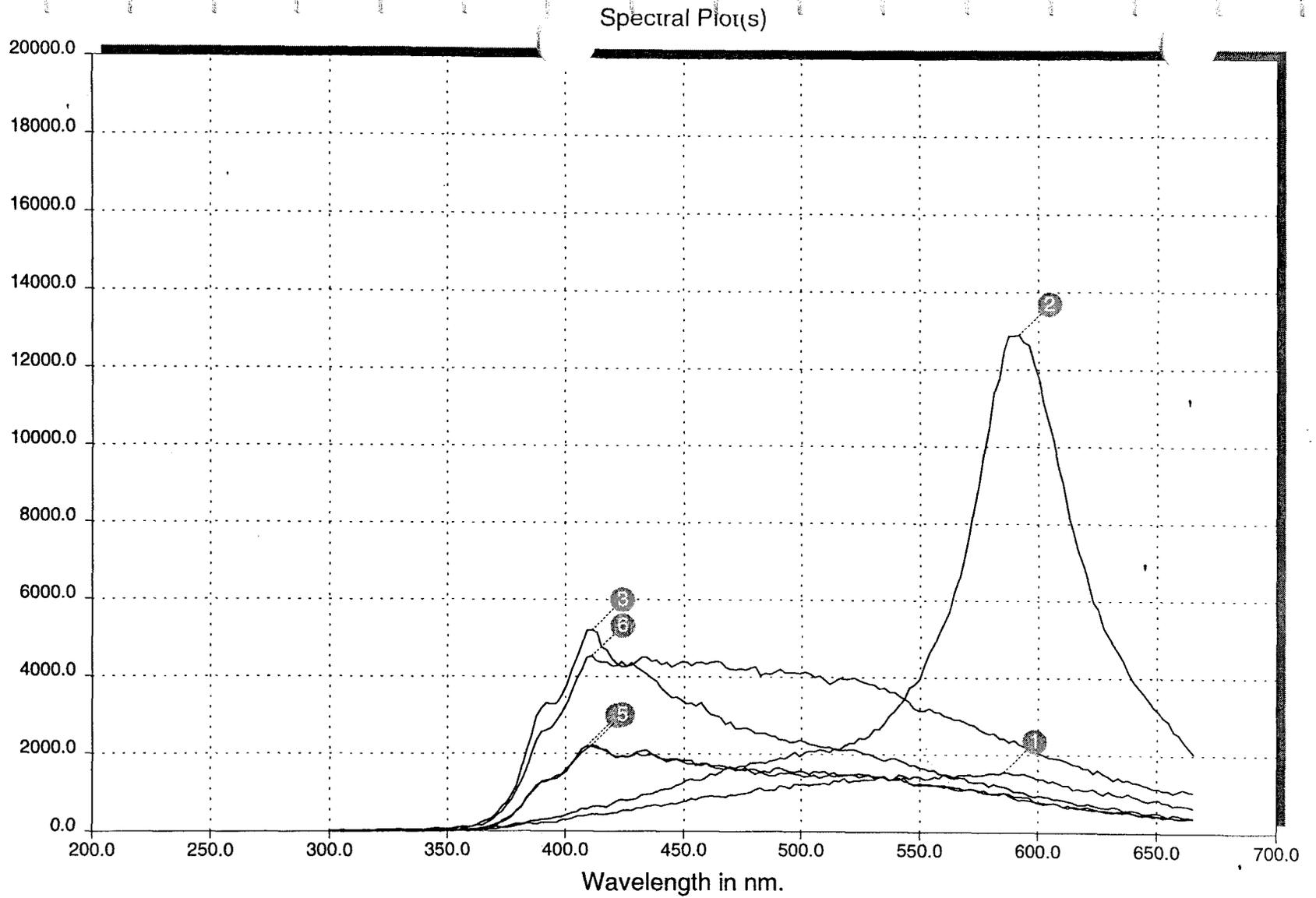


Time: 16:10:14
Date: 12-03-1996
Version: 1.0

Push: C:\BASIC71\DATA\SPL-02.PSH
Probe: C:\BASIC71\DATA\PROBE23E.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Fluorescence Intensity



Wavelength in nm.

1: 2.9 ft.; 1559 @ 585.4 nm

5: 12.9 ft.; 2217 @ 411.0 nm

2: 3.8 ft.; 12895 @ 591.7 nm

6: 14.3 ft.; 4526 @ 411.0 nm

3: 6.5 ft.; 5199 @ 411.0 nm

4: 10.9 ft.; 2191 @ 408.9 nm

Main: C:\BASIC71\DATA\SPL-02.PSH

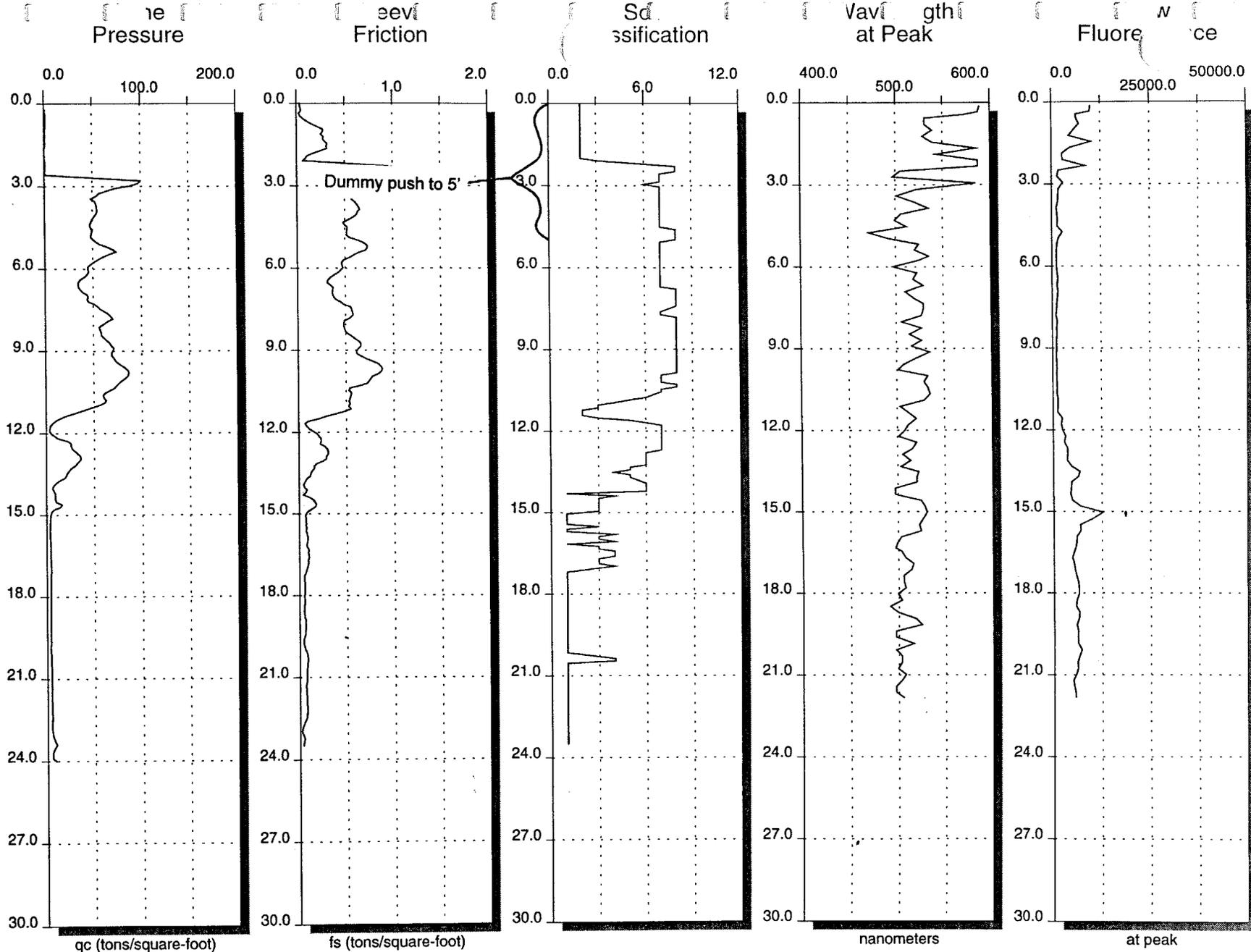
Probe: C:\BASIC71\DATA\PROBE23E.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL

Time: 16:10:14

Date: 12-03-1996

Version: 1.0



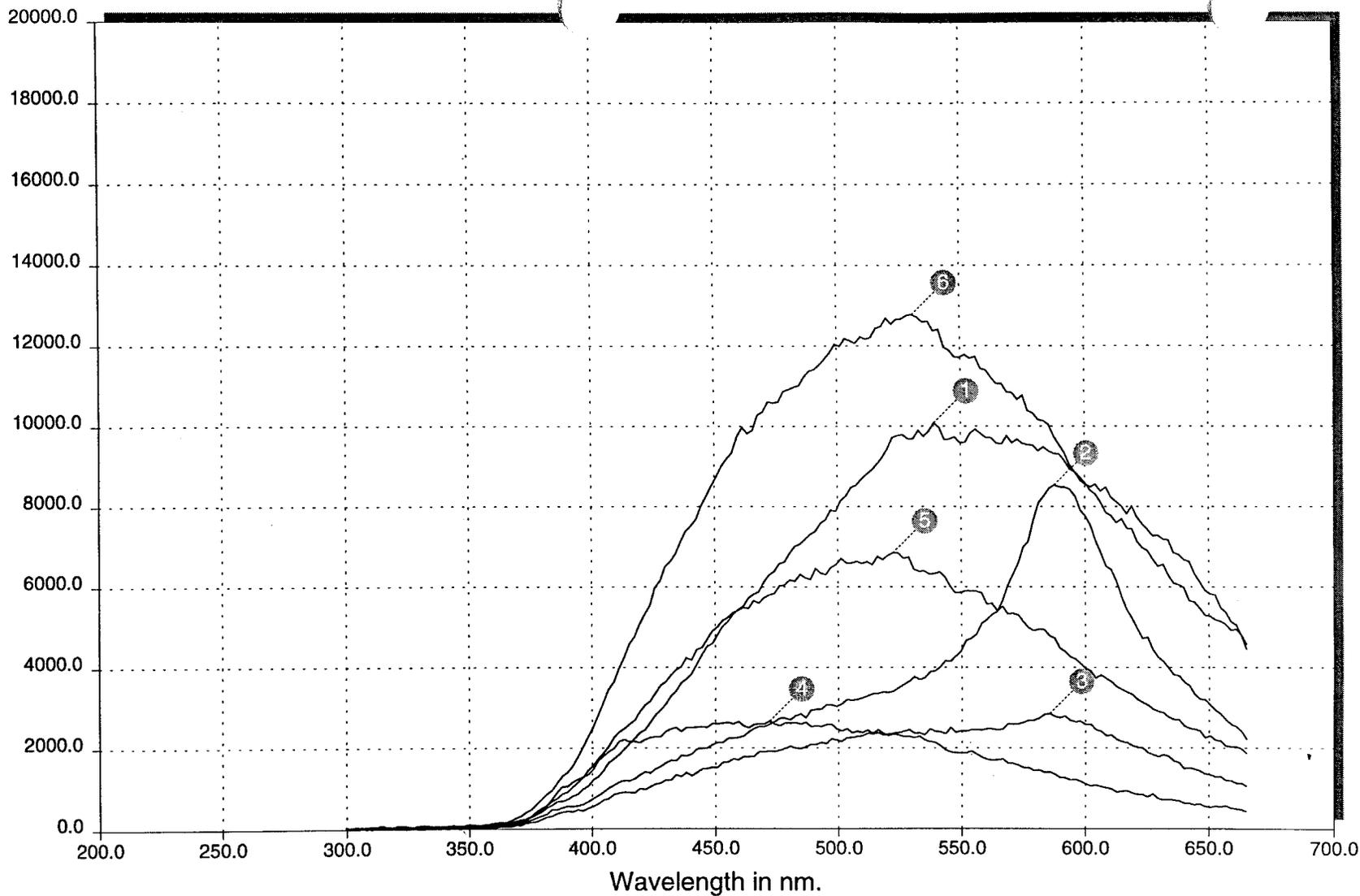
Time: 07:04:00
Date: 12-04-1996
Version: 1.0

Push: C:\BASIC71\DATA\SPL-03.PSH
Probe: C:\BASIC71\DATA\PROBE23E.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

Fluorescence Intensity



1: 1.5 ft.; 10076 @ 539.1 nm

2: 2.3 ft.; 8532 @ 587.5 nm

3: 2.9 ft.; 2852 @ 585.4 nm

4: 4.7 ft.; 2666 @ 471.9 nm

5: 13.5 ft.; 6843 @ 522.3 nm

6: 15.0 ft.; 12771 @ 530.7 nm

Main: C:\BASIC71\DATA\SPL-03.PSH

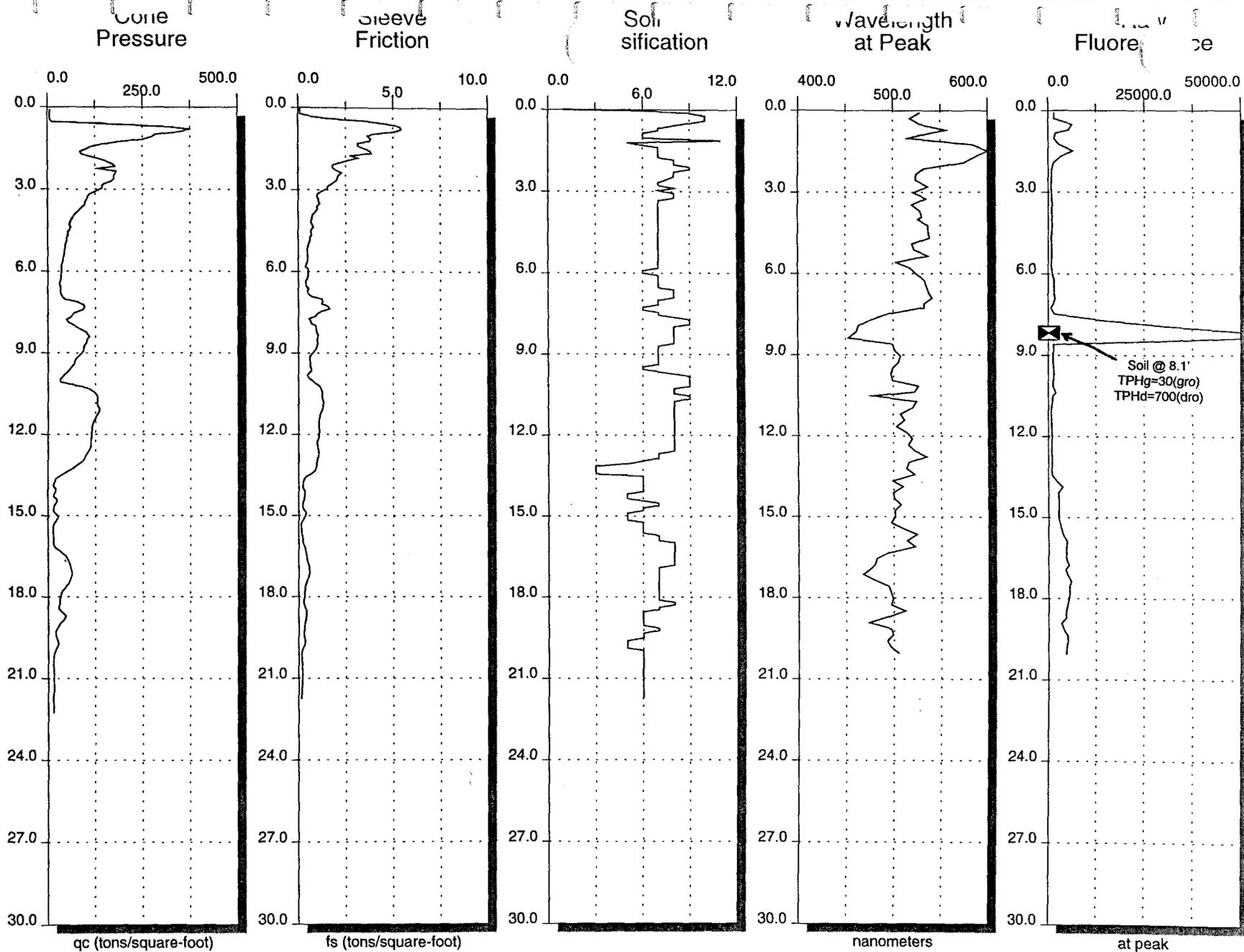
Probe: C:\BASIC71\DATA\PROBE23E.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL

Time: 07:04:00

Date: 12-04-1996

Version: 1.0



Depth (feet)

Soil @ 8.1'
TPHg=30(gro)
TPHd=700(dro)

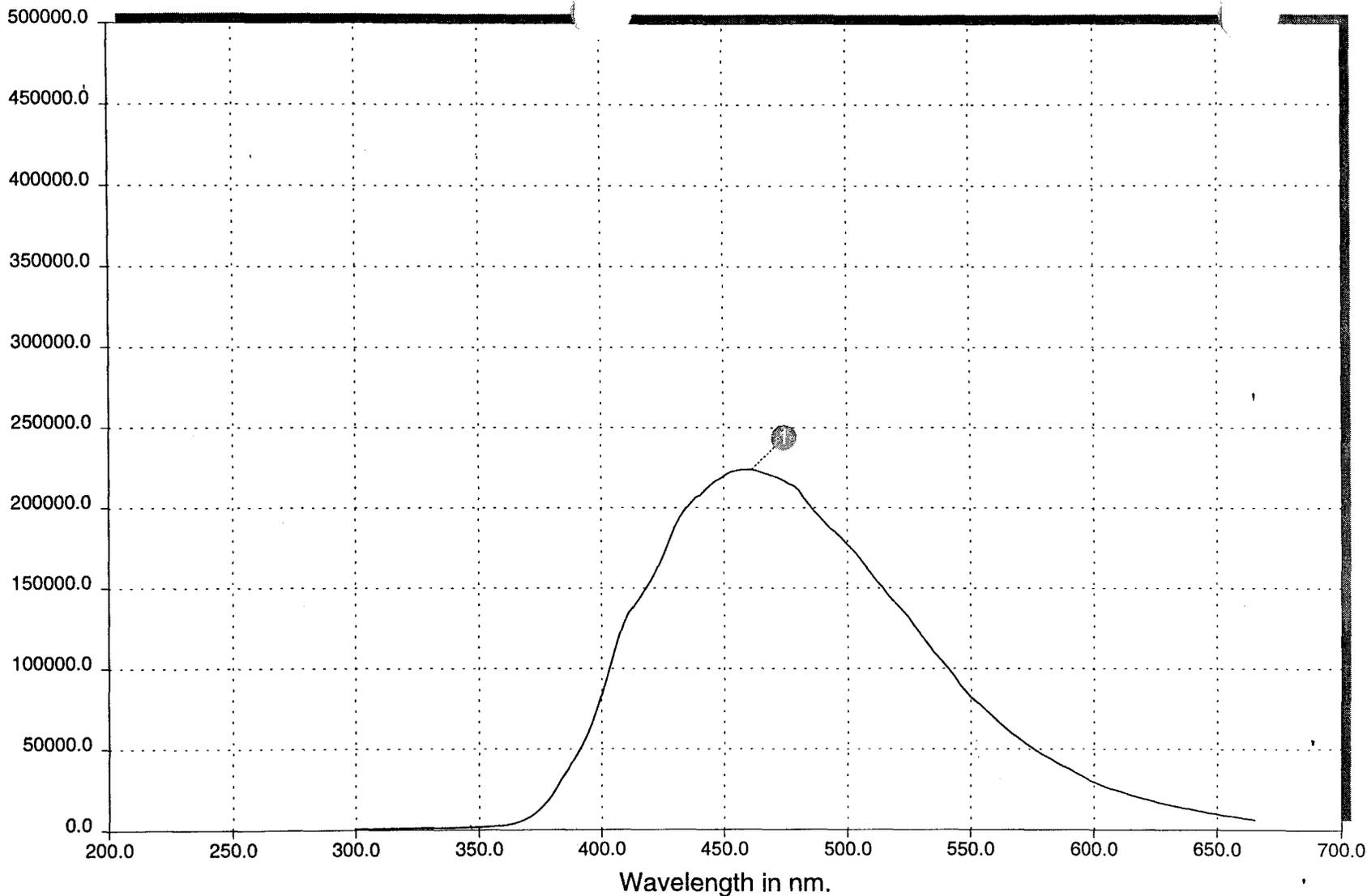
Time: 08:48:05
Date: 12-03-1996
Version: 1.0

Push: C:\BASIC71\DATA\FS-01.PSH
Probe: C:\BASIC71\DATA\PROBE23D.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

Fluorescence Intensity



1: 8.1 ft.; 223824 @ 461.4 nm

Time: 08:48:05

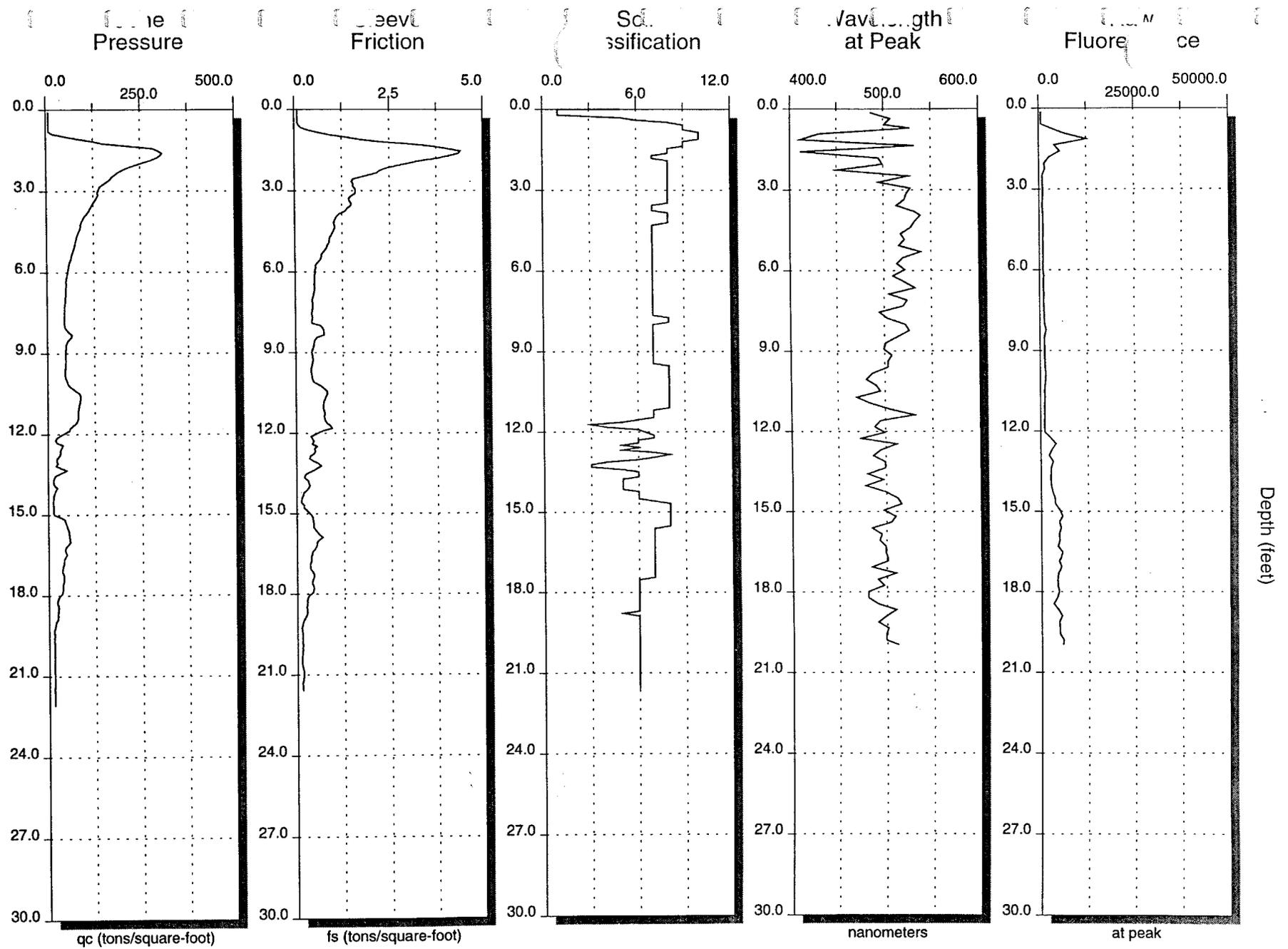
Date: 12-03-1996

Version: 1.0

Main: C:\BASIC71\DATA\FS-01.PSH

Probe: C:\BASIC71\DATA\PROBE23D.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL



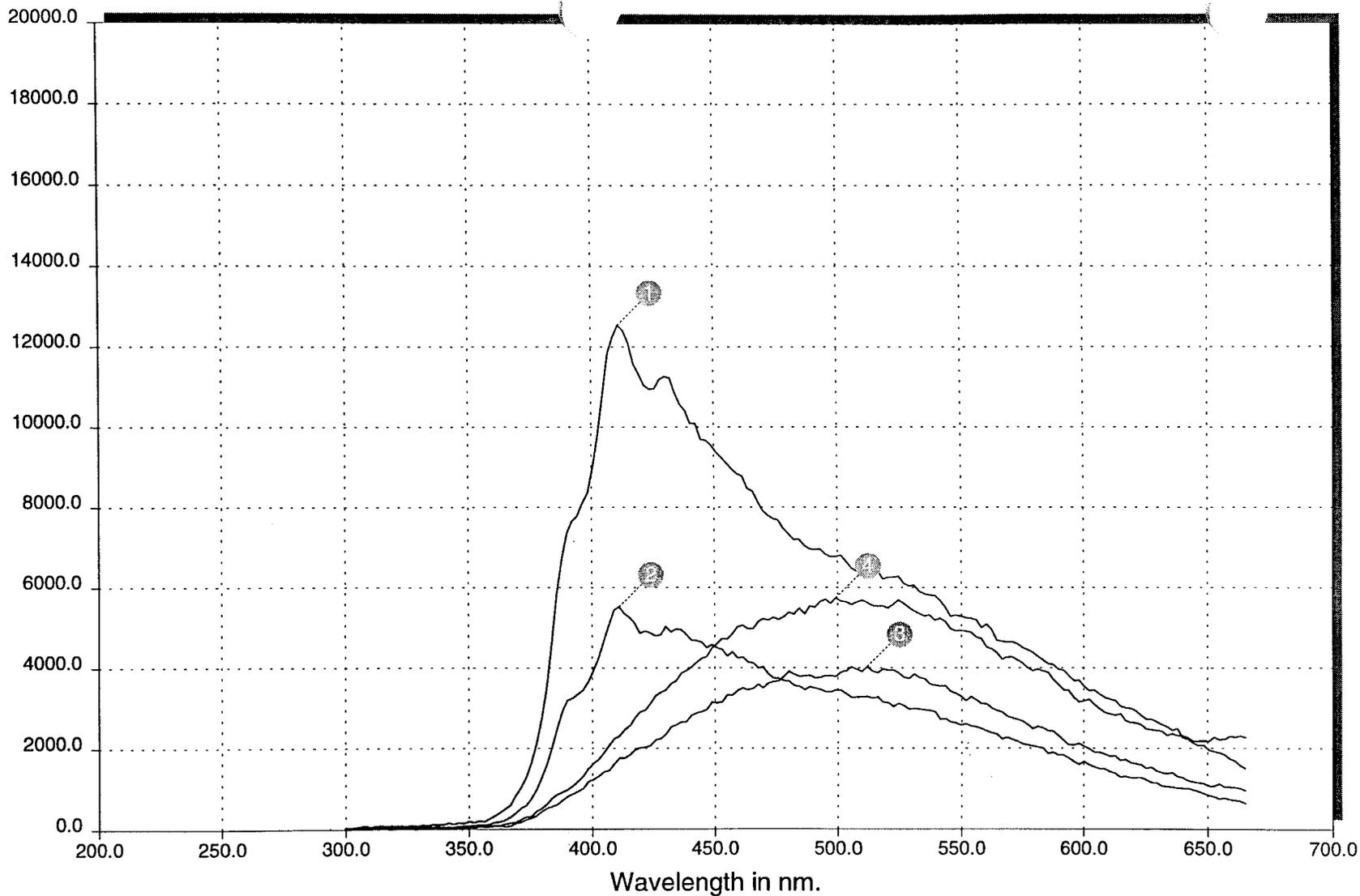
Time: 13:12:29
Date: 12-03-1996
Version: 1.0

Push: C:\BASIC71\DATA\FS-02.PSH
Probe: C:\BASIC71\DATA\PROBE23D.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plus

Fluorescence Intensity



- 1: 1.1 ft.; 12535 @ 411.0 nm
- 2: 1.6 ft.; 5515 @ 411.0 nm
- 3: 12.5 ft.; 4030 @ 511.8 nm
- 4: 19.8 ft.; 5738 @ 499.2 nm

Time: 13:12:29

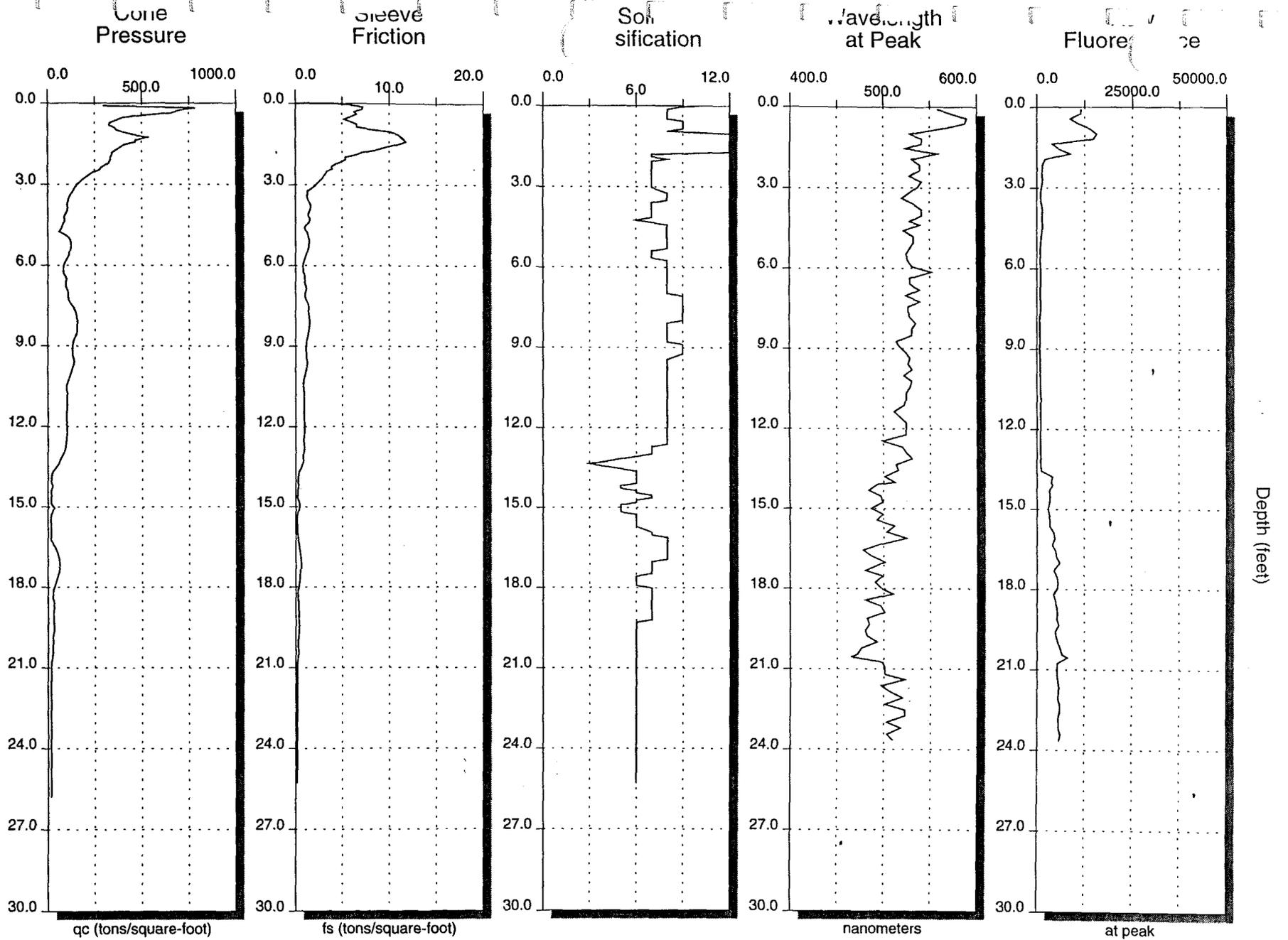
Date: 12-03-1996

Version: 1.0

Main: C:\BASIC71\DATA\FS-02.PSH

Probe: C:\BASIC71\DATA\PROBE23D.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL

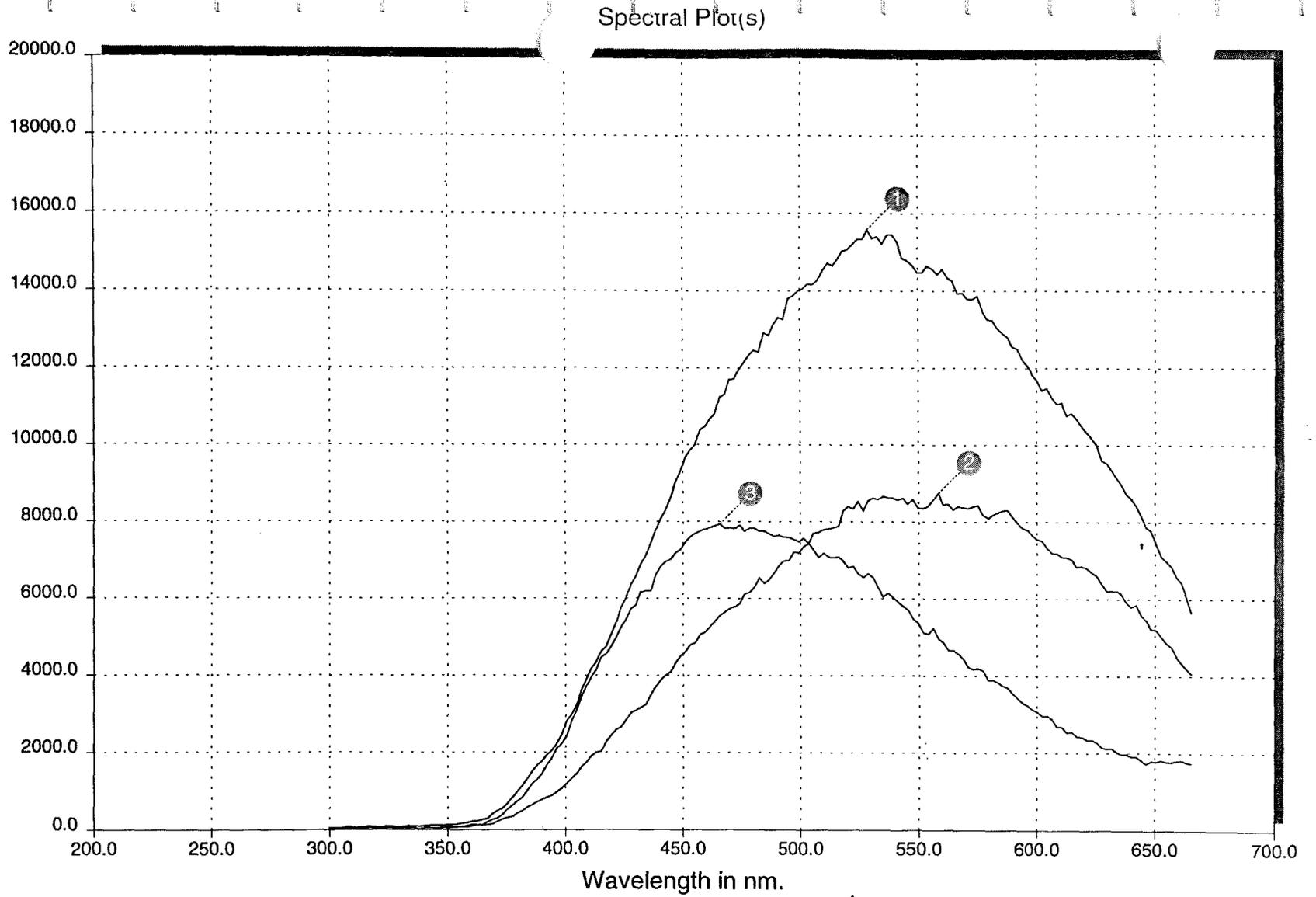


Time: 13:59:09
Date: 12-03-1996
Version: 1.0

Push: C:\BASIC71\DATA\FS-03.PSH
Probe: C:\BASIC71\DATA\PROBE23D.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



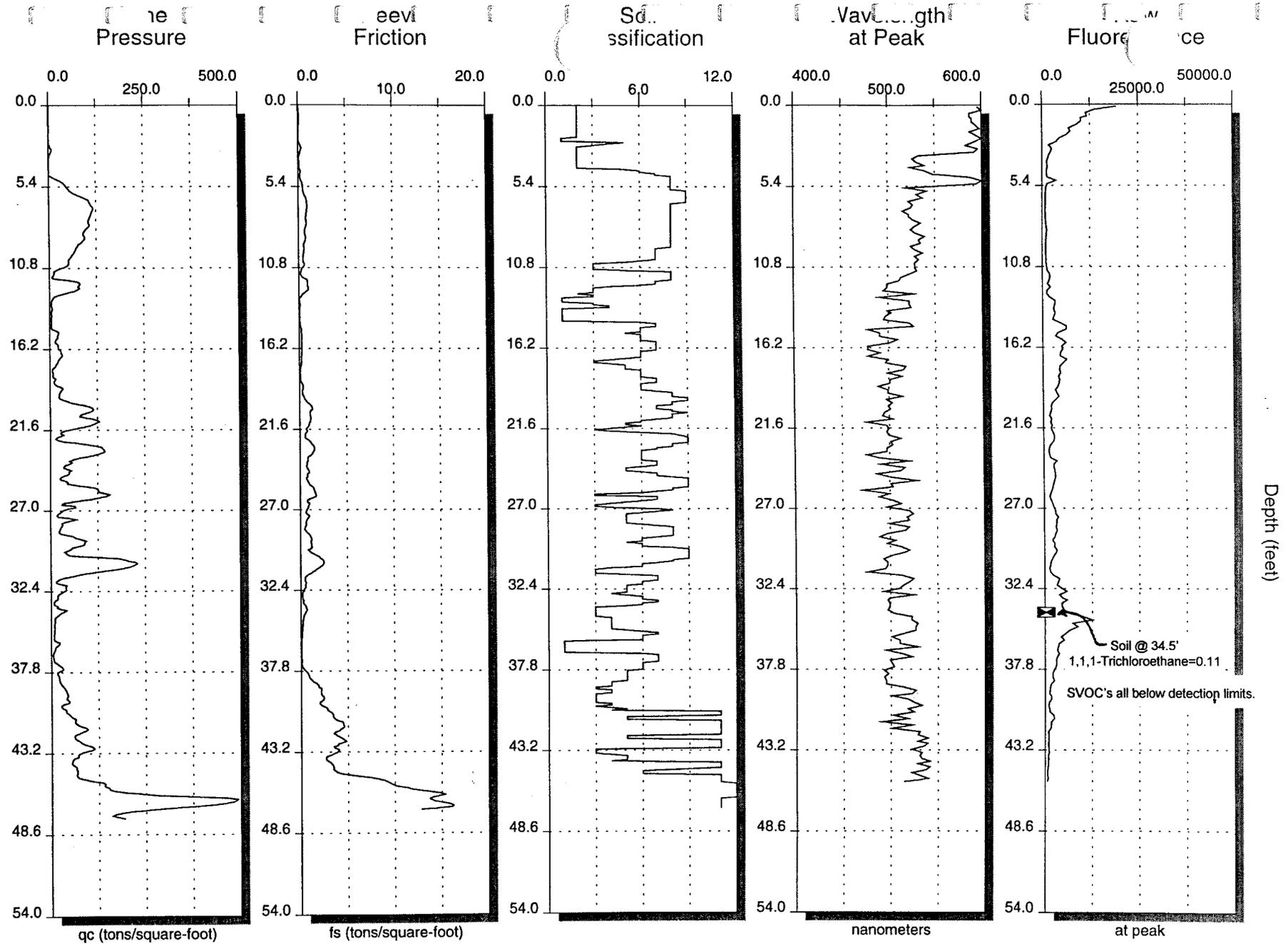
Fluorescence Intensity



Time: 13:59:09
Date: 12-03-1996
Version: 1.0

1: 1.0 ft.; 15583 @ 528.6 nm
2: 1.7 ft.; 8740 @ 558.1 nm
3: 20.6 ft.; 7930 @ 465.6 nm

Main: C:\BASIC71\DATA\FS-03.PSH
Probe: C:\BASIC71\DATA\PROBE23D.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL

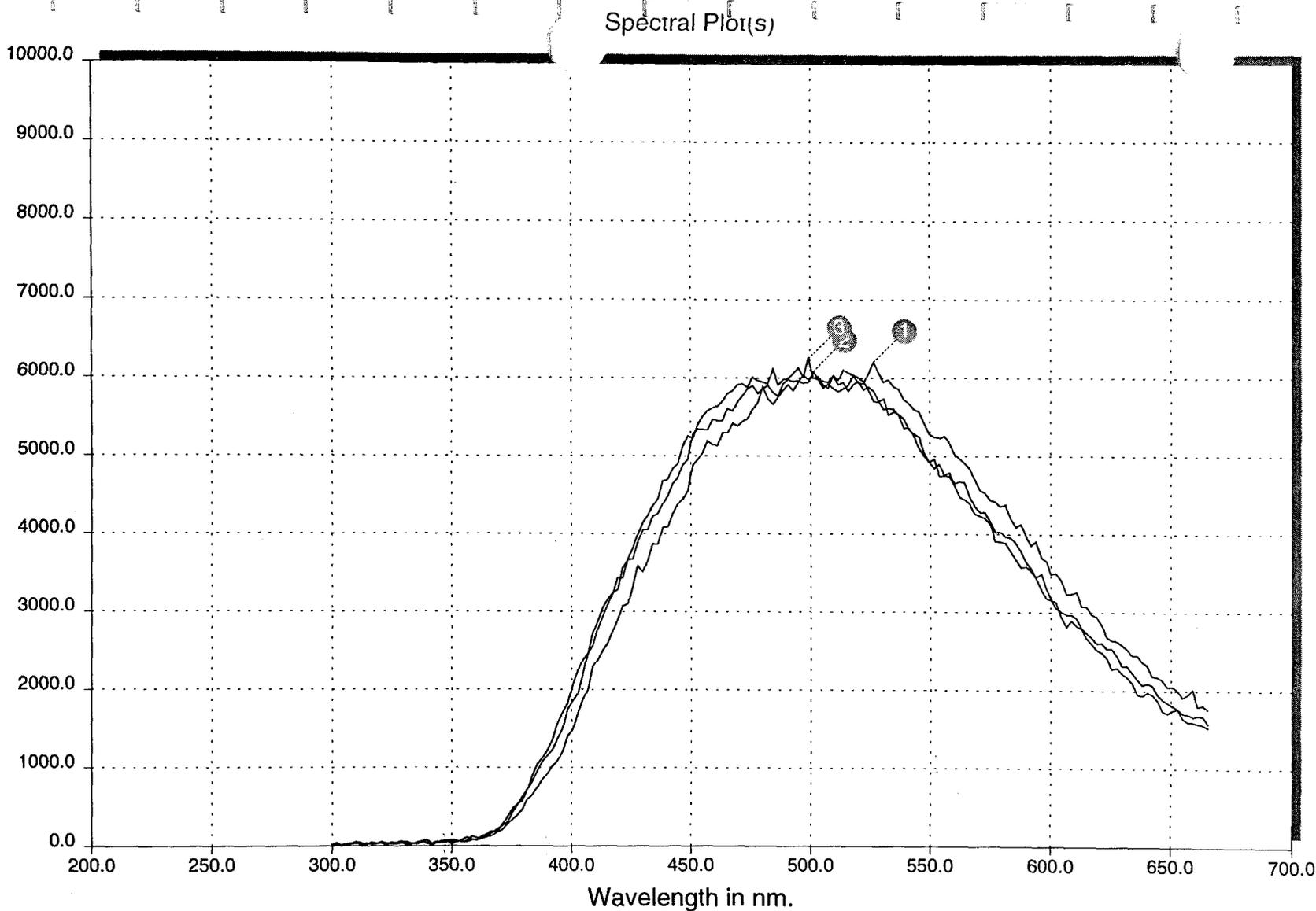


Time: 09:47:43
Date: 12-04-1996
Version: 1.0

Push: C:\BASIC71\DATA\IR5-01.PSH
Probe: C:\BASIC71\DATA\PROBE23E.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Fluorescence Intensity



Time: 09:47:43
Date: 12-04-1996
Version: 1.0

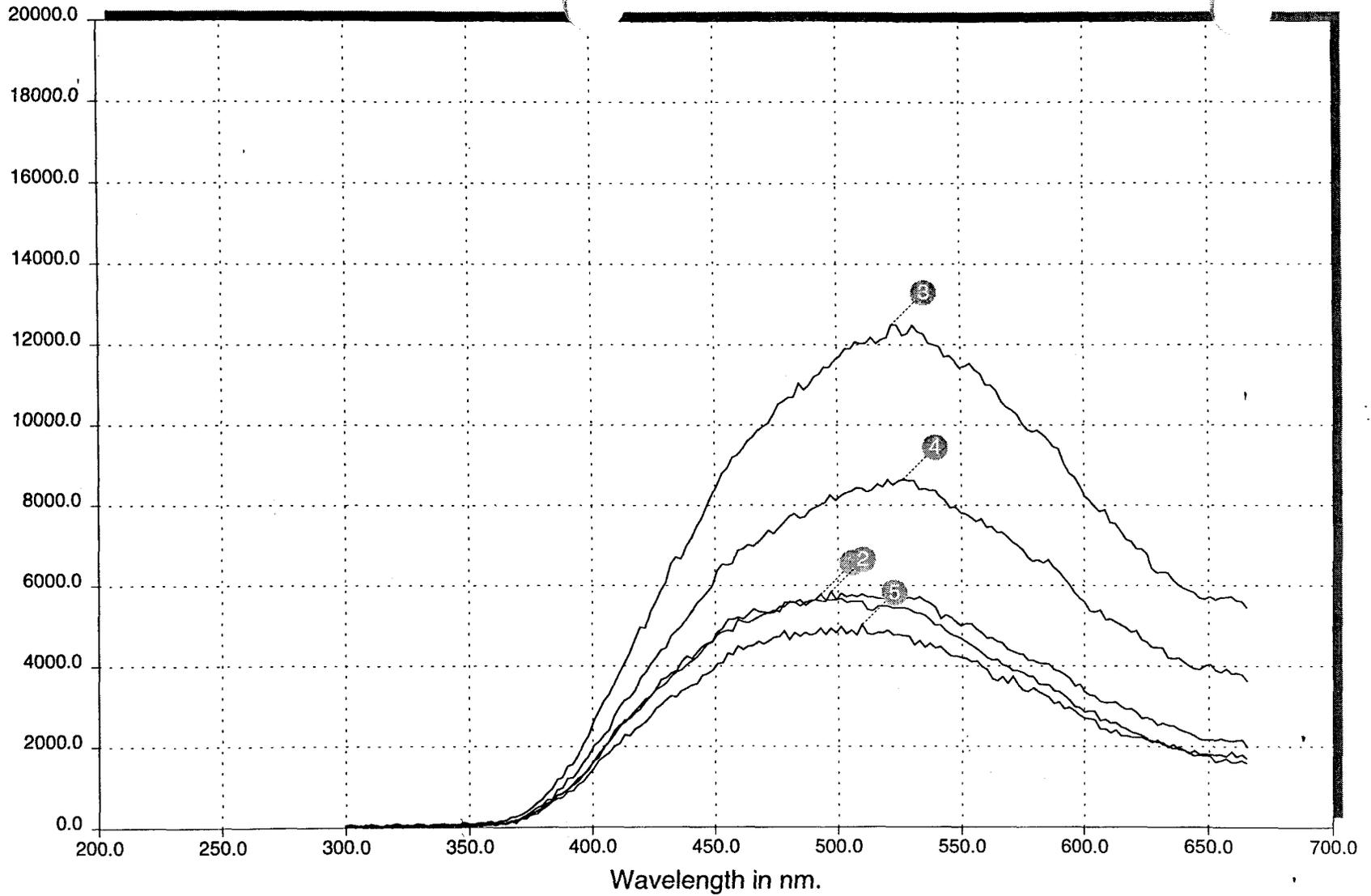
1: 14.8 ft.; 6203 @ 526.5 nm
2: 15.9 ft.; 6085 @ 501.3 nm
3: 17.0 ft.; 6245 @ 499.2 nm

Main: C:\BASIC71\DATA\IR5-01.PSH
Probe: C:\BASIC71\DATA\PROBE23E.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

Fluorescence Intensity



1: 32.6 ft.; 5767 @ 492.9 nm

5: 35.8 ft.; 5025 @ 509.7 nm

Time: 09:47:43

2: 33.2 ft.; 5842 @ 497.1 nm

Date: 12-04-1996

3: 34.5 ft.; 12495 @ 522.3 nm

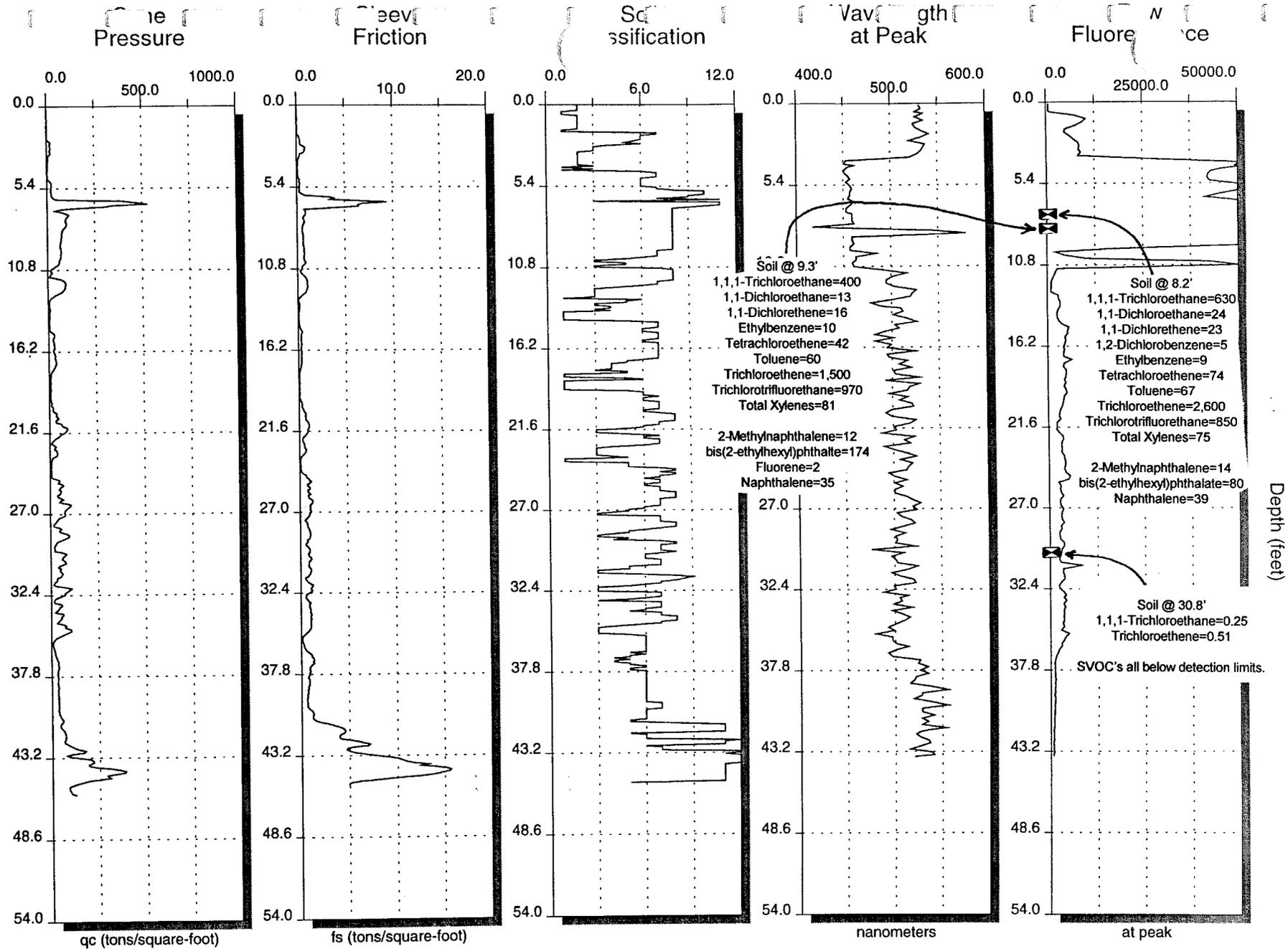
Version: 1.0

4: 35.0 ft.; 8643 @ 526.5 nm

Main: C:\BASIC71\DATA\IR5-01.PSH

Probe: C:\BASIC71\DATA\PROBE23E.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL

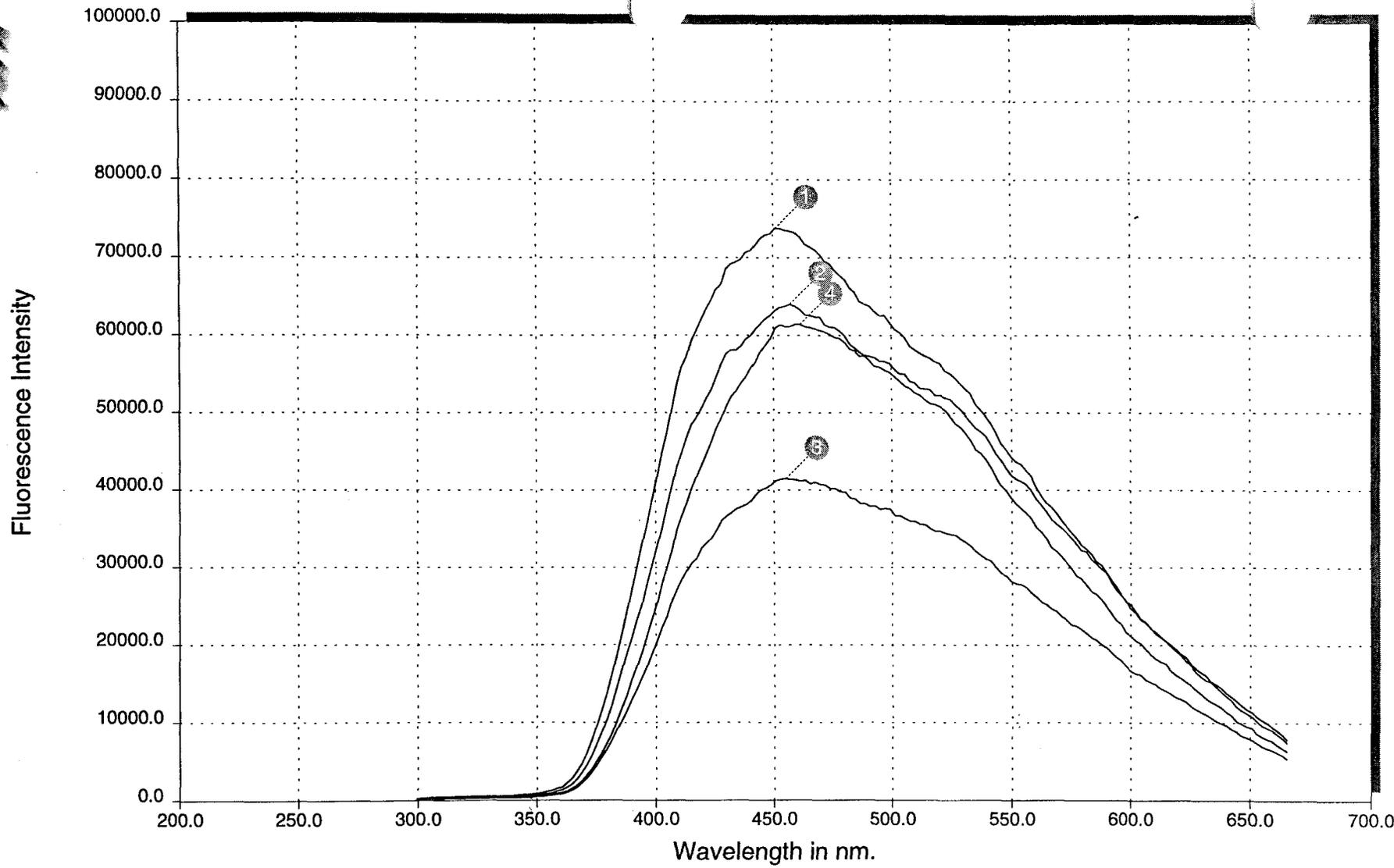


Time: 12:06:59
 Date: 12-04-1996
 Version: 1.0

Push: C:\BASIC71\DATA\IR5-02.PSH
 Probe: C:\BASIC71\DATA\PROBE23E.PRB
 Calibration: C:\BASIC71\DATA\1213DFM.CAL



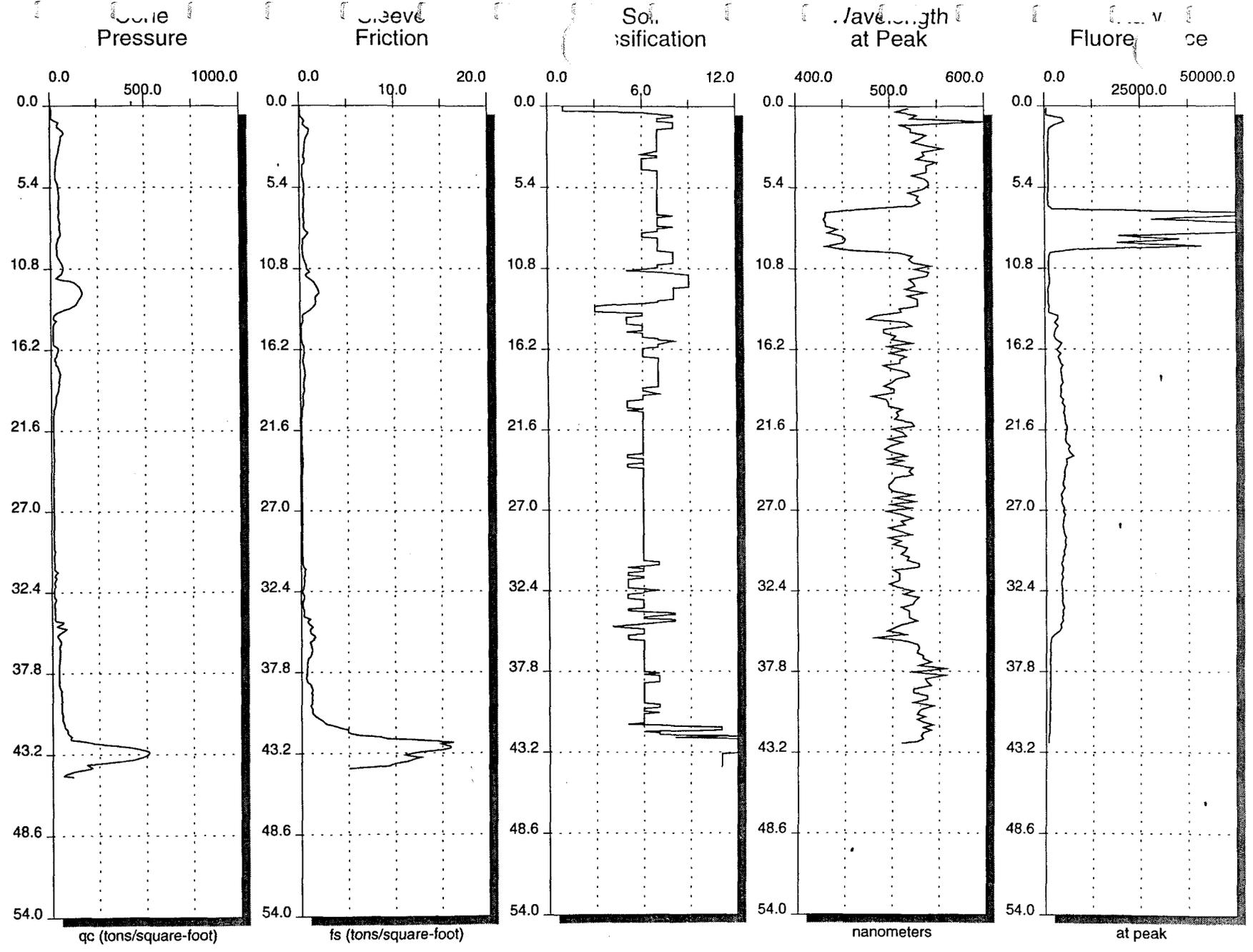
Spectral Plot(s)



Time: 12:06:59
Date: 12-04-1996
Version: 1.0

- 1: 4.0 ft.; 73758 @ 450.9 nm
- 2: 5.4 ft.; 64001 @ 457.2 nm
- 3: 6.3 ft.; 41465 @ 455.1 nm
- 4: 10.8 ft.; 61408 @ 461.4 nm

Main: C:\BASIC71\DATA\IR5-02.PSH
Probe: C:\BASIC71\DATA\PROBE23E.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL

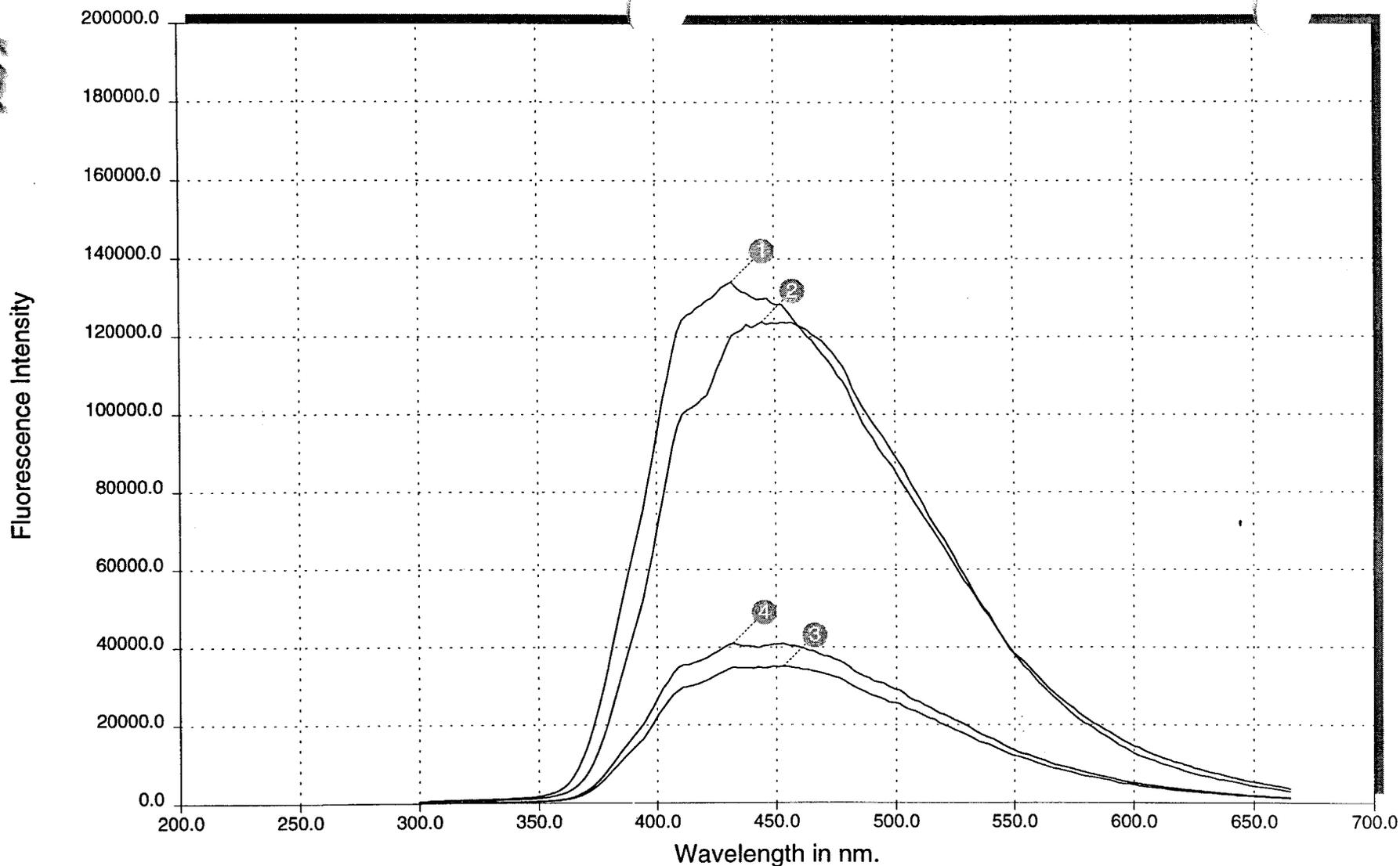


Time: 07:21:18
Date: 12-09-1996
Version: 1.0

Push: C:\BASIC71\DATA\IR5-03.PSH
Probe: C:\BASIC71\DATA\PROBE23E.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



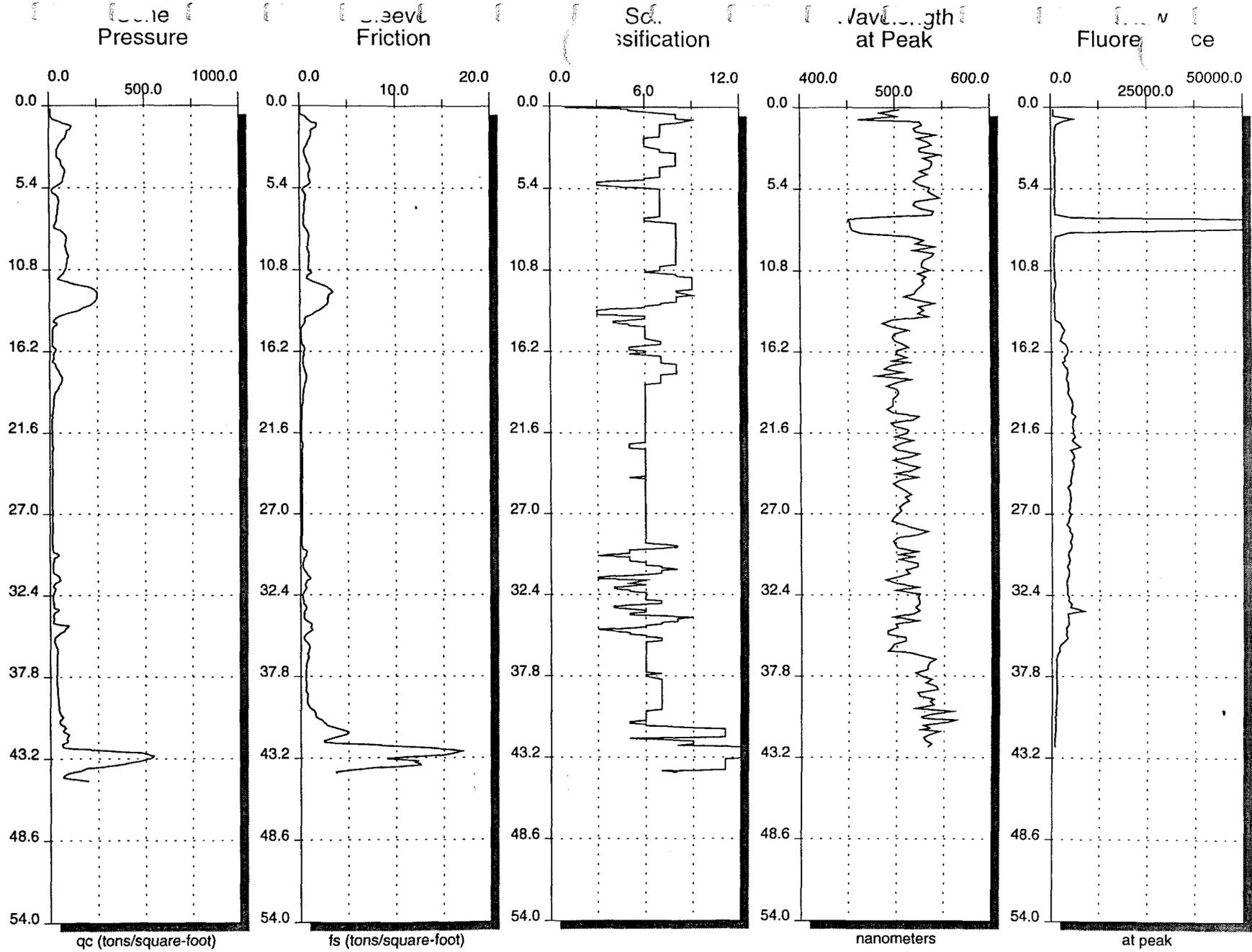
Spectral Plot(s)



Time: 07:21:18
Date: 12-09-1996
Version: 1.0

1: 7.3 ft.; 134061 @ 432.0 nm
2: 8.2 ft.; 123761 @ 444.6 nm
3: 8.9 ft.; 35109 @ 453.0 nm
4: 9.3 ft.; 40977 @ 432.0 nm

Main: C:\BASIC71\DATA\IR5-03.PSH
Probe: C:\BASIC71\DATA\PROBE23E.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Time: 09:07:18

Date: 12-09-1996

Version: 1.0

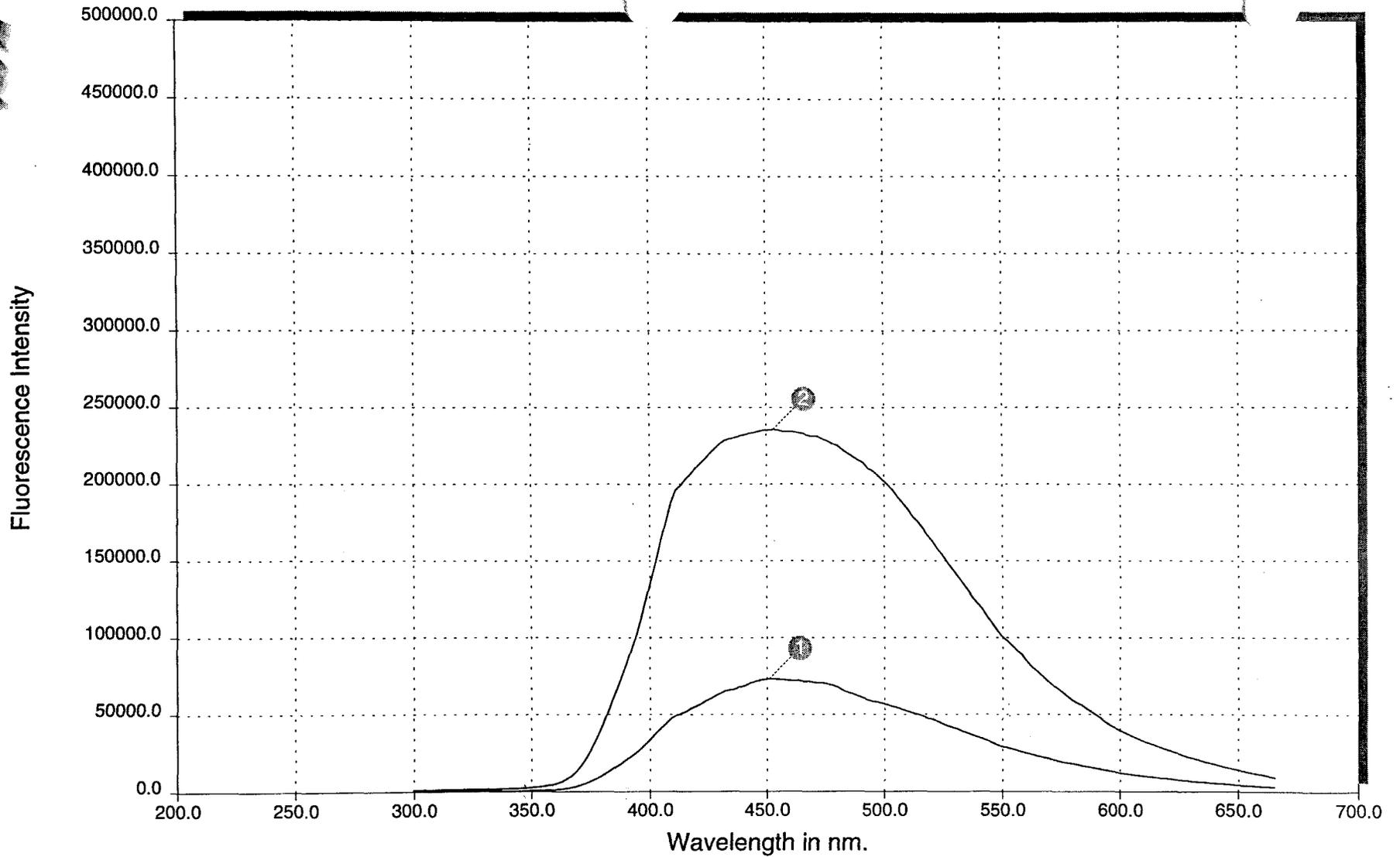
Push: C:\BASIC71\DATA\IR5-04.PSH

Probe: C:\BASIC71\DATA\PROBE23E.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL



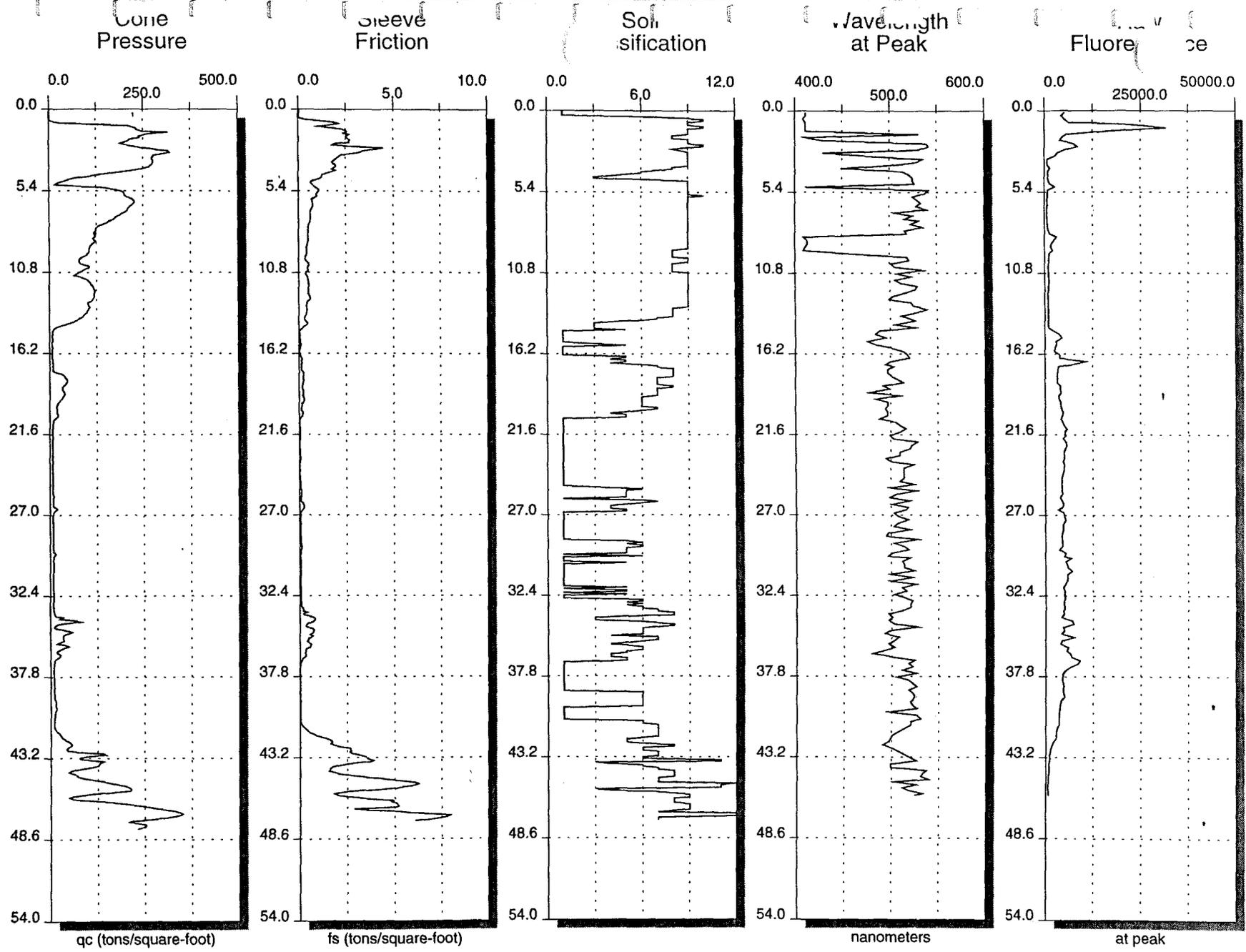
Spectral Plot(s)



Time: 09:07:18
Date: 12-09-1996
Version: 1.0

1: 7.4 ft.; 73089 @ 450.9 nm
2: 7.9 ft.; 235595 @ 453.0 nm

Main: C:\BASIC71\DATA\IR5-04.PSH
Probe: C:\BASIC71\DATA\PROBE23E.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



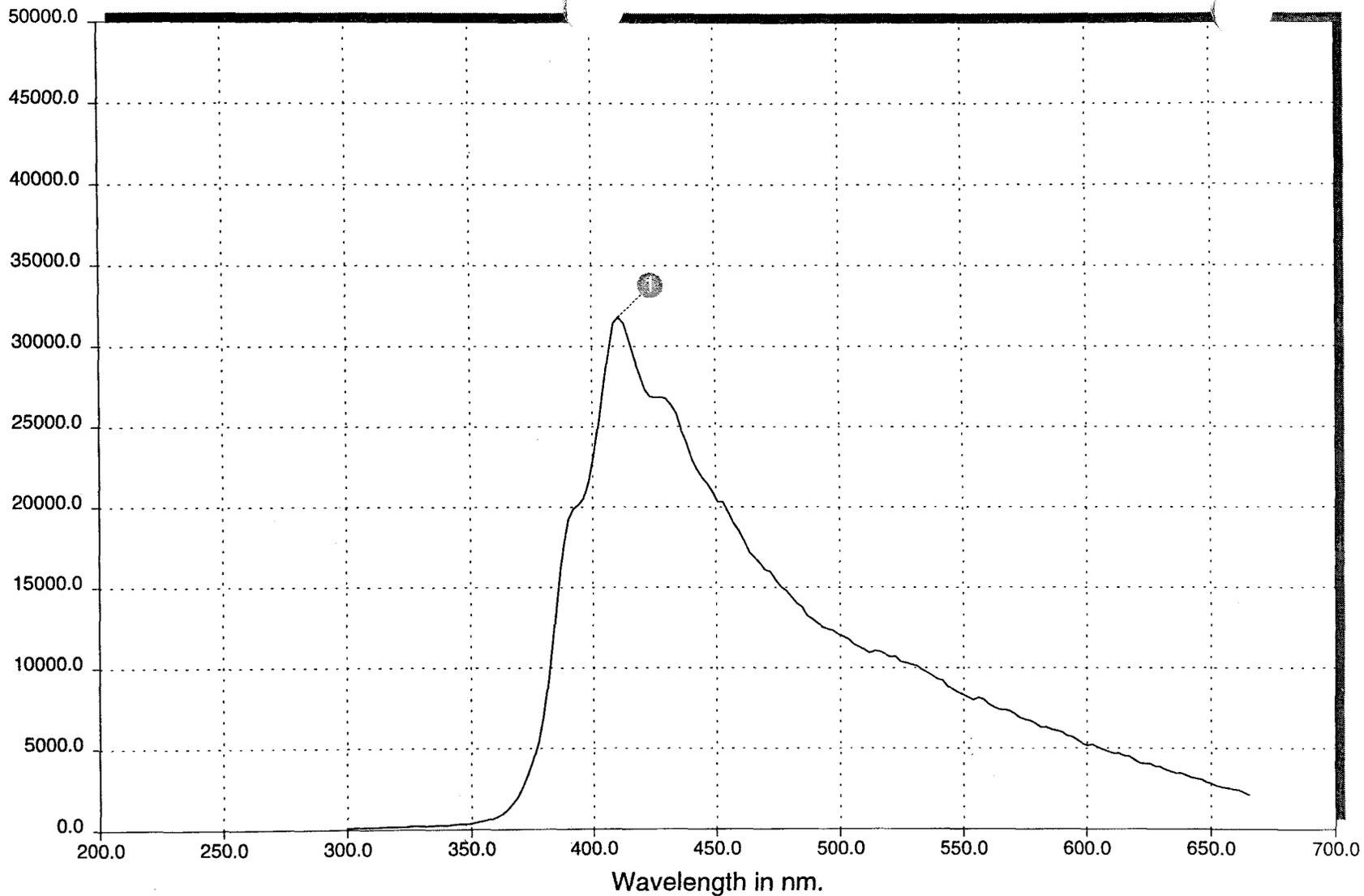
Time: 10:15:02
Date: 12-12-1996
Version: 1.0

Push: C:\BASIC71\DATA\IR5-05.PSH
Probe: C:\BASIC71\DATA\PROBE23F.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

Fluorescence Intensity



1: 1.1 ft.; 31787 @ 411.0 nm

Time: 10:15:02

Date: 12-12-1996

Version: 1.0

Main: C:\BASIC71\DATA\IR5-05.PSH

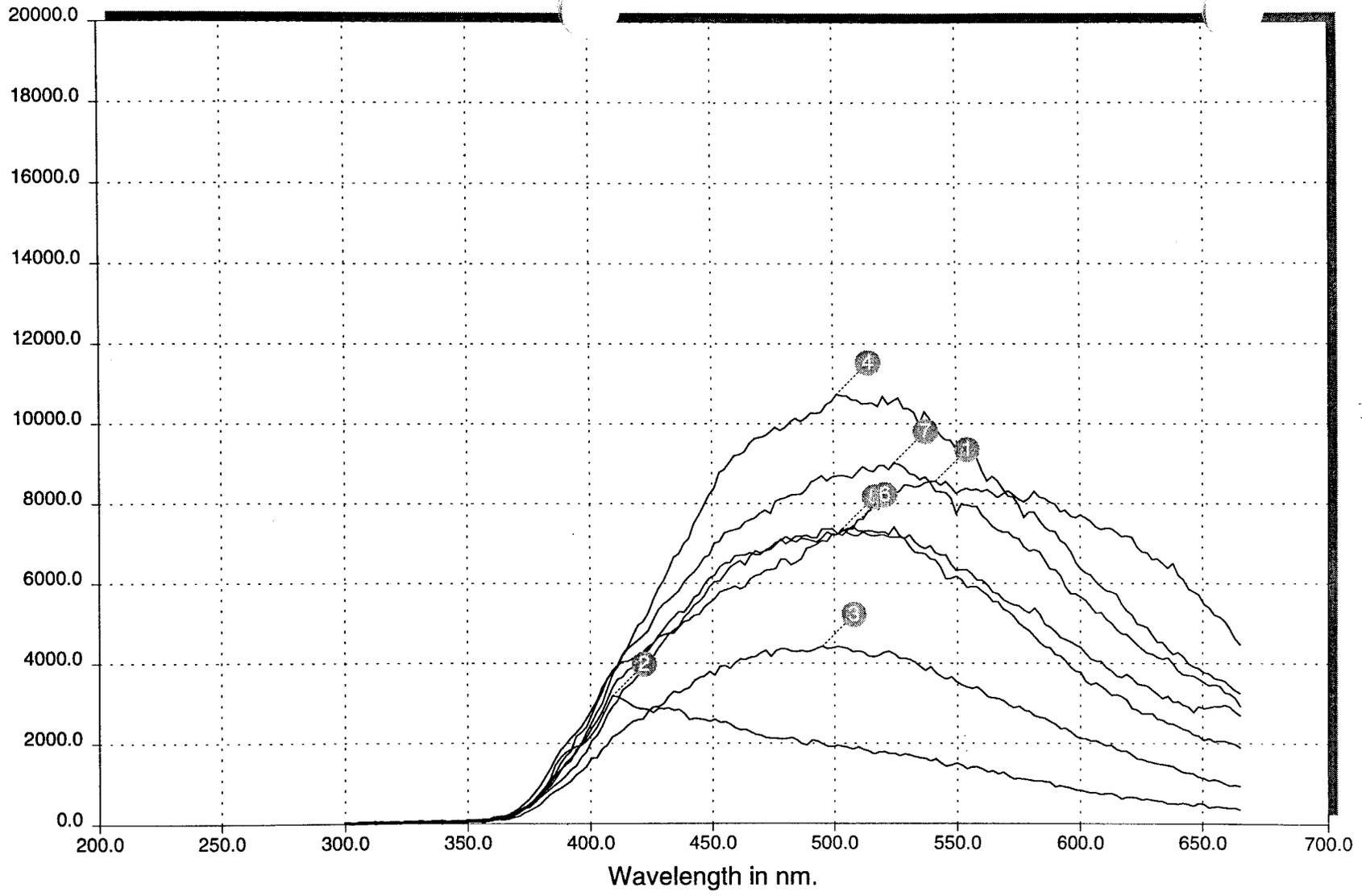
Probe: C:\BASIC71\DATA\PROBE23F.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

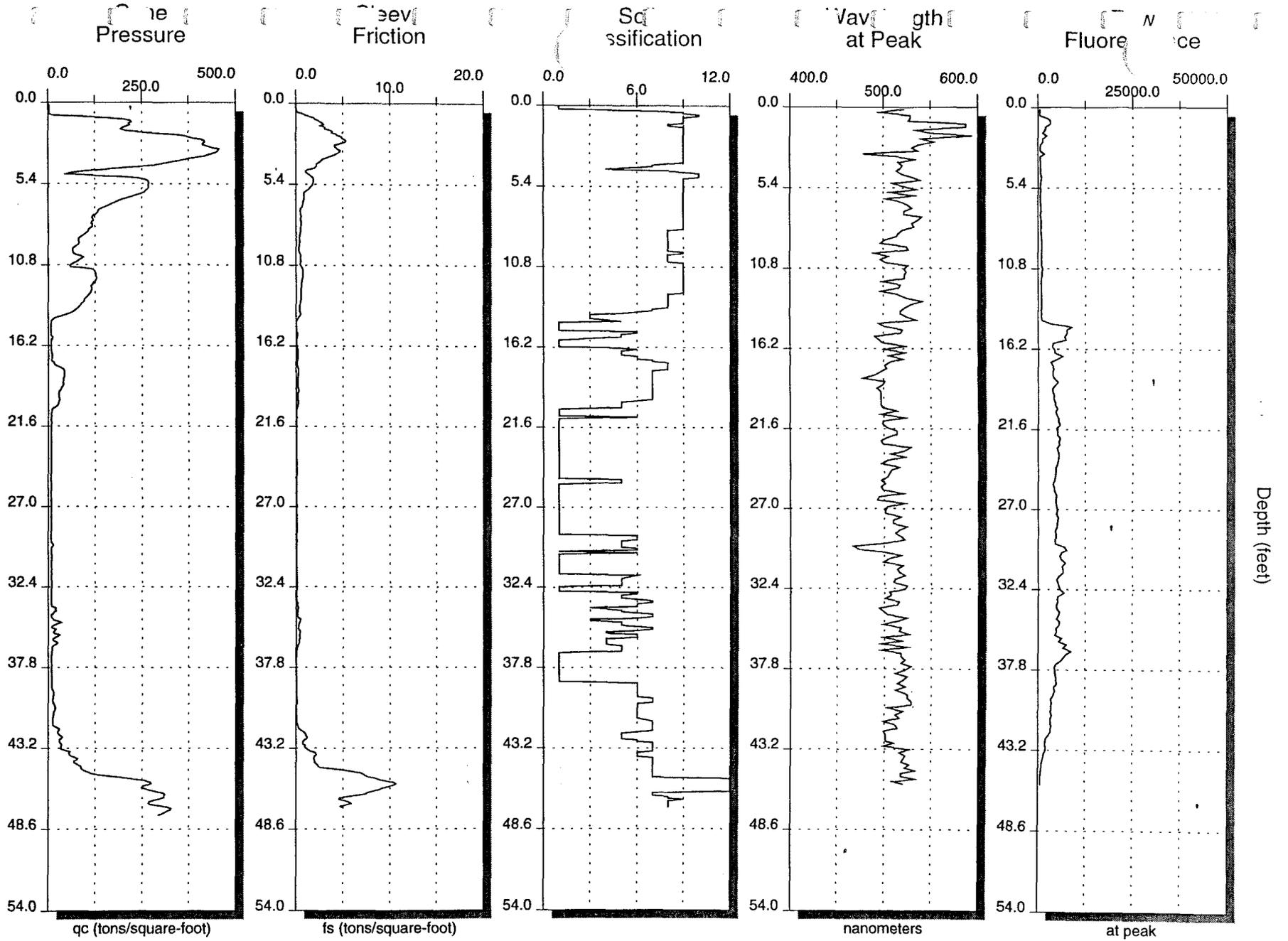
Fluorescence Intensity



Time: 10:15:02
Date: 12-12-1996
Version: 1.0

1: 2.4 ft.; 8552 @ 541.2 nm	5: 34.3 ft.; 7364 @ 503.4 nm
2: 8.4 ft.; 3178 @ 408.9 nm	6: 35.2 ft.; 7422 @ 507.6 nm
3: 15.1 ft.; 4422 @ 495.0 nm	7: 36.7 ft.; 9008 @ 524.4 nm
4: 16.7 ft.; 10727 @ 501.3 nm	

Main: C:\BASIC71\DATA\IR5-05.PSH
Probe: C:\BASIC71\DATA\PROBE23F.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL

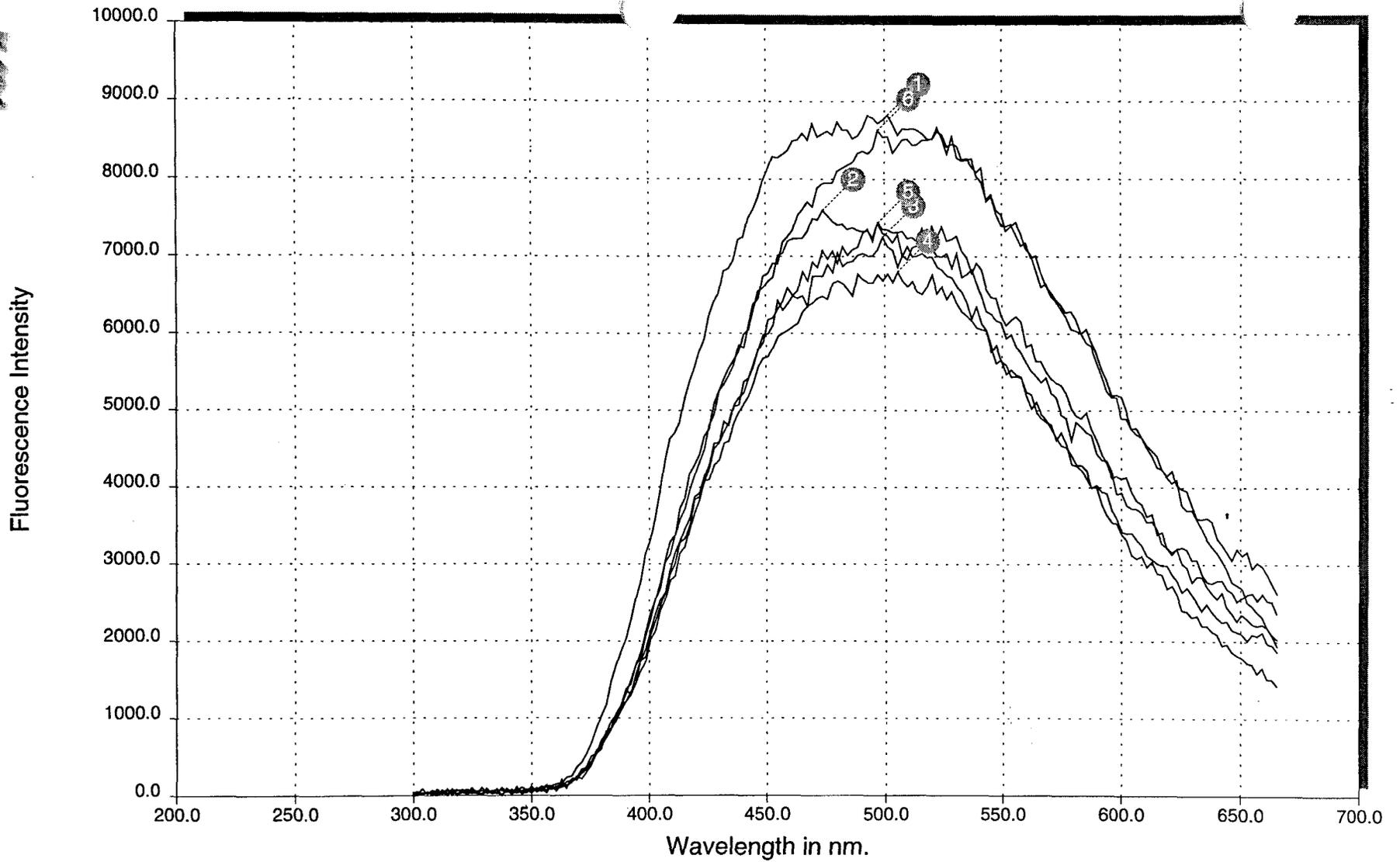


Time: 13:46:29
Date: 12-12-1996
Version: 1.0

Push: C:\BASIC71\DATA\IR5-06.PSH
Probe: C:\BASIC71\DATA\PROBE23F.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



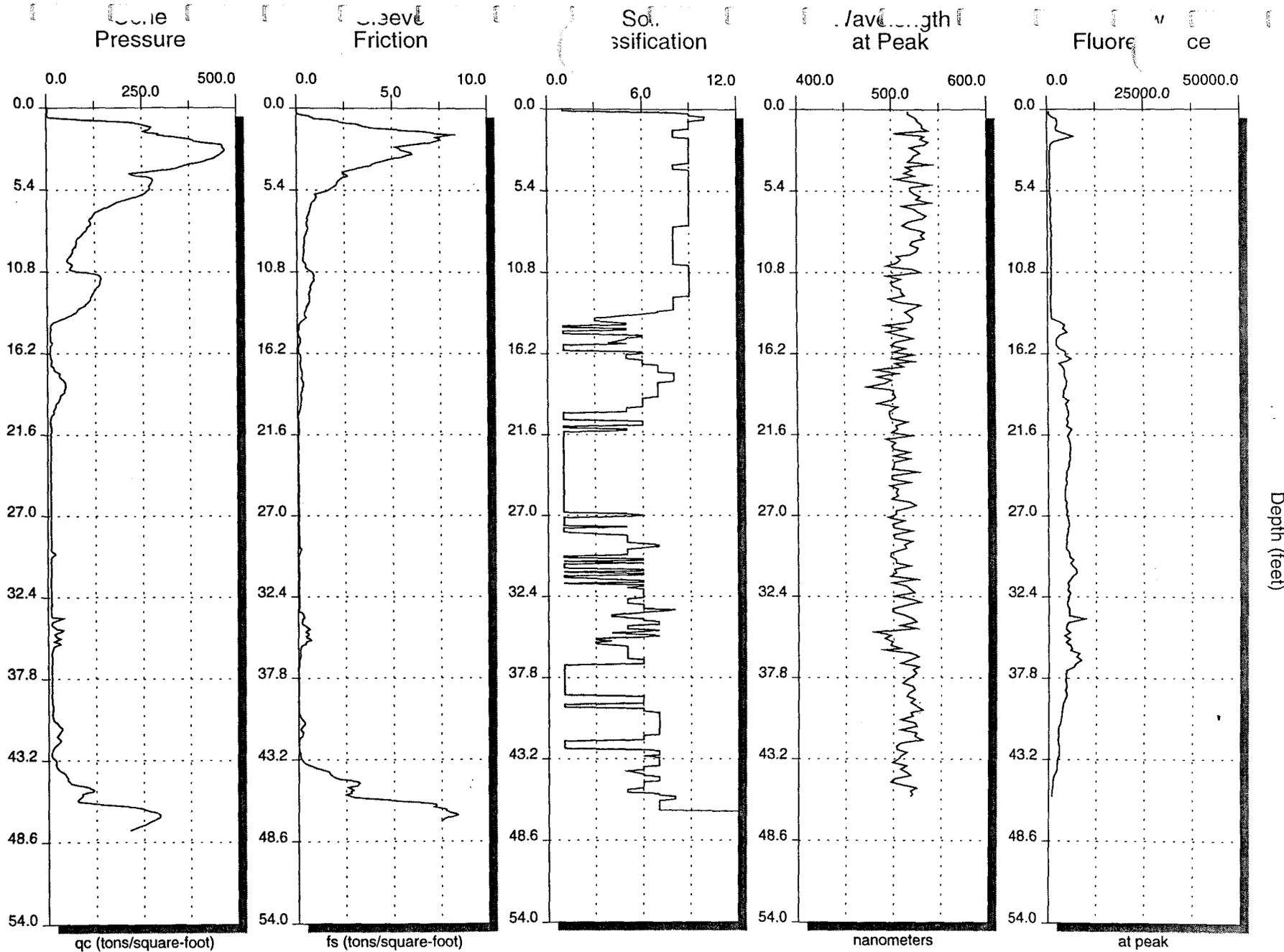
Spectral Plot(s)



1: 14.7 ft.; 8822 @ 501.3 nm	5: 36.1 ft.; 7437 @ 497.1 nm
2: 29.8 ft.; 7596 @ 474.0 nm	6: 36.6 ft.; 8629 @ 497.1 nm
3: 30.6 ft.; 7251 @ 499.2 nm	
4: 32.6 ft.; 6801 @ 505.5 nm	

Time: 13:46:29
Date: 12-12-1996
Version: 1.0

Main: C:\BASIC71\DATA\IR5-06.PSH
Probe: C:\BASIC71\DATA\PROBE23F.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Time: 14:29:06

Date: 12-12-1996

Version: 1.0

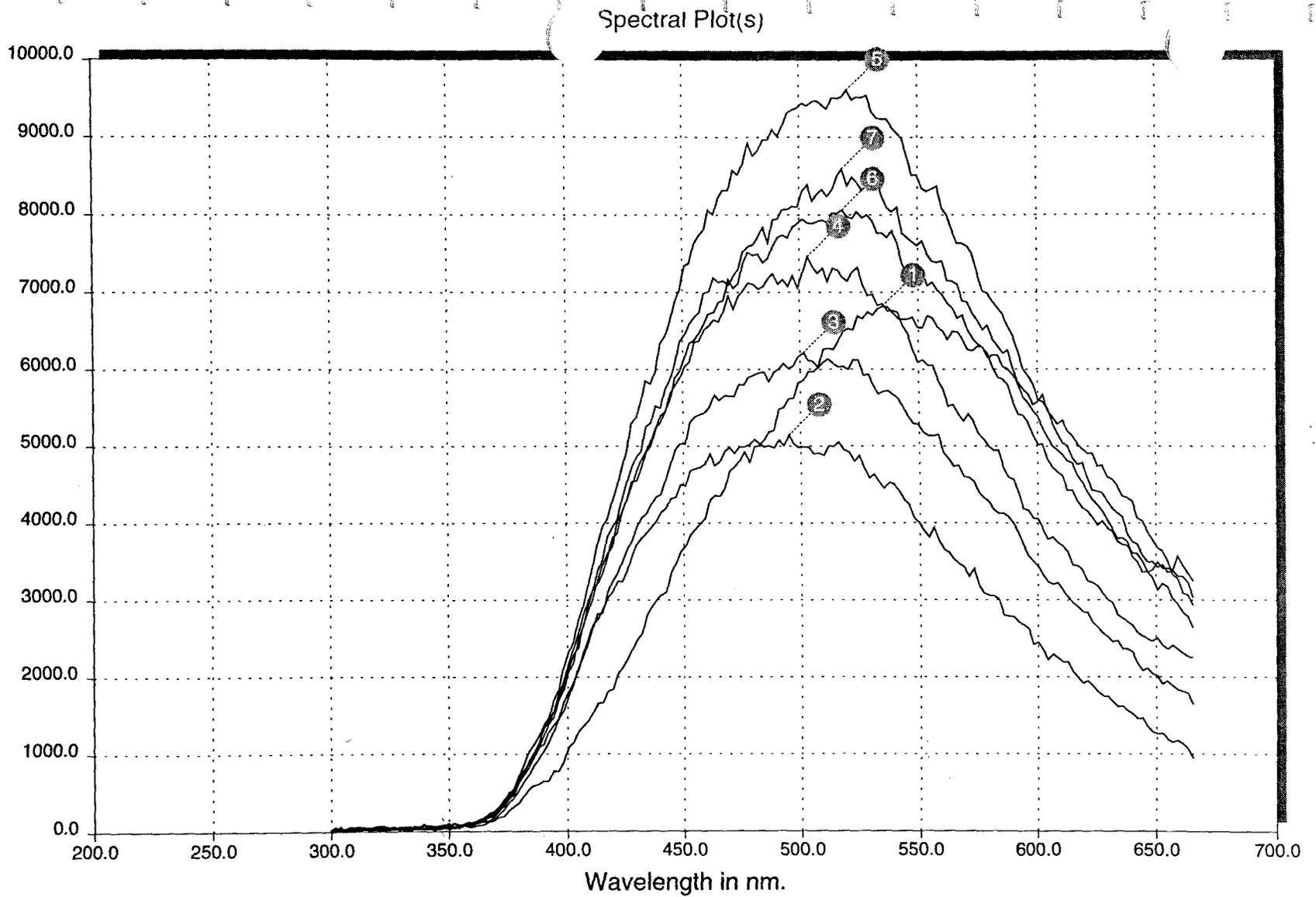
Push: C:\BASIC71\DATA\IR5-07.PSH

Probe: C:\BASIC71\DATA\PROBE23F.PR8

Calibration: C:\BASIC71\DATA\1213DFM.CAL



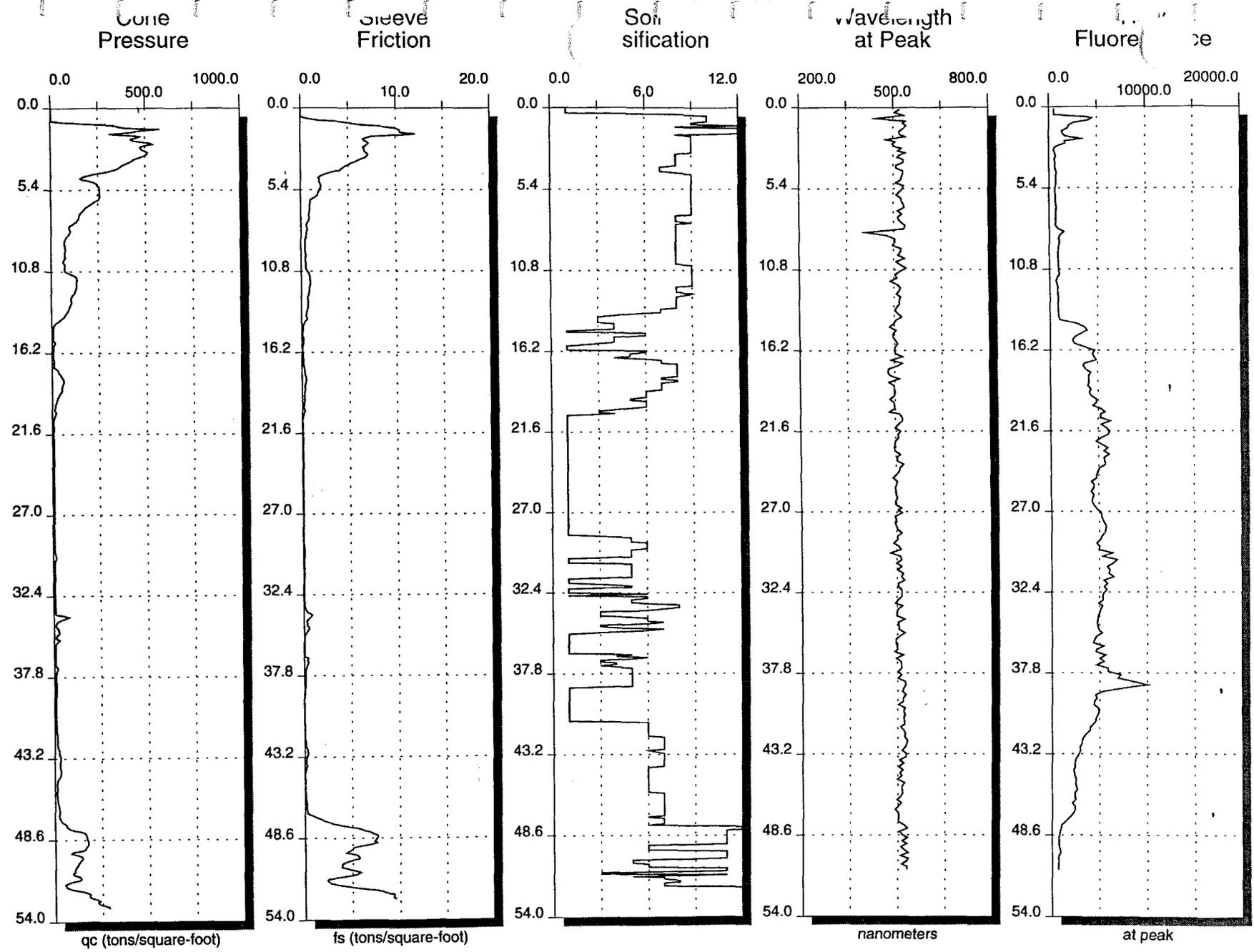
Fluorescence Intensity



Time: 14:29:06
Date: 12-12-1996
Version: 1.0

1: 1.8 ft.; 6816 @ 534.9 nm	5: 33.9 ft.; 9610 @ 520.2 nm
2: 14.8 ft.; 5141 @ 495.0 nm	6: 36.2 ft.; 8063 @ 518.1 nm
3: 16.5 ft.; 6211 @ 501.3 nm	7: 36.6 ft.; 8591 @ 518.1 nm
4: 30.8 ft.; 7457 @ 503.4 nm	

Main: C:\BASIC71\DATA\IR5-07.PSH
Probe: C:\BASIC71\DATA\PROBE23F.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



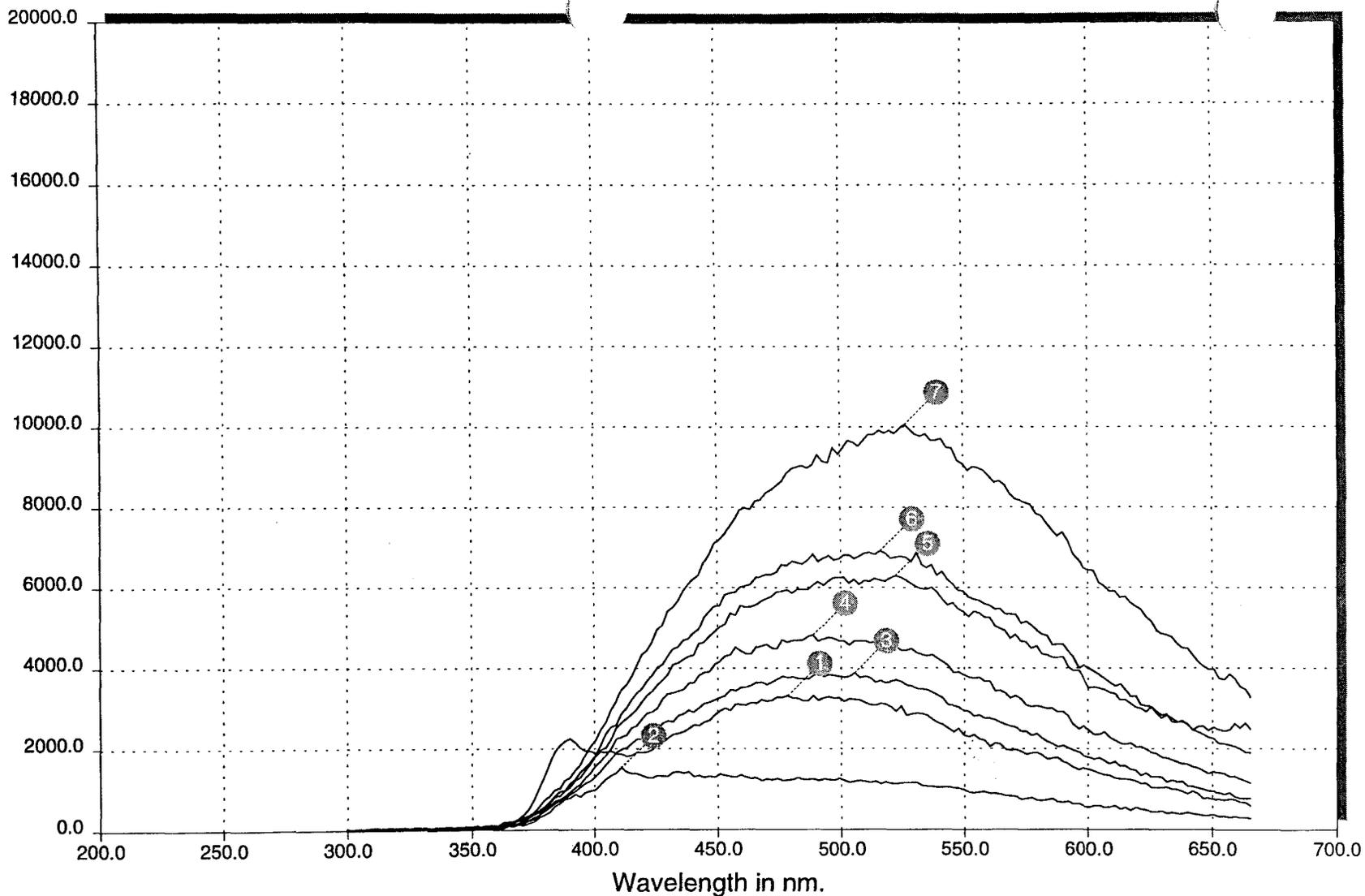
Time: 15:40:40
Date: 12-12-1996
Version: 1.0

Push: C:\BASIC71\DATA\IR5-08.PSH
Probe: C:\BASIC71\DATA\PROBE23F.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

Fluorescence Intensity



1: 2.1 ft.; 3313 @ 478.2 nm

5: 20.9 ft.; 6291 @ 522.3 nm

2: 8.3 ft.; 1526 @ 411.0 nm

6: 30.2 ft.; 6904 @ 516.0 nm

3: 14.8 ft.; 3876 @ 505.5 nm

7: 38.6 ft.; 10056 @ 526.5 nm

4: 16.8 ft.; 4814 @ 488.7 nm

Main: C:\BASIC71\DATA\IR5-08.PSH

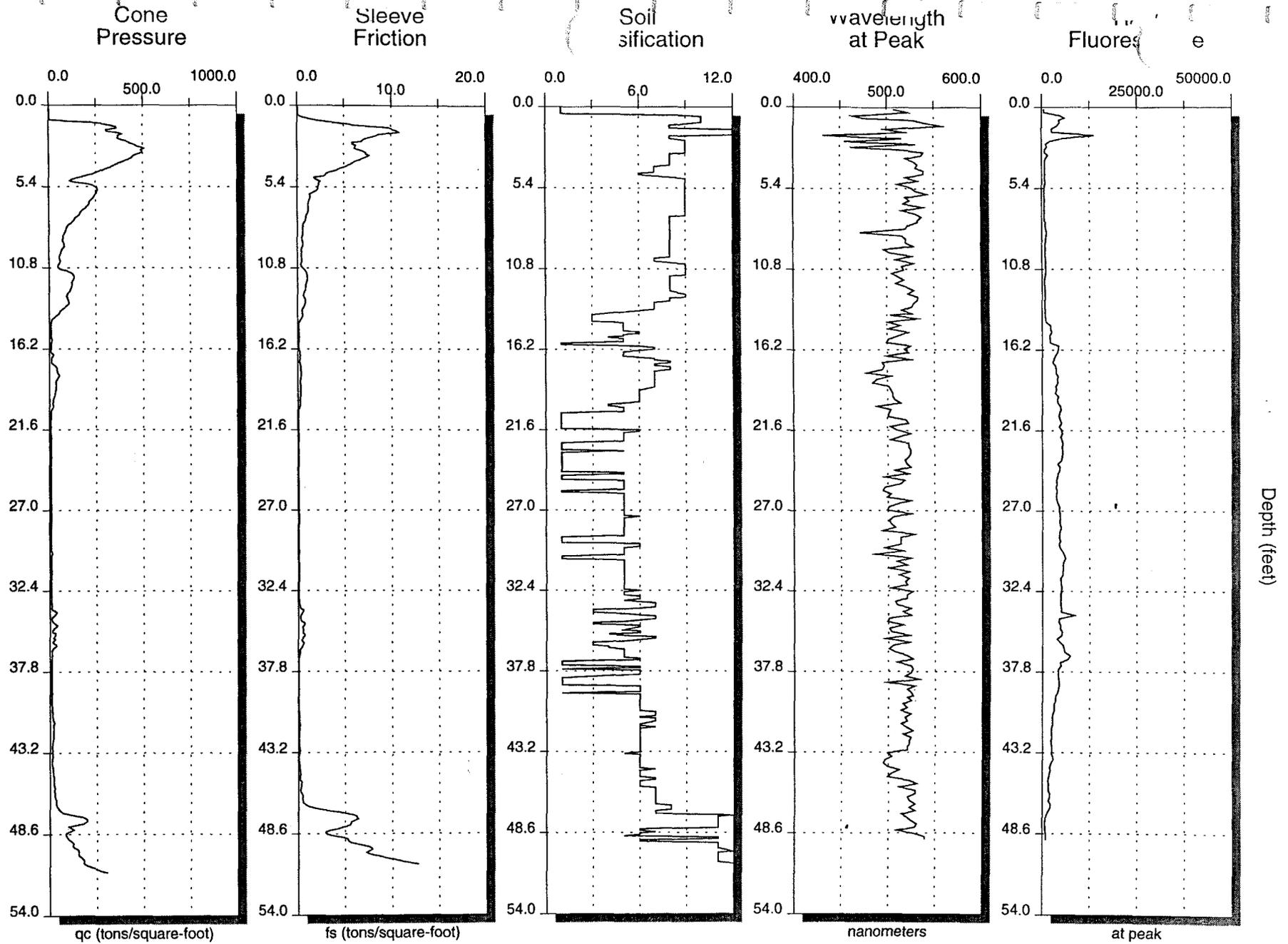
Probe: C:\BASIC71\DATA\PROBE23F.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL

Time: 15:40:40

Date: 12-12-1996

Version: 1.0



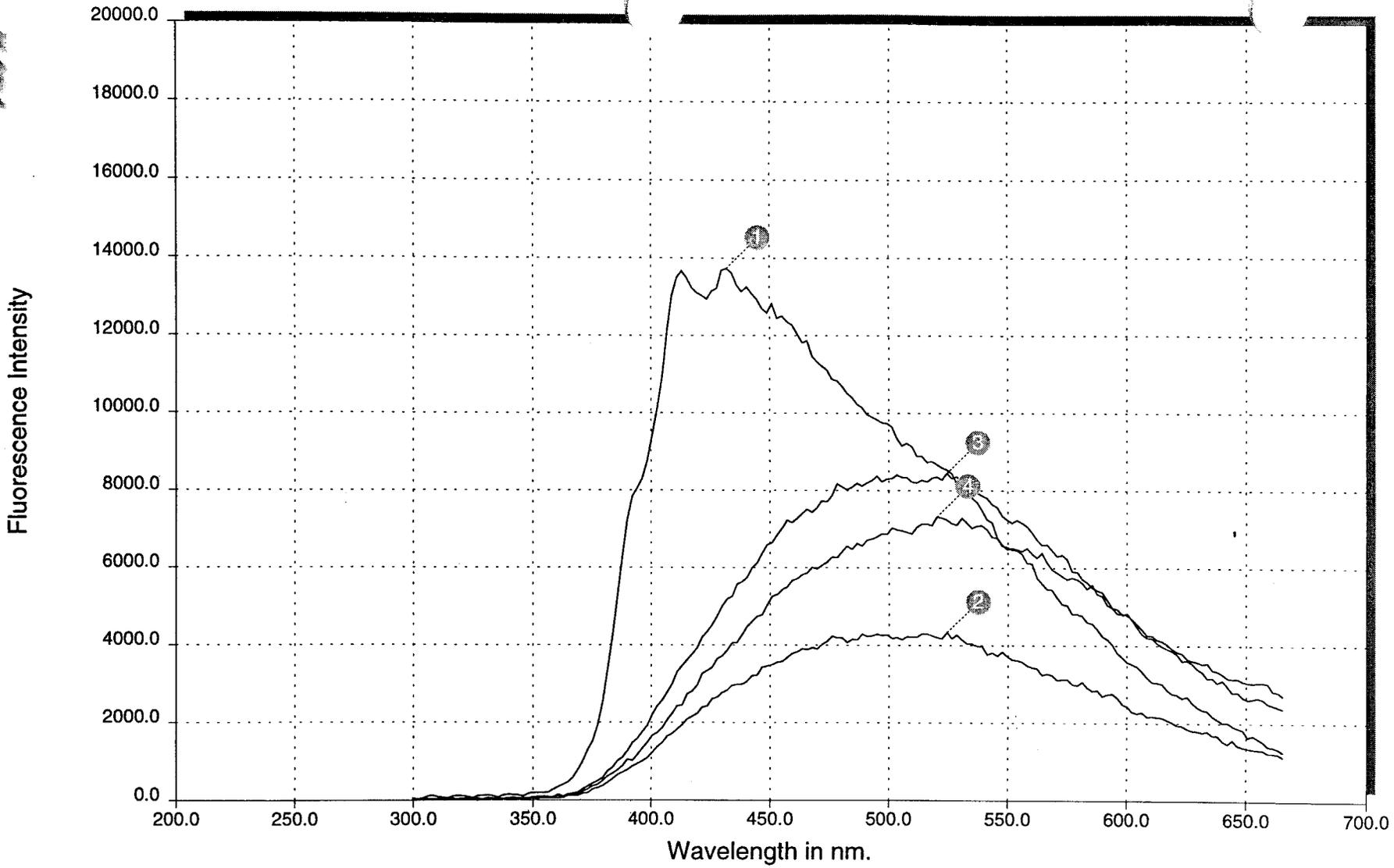
Depth (feet)

Time: 06:38:10
Date: 12-13-1996
Version: 1.0

Push: C:\BASIC71\DATA\IR5-09.PSH
Probe: C:\BASIC71\DATA\PROBE23F.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



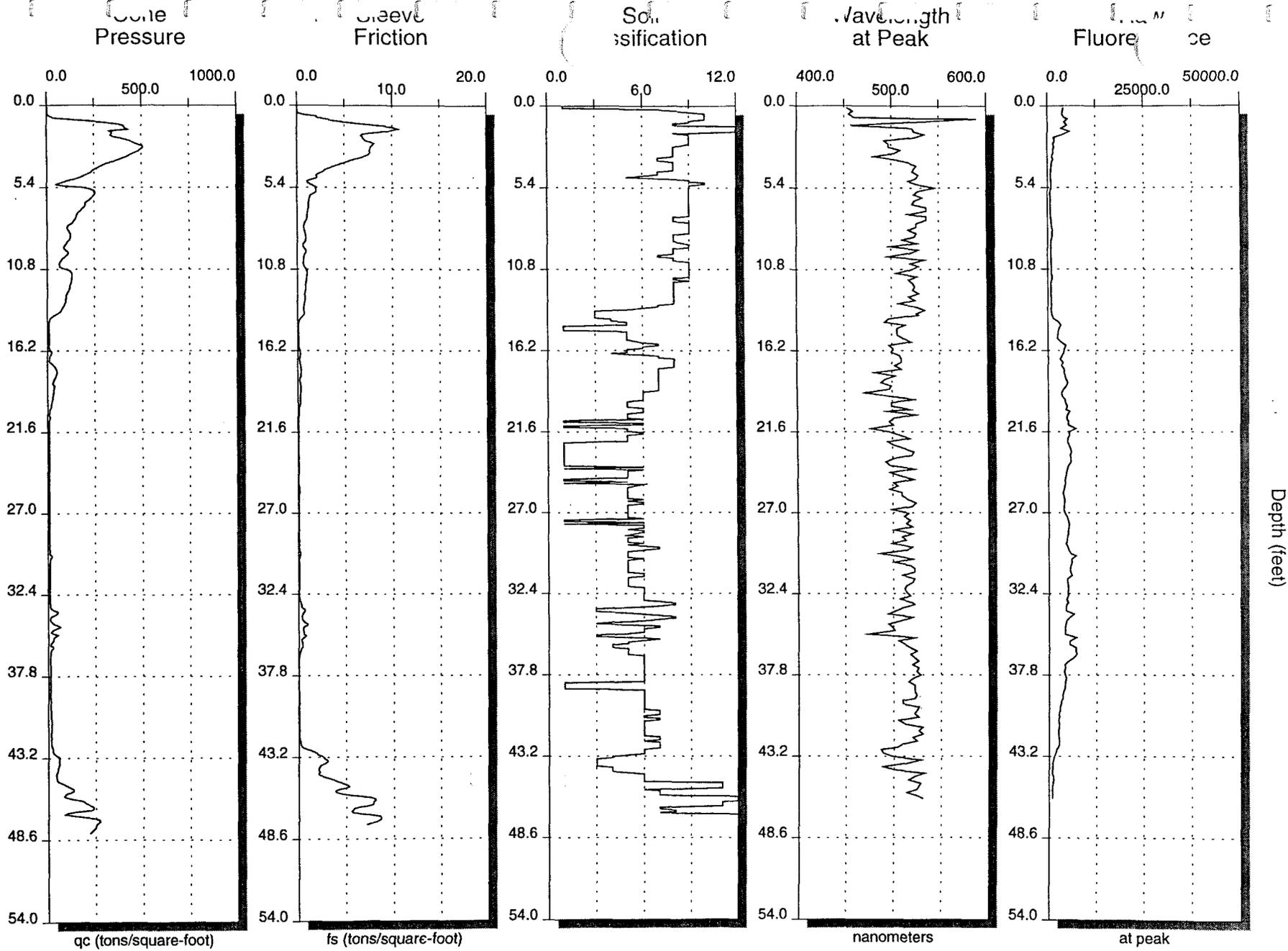
Spectral Plot(s)



Time: 06:38:10
Date: 12-13-1996
Version: 1.0

1: 1.9 ft.; 13729 @ 432.0 nm
2: 15.9 ft.; 4330 @ 524.4 nm
3: 34.0 ft.; 8443 @ 524.4 nm
4: 36.7 ft.; 7315 @ 520.2 nm

Main: C:\BASIC71\DATA\IR5-09.PSH
Probe: C:\BASIC71\DATA\PROBE23F.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Time: 07:27:29

Date: 12-13-1996

Version: 1.0

Push: C:\BASIC71\DATA\IR5-10.PSH

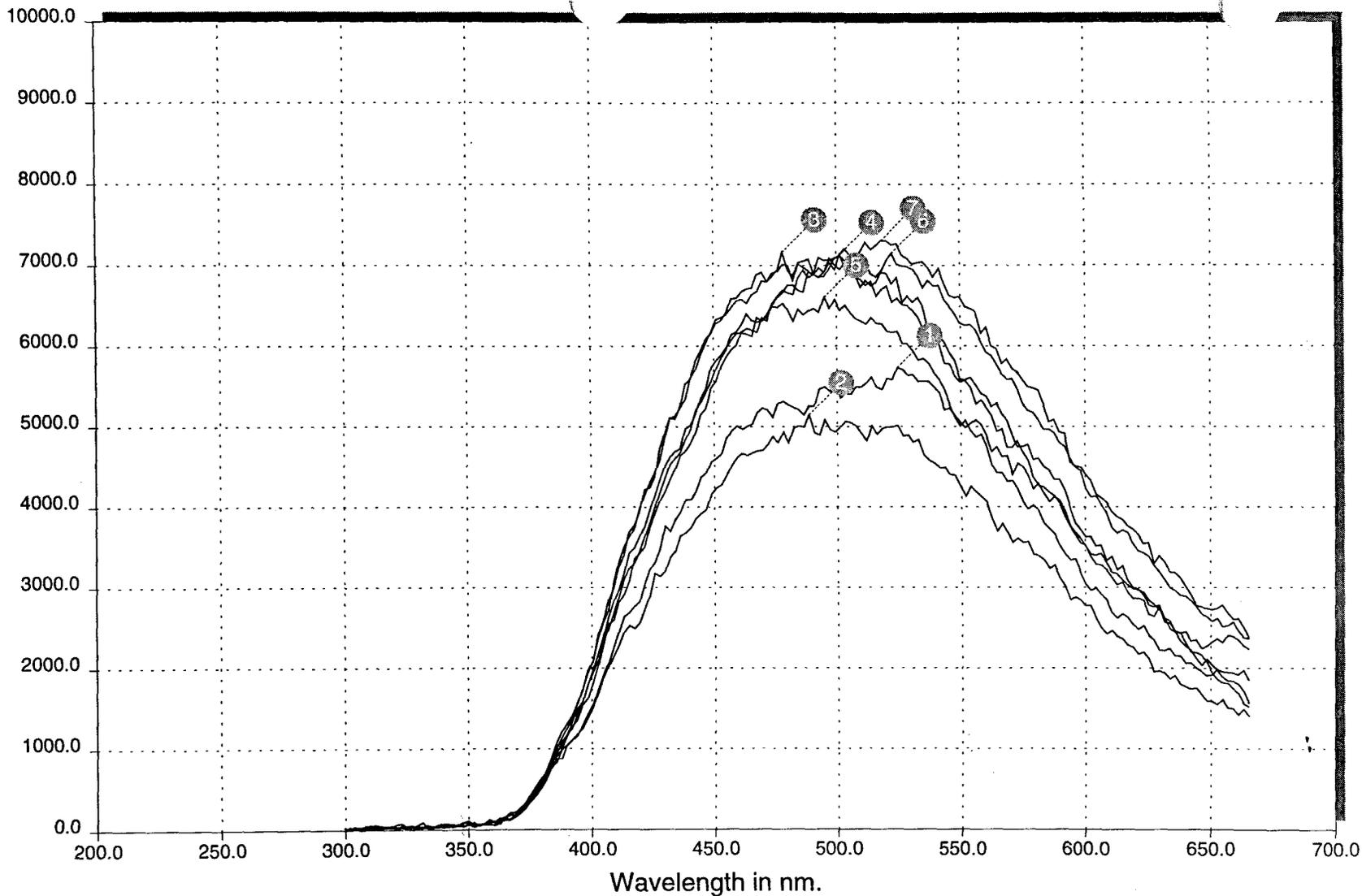
Probe: C:\BASIC71\DATA\PROBE23F.PR

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

Fluorescence Intensity



1: 1.7 ft.; 5730 @ 524.4 nm

5: 33.8 ft.; 6603 @ 495.0 nm

2: 18.3 ft.; 5146 @ 488.7 nm

6: 35.3 ft.; 7147 @ 522.3 nm

3: 21.4 ft.; 7162 @ 478.2 nm

7: 36.4 ft.; 7306 @ 518.1 nm

4: 29.9 ft.; 7130 @ 501.3 nm

Main: C:\BASIC71\DATA\IR5-10.PSH

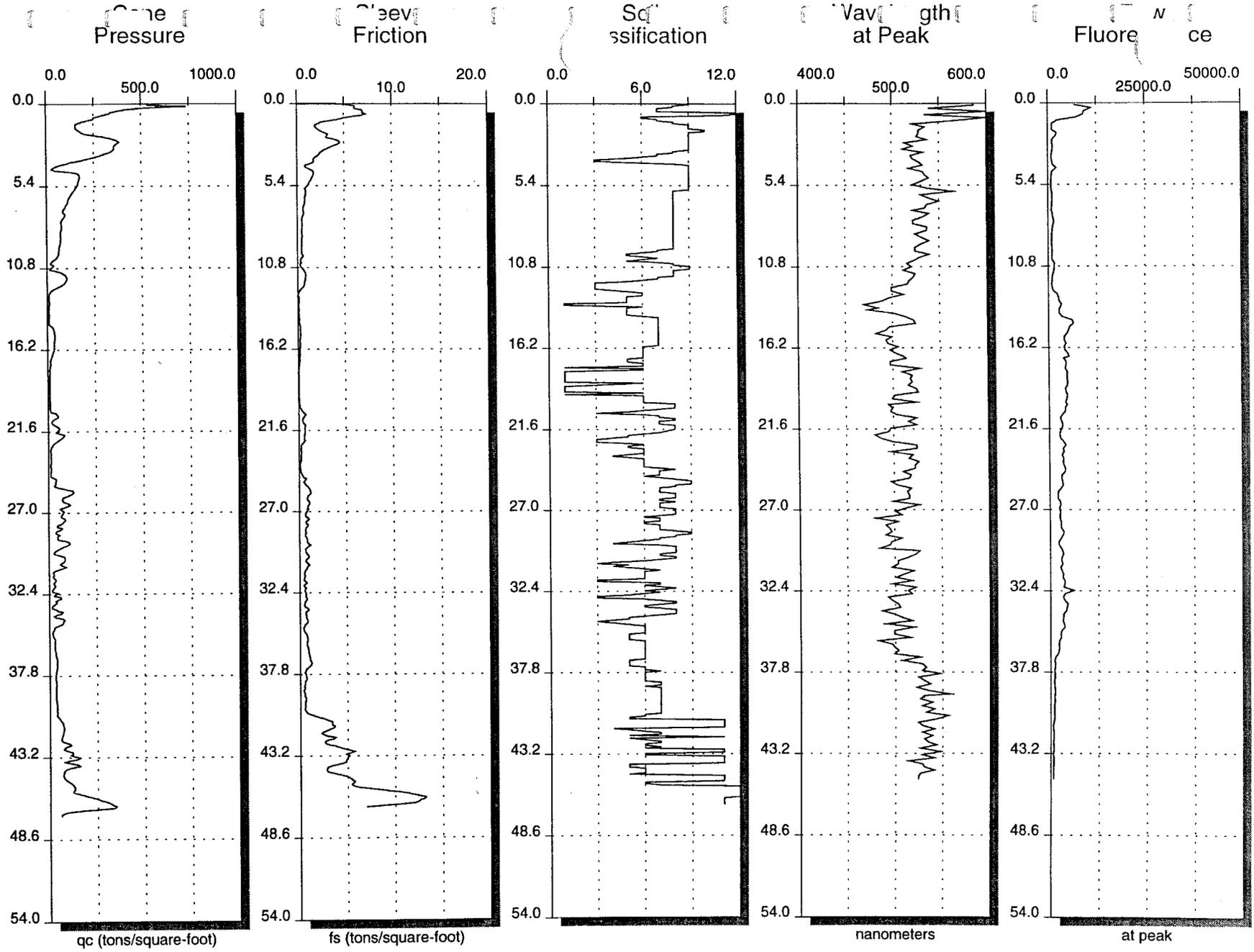
Probe: C:\BASIC71\DATA\PROBE23F.PR8

Calibration: C:\BASIC71\DATA\1213DFM.CAL

Time: 07:27:29

Date: 12-13-1996

Version: 1.0



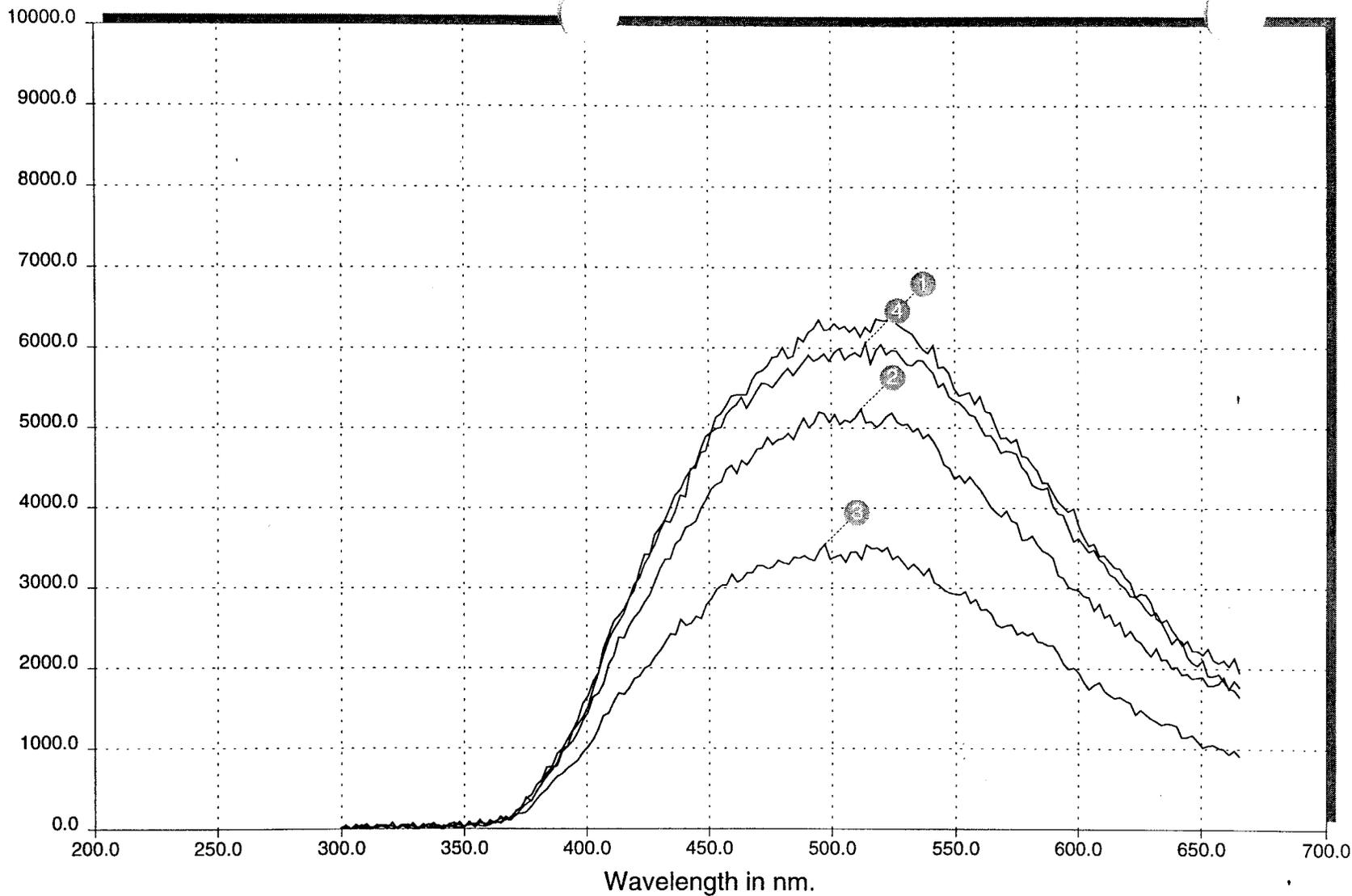
Time: 08:18:21
Date: 12-13-1996
Version: 1.0

Push: C:\BASIC71\DATA\IR5-11.PSH
Probe: C:\BASIC71\DATA\PROBE23F.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot

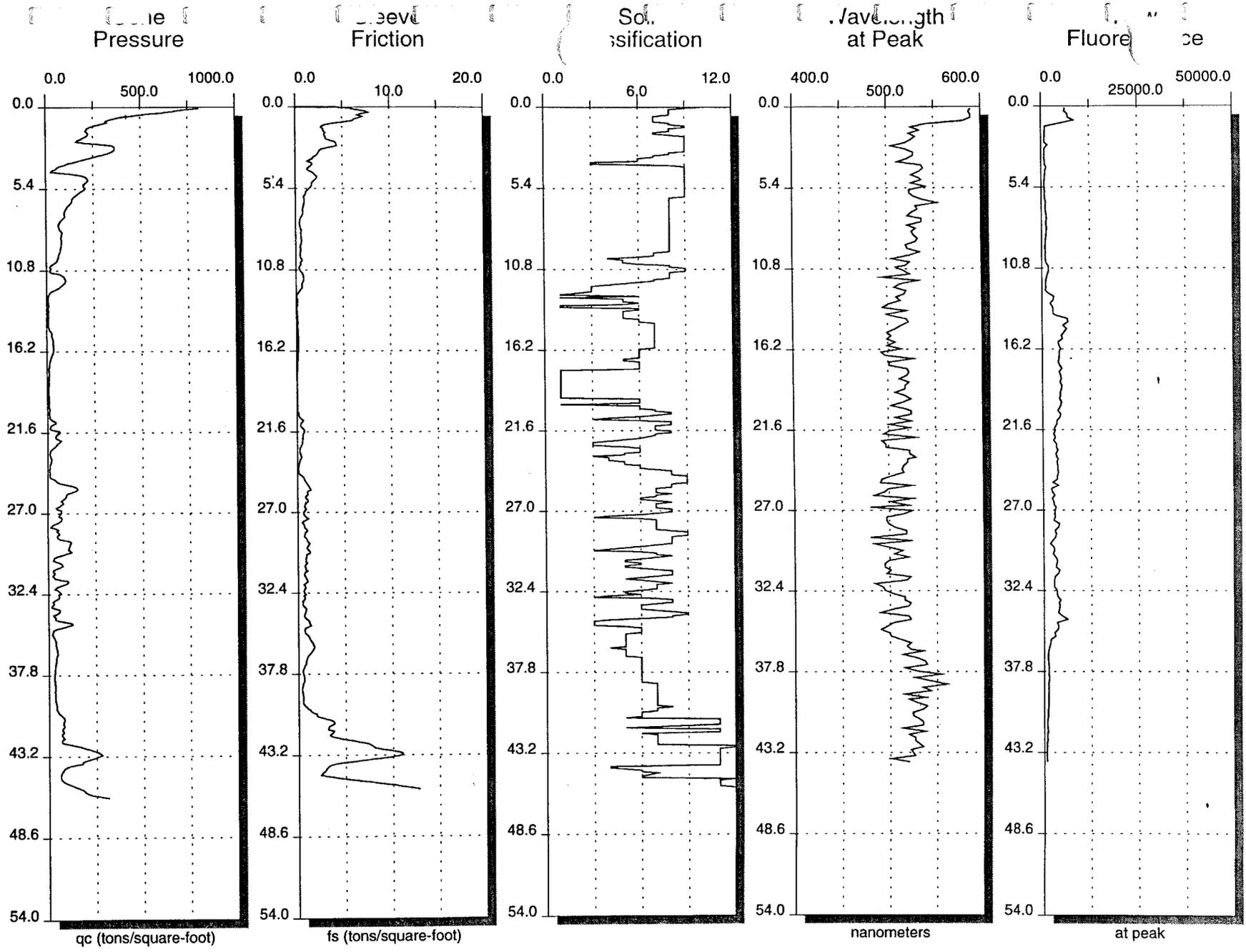
Fluorescence Intensity



1: 14.6 ft.; 6401 @ 524.4 nm
2: 16.8 ft.; 5234 @ 511.8 nm
3: 28.5 ft.; 3544 @ 497.1 nm
4: 32.4 ft.; 6064 @ 513.9 nm

Time: 08:18:21
Date: 12-13-1996
Version: 1.0

Main: C:\BASIC71\DATA\IR5-11.PSH
Probe: C:\BASIC71\DATA\PROBE23F.PR8
Calibration: C:\BASIC71\DATA\1213DFM.CAL



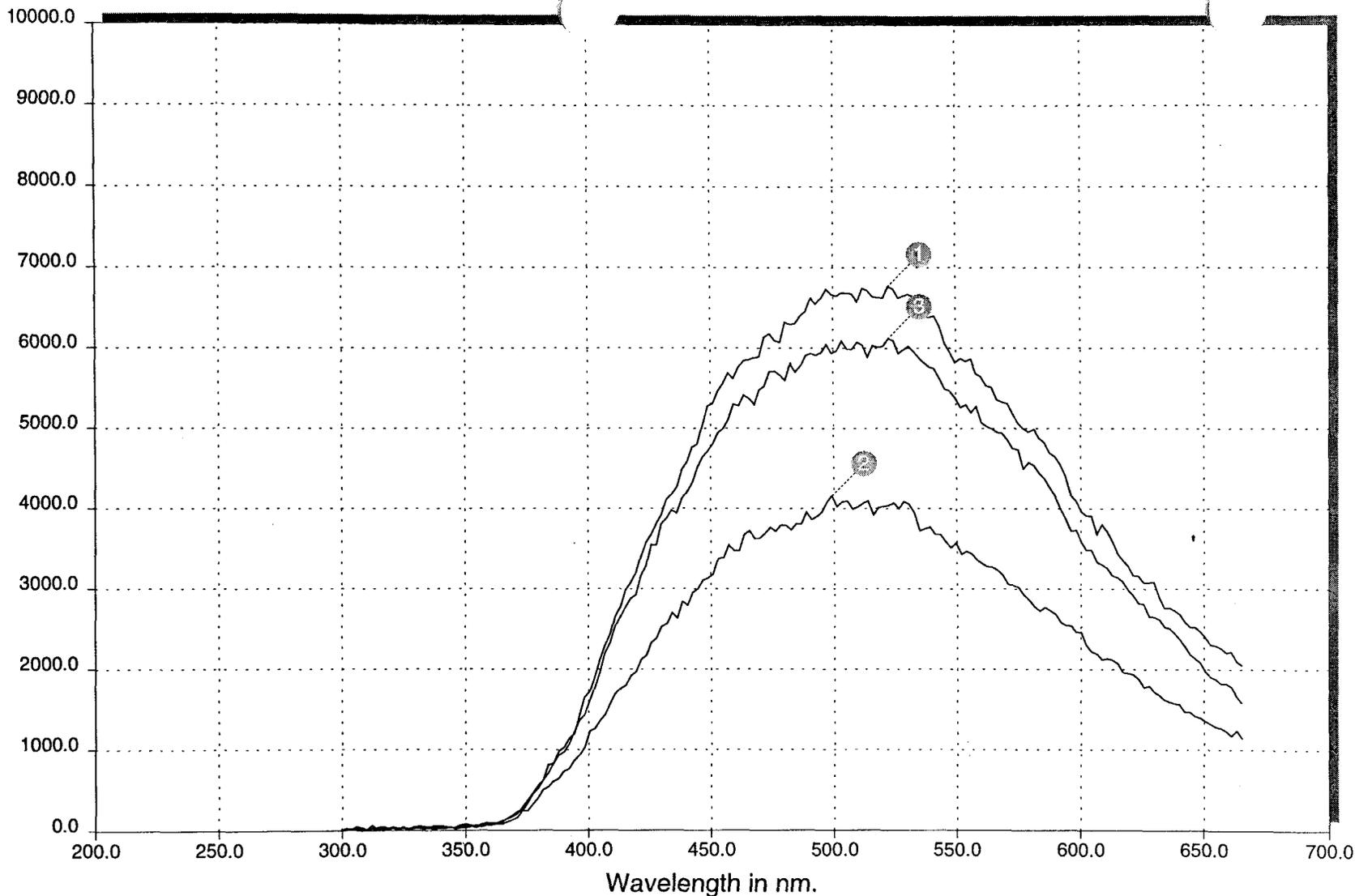
Time: 09:01:06
Date: 12-13-1996
Version: 1.0

Push: C:\BASIC71\DATA\IR5-12.PSH
Probe: C:\BASIC71\DATA\PROBE23F.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

Fluorescence Intensity



1: 14.4 ft.; 6764 @ 522.3 nm
2: 27.9 ft.; 4160 @ 499.2 nm
3: 34.3 ft.; 6116 @ 522.3 nm

Time: 09:01:06

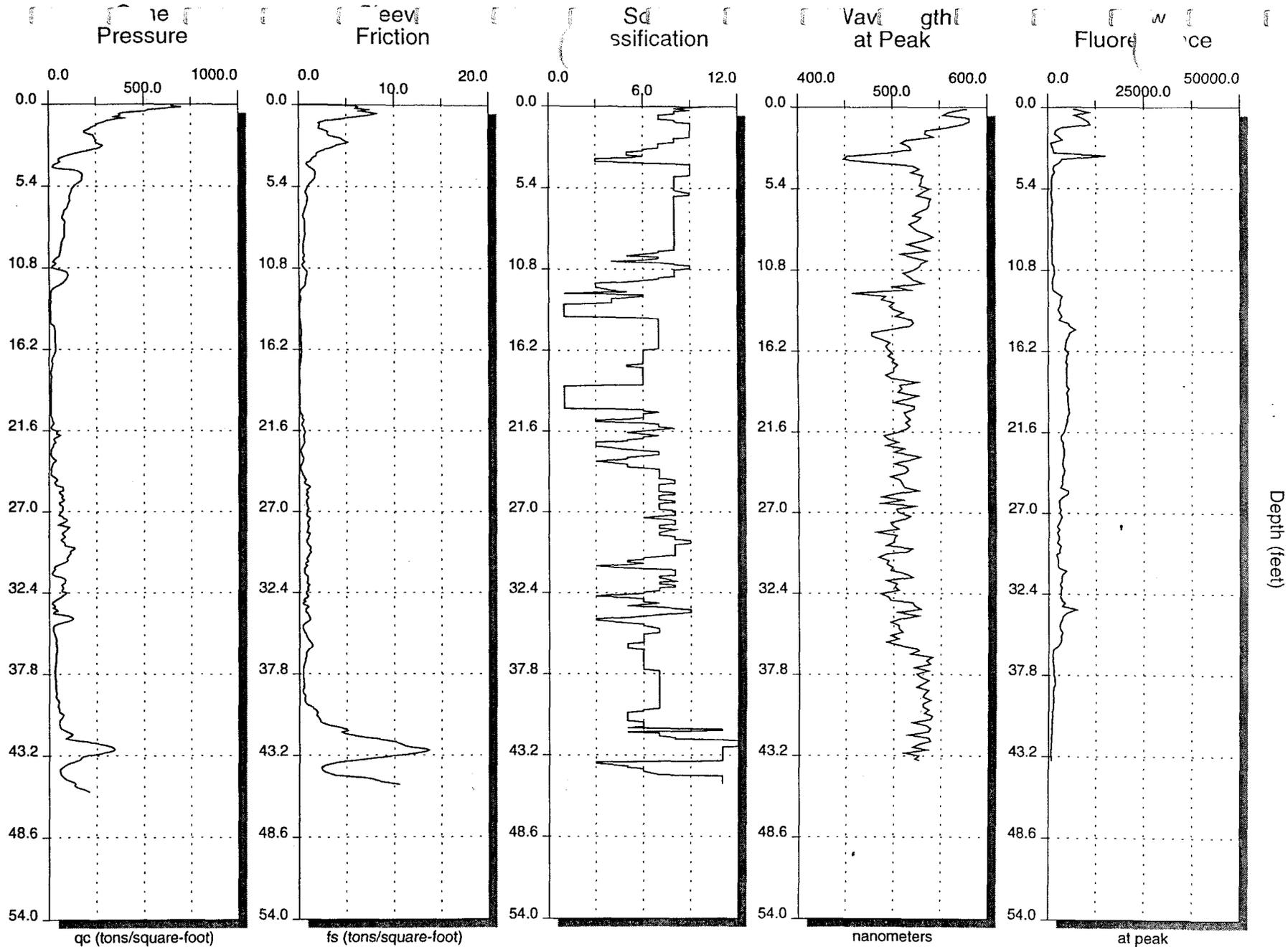
Date: 12-13-1996

Version: 1.0

Main: C:\BASIC71\DATA\IR5-12.PSH

Probe: C:\BASIC71\DATA\PROBE23F.PR8

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Time: 09:40:39

Date: 12-13-1996

Version: 1.0

Push: C:\BASIC71\DATA\IR5-13.PSH

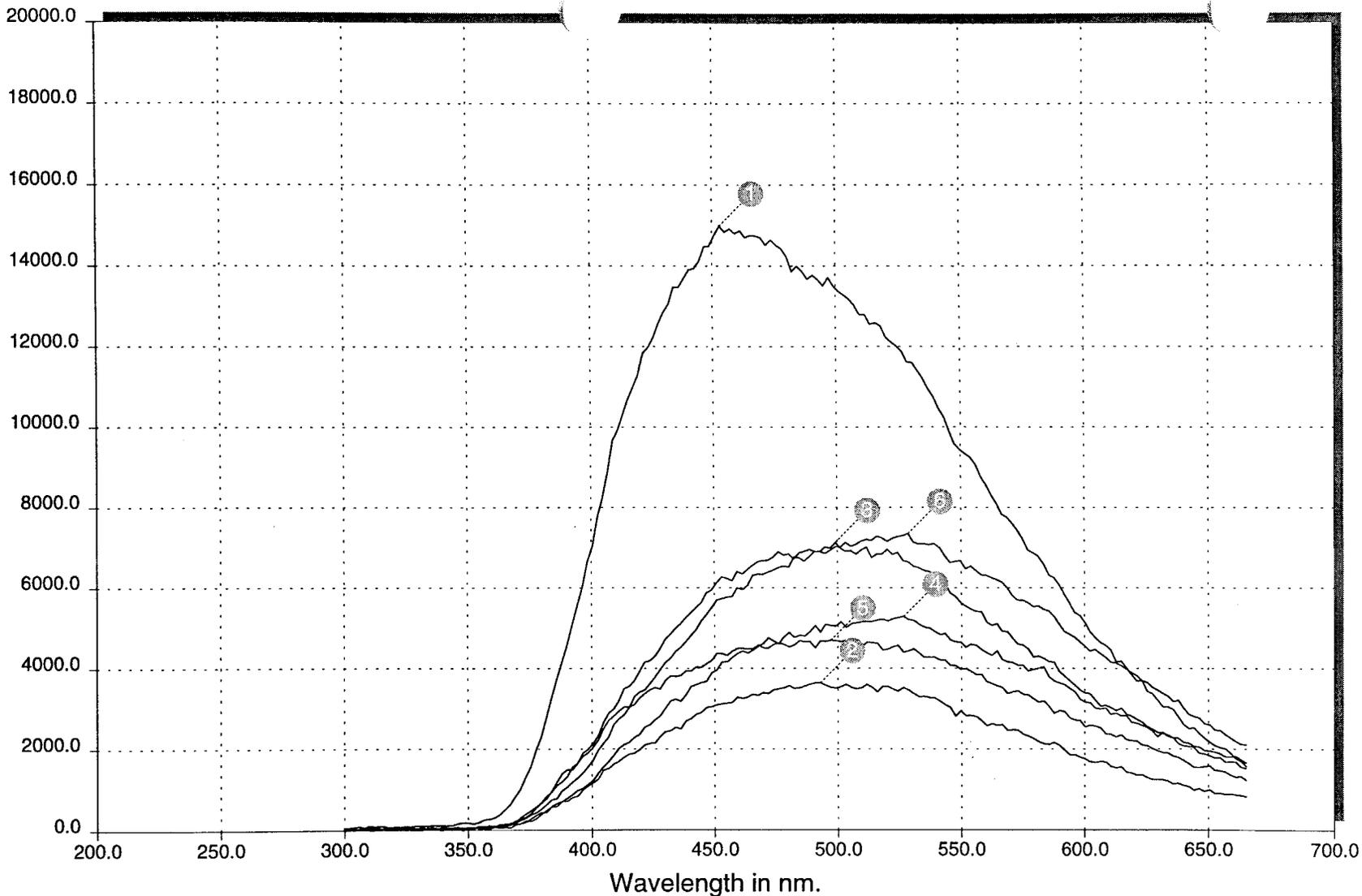
Probe: C:\BASIC71\DATA\PROBE23F.PR

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

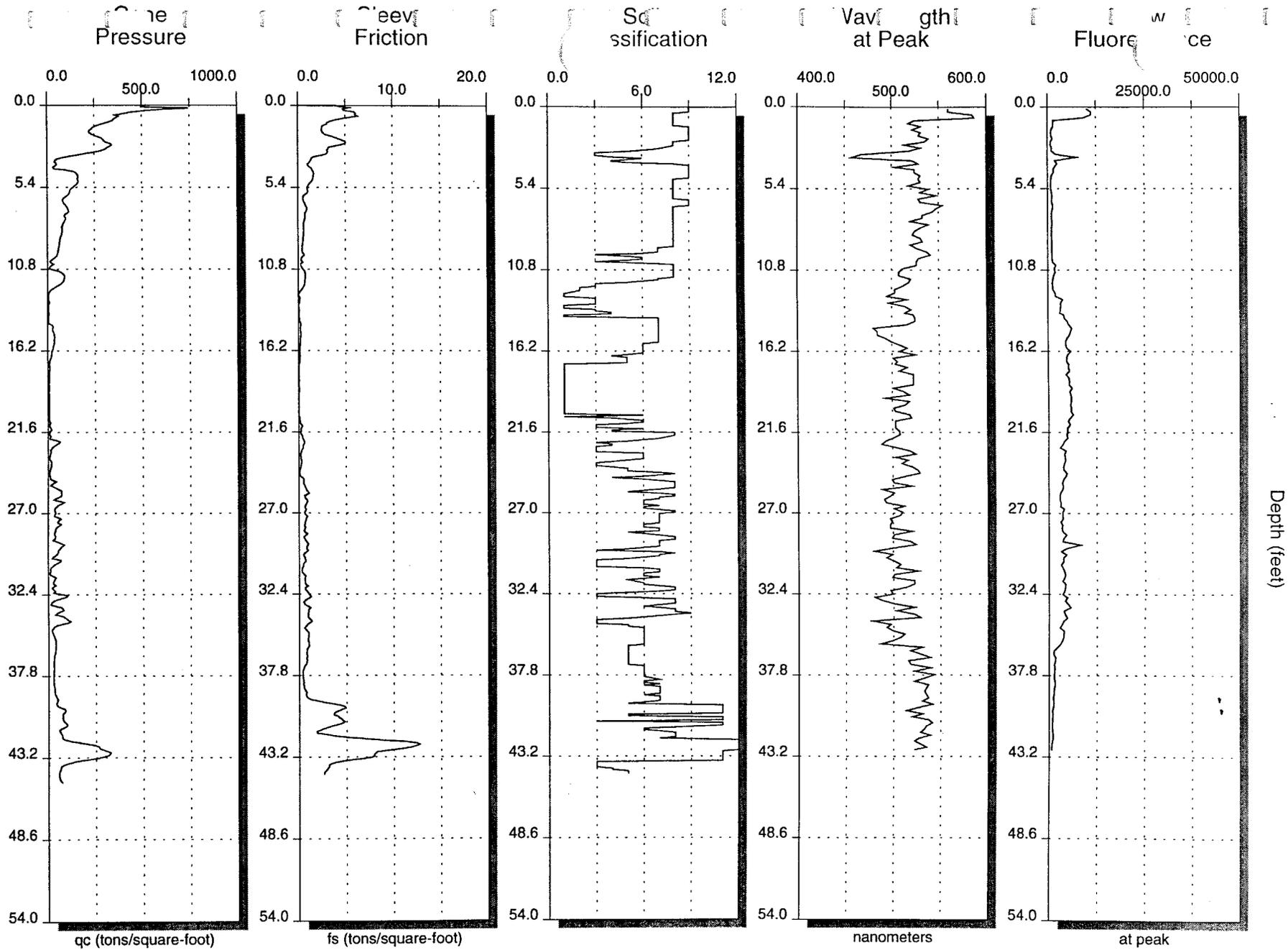
Fluorescence Intensity



Time: 09:40:39
Date: 12-13-1996
Version: 1.0

1: 3.3 ft.; 14983 @ 453.0 nm	5: 30.9 ft.; 4695 @ 497.1 nm
2: 12.6 ft.; 3640 @ 492.9 nm	6: 33.4 ft.; 7344 @ 528.6 nm
3: 14.8 ft.; 7122 @ 499.2 nm	
4: 25.5 ft.; 5284 @ 526.5 nm	

Main: C:\BASIC71\DATA\IR5-13.PSH
Probe: C:\BASIC71\DATA\PROBE23F.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Time: 10:22:04

Date: 12-13-1996

Version: 1.0

Push: C:\BASIC71\DATA\IR5-14.PSH

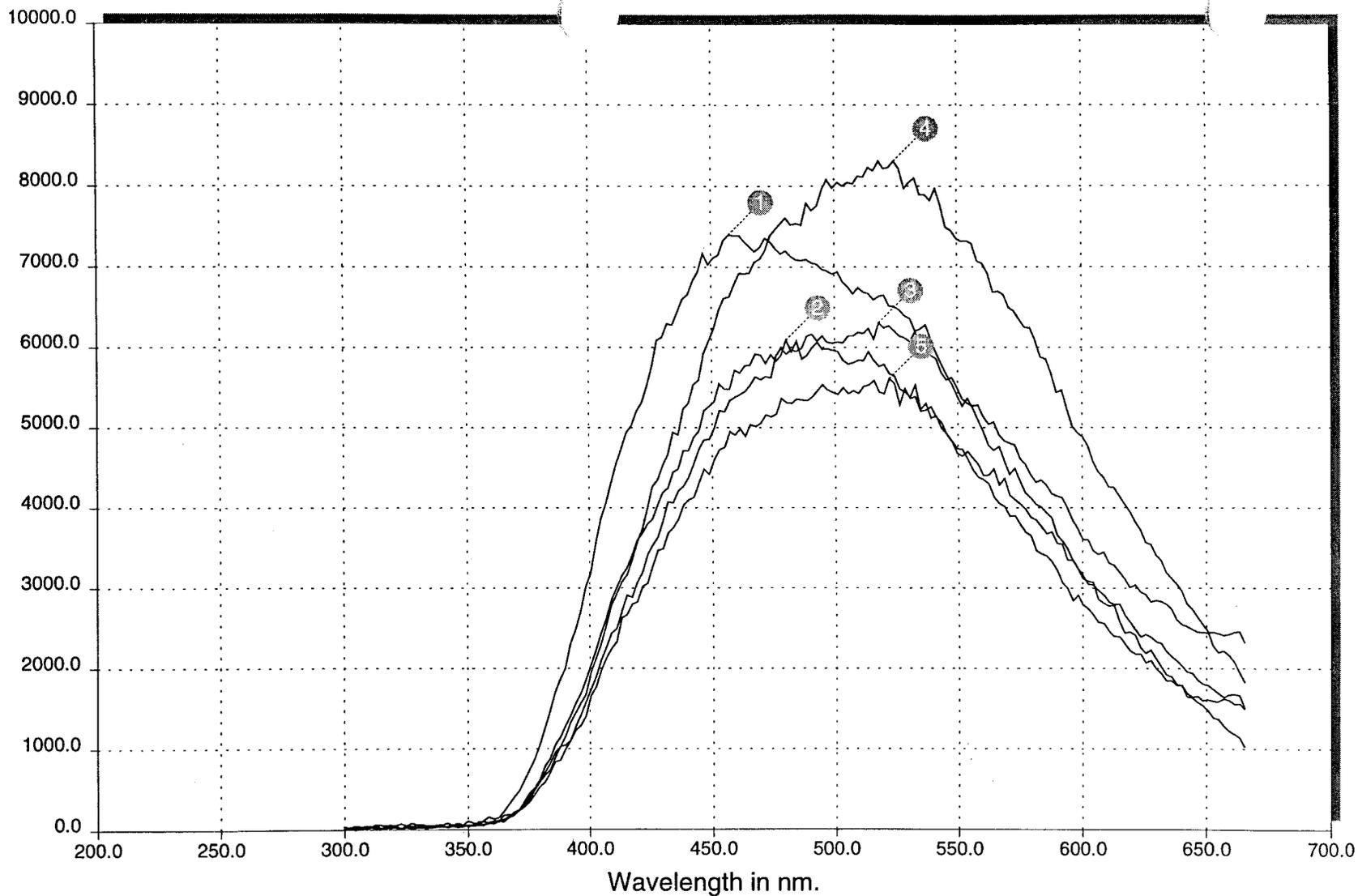
Probe: C:\BASIC71\DATA\PROBE23G.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

Fluorescence Intensity



1: 3.3 ft.; 7398 @ 457.2 nm

5: 33.3 ft.; 5610 @ 522.3 nm

2: 14.7 ft.; 6090 @ 480.3 nm

3: 20.4 ft.; 6305 @ 518.1 nm

4: 29.1 ft.; 8309 @ 524.4 nm

Main: C:\BASIC71\DATA\IR5-14.PSH

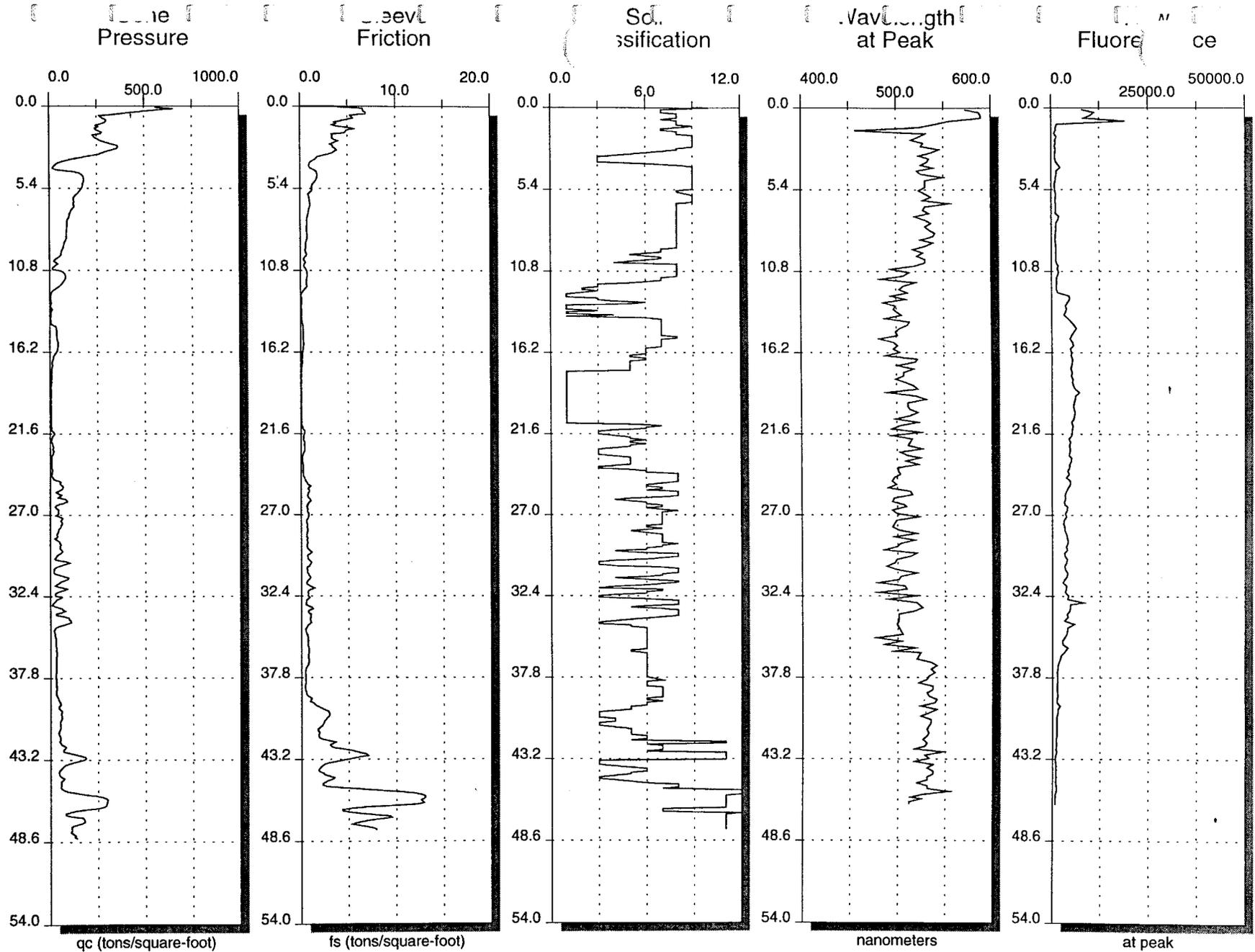
Probe: C:\BASIC71\DATA\PROBE23G.PRB

Calibration: C:\BASIC71\DATA\1213DFM.CAL

Time: 10:22:04

Date: 12-13-1996

Version: 1.0

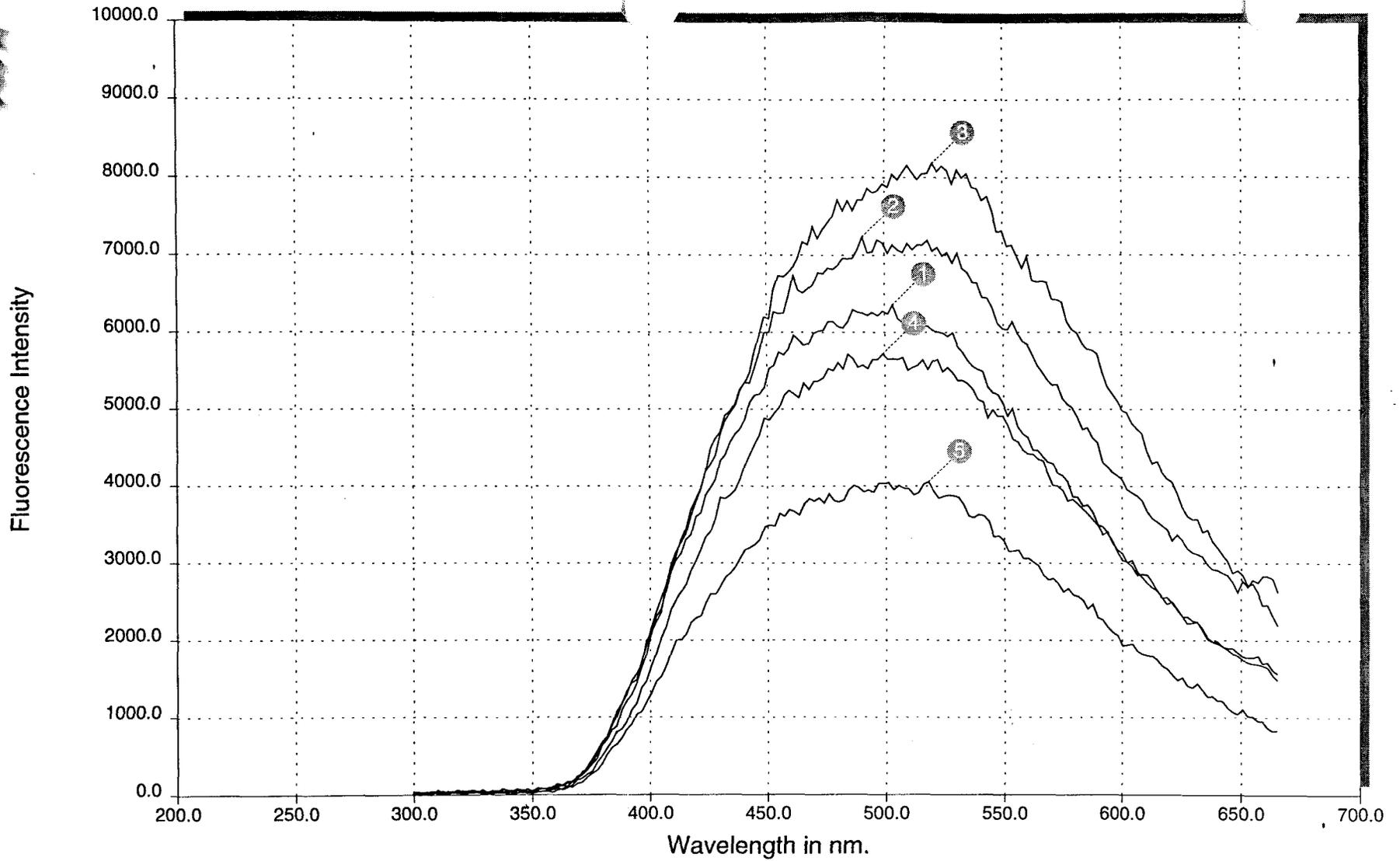


Time: 10:55:52
Date: 12-13-1996
Version: 1.0

Push: C:\BASIC71\DATA\IR5-15.PSH
Probe: C:\BASIC71\DATA\PROBE23G.PR8
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plots

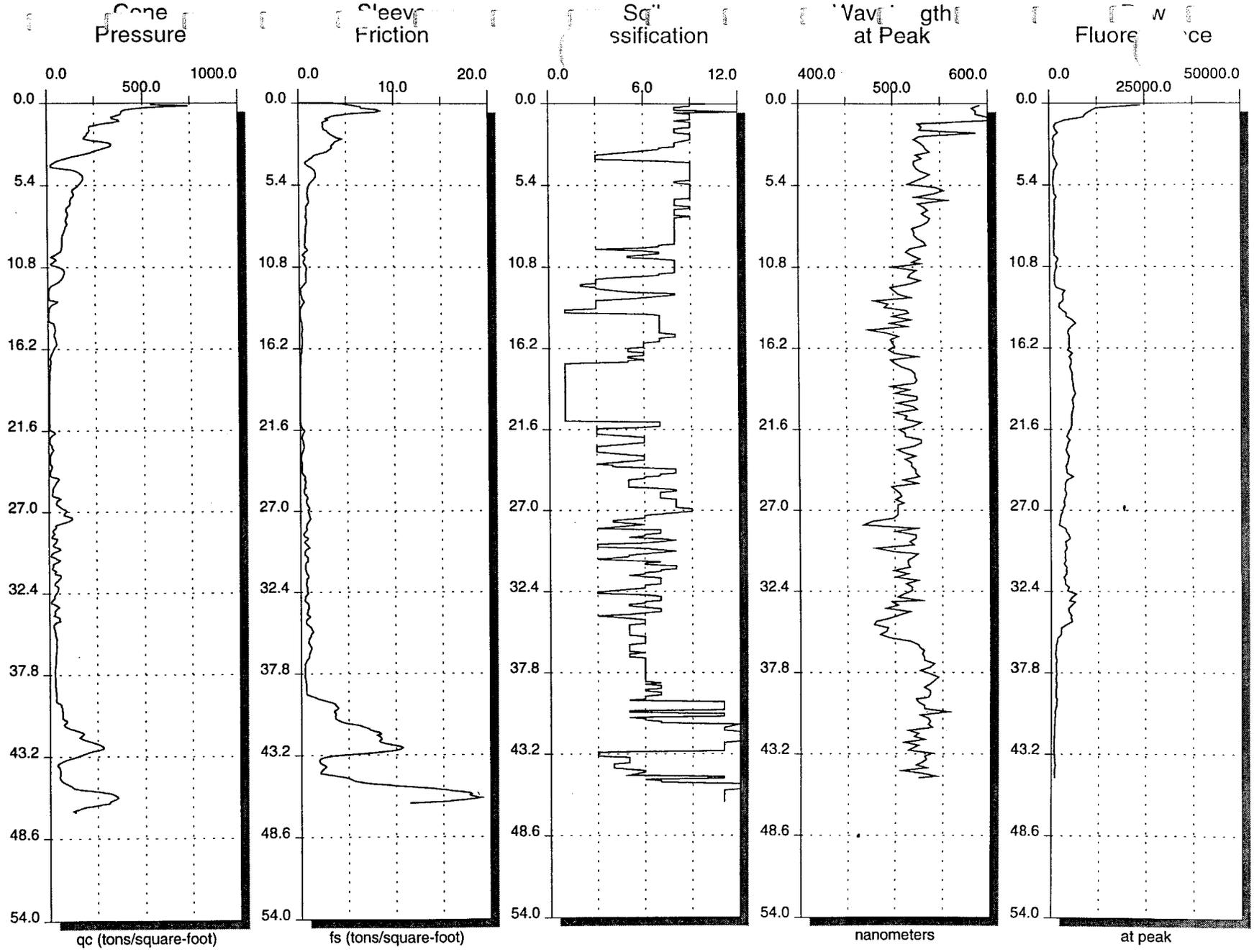


1: 14.6 ft.; 6353 @ 503.4 nm
2: 18.8 ft.; 7231 @ 490.8 nm
3: 32.8 ft.; 8181 @ 520.2 nm
4: 34.3 ft.; 5717 @ 499.2 nm

5: 35.8 ft.; 4054 @ 518.1 nm

Time: 10:55:52
Date: 12-13-1996
Version: 1.0

Main: C:\BASIC71\DATA\IR5-15.PSH
Probe: C:\BASIC71\DATA\PROBE23G.PR
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Depth (feet)

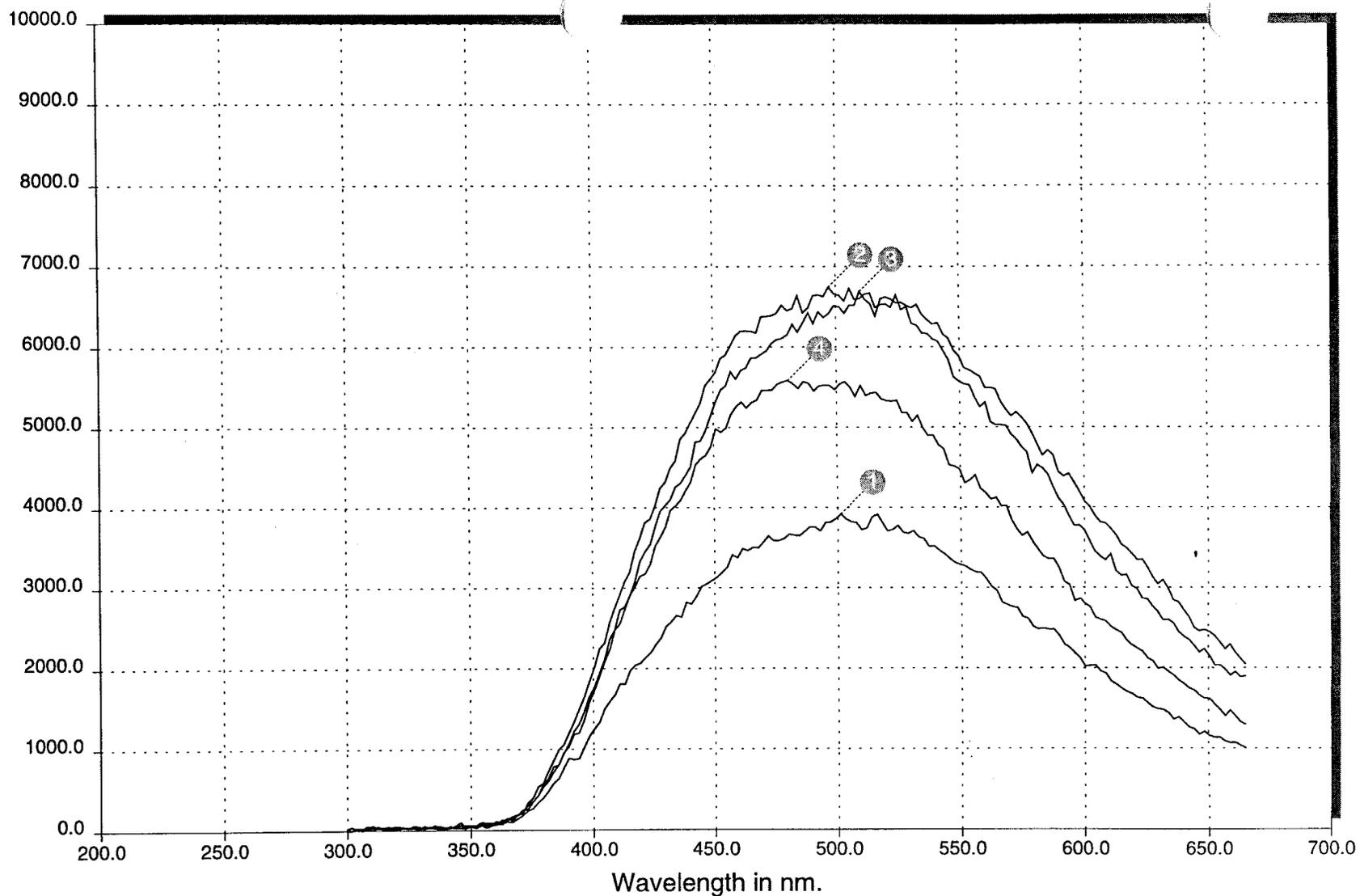
Time: 11:36:48
Date: 12-13-1996
Version: 1.0

Push: C:\BASIC71\DATA\IR5-16.PSH
Probe: C:\BASIC71\DATA\PROBE23G.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL



Spectral Plot(s)

Fluorescence Intensity



Time: 11:36:48
Date: 12-13-1996
Version: 1.0

1: 12.4 ft.; 3917 @ 501.3 nm
2: 14.5 ft.; 6742 @ 497.1 nm
3: 32.6 ft.; 6689 @ 509.7 nm
4: 34.4 ft.; 5580 @ 480.3 nm

Main: C:\BASIC71\DATA\IR5-16.PSH
Probe: C:\BASIC71\DATA\PROBE23G.PRB
Calibration: C:\BASIC71\DATA\1213DFM.CAL

APPENDIX B
LABORATORY DATA

CUSTOMER: DATE: 12/27/96
 PROJECT NAME/NUMBER: SCAFS NAS Alameda
 JOB ORDER NUMBER: U420020
 SAMPLED BY: Robert Stettler

NAVY PUBLIC WORKS CENTER
 ENVIRONMENTAL CHEMISTRY LABORATORY
 NAS NORTH ISLAND, BLDG M9
 SAN DIEGO, CA 92136
 PHONE (619) 546-8431 FAX (619) 546-0783

WILL BE:
 FAXED
 PICKED UP
 MAILED (GUARD)

CONTACT: Robert Stettler PHONE: 556-9421
 ALT. CONTACT: Rod Soule PHONE: 556-9506
 ACTIVITY: PWC Code 980 FAX: 68000
 ADDRESS: 2730 McKean St. Ste 1 HAZWASTE/GROUNDWATER (RCRA)
Bldg 398E DRINKING WATER
 DISCHARGE (HIDES)

NUMBER OF CONTAINERS	ANALYSIS REQUESTED																			
	TPH-GAS	TPH-SP5/DIESEL	8240	8270	BTX	ROG														
1	X	X																		
1		X																		
1	X	X																		
2			X	X																
2			X	X																
2			X	X																
1					X															
1					X															

Containers labeled as FF370

(Vials forced from pg 1 of 3 12/27/96 MS)

LAB LOG NUMBER	SAMPLE ID	DATE COLLECTED	TIME COLLECTED	SAMPLE MATRIX	CONTAINER TYPE
617915	FF37-03-7.5	12/9/96	15:20	Soil	55 Tube
617916	SPL-02-6	↓	16:20	↓	
617917	FS-01-8.1	↓	17:15	↓	
617918	IR5-01-34.5	12/10/96	14:40	Soil	40ml VOA
617919	IR5-02-8.2	12/11/96	08:45	↓	
617920	IR5-02-9.3	↓	09:00	↓	
617921	IR5-02-30.8	↓	10:35	↓	
617944	IR3-06-60-11.5	12/4/96		Ground water	40ml VOA
617945	BIG2-01-10.5	12/5/96		↓	↓

RELINQUISHED BY: Robert Stettler *Robert Stettler* RECEIVED BY: Liliana Estrada *Liliana Estrada* DATE: 12/12/96 TIME: 1300
 RELINQUISHED BY: _____ RECEIVED BY: _____ DATE: _____ TIME: _____
 RELINQUISHED BY: _____ RECEIVED BY: _____ DATE: _____ TIME: _____

COMMENTS: Soil samples in VOA's were collected as per "Massachusetts" method for volatiles.
Sim detection limits needed.

Cooler Temp: 5.5°C
 RECEIVED ON ICE: Y N
 CORRECT CONTAINER: Y N
 PRESERVED: Y N
 SEAL INTACT: Y N N/A

LAB USE ONLY
 CSO REVIEW: CWP 12/12/96
 DATE COMP: _____
 DATE MAILED: _____
 RESULTS REVIEWED BY: _____
 DATE: _____

Navy Public Works Center
Environmental Chemistry Laboratory Code 910
Naval Air Station North Island Bldg M-9
San Diego, CA 92135
TEL (619) 545 - 8431
FAX (619) 545 - 0793

CA ELAP CERT#1301

Activity: PWC CODE 980 Lab Number : 617915
Type of Sample: SOIL Sample ID : FF37-03-7.5
Date Sample Collected: 12/09/96 Date of Report : 12/27/96
Date Sample Received: 12/12/96 Analysis Method : EPA 8015M-GAS
Date Analysis Completed: 12/18/96 Extraction Method : EPA 5030A
Analyst : VZ, PAS

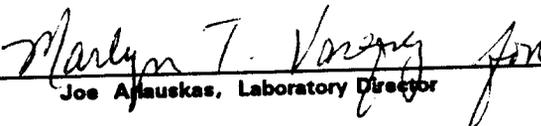
COMPOUND	LABORATORY REPORTING LIMIT	SAMPLE RESULTS	UNITS
TPH GAS	10	ND	Milligrams/Kilogram(ppm)

SURROGATE RECOVERY		
COMPOUND	PERCENT RECOVERY	ACCEPTANCE LIMITS
DIBROMOCHLOROMETHANE (DBCM)	86	30-180

Method Blank (MB) = ND

REMARKS:

TPH = TOTAL PETROLEUM HYDROCARBONS
ND = NOT DETECTED IN THIS ANALYSIS OR LESS THAN REPORTING LIMIT.


Joe Anuskas, Laboratory Director

"Your Satisfaction Is Our Success"

MV

GAS.S/100296
ORGANICS

Navy Public Works Center
 Environmental Chemistry Laboratory Code 910
 Naval Air Station North Island Bldg M-9
 San Diego, CA 92135
 TEL (619) 545 - 8431
 FAX (619) 545 - 0793

CA ELAP CERT#1301

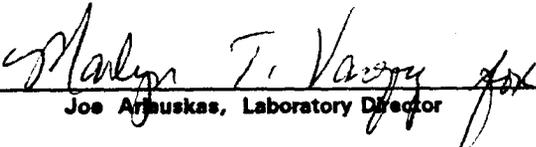
Activity: PWC CODE 980 Lab Number : 617917
 Type of Sample: SOIL Sample ID : FS-01-8.1
 Date Sample Collected: 12/09/96 Date of Report : 12/27/96
 Date Sample Received: 12/12/96 Analysis Method : EPA 8015M-GAS
 Date Analysis Completed: 12/20/96 Extraction Method : EPA 5030A
 Analyst : VZ, PAS

COMPOUND	LABORATORY REPORTING LIMIT	SAMPLE RESULTS	UNITS
TPH GAS	10	ND*	Milligrams/Kilogram(ppm)

SURROGATE RECOVERY		
COMPOUND	PERCENT RECOVERY	ACCEPTANCE LIMITS
DIBROMOCHLOROMETHANE (DBCM)	115	30-180

Method Blank (MB) = ND

REMARKS: TPH = TOTAL PETROLEUM HYDROCARBONS
 ND = NOT DETECTED IN THIS ANALYSIS OR LESS THAN REPORTING LIMIT.
 * = GASOLINE RANGE ORGANICS PRESENT (C₅ TO C₁₂) AT 30 MG/KG (PPM).


 Joe Anuskas, Laboratory Director

"Your Satisfaction Is Our Success"

MV

GAS.S/100296
 ORGANICS

Navy Public Works Center
Environmental Chemistry Laboratory Code 910
Naval Air Station North Island Bldg M-9
San Diego, CA 92135
TEL (619) 545 - 8431
FAX (619) 545 - 0793

CA ELAP CERT#1301

Activity: PWC CODE 980 Parameter: TPH
Type of Sample: SOIL Analysis Method: EPA 8015-M
Date Sample Collected: 12/09/96 Extraction Method: EPA 8015-M
Date Sample Received: 12/12/96 Date of Report: 12/24/96
Date Analysis Completed: 12/21/96 Laboratory Reporting Limits: 10
Date Extracted: 12/13/96 Units: Milligrams/Kilogram (ppm)
Analyst: AMH, AB

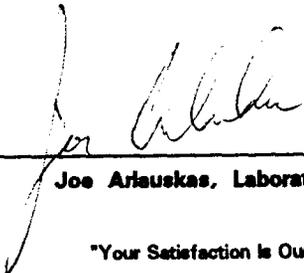
TOTAL PETROLEUM HYDROCARBONS (TPH) - DIESEL#2

LAB NUMBER	SAMPLE ID	SAMPLE RESULTS DIESEL#2	DRG *
617915	FF37 - 03 - 7.5	ND	2,900 E
617916	SPL - 02 - 6	ND	-----
617917	FS - 01 - 8.1	ND	700 E

Method Blank = ND

REMARKS:

ND = NOT DETECTED IN THIS ANALYSIS OR LESS THAN REPORTING LIMIT.
* = DIESEL RANGE ORGANICS C8 TO C28 ANOMALOUS PEAK PATTERN
(NON-JET FUEL AND NON-DIESEL #2)
E = ESTIMATED



Joe Arlauskas, Laboratory Director

"Your Satisfaction is Our Success"

Navy Public Works Center
 Environmental Chemistry Laboratory Code 910
 Naval Air Station North Island Bldg M-9
 San Diego, CA 92135
 TEL (619) 545 - 8431 FAX (619) 545 - 0793

CA ELAP CERT# 1301

REVISED REPORT

ACTIVITY: PWC CODE 980
 Type of sample: SOIL
 Date sample collected: 12/10/96
 Date sample received: 12/12/96
 Date analysis completed: 12/24/96
 Analyst: ARH

Lab number: 617918
 Sample ID: IR5 - 01 - 34.5
 Date of report: 01/08/97
 Analysis Method: EPA 8240B
 Extraction method: EPA 3580A / EPA 5030A
 Units: MILLIGRAMS/KILOGRAM (PPM)

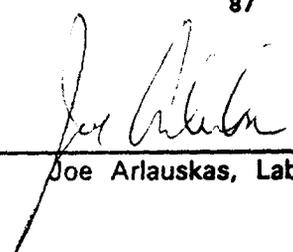
Compound Name	Laboratory ReportingLimit	Laboratory Results
1,1,1-Trichloroethane	0.04	0.11
1,1,2,2-Tetrachloroethane	0.04	ND
1,1,2-Trichloroethane	0.04	ND
1,1-Dichloroethane	0.04	ND
1,1-Dichloroethene	0.04	ND
1,2-Dichlorobenzene	0.04	ND
1,2-Dichloroethane	0.04	ND
1,2-Dichloropropane	0.04	ND
1,3-Dichlorobenzene	0.04	ND
1,4-Dichlorobenzene	0.04	ND
2-Butanone (MEK)	0.8	ND
n-Hexanone	0.4	ND
Acetone	0.8	ND
Benzene	0.04	ND
Bromodichloromethane	0.04	ND
Bromoform	0.04	ND
Bromomethane	0.04	ND
Carbon disulfide	0.4	ND
Carbon tetrachloride	0.04	ND
Chlorobenzene	0.04	ND
Chloroethane	0.04	ND

Compound Name	Laboratory ReportingLimit	Laboratory Results
Chloroform	0.04	ND
Chloromethane	0.04	ND
cis-1,3-Dichloropropene	0.04	ND
Cyclohexanone	0.8	ND
Dibromochloromethane	0.04	ND
Ethyl acetate	0.4	ND
Ethylbenzene	0.04	ND
Ethyl ether	0.8	ND
Methyl isobutyl ketone	0.4	ND
Methylene chloride	0.8	ND
Styrene	0.04	ND
Tetrachloroethane	0.04	ND
Toluene	0.04	ND
trans-1,2-Dichloroethane	0.04	ND
trans-1,3-Dichloropropene	0.04	ND
Trichloroethene	0.04	ND
Trichlorofluoromethane	0.04	ND
Trichlorotrifluoroethane	0.04	ND
Vinyl chloride	0.04	ND
Xylene (total)	0.8	ND

REMARKS: ND = Not detected in this analysis or less than reporting limit.

SURROGATE RECOVERIES

COMPOUND	PERCENT RECOVERY	ACCEPTANCE LIMITS
1,2-Dichloroethane-d4	96	80 - 128
Toluene-d8	98	78 - 126
Bromofluorobenzene	87	71 - 125



 Joe Arlauskas, Laboratory Director

CB

VOA-1

"Your Satisfaction Is Our Success"

617918.XLS

Navy Public Works Center
 Environmental Chemistry Laboratory Code 910
 Naval Air Station North Island Bldg M-9
 San Diego, CA 92135
 TEL (619) 545 - 8431 FAX (619) 545 - 0793

CA ELAP CERT# 1301

REVISED REPORT

ACTIVITY: PWC CODE 980
 Type of sample: SOIL
 Date sample collected: 12/11/96
 Date sample received: 12/12/96
 Date analysis completed: 12/24/96
 Analyst: ARH

Lab number: 617919
 Sample ID: IR5 - 02 - 8.2
 Date of report: 01/08/97
 Analysis Method: EPA 8240B
 Extraction method: EPA 3580A / EPA 5030A
 Units: MILLIGRAMS/KILOGRAM (PPM)

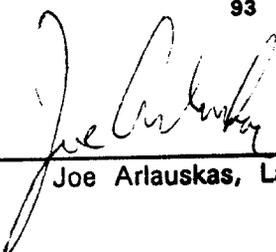
Compound Name	Laboratory ReportingLimit	Laboratory Results
1,1,1-Trichloroethane	230	630 D
1,1,2,2-Tetrachloroethane	5	ND
1,1,2-Trichloroethane	5	ND
1,1-Dichloroethane	5	24
1,1-Dichloroethene	5	23
1,2-Dichlorobenzene	5	6
1,2-Dichloroethane	5	ND
1,2-Dichloropropane	5	ND
1,3-Dichlorobenzene	5	ND
1,4-Dichlorobenzene	5	ND
2-Butanone (MEK)	100	ND
n-Hexanone	250	ND
Acetone	100	ND
Benzene	5	ND
Bromodichloromethane	5	ND
Bromoform	5	ND
Bromomethane	5	ND
Carbon disulfide	50	ND
Carbon tetrachloride	5	ND
Chlorobenzene	5	ND
Chloroethane	5	ND

Compound Name	Laboratory ReportingLimit	Laboratory Results
Chloroform	5	ND
Chloromethane	5	ND
cis-1,3-Dichloropropene	5	ND
Cyclohexanone	50	ND
Dibromochloromethane	5	ND
Ethyl acetate	50	ND
Ethylbenzene	5	9
Ethyl ether	50	ND
Methyl isobutyl ketone	250	ND
Methylene chloride	50	ND
Styrene	5	ND
Tetrachloroethene	5	74
Toluene	5	67
trans-1,2-Dichloroethene	5	ND
trans-1,3-Dichloropropene	5	ND
Trichloroethene	230	2,600 D
Trichlorofluoromethane	5	ND
Trichlorotrifluoroethane	230	850 D
Vinyl chloride	45	ND
Xylene (total)	10	75

REMARKS: ND = Not detected in this analysis or less than reporting limit.
 D = Sample diluted for reporting.

SURROGATE RECOVERIES

COMPOUND	PERCENT RECOVERY	ACCEPTANCE LIMITS
1,2-Dichloroethane-d4	100	80 - 128
Toluene-d8	95	78 - 126
Bromofluorobenzene	93	71 - 125



Joe Arlauskas, Laboratory Director

CB

Navy Public Works Center
 Environmental Chemistry Laboratory Code 910
 Naval Air Station North Island Bldg M-9
 San Diego, CA 92135
 TEL (619) 545 - 8431 FAX (619) 545 - 0793

CA ELAP CERT# 1301

REVISED REPORT

ACTIVITY: PWC CODE 980
 Type of sample: SOIL
 Date sample collected: 12/11/96
 Date sample received: 12/12/96
 Date analysis completed: 12/24/96
 Analyst: ARH

Lab number: 617920
 Sample ID: IR5 - 02 - 9.3
 Date of report: 01/08/97
 Analysis Method: EPA 8240B
 Extraction method: EPA 3580A / EPA 5030A
 Units: MILLIGRAMS/KILOGRAM (PPM)

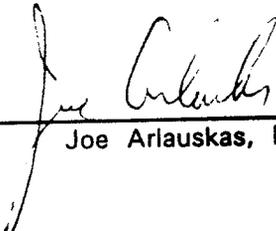
Compound Name	Laboratory ReportingLimit	Laboratory Results
1,1,1-Trichloroethane	185	400 D
1,1,2,2-Tetrachloroethane	4	ND
1,1,2-Trichloroethane	4	ND
1,1-Dichloroethane	4	13
1,1-Dichloroethene	4	16
1,2-Dichlorobenzene	4	ND
1,2-Dichloroethane	4	ND
1,2-Dichloropropane	4	ND
1,3-Dichlorobenzene	4	ND
1,4-Dichlorobenzene	4	ND
2-Butanone (MEK)	80	ND
2-Hexanone	40	ND
Acetone	80	ND
Benzene	4	ND
Bromodichloromethane	4	ND
Bromoform	4	ND
Bromomethane	4	ND
Carbon disulfide	8	ND
Carbon tetrachloride	4	ND
Chlorobenzene	4	ND
Chloroethane	4	ND

Compound Name	Laboratory ReportingLimit	Laboratory Results
Chloroform	4	ND
Chloromethane	4	ND
cis-1,3-Dichloropropene	4	ND
Cyclohexanone	8	ND
Dibromochloromethane	4	ND
Ethyl acetate	40	ND
Ethylbenzene	4	10
Ethyl ether	8	ND
Methyl isobutyl ketone	200	ND
Methylene chloride	8	ND
Styrene	4	ND
Tetrachloroethene	4	42
Toluene	4	60
trans-1,2-Dichloroethene	4	ND
trans-1,3-Dichloropropene	4	ND
Trichloroethene	185	1500 D
Trichlorofluoromethane	4	ND
Trichlorotrifluoroethane	185	970 D
Vinyl chloride	4	ND
Xylene (total)	8	81

REMARKS: ND = Not detected in this analysis or less than reporting limit.
 D = Sample diluted for reporting.

SURROGATE RECOVERIES

COMPOUND	PERCENT RECOVERY	ACCEPTANCE LIMITS
1,2-Dichloroethane-d4	100	80 - 128
Toluene-d8	99	78 - 126
Bromofluorobenzene	95	71 - 125



 Joe Arlauskas, Laboratory Director

CB

Navy Public Works Center
 Environmental Chemistry Laboratory Code 910
 Naval Air Station North Island Bldg M-9
 San Diego, CA 92135
 TEL (619) 545 - 8431 FAX (619) 545 - 0793

CA ELAP CERT# 1301

REVISED REPORT

ACTIVITY: PWC CODE 980
 Type of sample: SOIL
 Date sample collected: 12/11/96
 Date sample received: 12/12/96
 Date analysis completed: 12/24/96
 Analyst : ARH

Lab number : 617921
 Sample ID : IR5 - 02 - 30.8
 Date of report : 01/08/97
 Analysis Method : EPA 8240B
 Extraction method : EPA 3580A / EPA 5030A
 Units: MILLIGRAMS/KILOGRAM (PPM)

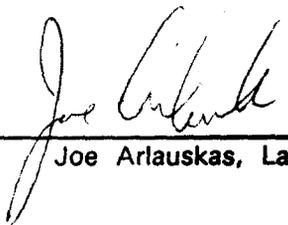
Compound Name	Laboratory ReportingLimit	Laboratory Results
1,1,1-Trichloroethane	0.03	0.25
1,1,2,2-Tetrachloroethane	0.03	ND
1,1,2-Trichloroethane	0.03	ND
1,1-Dichloroethane	0.03	ND
1,1-Dichloroethene	0.03	ND
1,2-Dichlorobenzene	0.03	ND
1,2-Dichloroethane	0.03	ND
1,2-Dichloropropane	0.03	ND
1,3-Dichlorobenzene	0.03	ND
1,4-Dichlorobenzene	0.03	ND
2-Butanone (MEK)	0.6	ND
2-Hexanone	0.3	ND
Acetone	0.6	ND
Benzene	0.03	ND
Bromodichloromethane	0.03	ND
Bromoform	0.03	ND
Bromomethane	0.03	ND
Carbon disulfide	0.06	ND
Carbon tetrachloride	0.03	ND
Chlorobenzene	0.03	ND
Chloroethane	0.03	ND

Compound Name	Laboratory ReportingLimit	Laboratory Results
Chloroform	0.03	ND
Chloromethane	0.03	ND
cis-1,3-Dichloropropene	0.03	ND
Cyclohexanone	0.06	ND
Dibromochloromethane	0.03	ND
Ethyl acetate	0.3	ND
Ethylbenzene	0.03	ND
Ethyl ether	0.06	ND
Methyl isobutyl ketone	0.3	ND
Methylene chloride	0.6	ND
Styrene	0.03	ND
Tetrachloroethene	0.03	ND
Toluene	0.03	ND
trans-1,2-Dichloroethene	0.03	ND
trans-1,3-Dichloropropene	0.03	ND
Trichloroethene	0.03	0.51
Trichlorofluoromethane	0.03	ND
Trichlorotrifluoroethane	0.03	ND
Vinyl chloride	0.03	ND
Xylene (total)	0.06	ND

REMARKS: ND = Not detected in this analysis or less than reporting limit.

SURROGATE RECOVERIES

COMPOUND	PERCENT RECOVERY	ACCEPTANCE LIMITS
1,2-Dichloroethane-d4	95	80 - 128
Toluene-d8	105	78 - 126
Bromofluorobenzene	88	71 - 125



 Joe Arlauskas, Laboratory Director

CB

Navy Public Works Center
 Environmental Chemistry Laboratory Code 910
 Naval Air Station North Island Bldg M-9
 San Diego, CA 92135
 TEL (619) 545 - 8431 FAX (619) 545 - 0793

CA ELAP CERT# 1301

ACTIVITY: PWC CODE 980
 Type of sample: SOIL
 Date sample collected: 12/10/96
 Date sample received: 12/12/96
 Date analysis completed: 12/19/96
 Analyst: ARH,BAH

Lab number : 617918
 Sample ID : IR5 - 01 - 34.5
 Date of report : 12/27/96
 Analysis Method : EPA 8270B
 Extraction method : EPA 3550A
 Extraction date : 12/18/96
 Units: MILLIGRAMS / KILOGRAM (PPM)

Compound name	Laboratory Reporting limit	Laboratory Results
1,2,4-Trichlorobenzene	0.3	ND
1,2-Dichlorobenzene	0.3	ND
1,3-Dichlorobenzene	0.3	ND
1,4-Dichlorobenzene	0.3	ND
2,4,5-Trichlorophenol	0.3	ND
2,4,6-Trichlorophenol	0.3	ND
2,4-Dichlorophenol	0.3	ND
2,4-Dimethylphenol	0.3	ND
2,4-Dinitrophenol	0.3	ND
2,4-Dinitrotoluene	0.3	ND
2,6-Dinitrotoluene	0.3	ND
2-Chloronaphthalene	0.3	ND
2-Chlorophenol	0.3	ND
2-Methylnaphthalene	0.3	ND
2-Methylphenol (2-Cresol)	0.3	ND
2-Nitroaniline	0.3	ND
2-Nitrophenol	0.3	ND
3,3'-Dichlorobenzidine	0.5	ND
3-Nitroaniline	0.3	ND
4,6-Dinitro-2-methylphenol	0.3	ND
4-Bromophenyl-phenylether	0.5	ND
4-Chloro-3-methylphenol	0.3	ND
4-Chloroaniline	0.3	ND
4-Chlorophenyl-phenylether	0.3	ND
4-Methylphenol (4-Cresol) *	0.3	ND
4-Nitroaniline	0.3	ND
4-Nitrophenol	0.3	ND
Acenaphthene	0.3	ND
Acenaphthylene	0.3	ND
Aniline	0.3	ND
Anthracene	0.3	ND
Benzidine	0.5	ND
Benzo[a]anthracene	0.5	ND
Benzo[a]pyrene	0.5	ND

Compound Name	Laboratory Reporting Limit	Laboratory Results
Benzo[b]fluoranthene	0.3	ND
Benzo[g,h,i]perylene	0.5	ND
Benzo[k]fluoranthene	0.5	ND
Benzoic Acid	0.3	ND
Benzyl alcohol	0.3	ND
bis(2-Chloroethoxy)methane	0.3	ND
bis(2-Chloroethyl)ether	0.3	ND
bis(2-chloroisopropyl)ether	0.3	ND
bis(2-Ethylhexyl)phthalate	0.3	ND
Butylbenzylphthalate	0.5	ND
Chrysene	0.3	ND
Di-n-butylphthalate	1.0	ND
Di-n-octylphthalate	0.3	ND
Dibenz[a,h]anthracene	0.5	ND
Dibenzofuran	0.3	ND
Diethylphthalate	0.3	ND
Dimethylphthalate	0.3	ND
Fluoranthene	0.5	ND
Fluorene	0.3	ND
Hexachlorobenzene	0.5	ND
Hexachlorobutadiene	0.3	ND
Hexachlorocyclopentadiene	0.5	ND
Hexachloroethane	0.3	ND
Indeno[1,2,3-cd]pyrene	0.3	ND
Isophorone	0.3	ND
N-Nitroso-di-n-propylamine	0.5	ND
N-Nitrosodimethylamine	0.3	ND
n-Nitrosodiphenylamine	0.5	ND
Naphthalene	0.3	ND
Nitrobenzene	0.3	ND
Pentachlorophenol	0.5	ND
Phenanthrene	0.3	ND
Phenol	0.3	ND
Pyrene	0.5	ND
Pyridine	2.5	ND

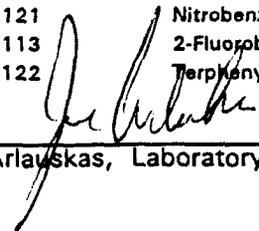
* 3-Methylphenol is included in the quantitation due to co-elution.

REMARKS: ND = not detected in this analysis or less than reporting limit.

Note: This is a 1.6 fold dilution.

ACID SURROGATE	% RECOVERY	ACCEPTANCE LIMIT
2-Fluorophenol	43	25 - 121
Phenol-d6	50	24 - 113
2,4,6-Tribromophenol	59	19 - 122

BASE SURROGATE	% RECOVERY	ACCEPTANCE LIMIT
Nitrobenzene-d5	51	23 - 120
2-Fluorobiphenyl	52	30 - 115
Terphenyl-d14	52	18 - 137


 Joe Arlauskas, Laboratory Director

AL

Navy Public Works Center
 Environmental Chemistry Laboratory Code 910
 Naval Air Station North Island Bldg M-9
 San Diego, CA 92135
 TEL (619) 545 - 8431 FAX (619) 545 - 0793

CA ELAP CERT# 1301

ACTIVITY: PWC CODE 980
 Type of sample: SOIL
 Date sample collected: 12/11/96
 Date sample received: 12/12/96
 Date analysis completed: 12/19/96
 Analyst: ARH,BAH

Lab number : 617919
 Sample ID : IR5 - 02 - 8.2
 Date of report : 12/27/96
 Analysis Method : EPA 8270B
 Extraction method : EPA 3550A
 Extraction date : 12/18/96
 Units: MILLIGRAMS / KILOGRAM (PPM)

Compound name	Laboratory Reporting limit	Laboratory Results
1,2,4-Trichlorobenzene	3.7	ND
1,2-Dichlorobenzene	3.7	ND
1,3-Dichlorobenzene	3.7	ND
1,4-Dichlorobenzene	3.7	ND
2,4,5-Trichlorophenol	3.7	ND
2,4,6-Trichlorophenol	3.7	ND
2,4-Dichlorophenol	3.7	ND
2,4-Dimethylphenol	3.7	ND
2,4-Dinitrophenol	3.7	ND
2,4-Dinitrotoluene	3.7	ND
2,6-Dinitrotoluene	3.7	ND
2-Chloronaphthalene	3.7	ND
2-Chlorophenol	3.7	ND
2-Methylnaphthalene	3.7	14
2-Methylphenol (2-Cresol)	3.7	ND
2-Nitroaniline	3.7	ND
2-Nitrophenol	3.7	ND
3,3'-Dichlorobenzidine	7.4	ND
3-Nitroaniline	3.7	ND
4,6-Dinitro-2-methylphenol	3.7	ND
4-Bromophenyl-phenylether	7.4	ND
4-Chloro-3-methylphenol	3.7	ND
4-Chloroaniline	3.7	ND
4-Chlorophenyl-phenylether	3.7	ND
4-Methylphenol (4-Cresol)*	3.7	ND
4-Nitroaniline	3.7	ND
4-Nitrophenol	3.7	ND
Acenaphthene	3.7	ND
Acenaphthylene	3.7	ND
Aniline	3.7	ND
Anthracene	3.7	ND
Benzidine	7.4	ND
Benzo[a]anthracene	7.4	ND
Benzo[a]pyrene	7.4	ND

Compound Name	Laboratory Reporting Limit	Laboratory Results
Benzo[b]fluoranthene	3.7	ND
Benzo[g,h,i]perylene	7.4	ND
Benzo[k]fluoranthene	7.4	ND
Benzoic Acid	3.7	ND
Benzyl alcohol	3.7	ND
bis(2-Chloroethoxy)methane	3.7	ND
bis(2-Chloroethyl)ether	3.7	ND
bis(2-chloroisopropyl)ether	3.7	ND
bis(2-Ethylhexyl)phthalate	3.7	80
Butylbenzylphthalate	7.4	ND
Chrysene	3.7	ND
Di-n-butylphthalate	14.8	ND
Di-n-octylphthalate	3.7	ND
Dibenz[a,h]anthracene	7.4	ND
Dibenzofuran	3.7	ND
Diethylphthalate	3.7	ND
Dimethylphthalate	3.7	ND
Fluoranthene	7.4	ND
Fluorene	3.7	ND
Hexachlorobenzene	7.4	ND
Hexachlorobutadiene	3.7	ND
Hexachlorocyclopentadiene	7.4	ND
Hexachloroethane	3.7	ND
Indeno[1,2,3-cd]pyrene	3.7	ND
Isophorone	3.7	ND
N-Nitroso-di-n-propylamine	7.4	ND
N-Nitrosodimethylamine	3.7	ND
n-Nitrosodiphenylamine	7.4	ND
Naphthalene	3.7	39
Nitrobenzene	3.7	ND
Pentachlorophenol	7.4	ND
Phenanthrene	3.7	ND
Phenol	3.7	ND
Pyrene	7.4	ND
Pyridine	37.0	ND

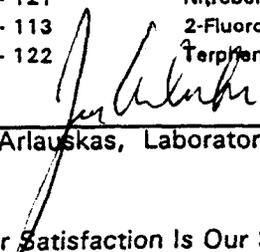
* 3-Methylphenol is included in the quantitation due to co-elution.

REMARKS: ND = not detected in this analysis or less than reporting limit.

Note: This is a 22 fold dilution.

ACID SURROGATE	% RECOVERY	ACCEPTANCE LIMIT
2-Fluorophenol	83	25 - 121
Phenol-d6	98	24 - 113
2,4,6-Tribromophenol	53	19 - 122

BASE SURROGATE	% RECOVERY	ACCEPTANCE LIMIT
Nitrobenzene-d5	44	23 - 120
2-Fluorobiphenyl	80	30 - 115
Terphenyl-d14	76	18 - 137


 Joe Arlauskas, Laboratory Director

AL

SV-2

"Your Satisfaction Is Our Success"

617919.XLS

Navy Public Works Center
Environmental Chemistry Laboratory Code 910
Naval Air Station North Island Bldg M-9
San Diego, CA 92135
TEL (619) 545 - 8431 FAX (619) 545 - 0793

CA ELAP CERT# 1301

ACTIVITY: PWC CODE 980
Type of sample: SOIL
Date sample collected: 12/11/96
Date sample received: 12/12/96
Date analysis completed: 12/19 & 12/20/96
Analyst: ARH,BAH

Lab number : 617920
Sample ID : IR5 - 02 - 9.3
Date of report : 12/27/97
Analysis Method : EPA 8270B
Extraction method : EPA 3550A
Extraction date : 12/18/96
Units: MILLIGRAMS / KILOGRAM (PPM)

Compound name	Laboratory Reporting limit	Laboratory Results
1,2,4-Trichlorobenzene	2.3	ND
1,2-Dichlorobenzene	2.3	ND
1,3-Dichlorobenzene	2.3	ND
1,4-Dichlorobenzene	2.3	ND
2,4,5-Trichlorophenol	2.3	ND
2,4,6-Trichlorophenol	2.3	ND
2,4-Dichlorophenol	2.3	ND
2,4-Dimethylphenol	2.3	ND
2,4-Dinitrophenol	2.3	ND
2,4-Dinitrotoluene	2.3	ND
2,6-Dinitrotoluene	2.3	ND
2-Chloronaphthalene	2.3	ND
2-Chlorophenol	2.3	ND
2-Methylnaphthalene	2.3	12
2-Methylphenol (2-Cresol)	2.3	ND
2-Nitroaniline	2.3	ND
2-Nitrophenol	2.3	ND
3,3'-Dichlorobenzidine	4.6	ND
3-Nitroaniline	2.3	ND
4,6-Dinitro-2-methylphenol	2.3	ND
4-Bromophenyl-phenylether	4.6	ND
4-Chloro-3-methylphenol	2.3	ND
4-Chloroaniline	2.3	ND
4-Chlorophenyl-phenylether	2.3	ND
4-Methylphenol (4-Cresol)*	2.3	ND
4-Nitroaniline	2.3	ND
4-Nitrophenol	2.3	ND
Acenaphthene	2.3	ND
Acenaphthylene	2.3	ND
Aniline	2.3	ND
Anthracene	2.3	ND
Benzidine	4.6	ND
Benzo[a]anthracene	4.6	ND
Benzo[a]pyrene	4.6	ND

Compound Name	Laboratory Reporting Limit	Laboratory Results
Benzo[b]fluoranthene	2.3	ND
Benzo[g,h,i]perylene	4.6	ND
Benzo[k]fluoranthene	4.6	ND
Benzoic Acid	2.3	ND
Benzyl alcohol	2.3	ND
bis(2-Chloroethoxy)methane	2.3	ND
bis(2-Chloroethyl)ether	2.3	ND
bis(2-chloroisopropyl)ether	2.3	ND
bis(2-Ethylhexyl)phthalate	23	174 D
Butylbenzylphthalate	4.6	ND
Chrysene	2.3	ND
Di-n-butylphthalate	9.2	ND
Di-n-octylphthalate	2.3	ND
Dibenz[a,h]anthracene	4.6	ND
Dibenzofuran	2.3	ND
Diethylphthalate	2.3	ND
Dimethylphthalate	2.3	ND
Fluoranthene	4.6	ND
Fluorene	2.3	2
Hexachlorobenzene	4.6	ND
Hexachlorobutadiene	2.3	ND
Hexachlorocyclopentadiene	4.6	ND
Hexachloroethane	2.3	ND
Indeno[1,2,3-cd]pyrene	2.3	ND
Isophorone	2.3	ND
N-Nitroso-di-n-propylamine	4.6	ND
N-Nitrosodimethylamine	2.3	ND
n-Nitrosodiphenylamine	4.6	ND
Naphthalene	2.3	35
Nitrobenzene	2.3	ND
Pentachlorophenol	4.6	ND
Phenanthrene	2.3	ND
Phenol	2.3	ND
Pyrene	4.6	ND
Pyridine	23.0	ND

* 3-Methylphenol is included in the quantitation due to co-elution.

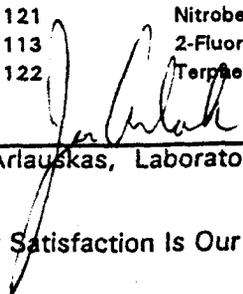
REMARKS: ND = not detected in this analysis or less than reporting limit.

D = value reported from a dilution analysis.

Note: This is a combination of a 14 fold and a 140 fold dilution analysis

ACID SURROGATE	% RECOVERY	ACCEPTANCE LIMIT
2-Fluorophenol	75	25 - 121
Phenol-d6	57	24 - 113
2,4,6-Tribromophenol	45	19 - 122

BASE SURROGATE	% RECOVERY	ACCEPTANCE LIMIT
Nitrobenzene-d5	66	23 - 120
2-Fluorobiphenyl	70	30 - 115
Terphenyl-d14	73	18 - 137


Joe Arlauskas, Laboratory Director

AL

SV-2

"Your Satisfaction Is Our Success"

617920.XLS

Navy Public Works Center
 Environmental Chemistry Laboratory Code 910
 Naval Air Station North Island Bldg M-9
 San Diego, CA 92135
 TEL (619) 545 - 8431 FAX (619) 545 - 0793

CA ELAP CERT# 1301

ACTIVITY: PWC CODE 980
 Type of sample: SOIL
 Date sample collected: 12/11/96
 Date sample received: 12/12/96
 Date analysis completed: 12/19/96
 Analyst: ARH,BAH

Lab number : 617921
 Sample ID : IR5 - 02 - 30.8
 Date of report : 12/27/96
 Analysis Method : EPA 8270B
 Extraction method : EPA 3550A
 Extraction date : 12/18/96
 Units: MILLIGRAMS / KILOGRAM (PPM)

Compound name	Laboratory Reporting limit	Laboratory Results
1,2,4-Trichlorobenzene	0.2	ND
1,2-Dichlorobenzene	0.2	ND
1,3-Dichlorobenzene	0.2	ND
1,4-Dichlorobenzene	0.2	ND
2,4,5-Trichlorophenol	0.2	ND
2,4,6-Trichlorophenol	0.2	ND
2,4-Dichlorophenol	0.2	ND
2,4-Dimethylphenol	0.2	ND
2,4-Dinitrophenol	0.2	ND
2,4-Dinitrotoluene	0.2	ND
2,6-Dinitrotoluene	0.2	ND
2-Chloronaphthalene	0.2	ND
2-Chlorophenol	0.2	ND
2-Methylnaphthalene	0.2	ND
2-Methylphenol (2-Cresol)	0.2	ND
2-Nitroaniline	0.2	ND
2-Nitrophenol	0.2	ND
3,3'-Dichlorobenzidine	0.4	ND
3-Nitroaniline	0.2	ND
4,6-Dinitro-2-methylphenol	0.2	ND
4-Bromophenyl-phenylether	0.4	ND
4-Chloro-3-methylphenol	0.2	ND
4-Chloroaniline	0.2	ND
4-Chlorophenyl-phenylether	0.2	ND
4-Methylphenol (4-Cresol) *	0.2	ND
4-Nitroaniline	0.2	ND
4-Nitrophenol	0.2	ND
Acenaphthene	0.2	ND
Acenaphthylene	0.2	ND
Aniline	0.2	ND
Anthracene	0.2	ND
Benzidine	0.4	ND
Benzo[a]anthracene	0.4	ND
Benzo[a]pyrene	0.4	ND

Compound Name	Laboratory Reporting Limit	Laboratory Results
Benzo[b]fluoranthene	0.2	ND
Benzo[g,h,i]perylene	0.4	ND
Benzo[k]fluoranthene	0.4	ND
Benzoic Acid	0.2	ND
Benzyl alcohol	0.2	ND
bis(2-Chloroethoxy)methane	0.2	ND
bis(2-Chloroethyl)ether	0.2	ND
bis(2-chloroisopropyl)ether	0.2	ND
bis(2-Ethylhexyl)phthalate	0.2	ND
Butylbenzylphthalate	0.4	ND
Chrysene	0.2	ND
Di-n-butylphthalate	0.8	ND
Di-n-octylphthalate	0.2	ND
Dibenz[a,h]anthracene	0.4	ND
Dibenzofuran	0.2	ND
Diethylphthalate	0.2	ND
Dimethylphthalate	0.2	ND
Fluoranthene	0.4	ND
Fluorene	0.2	ND
Hexachlorobenzene	0.4	ND
Hexachlorobutadiene	0.2	ND
Hexachlorocyclopentadiene	0.4	ND
Hexachloroethane	0.2	ND
Indeno[1,2,3-cd]pyrene	0.2	ND
Isophorone	0.2	ND
N-Nitroso-di-n-propylamine	0.4	ND
N-Nitrosodimethylamine	0.2	ND
n-Nitrosodiphenylamine	0.4	ND
Naphthalene	0.2	ND
Nitrobenzene	0.2	ND
Pentachlorophenol	0.4	ND
Phenanthrene	0.2	ND
Phenol	0.2	ND
Pyrene	0.4	ND
Pyridine	2.0	ND

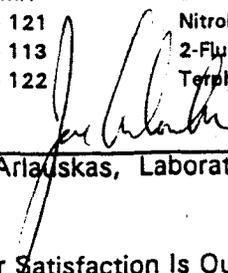
* 3-Methylphenol is included in the quantitation due to co-elution.

REMARKS: ND = not detected in this analysis or less than reporting limit.

Note: This is a 1.4 fold dilution.

ACID SURROGATE	% RECOVERY	ACCEPTANCE LIMIT
2-Fluorophenol	43	25 - 121
Phenol-d6	50	24 - 113
2,4,6-Tribromophenol	56	19 - 122

BASE SURROGATE	% RECOVERY	ACCEPTANCE LIMIT
Nitrobenzene-d5	53	23 - 120
2-Fluorobiphenyl	54	30 - 115
Terphenyl-d14	53	18 - 137


 Joe Arlauskas, Laboratory Director

AL

SV-2

"Your Satisfaction Is Our Success"

617921.XLS

Navy Public Works Center
Environmental Chemistry Laboratory Code 910
Naval Air Station North Island Bldg M-9
San Diego, CA 92135
TEL (619) 545 - 8431 FAX (619) 545 - 0793

CA ELAP CERT# 1301

SEMIVOLATILE METHOD BLANK

ACTIVITY:

Type of sample: SOIL
Date sample collected:
Date sample received:
Date analysis completed: 12/18/96
Analyst: ARH,BAH

Lab number : MB FOR 617918-617921
Sample ID : METHOD BLANK 1218S
Date of report : 12/27/96
Analysis Method : EPA 8270B
Extraction method : EPA 3550A
Extraction date : 12/18/96
Units: MILLIGRAMS / KILOGRAM (PPM)

Compound name	Laboratory Reporting limit	Laboratory Results
1,2,4-Trichlorobenzene	0.2	ND
1,2-Dichlorobenzene	0.2	ND
1,3-Dichlorobenzene	0.2	ND
1,4-Dichlorobenzene	0.2	ND
2,4,5-Trichlorophenol	0.2	ND
2,4,6-Trichlorophenol	0.2	ND
2,4-Dichlorophenol	0.2	ND
2,4-Dimethylphenol	0.2	ND
2,4-Dinitrophenol	0.2	ND
2,4-Dinitrotoluene	0.2	ND
2,6-Dinitrotoluene	0.2	ND
2-Chloronaphthalene	0.2	ND
2-Chlorophenol	0.2	ND
2-Methylnaphthalene	0.2	ND
2-Methylphenol (2-Cresol)	0.2	ND
2-Nitroaniline	0.2	ND
2-Nitrophenol	0.2	ND
3,3'-Dichlorobenzidine	0.3	ND
3-Nitroaniline	0.2	ND
4,6-Dinitro-2-methylphenol	0.2	ND
4-Bromophenyl-phenylether	0.3	ND
4-Chloro-3-methylphenol	0.2	ND
4-Chloroaniline	0.2	ND
4-Chlorophenyl-phenylether	0.2	ND
4-Methylphenol (4-Cresol)*	0.2	ND
4-Nitroaniline	0.2	ND
4-Nitrophenol	0.2	ND
Acenaphthene	0.2	ND
Acenaphthylene	0.2	ND
Aniline	0.2	ND
Anthracene	0.2	ND
Benzidine	0.3	ND
Benzo[a]anthracene	0.3	ND
Benzo[a]pyrene	0.3	ND

Compound Name	Laboratory Reporting Limit	Laboratory Results
Benzo[b]fluoranthene	0.2	ND
Benzo[g,h,i]perylene	0.3	ND
Benzo[k]fluoranthene	0.3	ND
Benzoic Acid	0.2	ND
Benzyl alcohol	0.2	ND
bis(2-Chloroethoxy)methane	0.2	ND
bis(2-Chloroethyl)ether	0.2	ND
bis(2-chloroisopropyl)ether	0.2	ND
bis(2-Ethylhexyl)phthalate	0.2	ND
Butylbenzylphthalate	0.3	ND
Chrysene	0.2	ND
Di-n-butylphthalate	0.6	ND
Di-n-octylphthalate	0.2	ND
Dibenz[a,h]anthracene	0.3	ND
Dibenzofuran	0.2	ND
Diethylphthalate	0.2	ND
Dimethylphthalate	0.2	ND
Fluoranthene	0.3	ND
Fluorene	0.2	ND
Hexachlorobenzene	0.3	ND
Hexachlorobutadiene	0.2	ND
Hexachlorocyclopentadiene	0.3	ND
Hexachloroethane	0.2	ND
Indeno[1,2,3-cd]pyrene	0.2	ND
Isophorone	0.2	ND
N-Nitroso-di-n-propylamine	0.3	ND
N-Nitrosodimethylamine	0.2	ND
n-Nitrosodiphenylamine	0.3	ND
Naphthalene	0.2	ND
Nitrobenzene	0.2	ND
Pentachlorophenol	0.3	ND
Phenanthrene	0.2	ND
Phenol	0.2	ND
Pyrene	0.3	ND
Pyridine	1.5	ND

* 3-Methylphenol is included in the quantitation due to co-elution.

REMARKS: ND = not detected in this analysis or less than reporting limit.

ACID SURROGATE	% RECOVERY	ACCEPTANCE LIMIT
2-Fluorophenol	50	25 - 121
Phenol-d6	60	24 - 113
2,4,6-Tribromophenol	65	19 - 122

BASE SURROGATE	% RECOVERY	ACCEPTANCE LIMIT
Nitrobenzene-d5	65	23 - 120
2-Fluorobiphenyl	67	30 - 115
Terphenyl-d14	60	18 - 137

Joe Arlauskas (CSG)
for Joe Arlauskas, Laboratory Director

Navy Public Works Center
Environmental Chemistry Laboratory Code 910
Naval Air Station North Island Bldg M-9
San Diego, CA 92135
TEL (619) 545 - 8431
FAX (619) 545 - 0793

CA ELAP CERT#1301

Activity: PWC CODE 980 Lab Number : 617944
Type of Sample: WASTEWATER Sample ID : IR 3 - 06 - W - 11.5
Date Sample Collected: 12/04/96 Date of Report : 12/24/96
Date Sample Received: 12/12/96 Analysis Method : EPA 8020A
Date Analysis Completed: 12/12/96 Extraction Method : EPA 6030A
Analyst : PAS

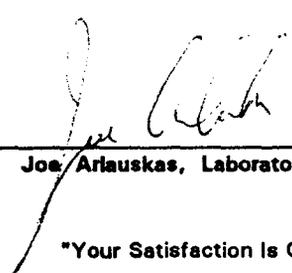
COMPOUND	LABORATORY REPORTING LIMIT	SAMPLE RESULTS	UNITS
BENZENE	0.5	ND	Micrograms/Liter(ppb)
TOLUENE	0.5	2.6	Micrograms/Liter(ppb)
ETHYLBENZENE	0.5	14	Micrograms/Liter(ppb)
XYLENES (TOTAL)	1.5	15	Micrograms/Liter(ppb)

SURROGATE RECOVERY		
COMPOUND	PERCENT RECOVERY	ACCEPTANCE LIMITS
DIBROMOCHLOROMETHANE (DBCM)	*	39-153

Method Blank (MB) = ND

REMARKS:

ND = NOT DETECTED IN THIS ANALYSIS OR LESS THAN REPORTING LIMIT.
* = UNABLE TO CALCULATE DUE TO MATRIX INTERFERENCE.



Joe Arlauskas, Laboratory Director

"Your Satisfaction Is Our Success"

CB

BTEX.W/100296
ORGANICS

Navy Public Works Center
 Environmental Chemistry Laboratory Code 910
 Naval Air Station North Island Bldg M-9
 San Diego, CA 92135
 TEL (619) 545 - 8431
 FAX (619) 545 - 0793

CA ELAP CERT#1301

Activity:	PWC CODE 980	Lab Number :	617945
Type of Sample:	WASTEWATER	Sample ID :	B1 G2 - 01 - 10.5
Date Sample Collected:	12/06/96	Date of Report :	12/24/96
Date Sample Received:	12/12/96	Analysis Method :	EPA 8020A
Date Analysis Completed:	12/12/96	Extraction Method :	EPA 5030A
Analyst :	PAS		

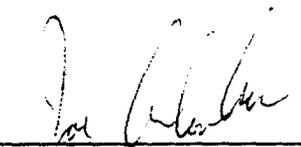
COMPOUND	LABORATORY REPORTING LIMIT	SAMPLE RESULTS	UNITS
BENZENE	0.5	2.9	Micrograms/Liter(ppb)
TOLUENE	0.5	0.8	Micrograms/Liter(ppb)
ETHYLBENZENE	0.5	ND	Micrograms/Liter(ppb)
XYLENES (TOTAL)	1.5	ND	Micrograms/Liter(ppb)

SURROGATE RECOVERY		
COMPOUND	PERCENT RECOVERY	ACCEPTANCE LIMITS
DIBROMOCHLOROMETHANE (DBCM)	98	39-153

Method Blank (MB) = ND

REMARKS:

ND = NOT DETECTED IN THIS ANALYSIS OR LESS THAN REPORTING LIMIT.



 Joe Arlauskas, Laboratory Director

"Your Satisfaction Is Our Success"

CB

BTEX.W/100296
 ORGANICS

NAVY PUBLIC WORKS CENTER
 ENVIRONMENTAL CHEMISTRY LABORATORY
 NAVAL AIR STATION NORTH ISLAND BLDG M-9
 SAN DIEGO, CA 92135
 TEL (619) 545-8431
 FAX (619) 545-0793

CA ELAP CERT#1301

Type of Sample:	SOIL	Parameter:	TPH
Date Analysis Completed:	12/20/96	Analysis Method:	EPA 8015-M
Date Extracted:	12/13/96	Extraction Method:	EPA 8015-M
Analyst:	AMH, AB	Date of Report:	12/27/96
Batch #:	S - 6054	Laboratory Reporting Limit:	10
		Units:	PARTS PER MILLION (PPM)

QA/QC DATA FOR TOTAL PETROLEUM HYDROCARBONS

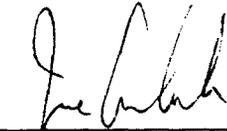
Associated QA/QC for Lab Number (s): 617931, 617934, 617937 - 617940

LAB NUMBER	QC ID	Actual Spike Amount (ppm)	Measured Spike Amount (ppm)	% Spike Recovery	% Spike Recovery Acceptance Limits	RPD	RPD ACCEPTANCE LIMITS
MS	617818	200	411	205 *	75-125	---	0-20
MSD	617818	200	423	211 *	75-125	3	0-20
MBS	---	200	243	121	---	---	---

Method Blank (MB) = ND

REMARKS:

- ND = NOT DETECTED IN THIS ANALYSIS OR LESS THAN REPORTING LIMIT.
- RPD = RELATIVE PERCENT DIFFERENCE
- MS = MATRIX SPIKE
- MSD = MATRIX SPIKE DUPLICATE
- MBS = METHOD BLANK SPIKE
- * = HIGH RECOVERY DUE TO MATRIX INTERFERENCE.



 Joe Arlauskas, Laboratory Director

AL

"Your Satisfaction Is Our Success"

QATPH/101196
 ORGANICS

NAVY PUBLIC WORKS CENTER
ENVIRONMENTAL CHEMISTRY LABORATORY
NAVAL AIR STATION NORTH ISLAND BLDG M-9
SAN DIEGO, CA 92135
TEL (619) 545-8431
FAX (619) 545-0793

CA ELAP CERT#1301

Type of Sample: SOIL
 Date Analysis Completed: 12/20/86
 Date Extracted: 12/13/86
 Analyst: AMH, AB
 Batch #: S - 8064

Parameter: TOTAL PETROLEUM HYDROCARBONS
 Analysis Method: EPA 8015-M
 Extraction Method: EPA 8015-M
 Date of Report: 12/24/86
 Laboratory Reporting Limit: 10
 Units: PARTS PER MILLION (PPM)

QA/QA DATA FOR TOTAL PETROLEUM HYDROCARBONS

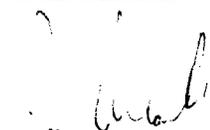
Associated QA/QC for Lab Number (s): 617927 - 617930

LAB NUMBER	QC ID	Actual Spike Amount (ppm)	Measured Spike Amount (ppm)	% Spike Recovery	% Spike Recovery Acceptance Limits	RPD	RPD ACCEPTANCE LIMITS
MS	617818	200	411	206 *	75-125	----	0-20
MSD	617818	200	423	211 *	75-125	3	0-20
MBS	----	200	243	121	----	----	----

Method Blank (MB) = ND

REMARKS:

- ND = NOT DETECTED IN THIS ANALYSIS OR LESS THAN REPORTING LIMIT.
- RPD = RELATIVE PERCENT DIFFERENCE
- MS = MATRIX SPIKE
- MSD = MATRIX SPIKE DUPLICATE
- MBS = METHOD BLANK SPIKE
- * = HIGH RECOVERY DUE TO MATRIX INTERFERENCE.



 Joe Artuska, Laboratory Director

CB

"Your Satisfaction is Our Success"

Navy Public Works Center
 Environmental Chemistry Laboratory Code 910
 Naval Air Station North Island Bldg M-9
 San Diego, CA 92135
 TEL (619) 545 - 8431
 FAX (619) 545 - 0793

CA ELAP CERT#1301

Activity: PWC CODE 980 Lab Number : 617944
 Type of Sample: WASTEWATER Sample ID : IR 3 - 06 - W - 11.5
 Date Sample Collected: 12/04/96 Date of Report : 12/24/96
 Date Sample Received: 12/12/96 Analysis Method : EPA 8020A
 Date Analysis Completed: 12/12/96 Extraction Method : EPA 5030A
 Analyst : PAS

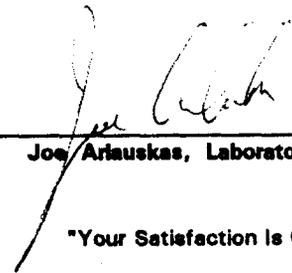
COMPOUND	LABORATORY REPORTING LIMIT	SAMPLE RESULTS	UNITS
BENZENE	0.5	ND	Micrograms/Liter(ppb)
TOLUENE	0.5	2.6	Micrograms/Liter(ppb)
ETHYLBENZENE	0.5	14	Micrograms/Liter(ppb)
XYLENES (TOTAL)	1.5	16	Micrograms/Liter(ppb)

SURROGATE RECOVERY		
COMPOUND	PERCENT RECOVERY	ACCEPTANCE LIMITS
DIBROMOCHLOROMETHANE (DBCM)	*	39-153

Method Blank (MB) = ND

REMARKS:

ND = NOT DETECTED IN THIS ANALYSIS OR LESS THAN REPORTING LIMIT.
 * = UNABLE TO CALCULATE DUE TO MATRIX INTERFERENCE.



 Joe Arlauskas, Laboratory Director
 "Your Satisfaction Is Our Success"

CB

BTEX.W/100296
 ORGANICS

Navy Public Works Center
Environmental Chemistry Laboratory Code 910
Naval Air Station North Island Bldg M-9
San Diego, CA 92135
TEL (619) 545 - 8431
FAX (619) 545 - 0793

CA ELAP CERT#1301

Activity: PWC CODE 980 Lab Number : 617945
Type of Sample: WASTEWATER Sample ID : B1 G2 - 01 - 10.5
Date Sample Collected: 12/05/96 Date of Report : 12/24/96
Date Sample Received: 12/12/96 Analysis Method : EPA 8020A
Date Analysis Completed: 12/12/96 Extraction Method : EPA 5030A
Analyst : PAS

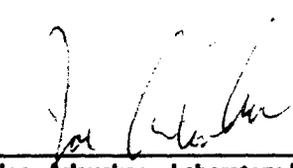
COMPOUND	LABORATORY REPORTING LIMIT	SAMPLE RESULTS	UNITS
BENZENE	0.5	2.9	Micrograms/Liter(ppb)
TOLUENE	0.5	0.8	Micrograms/Liter(ppb)
ETHYLBENZENE	0.5	ND	Micrograms/Liter(ppb)
XYLENES (TOTAL)	1.5	ND	Micrograms/Liter(ppb)

SURROGATE RECOVERY		
COMPOUND	PERCENT RECOVERY	ACCEPTANCE LIMITS
DIBROMOCHLOROMETHANE (DBCM)	98	39-153

Method Blank (MB) = ND

REMARKS:

ND = NOT DETECTED IN THIS ANALYSIS OR LESS THAN REPORTING LIMIT.



Joe Arlauskas, Laboratory Director

"Your Satisfaction Is Our Success"

CB

BTEX.W/100296
ORGANICS

Navy Public Works Center
 Environmental Chemistry Laboratory Code 910
 Naval Air Station North Island Bldg M-9
 San Diego, CA 92135
 TEL (619) 545 - 8431
 FAX (619) 545 - 0793

CA ELAP CERT#1301

Activity: Lab Number : MB FOR 617922 - 617946
 Type of Sample: WATER Sample ID : METHOD BLANK 12/12
 Date Sample Collected: Date of Report : 12/24/96
 Date Sample Received: Analysis Method : EPA 8020A
 Date Analysis Completed: 12/12/96 Extraction Method : EPA 5030A
 Analyst : PAS

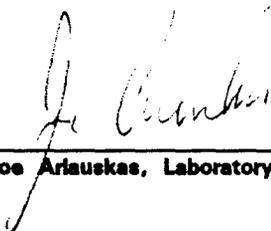
COMPOUND	LABORATORY REPORTING LIMIT	SAMPLE RESULTS	UNITS
TPH GAS	0.5	ND	Milligrams/Liter (ppm)
BENZENE	0.5	ND	Micrograms/Liter(ppb)
TOLUENE	0.5	ND	Micrograms/Liter(ppb)
ETHYLBENZENE	0.5	ND	Micrograms/Liter(ppb)
XYLENES (TOTAL)	1.5	ND	Micrograms/Liter(ppb)

SURROGATE RECOVERY		
COMPOUND	PERCENT RECOVERY	ACCEPTANCE LIMITS
DIBROMOCHLOROMETHANE (DBCM)	100	39-153

Method Blank (MB) = ND

REMARKS:

ND = NOT DETECTED IN THIS ANALYSIS OR LESS THAN REPORTING LIMIT.



 Joe Arlauskas, Laboratory Director

"Your Satisfaction Is Our Success"

CB

BTEX.W/100296
 ORGANICS

Navy Public Works Center
Environmental Chemistry Laboratory Code 910
Naval Air Station North Island Bldg M-9
San Diego, CA 92135
TEL (619) 545 - 8431
FAX (619) 545 - 0793

CA ELAP CERT#1301

Activity: PWC CODE 980 Parameter: TPH
Type of Sample: SOIL Analysis Method: EPA 8015-M
Date Sample Collected: 12/10/96 Extraction Method: EPA 8015-M
Date Sample Received: 12/12/96 Date of Report: 12/24/96
Date Analysis Completed: 12/21/96 Laboratory Reporting Limits: 10
Date Extracted: 12/12/96 Units: Milligrams/Kilogram (ppm)
Analyst: AMH, AB

TOTAL PETROLEUM HYDROCARBONS (TPH) - DIESEL#2

LAB NUMBER	SAMPLE ID	SAMPLE RESULTS DIESEL#2	DRO *
817927	FF37 - 15 - 6	ND	140 * E
817930	TOW - 03 - 7	ND	790 * E

Method Blank (MB) = ND

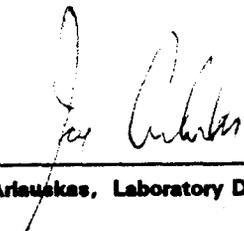
REMARKS:

ND = NOT DETECTED IN THIS ANALYSIS OR LESS THAN REPORTING LIMIT.

* = DIESEL RANGE ORGANICS C8 TO C14 ANOMALOUS PEAK PATTERN
(NON-JET FUEL AND NON-DIESEL #2)

E = ESTIMATED

TPHD.S/101198
- ORGANICS



Joe Arlauskas, Laboratory Director

"Your Satisfaction is Our Success"

Navy Public Works Center
 Environmental Chemistry Laboratory Code 910
 Naval Air Station North Island Bldg M-9
 San Diego, CA 92135
 TEL (619) 545 - 8431
 FAX (619) 545 - 0793

CA ELAP CERT#1301

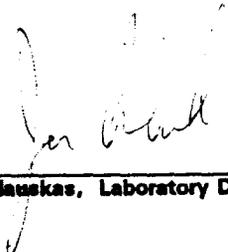
Activity: PWC CODE 980 Lab Number: 617926
 Type of Sample: WASTEWATER Sample ID: IR 3 - 11 - W - 11.5
 Date Sample Collected: 12/08/96 Date of Report: 12/24/96
 Date Sample Received: 12/12/96 Analysis Method: EPA 8020A
 Date Analysis Completed: 12/12/96 Extraction Method: EPA 5030A
 Analyst: PAS

COMPOUND	LABORATORY REPORTING LIMIT	SAMPLE RESULTS	UNITS
TPH GAS	0.5	ND **	Milligrams/Liter (ppm)
BENZENE	0.5	ND	Micrograms/Liter(ppb)
TOLUENE	0.5	4.4	Micrograms/Liter(ppb)
ETHYLBENZENE	0.5	7.7	Micrograms/Liter(ppb)
XYLENES (TOTAL)	1.5	1.9	Micrograms/Liter(ppb)

SURROGATE RECOVERY		
COMPOUND	PERCENT RECOVERY	ACCEPTANCE LIMITS
DIBROMOCHLOROMETHANE (DBCM)	*	38-153

Method Blank (MB) = ND

REMARKS: TPH = TOTAL PETROLEUM HYDROCARBONS
 ND = NOT DETECTED IN THIS ANALYSIS OR LESS THAN REPORTING LIMIT.
 * = UNABLE TO CALCULATE DUE TO MATRIX INTERFERENCE
 ** = GASOLINE RANGE ORGANICS PRESENT AT 5.3 PPM



Joe Arlauskas, Laboratory Director

"Your Satisfaction is Our Success"

CB

GB.W/100296
 ORGANICS

Navy Public Works Center
 Environmental Chemistry Laboratory Code 910
 Naval Air Station North Island Bldg M-9
 San Diego, CA 92135
 TEL (619) 545 - 8431
 FAX (619) 545 - 0793

CA ELAP CERT#1301

Activity: PWC CODE 980 Lab Number : 617927
 Type of Sample: SOIL Sample ID : FF37-15-6
 Date Sample Collected: 12/10/96 Date of Report : 12/27/96
 Date Sample Received: 12/12/96 Analysis Method : EPA 8015M-GAS
 Date Analysis Completed: 12/23/96 Extraction Method : EPA 5030A
 Analyst : VZ

COMPOUND	LABORATORY REPORTING LIMIT	SAMPLE RESULTS	UNITS
TPH GAS	10	ND*	Milligrams/Kilogram(ppm)

SURROGATE RECOVERY		
COMPOUND	PERCENT RECOVERY	ACCEPTANCE LIMITS
DIBROMOCHLOROMETHANE (DBCM)	**	30-180

Method Blank (MB) = ND

REMARKS: TPH = TOTAL PETROLEUM HYDROCARBONS
 ND = NOT DETECTED IN THIS ANALYSIS OR LESS THAN REPORTING LIMIT.
 * = GASOLINE RANGE ORGANICS PRESENT (C₆ TO C₁₂) AT 850 MG/KG (PPM).
 ** = SURROGATE OUTSIDE THE ACCEPTANCE LIMITS DUE TO MATRIX INTERFERENCE.

Mary Havlicek

 Joe Arkuskas, Laboratory Director
 Mary Havlicek, Technical Operations Manager

"Your Satisfaction Is Our Success"

MV

GAS.S/100296
 ORGANICS

Navy Public Works Center
 Environmental Chemistry Laboratory Code 910
 Naval Air Station North Island Bldg M-9
 San Diego, CA 92135
 TEL (619) 545 - 8431
 FAX (619) 545 - 0793

CA ELAP CERT#1301

Activity: PWC CODE 980 Lab Number : 617928
 Type of Sample: SOIL Sample ID : B162-02-6
 Date Sample Collected: 12/10/96 Date of Report : 12/27/96
 Date Sample Received: 12/12/96 Analysis Method : EPA 8015M-GAS
 Date Analysis Completed: 12/23/96 Extraction Method : EPA 5030A
 Analyst : VZ

COMPOUND	LABORATORY REPORTING LIMIT	SAMPLE RESULTS	UNITS
TPH GAS	10	ND*	Milligrams/Kilogram(ppm)

SURROGATE RECOVERY		
COMPOUND	PERCENT RECOVERY	ACCEPTANCE LIMITS
DIBROMOCHLOROMETHANE (DBCM)	**	30-180

Method Blank (MB) = ND

REMARKS: TPH = TOTAL PETROLEUM HYDROCARBONS
 ND = NOT DETECTED IN THIS ANALYSIS OR LESS THAN REPORTING LIMIT.
 * = GASOLINE RANGE ORGANICS PRESENT (C₆ TO C₁₂) AT 300 MG/KG (PPM).
 ** = SURROGATE OUTSIDE THE ACCEPTANCE LIMITS DUE TO MATRIX INTERFERENCE.

Marilyn T. Vargay fox

 Joe Arlauskas, Laboratory Director
 Mary Havlicek, Technical Operations Manager

"Your Satisfaction Is Our Success"

MV

GAS.S/100296
 ORGANICS

Navy Public Works Center
 Environmental Chemistry Laboratory Code 910
 Naval Air Station North Island Bldg M-9
 San Diego, CA 92135
 TEL (619) 545 - 8431
 FAX (619) 545 - 0793

CA ELAP CERT#1301

Activity: PWC CODE 980 Lab Number : 617929
 Type of Sample: SOIL Sample ID : B162-03-6
 Date Sample Collected: 12/10/96 Date of Report : 12/27/96
 Date Sample Received: 12/12/96 Analysis Method : EPA 8015M-GAS
 Date Analysis Completed: 12/23/96 Extraction Method : EPA 5030A
 Analyst : VZ

COMPOUND	LABORATORY REPORTING LIMIT	SAMPLE RESULTS	UNITS
TPH GAS	10	ND*	Milligrams/Kilogram(ppm)

SURROGATE RECOVERY		
COMPOUND	PERCENT RECOVERY	ACCEPTANCE LIMITS
DIBROMOCHLOROMETHANE (DBCM)	164	30-180

Method Blank (MB) = ND

REMARKS:

TPH = TOTAL PETROLEUM HYDROCARBONS
 ND = NOT DETECTED IN THIS ANALYSIS OR LESS THAN REPORTING LIMIT.
 * = GASOLINE RANGE ORGANICS PRESENT (C₆ TO C₁₂) AT 510 MG/KG (PPM).

Marlyn T. Vazquez
 Joe Arpauskas, Laboratory Director *for*

"Your Satisfaction Is Our Success"

MV

GAS.S/100296
 ORGANICS

Navy Public Works Center
 Environmental Chemistry Laboratory Code 910
 Naval Air Station North Island Bldg M-9
 San Diego, CA 92135
 TEL (619) 545 - 8431
 FAX (619) 545 - 0793

CA ELAP CERT#1301

Activity:	PWC CODE 980	Lab Number :	617930
Type of Sample:	SOIL	Sample ID :	TOW-03-7
Date Sample Collected:	12/10/96	Date of Report :	12/27/96
Date Sample Received:	12/12/96	Analysis Method :	EPA 8015M-GAS
Date Analysis Completed:	12/23/96	Extraction Method :	EPA 5030A
Analyst :	VZ		

COMPOUND	LABORATORY REPORTING LIMIT	SAMPLE RESULTS	UNITS
TPH GAS	10	ND*	Milligrams/Kilogram(ppm)

SURROGATE RECOVERY		
COMPOUND	PERCENT RECOVERY	ACCEPTANCE LIMITS
DIBROMOCHLOROMETHANE (DBCM)	138	30-180

Method Blank (MB) = ND

REMARKS: TPH = TOTAL PETROLEUM HYDROCARBONS
 ND = NOT DETECTED IN THIS ANALYSIS OR LESS THAN REPORTING LIMIT.
 * = GASOLINE RANGE ORGANICS PRESENT (C₅ TO C₁₂) AT 1700 MG/KG (PPM).

Marilyn T. Vazgen

 Joe Arluskas, Laboratory Director

"Your Satisfaction Is Our Success"

MV

GAS.S/100296
 ORGANICS

Navy Public Works Center
 Environmental Chemistry Laboratory Code 910
 Naval Air Station North Island Bldg M-9
 San Diego, CA 92135
 TEL (619) 545 - 8431
 FAX (619) 545 - 0793

CA ELAP CERT#1301

Activity: PWC CODE 980 Lab Number : 617922
 Type of Sample: WASTEWATER Sample ID : IR 3 - 06 - W - 6.5
 Date Sample Collected: 12/04/96 Date of Report : 12/26/96
 Date Sample Received: 12/12/96 Analysis Method : EPA 8020A
 Date Analysis Completed: 12/12/96 Extraction Method : EPA 5030A
 Analyst : PAS

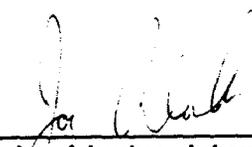
COMPOUND	LABORATORY REPORTING LIMIT	SAMPLE RESULTS**	UNIT#
BENZENE	0.5	36 C	Micrograms/Liter(ppb)
TOLUENE	0.5	5.9	Micrograms/Liter(ppb)
ETHYLBENZENE	0.5	47 C	Micrograms/Liter(ppb)
XYLENES (TOTAL)	1.5	42 E	Micrograms/Liter(ppb)

SURROGATE RECOVERY		
COMPOUND	PERCENT RECOVERY	ACCEPTANCE LIMITS
DIBROMOCHLOROMETHANE (DBCM)	*	39-153

Method Blank (MB) = ND

REMARKS:

- ND = NOT DETECTED IN THIS ANALYSIS OR LESS THAN REPORTING LIMIT.
- * = UNABLE TO CALCULATE DUE TO MATRIX INTERFERENCE.
- C = COMPOUND CONFIRMED BY GC/MS.
- E = COMPOUND NOT CONFIRMED BY GC/MS .
- ** = VALUES REPORTED FROM EPA 8020 ANALYSIS.



 Joe Arlauskas, Laboratory Director

"Your Satisfaction Is Our Success"

AL

BTEX.W/100296
 ORGANICS

Navy Public Works Center
 Environmental Chemistry Laboratory Code 910
 Naval Air Station North Island Bldg M-9
 San Diego, CA 92135
 TEL (619) 545 - 8431
 FAX (619) 545 - 0793

CA ELAP CERT#1301

Activity:	PWC CODE 980	Lab Number :	617923
Type of Sample:	WASTEWATER	Sample ID :	B1 62 - 01 - W - 6.5
Date Sample Collected:	12/05/96	Date of Report :	12/26/96
Date Sample Received:	12/12/96	Analysis Method :	EPA 8020A
Date Analysis Completed:	12/12/96	Extraction Method :	EPA 5030A
Analyst :	PAS		

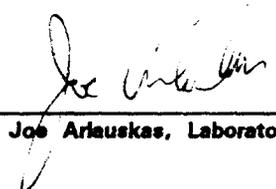
COMPOUND	LABORATORY REPORTING LIMIT	SAMPLE RESULTS**	UNITS
BENZENE	0.5	ND	Micrograms/Liter(ppb)
TOLUENE	0.5	13 E	Micrograms/Liter(ppb)
ETHYLBENZENE	0.5	ND	Micrograms/Liter(ppb)
XYLENES (TOTAL)	1.5	34 E	Micrograms/Liter(ppb)

SURROGATE RECOVERY		
COMPOUND	PERCENT RECOVERY	ACCEPTANCE LIMITS
DIBROMOCHLOROMETHANE (DBCM)	*	39-153

Method Blank (MB) = ND

REMARKS:

- ND = NOT DETECTED IN THIS ANALYSIS OR LESS THAN REPORTING LIMIT.
- * = UNABLE TO CALCULATE DUE TO MATRIX INTERFERENCE.
- E = COMPOUND NOT CONFIRMED BY GC/MS.
- ** = VALUES REPORTED FROM EPA 8020 ANALYSIS.



Joe Arlauskas, Laboratory Director

"Your Satisfaction Is Our Success"

AL

BTEX.W/100296
 ORGANICS

Navy Public Works Center
 Environmental Chemistry Laboratory Code 910
 Naval Air Station North Island Bldg M-9
 San Diego, CA 92135
 TEL (619) 545 - 8431
 FAX (619) 545 - 0793

CA ELAP CERT#1301

Activity:	PWC CODE 980	Lab Number :	617924
Type of Sample:	WASTEWATER	Sample ID :	IR 13 - 06 - W - 6.5
Date Sample Collected:	12/05/96	Date of Report :	12/24/96
Date Sample Received:	12/12/96	Analysis Method :	EPA 8020A
Date Analysis Completed:	12/12/96	Extraction Method :	EPA 5030A
Analyst :	PAS		

COMPOUND	LABORATORY REPORTING LIMIT	SAMPLE RESULTS	UNITS
BENZENE	0.5	ND	Micrograms/Liter(ppb)
TOLUENE	0.5	ND	Micrograms/Liter(ppb)
ETHYLBENZENE	0.5	ND	Micrograms/Liter(ppb)
XYLENES (TOTAL)	1.5	ND	Micrograms/Liter(ppb)

SURROGATE RECOVERY		
COMPOUND	PERCENT RECOVERY	ACCEPTANCE LIMITS
DIBROMOCHLOROMETHANE (DBCM)	116	39-153

Method Blank (MB) = ND

REMARKS:

ND = NOT DETECTED IN THIS ANALYSIS OR LESS THAN REPORTING LIMIT.



Joe Arlauskas, Laboratory Director

"Your Satisfaction is Our Success"

CB

BTEX.W/100296
 ORGANICS

Navy Public Works Center
 Environmental Chemistry Laboratory Code 910
 Naval Air Station North Island Bldg M-9
 San Diego, CA 92135
 TEL (619) 545 - 8431
 FAX (619) 545 - 0793

CA ELAP CERT#1301

Activity: PWC CODE 980 Lab Number : 617925
 Type of Sample: WASTEWATER Sample ID : IR 3 - 12 - W - 12.5
 Date Sample Collected: 12/06/96 Date of Report : 12/26/96
 Date Sample Received: 12/12/96 Analysis Method : EPA 8020A
 Date Analysis Completed: 12/12/96 Extraction Method : EPA 5030A
 Analyst : PAS

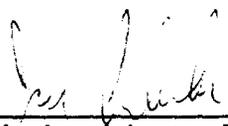
COMPOUND	LABORATORY REPORTING LIMIT	SAMPLE RESULTS**	UNITS
BENZENE	10	1,300 C D	Micrograms/Liter(ppb)
TOLUENE	10	36 D	Micrograms/Liter(ppb)
ETHYLBENZENE	10	1,800 C D	Micrograms/Liter(ppb)
XYLENES (TOTAL)	30	4,200 C D	Micrograms/Liter(ppb)

SURROGATE RECOVERY		
COMPOUND	PERCENT RECOVERY	ACCEPTANCE LIMITS
DIBROMOCHLOROMETHANE (DBCM)	*	39-153

Method Blank (MB) = ND

REMARKS:

- ND = NOT DETECTED IN THIS ANALYSIS OR LESS THAN REPORTING LIMIT.
- * = UNABLE TO CALCULATE DUE TO MATRIX INTERFERENCE.
- C = COMPOUND CONFIRMED BY GC/MS.
- D = DILUTED 20 FOLD.
- ** = VALUES REPORTED FROM EPA 8020 ANALYSIS.



 Joe Arlauskas, Laboratory Director

"Your Satisfaction Is Our Success"

AL

BTEX.W/100298
 ORGANICS

CUSTOMER DATE: 12/27/96
 PROJECT NAME/NUMBER: SCAPS NAS Alameda
 JOB ORDER NUMBER: 11420020
 SAMPLED BY: Robert Stettler

NAVY PUBLIC WORKS CENTER
 ENVIRONMENTAL CHEMISTRY LABORATORY
 NAS NORTH ISLAND, BLDG-M8
 SAN DIEGO, CA 92135
 PHONE (619)545-8431 FAX (619)545-0783

AS WILL BE:
 FAXED
 PICKED UP
 MAILED (GUARD)

CONTACT: Robert Stettler PHONE: 556-9121
 ALT. CONTACT: Kod Soule PHONE: 556-9506
 ACTIVITY: PWC Code 980 FAX: 68000
 ADDRESS: 2730 McKean St. HAZWASTE/GROUNDWATER (RCRA)
Stel Bldg 398E DRINKING WATER
 DISCHARGE (NPDES)

LAB LOG NUMBER	SAMPLE ID	DATE COLLECTED	TIME COLLECTED	SAMPLE MATRIX	CONTAINER TYPE
617931	IR3-15-3.4	12/8/96	10:15	SOIL	SS Tube
617932	IR3-21-7.5	↓	11:00		
617933	IR3-17-7.5		11:30		
617934	IR3-19-2		11:50		
617935	IR3-11-6.5		14:35		
617936	IR3-10-10.5		15:05		
617937	FF37-05-10.2		16:05		
617938	FF37-06-6.7		16:30		
617939	FF37 ^{RHS} -07-6		16:50		
617940	FF37-09-7.2		17:25		

NUMBER OF CONTAINERS	ANALYSIS REQUESTED										
	TPH	TP-5	PIESEL	TPH	Gas	SOIL					
1	X										
1		X									
1		X									
1	X	X									
1		X									
1		X									
1	X										
1	X										
1	X	X									

RELINQUISHED BY: Robert A Stettler Robert A. Stettler RECEIVED BY: Aliciana Gostrada DATE: 12/12/96 TIME: 1300
PRINT & SIGN PRINT & SIGN
 RECEIVED BY: Liliana Estrada
PRINT & SIGN
 RELINQUISHED BY: _____ RECEIVED BY: _____ DATE: _____ TIME: _____
PRINT & SIGN PRINT & SIGN
 RELINQUISHED BY: _____ RECEIVED BY: _____ DATE: _____ TIME: _____
PRINT & SIGN PRINT & SIGN

COMMENTS:
Sam detectran limits needed.

Cooler Temp: 5.5 °C
 RECEIVED ON ICE: Y N
 CORRECT CONTAINER: Y N
 PRESERVED: Y N
 SEAL INTACT: Y N N/A

LAB USE ONLY
 CBQ REVIEW: CBQ 12/12/96
 DATE COMP.: _____
 DATE MAILED: _____
 RESULTS REVIEWED BY: _____
 DATE: _____

Navy Public Works Center
Environmental Chemistry Laboratory Code 910
Naval Air Station North Island Bldg M-9
San Diego, CA 92135
TEL (619) 545 - 8431
FAX (619) 545 - 0793

CA ELAP CERT#1301

Activity: PWC CODE 980 Parameter: TPH
Type of Sample: SOIL Analysis Method: EPA 8015-M
Date Sample Collected: 12/08/96 Extraction Method: EPA 8015-M
Date Sample Received: 12/12/96 Date of Report: 12/27/96
Date Analysis Completed: 12/22/96 Laboratory Reporting Limits: 10
Date Extracted: 12/12/96 Units: Milligrams/Kilogram (ppm)
Analyst: AMH, AB

TOTAL PETROLEUM HYDROCARBONS (TPH) - DIESEL #2

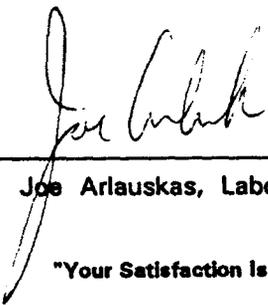
LAB NUMBER	SAMPLE ID	SAMPLE RESULTS DIESEL # 2
617931	IR 3 - 15 - 3.4	ND
617934	IR 3 - 19 - 2	ND
617937	FF37 - 05 - 10.2	ND
617938	FF37 - 06 - 6.7	ND
617939	FF37 - 07 - 6	ND
617940	FF37 - 09 - 7.2	*E

Method Blank (MB) = ND

REMARKS: ND = NOT DETECTED IN THIS ANALYSIS OR LESS THAN REPORTING LIMIT.

* = DIESEL RANGE ORGANICS C8 TO C14 ANOMALOUS PEAK PATTERN
(NON-JET FUEL AND NON-DIESEL #2 DETECTED AT 100 PPM)

E = ESTIMATED



Joe Arlauskas, Laboratory Director

"Your Satisfaction Is Our Success"

AL

TPHD.S/101196
ORGANICS

Navy Public Works Center
Environmental Chemistry Laboratory Code 910
Naval Air Station North Island Bldg M-9
San Diego, CA 92135
TEL (619) 545 - 8431
FAX (619) 545 - 0793

CA ELAP CERT#1301

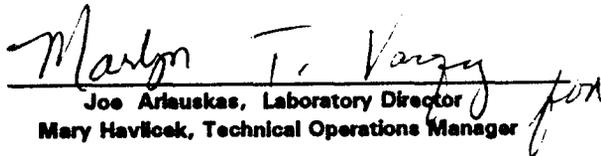
Activity: PWC CODE 980 Lab Number : 617932
Type of Sample: SOIL Sample ID : IR3-21-7.6
Date Sample Collected: 12/08/96 Date of Report : 12/27/96
Date Sample Received: 12/12/96 Analysis Method : EPA 8015M-GAS
Date Analysis Completed: 12/20/96 Extraction Method : EPA 5030A
Analyst : VZ, PAS

COMPOUND	LABORATORY REPORTING LIMIT	SAMPLE RESULTS	UNITS
TPH GAS	10	ND	Milligrams/Kilogram(ppm)

SURROGATE RECOVERY		
COMPOUND	PERCENT RECOVERY	ACCEPTANCE LIMITS
DIBROMOCHLOROMETHANE (DBCM)	92	30-180

Method Blank (MB) = ND

REMARKS: TPH = TOTAL PETROLEUM HYDROCARBONS
ND = NOT DETECTED IN THIS ANALYSIS OR LESS THAN REPORTING LIMIT.


Joe Arlauskas, Laboratory Director
Mary Havlicek, Technical Operations Manager

"Your Satisfaction Is Our Success"

MV

GAS.S/100296
ORGANICS

Navy Public Works Center
Environmental Chemistry Laboratory Code 910
Naval Air Station North Island Bldg M-9
San Diego, CA 92135
TEL (619) 545 - 8431
FAX (619) 545 - 0793

CA ELAP CERT#1301

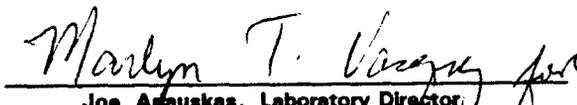
Activity: PWC CODE 980 Lab Number : 617933
Type of Sample: SOIL Sample ID : IR3-17-7.5
Date Sample Collected: 12/08/96 Date of Report : 12/27/96
Date Sample Received: 12/12/96 Analysis Method : EPA 8015M-GAS
Date Analysis Completed: 12/20/96 Extraction Method : EPA 5030A
Analyst : VZ, PAS

COMPOUND	LABORATORY REPORTING LIMIT	SAMPLE RESULTS	UNITS
TPH GAS	10	ND	Milligrams/Kilogram(ppm)

SURROGATE RECOVERY		
COMPOUND	PERCENT RECOVERY	ACCEPTANCE LIMITS
DIBROMOCHLOROMETHANE (DBCM)	93	30-180

Method Blank (MB) = ND

REMARKS: TPH = TOTAL PETROLEUM HYDROCARBONS
ND = NOT DETECTED IN THIS ANALYSIS OR LESS THAN REPORTING LIMIT.



Joe Anauskas, Laboratory Director
Mary Havlicek, Technical Operations Manager

"Your Satisfaction Is Our Success"

MV

GAS.S/100296
ORGANICS

Navy Public Works Center
 Environmental Chemistry Laboratory Code 910
 Naval Air Station North Island Bldg M-9
 San Diego, CA 92135
 TEL (619) 545 - 8431
 FAX (619) 545 - 0793

CA ELAP CERT#1301

Activity:	PWC CODE 980	Lab Number :	617934
Type of Sample:	SOIL	Sample ID :	IR3-19-2
Date Sample Collected:	12/08/96	Date of Report :	12/27/96
Date Sample Received:	12/12/96	Analysis Method :	EPA 8015M-GAS
Date Analysis Completed:	12/20/96	Extraction Method :	EPA 5030A
Analyst :	VZ, PAS		

COMPOUND	LABORATORY REPORTING LIMIT	SAMPLE RESULTS	UNITS
TPH GAS	10	ND	Milligrams/Kilogram(ppm)

SURROGATE RECOVERY		
COMPOUND	PERCENT RECOVERY	ACCEPTANCE LIMITS
DIBROMOCHLOROMETHANE (DBCM)	63	30-180

Method Blank (MB) = ND

REMARKS: TPH = TOTAL PETROLEUM HYDROCARBONS
 ND = NOT DETECTED IN THIS ANALYSIS OR LESS THAN REPORTING LIMIT.

Marilyn T. Vazquez

 Joe Anuskas, Laboratory Director
 Mary Havlicek, Technical Operations Manager

"Your Satisfaction Is Our Success"

MV

GAS.S/100296
 ORGANICS

Navy Public Works Center
 Environmental Chemistry Laboratory Code 910
 Naval Air Station North Island Bldg M-9
 San Diego, CA 92135
 TEL (619) 545 - 8431
 FAX (619) 545 - 0793

CA ELAP CERT#1301

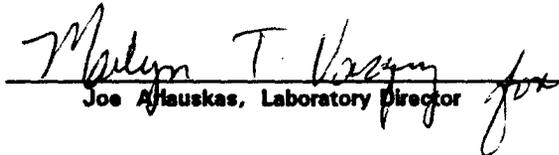
Activity: PWC CODE 980 Lab Number : 617935
 Type of Sample: SOIL Sample ID : IR3-11-6.6
 Date Sample Collected: 12/08/96 Date of Report : 12/27/96
 Date Sample Received: 12/12/96 Analysis Method : EPA 8015M-GAS
 Date Analysis Completed: 12/20/96 Extraction Method : EPA 5030A
 Analyst : VZ, PAS

COMPOUND	LABORATORY REPORTING LIMIT	SAMPLE RESULTS	UNITS
TPH GAS	10	ND*	Milligrams/Kilogram(ppm)

SURROGATE RECOVERY		
COMPOUND	PERCENT RECOVERY	ACCEPTANCE LIMITS
DIBROMOCHLOROMETHANE (DBCM)	**	30-180

Method Blank (MB) = ND

REMARKS: TPH = TOTAL PETROLEUM HYDROCARBONS
 ND = NOT DETECTED IN THIS ANALYSIS OR LESS THAN REPORTING LIMIT.
 * = GASOLINE RANGE ORGANICS PRESENT (C₆ TO C₁₂) AT 315 MG/KG (PPM).
 ** = SURROGATE OUTSIDE ACCEPTANCE LIMITS DUE TO MATRIX INTERFERENCE.


 Joe Aftauskas, Laboratory Director

"Your Satisfaction Is Our Success"

MV

GAS.S/100296
 ORGANICS

Navy Public Works Center
 Environmental Chemistry Laboratory Code 910
 Naval Air Station North Island Bldg M-9
 San Diego, CA 92135
 TEL (619) 545 - 8431
 FAX (619) 545 - 0793

CA ELAP CERT#1301

Activity:	PWC CODE 980	Lab Number :	617936
Type of Sample:	SOIL	Sample ID :	IR3-10-10.5
Date Sample Collected:	12/08/96	Date of Report :	12/27/96
Date Sample Received:	12/12/96	Analysis Method :	EPA 8015M-GAS
Date Analysis Completed:	12/20/96	Extraction Method :	EPA 5030A
Analyst :	VZ, PAS		

COMPOUND	LABORATORY REPORTING LIMIT	SAMPLE RESULTS	UNITS
TPH GAS	10	ND	Milligrams/Kilogram(ppm)

SURROGATE RECOVERY		
COMPOUND	PERCENT RECOVERY	ACCEPTANCE LIMITS
DIBROMOCHLOROMETHANE (DBCM)	88	30-180

Method Blank (MB) = ND

REMARKS: TPH = TOTAL PETROLEUM HYDROCARBONS
 ND = NOT DETECTED IN THIS ANALYSIS OR LESS THAN REPORTING LIMIT.

Marklyn T. Vazquez

 Joe Arlauskas, Laboratory Director

"Your Satisfaction Is Our Success"

MV

GAS.S/100296
 ORGANICS

Navy Public Works Center
 Environmental Chemistry Laboratory Code 910
 Naval Air Station North Island Bldg M-9
 San Diego, CA 92135
 TEL (619) 545 - 8431
 FAX (619) 545 - 0793

CA ELAP CERT#1301

Activity: PWC CODE 980 Lab Number : 617940
 Type of Sample: SOIL Sample ID : FF37-09-7.2
 Date Sample Collected: 12/08/96 Date of Report : 12/27/96
 Date Sample Received: 12/12/96 Analysis Method : EPA 8015M-GAS
 Date Analysis Completed: 12/24/96 Extraction Method : EPA 5030A
 Analyst : VZ

COMPOUND	LABORATORY REPORTING LIMIT	SAMPLE RESULTS	UNITS
TPH GAS	10	ND*	Milligrams/Kilogram(ppm)

SURROGATE RECOVERY		
COMPOUND	PERCENT RECOVERY	ACCEPTANCE LIMITS
DIBROMOCHLOROMETHANE (DBCM)	154	30-180

Method Blank (MB) = ND

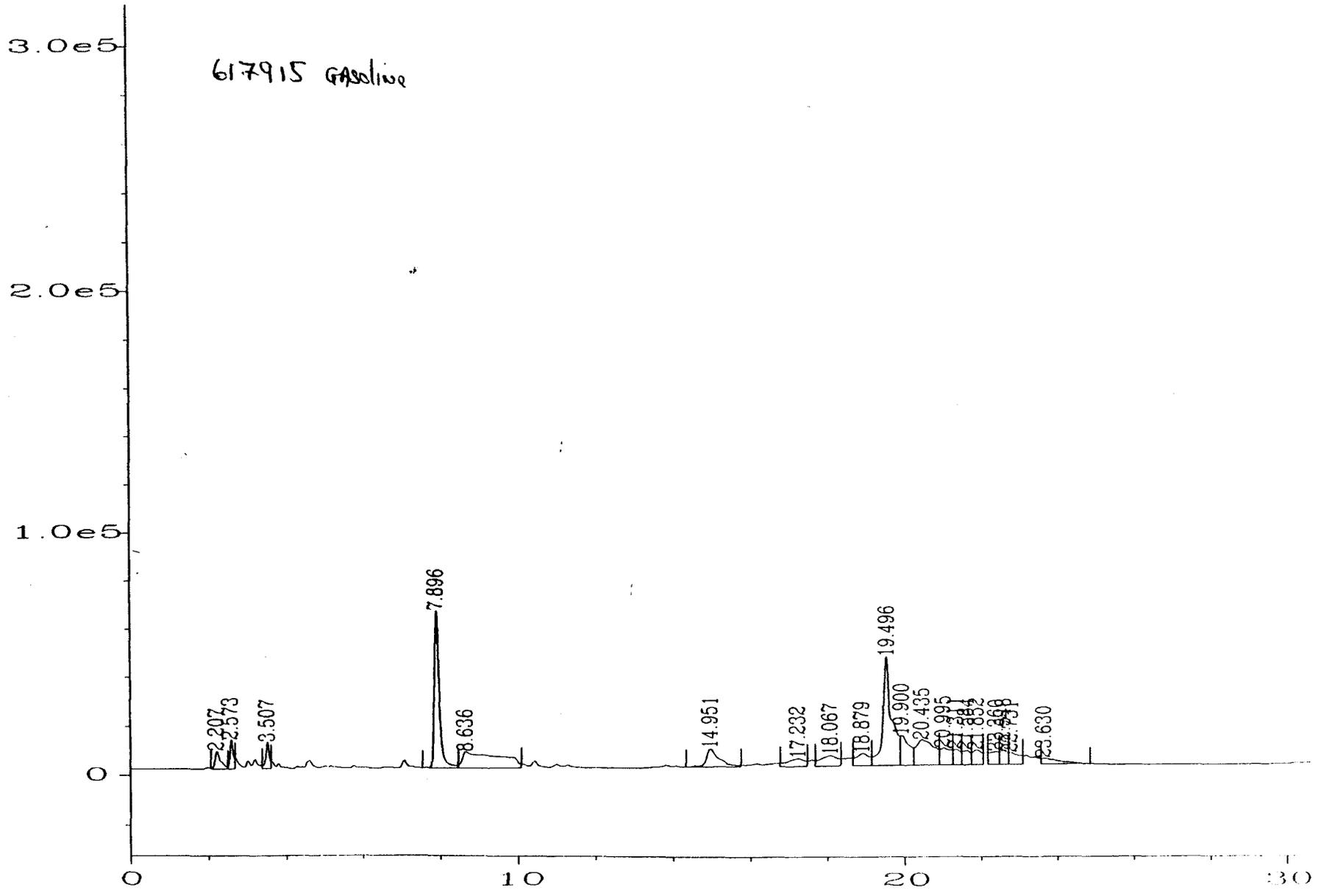
REMARKS: TPH = TOTAL PETROLEUM HYDROCARBONS
 ND = NOT DETECTED IN THIS ANALYSIS OR LESS THAN REPORTING LIMIT.
 * = GASOLINE RANGE ORGANICS PRESENT (C₆ TO C₁₂) AT 390 MG/KG (PPM).

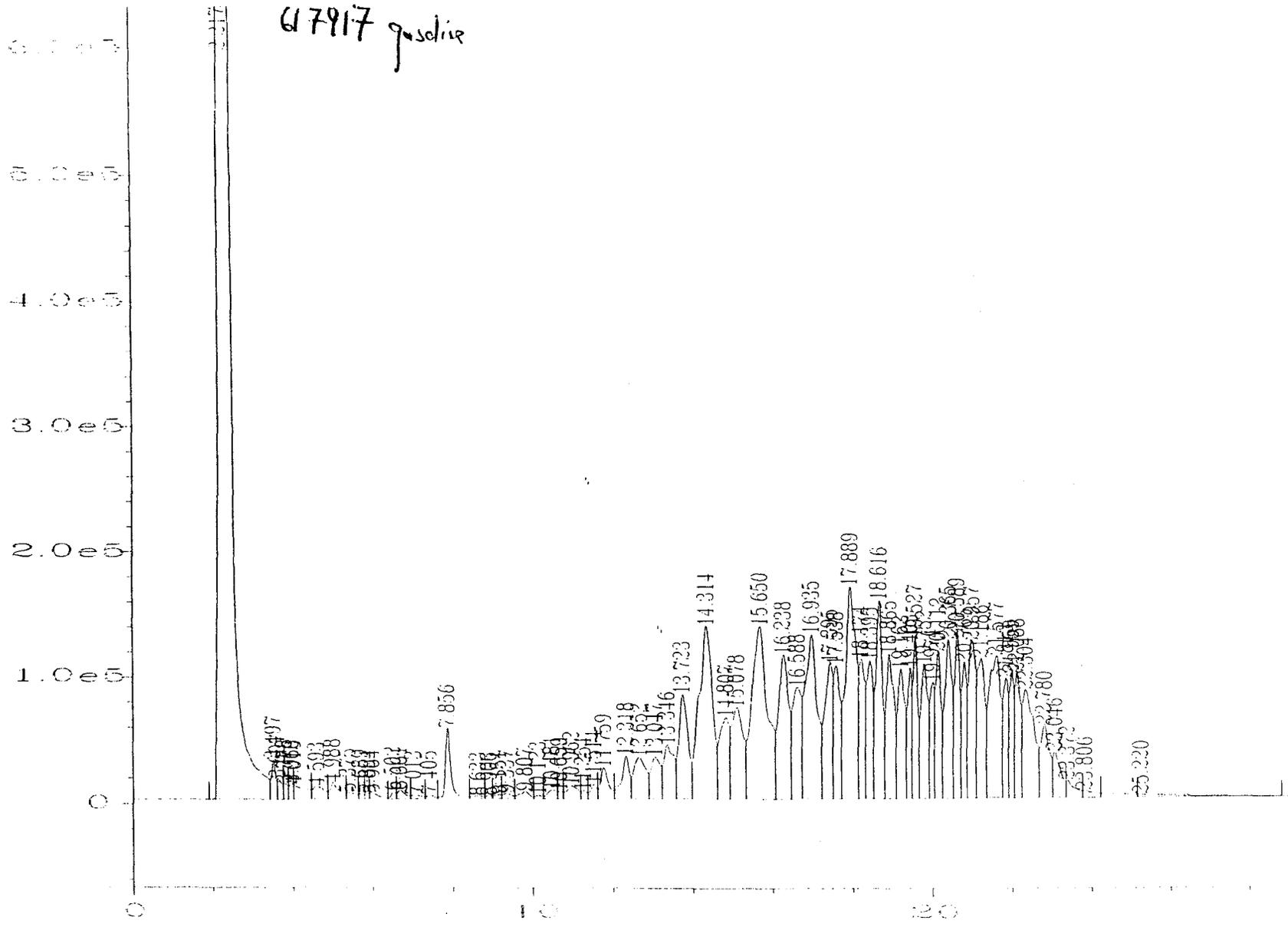
Marlyn T. Vazquez for
 Joe Arlauskas, Laboratory Director

"Your Satisfaction Is Our Success"

MV

GAS.S/100296
 ORGANICS



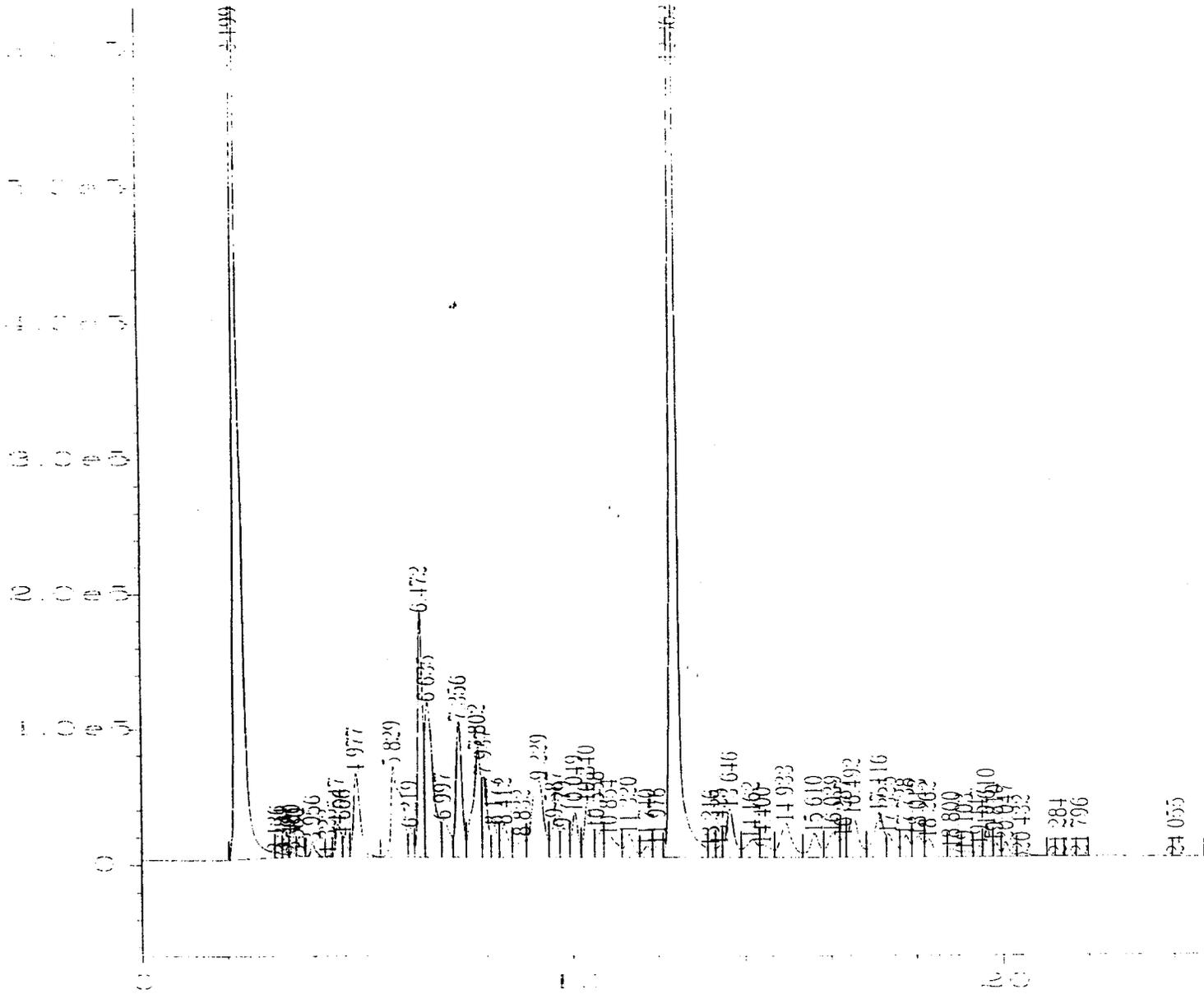


617927 Gasoline

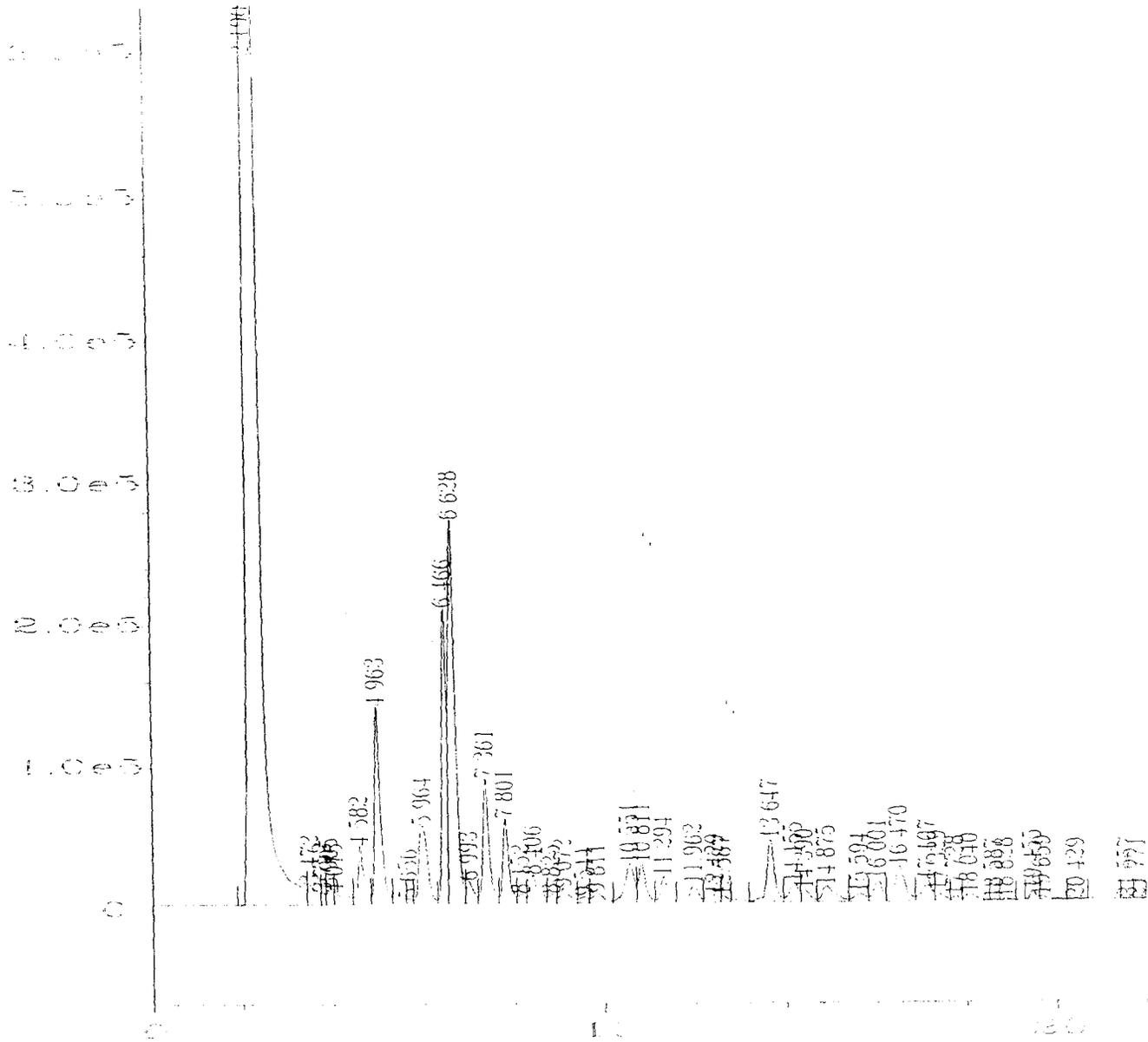
72.534	
3.898	
1.579	
6.595	
7.622	
7.901	
7.803	
8.179	
8.623	
9.098	
9.571	
9.823	
10.316	
11.20	
11.993	
12.371	
12.855	
12.621	
11.443	
15.607	
18.585	
18.98822	
19.411	
19.662	
19.252	
20.073	
19.915	
20.366405	
20.985	
21.368	
21.888	
22.409	
22.931	
23.452	
23.973	
24.494	
25.015	
25.536	
26.057	
26.578	
27.099	
27.620	
28.141	
28.662	
29.183	
29.704	
30.225	
30.746	
31.267	
31.788	
32.309	
32.830	
33.351	
33.872	
34.393	
34.914	
35.435	
35.956	
36.477	
36.998	
37.519	
38.040	
38.561	
39.082	
39.603	
40.124	
40.645	
41.166	
41.687	
42.208	
42.729	
43.250	
43.771	
44.292	
44.813	
45.334	
45.855	
46.376	
46.897	
47.418	
47.939	
48.460	
48.981	
49.502	
50.023	
50.544	
51.065	
51.586	
52.107	
52.628	
53.149	
53.670	
54.191	
54.712	
55.233	
55.754	
56.275	
56.796	
57.317	
57.838	
58.359	
58.880	
59.401	
59.922	
60.443	
60.964	
61.485	
62.006	
62.527	
63.048	
63.569	
64.090	
64.611	
65.132	
65.653	
66.174	
66.695	
67.216	
67.737	
68.258	
68.779	
69.300	
69.821	
70.342	
70.863	
71.384	
71.905	
72.426	
72.947	
73.468	
73.989	
74.510	
75.031	
75.552	
76.073	
76.594	
77.115	
77.636	
78.157	
78.678	
79.199	
79.720	
80.241	
80.762	
81.283	
81.804	
82.325	
82.846	
83.367	
83.888	
84.409	
84.930	
85.451	
85.972	
86.493	
87.014	
87.535	
88.056	
88.577	
89.098	
89.619	
90.140	
90.661	
91.182	
91.703	
92.224	
92.745	
93.266	
93.787	
94.308	
94.829	
95.350	
95.871	
96.392	
96.913	
97.434	
97.955	
98.476	
98.997	
99.518	
100.039	
100.560	
101.081	
101.602	
102.123	
102.644	
103.165	
103.686	
104.207	
104.728	
105.249	
105.770	
106.291	
106.812	
107.333	
107.854	
108.375	
108.896	
109.417	
109.938	
110.459	
110.980	
111.501	
112.022	
112.543	
113.064	
113.585	
114.106	
114.627	
115.148	
115.669	
116.190	
116.711	
117.232	
117.753	
118.274	
118.795	
119.316	
119.837	
120.358	
120.879	
121.400	
121.921	
122.442	
122.963	
123.484	
124.005	
124.526	
125.047	
125.568	
126.089	
126.610	
127.131	
127.652	
128.173	
128.694	
129.215	
129.736	
130.257	
130.778	
131.299	
131.820	
132.341	
132.862	
133.383	
133.904	
134.425	
134.946	
135.467	
135.988	
136.509	
137.030	
137.551	
138.072	
138.593	
139.114	
139.635	
140.156	
140.677	
141.198	
141.719	
142.240	
142.761	
143.282	
143.803	
144.324	
144.845	
145.366	
145.887	
146.408	
146.929	
147.450	
147.971	
148.492	
149.013	
149.534	
150.055	
150.576	
151.097	
151.618	
152.139	
152.660	
153.181	
153.702	
154.223	
154.744	
155.265	
155.786	
156.307	
156.828	
157.349	
157.870	
158.391	
158.912	
159.433	
159.954	
160.475	
160.996	
161.517	
162.038	
162.559	
163.080	
163.601	
164.122	
164.643	
165.164	
165.685	
166.206	
166.727	
167.248	
167.769	
168.290	
168.811	
169.332	
169.853	
170.374	
170.895	
171.416	
171.937	
172.458	
172.979	
173.500	
174.021	
174.542	
175.063	
175.584	
176.105	
176.626	
177.147	
177.668	
178.189	
178.710	
179.231	
179.752	
180.273	
180.794	
181.315	
181.836	
182.357	
182.878	
183.399	
183.920	
184.441	
184.962	
185.483	
186.004	
186.525	
187.046	
187.567	
188.088	
188.609	
189.130	
189.651	
190.172	
190.693	
191.214	
191.735	
192.256	
192.777	
193.298	
193.819	
194.340	
194.861	
195.382	
195.903	
196.424	
196.945	
197.466	
197.987	
198.508	
199.029	
199.550	
200.071	
200.592	
201.113	
201.634	
202.155	
202.676	
203.197	
203.718	
204.239	
204.760	
205.281	
205.802	
206.323	
206.844	
207.365	
207.886	
208.407	
208.928	
209.449	
209.970	
210.491	
211.012	
211.533	
212.054	
212.575	
213.096	
213.617	
214.138	
214.659	
215.180	
215.701	
216.222	
216.743	
217.264	
217.785	
218.306	
218.827	
219.348	
219.869	
220.390	
220.911	
221.432	
221.953	
222.474	
222.995	
223.516	
224.037	
224.558	
225.079	
225.600	
226.121	
226.642	
227.163	
227.684	
228.205	
228.726	
229.247	
229.768	
230.289	
230.810	
231.331	
231.852	
232.373	
232.894	
233.415	
233.936	
234.457	
234.978	
235.499	
236.020	
236.541	
237.062	
237.583	
238.104	
238.625	
239.146	
239.667	
240.188	
240.709	
241.230	
241.751	
242.272	
242.793	
243.314	
243.835	
244.356	
244.877	
245.398	
245.919	
246.440	
246.961	
247.482	
248.003	
248.524	
249.045	
249.566	
250.087	
250.608	
251.129	
251.650	
252.171	
252.692	
253.213	
253.734	
254.255	
254.776	
255.297	
255.818	
256.339	
256.860	
257.381	
257.902	
258.423	
258.944	
259.465	
260.086	
260.607	
261.128	
261.649	
262.170	
262.691	
263.212	
263.733	
264.254	
264.775	
265.296	
265.817	
266.338	
266.859	
267.380	
267.901	
268.422	
268.943	
269.464	
270.085	
270.606	
271.127	
271.648	
272.169	
272.690	
273.211	
273.732	
274.253	
274.774	
275.295	
275.816	
276.337	
276.858	
277.379	
277.900	
278.421	
278.942	
279.463	
280.084	
280.605	
281.126	
281.647	
282.168	
282.689	
283.210	
283.731	
284.252	
284.773	
285.294	
285.815	
286.336	
286.857	
287.378	
287.899	
288.420	
288.941	
289.462	
290.083	
290.604	
291.125	
291.646	
292.167	
292.688	
293.209	
293.730	
294.251	
294.772	
295.293	
295.814	
296.335	
296.856	
297.377	
297.898	
298.419	
298.940	
299.461	
300.082	
300.603	
301.124	
301.645	
302.166	
302.687	
303.208	
303.729	
304.250	
304.771	
305.292	
305.813	
306.334	
306.855	
307.376	
307.897	
308.418	
308.939	
309.460	
310.081	
310.602	
311.123	
311.644	
312.165	
312.686	
313.207	
313.728	
314.249	
314.770	
315.291	
315.812	
316.333	
316.854	
317.375	
317.896	
318.417	
318.938	
319.459	
320.080	
320.601	
321.122	
321.643	
322.164	
322.685	
323.206	
323.727	
324.248	
324.769	
325.290	
325.811	
326.332	
326.853	
327.374	
327.895	
328.416	
328.937	
329.458	
330.079	
330.600	
331.121	
331.642	
332.163	</

617930

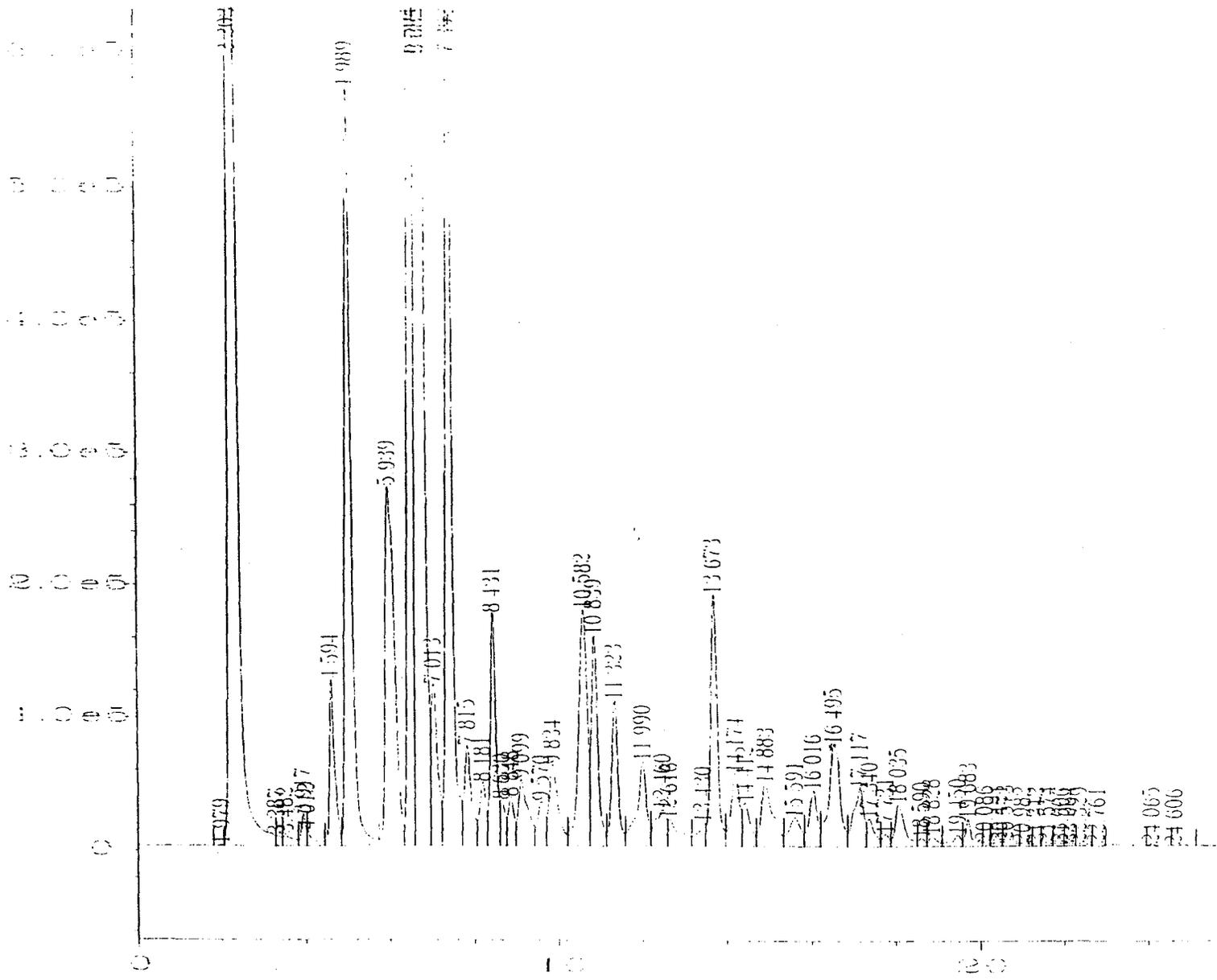
Gasoline

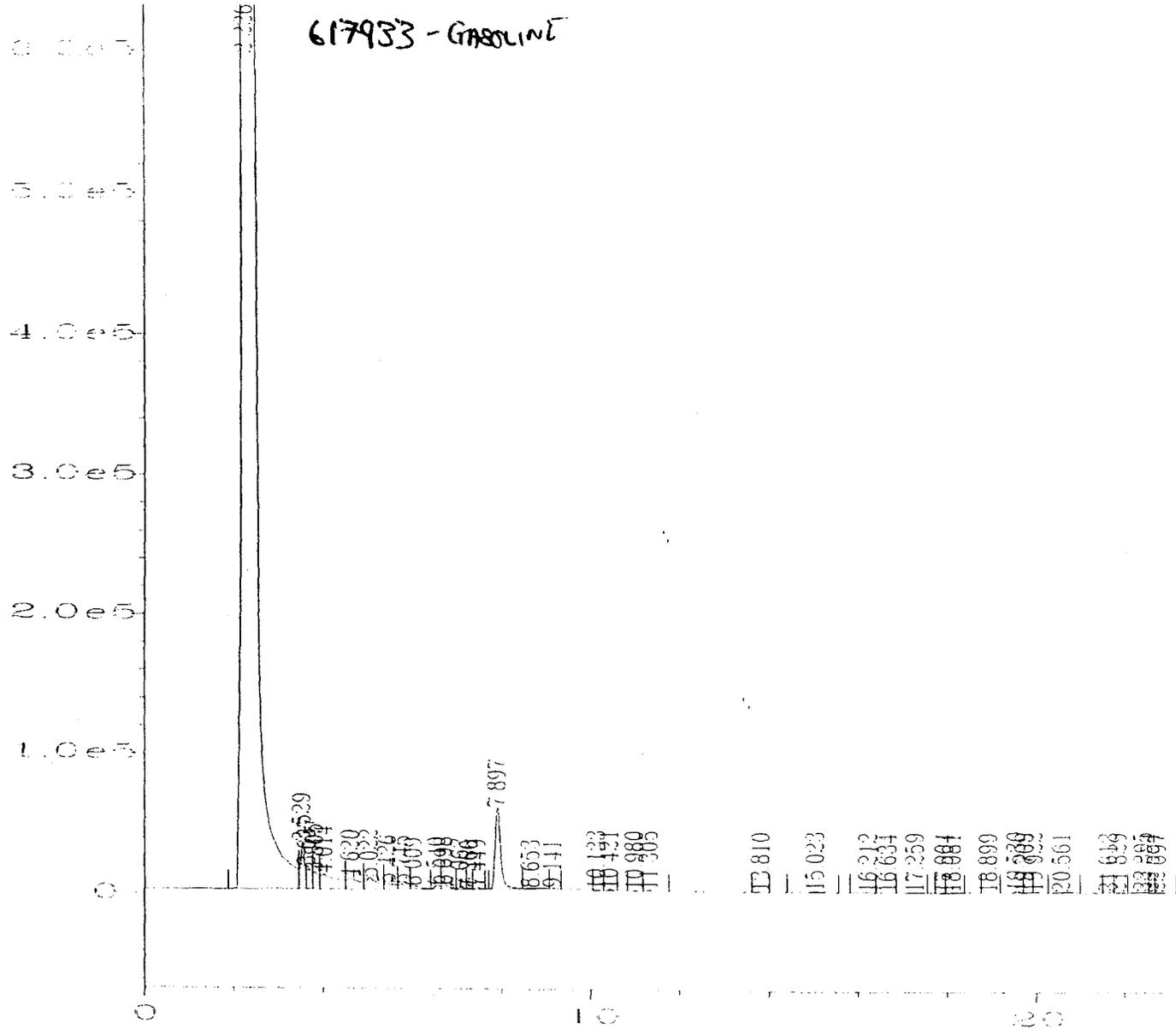


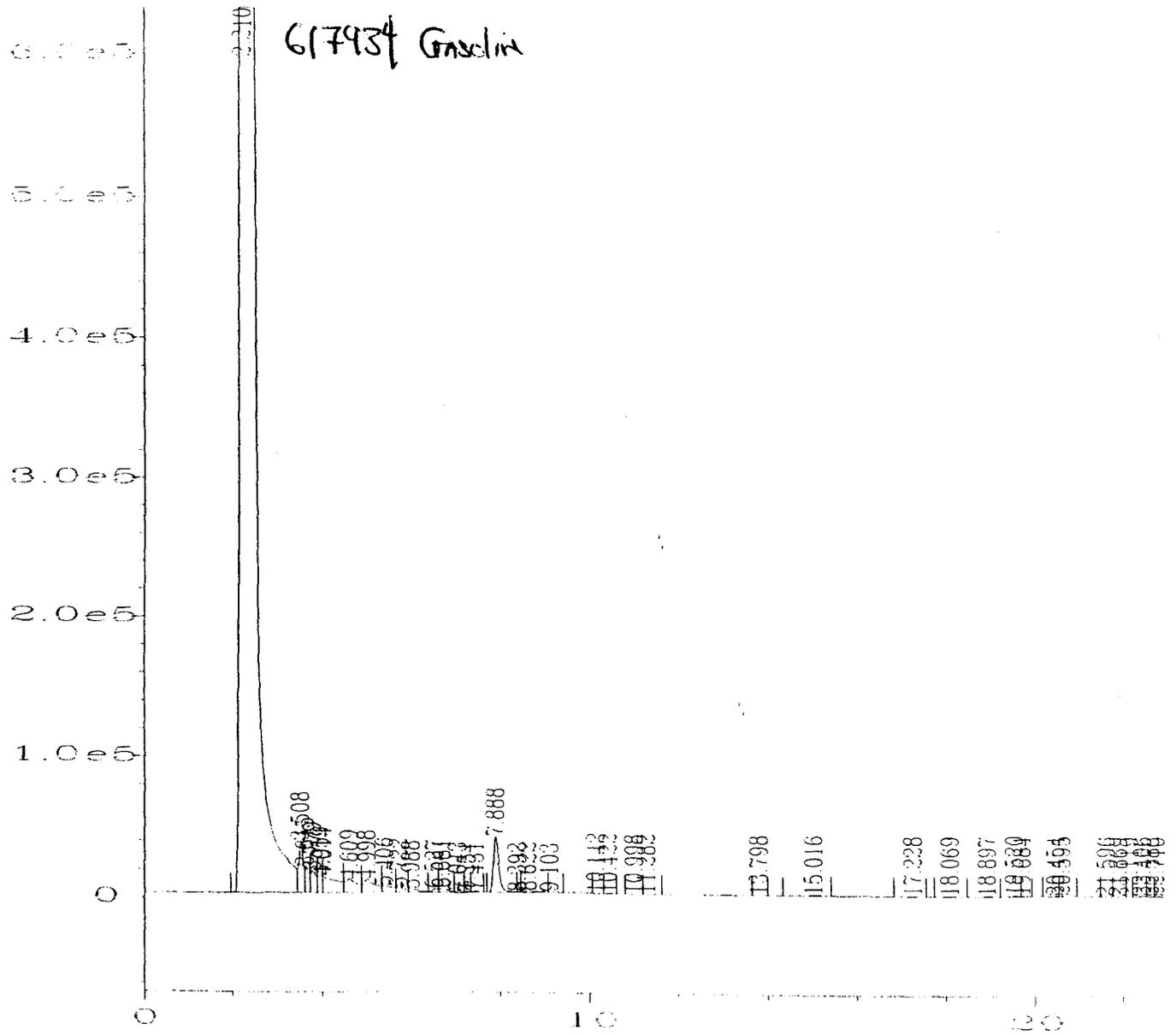
617928 Gasline

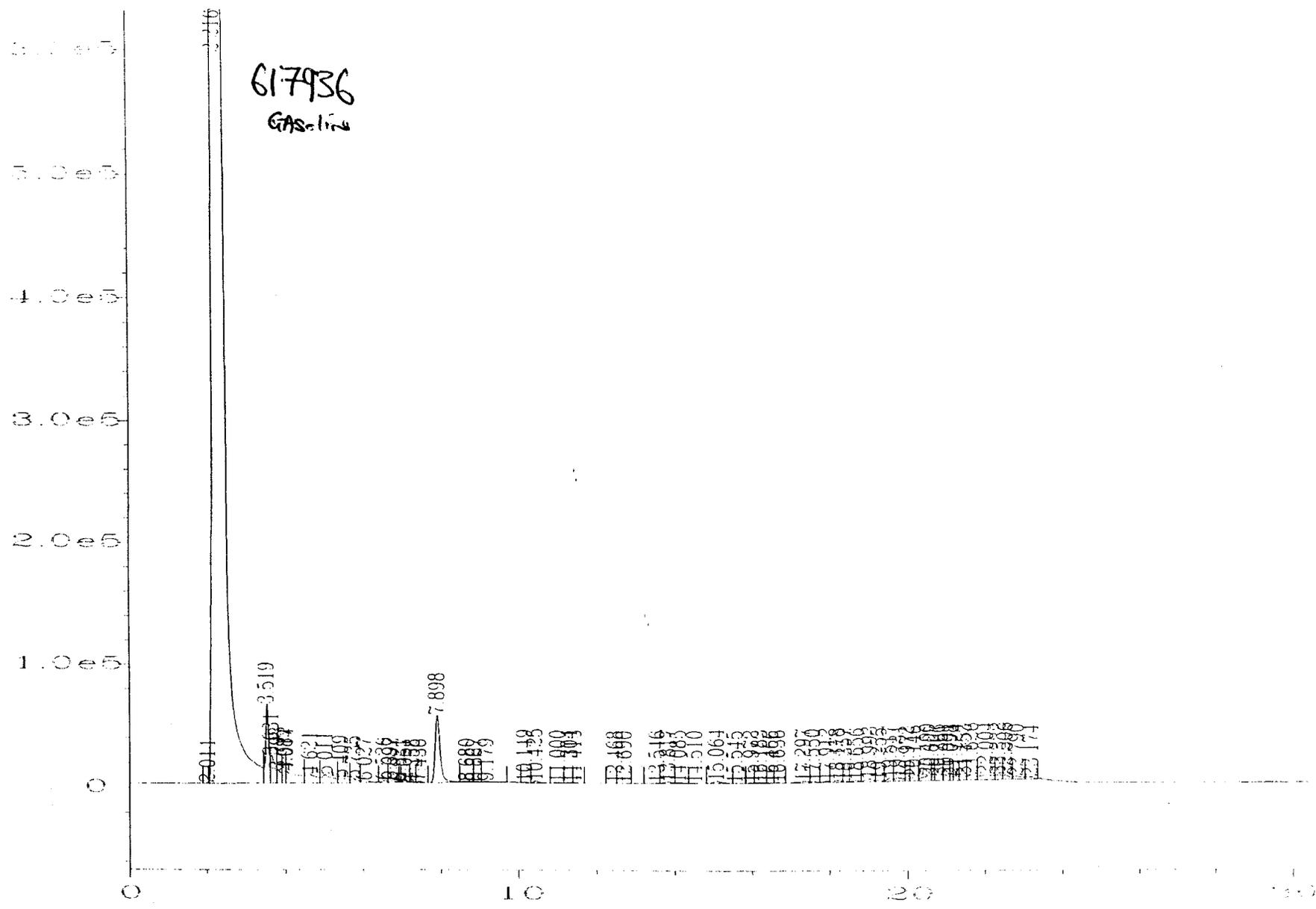


7929 Gasline









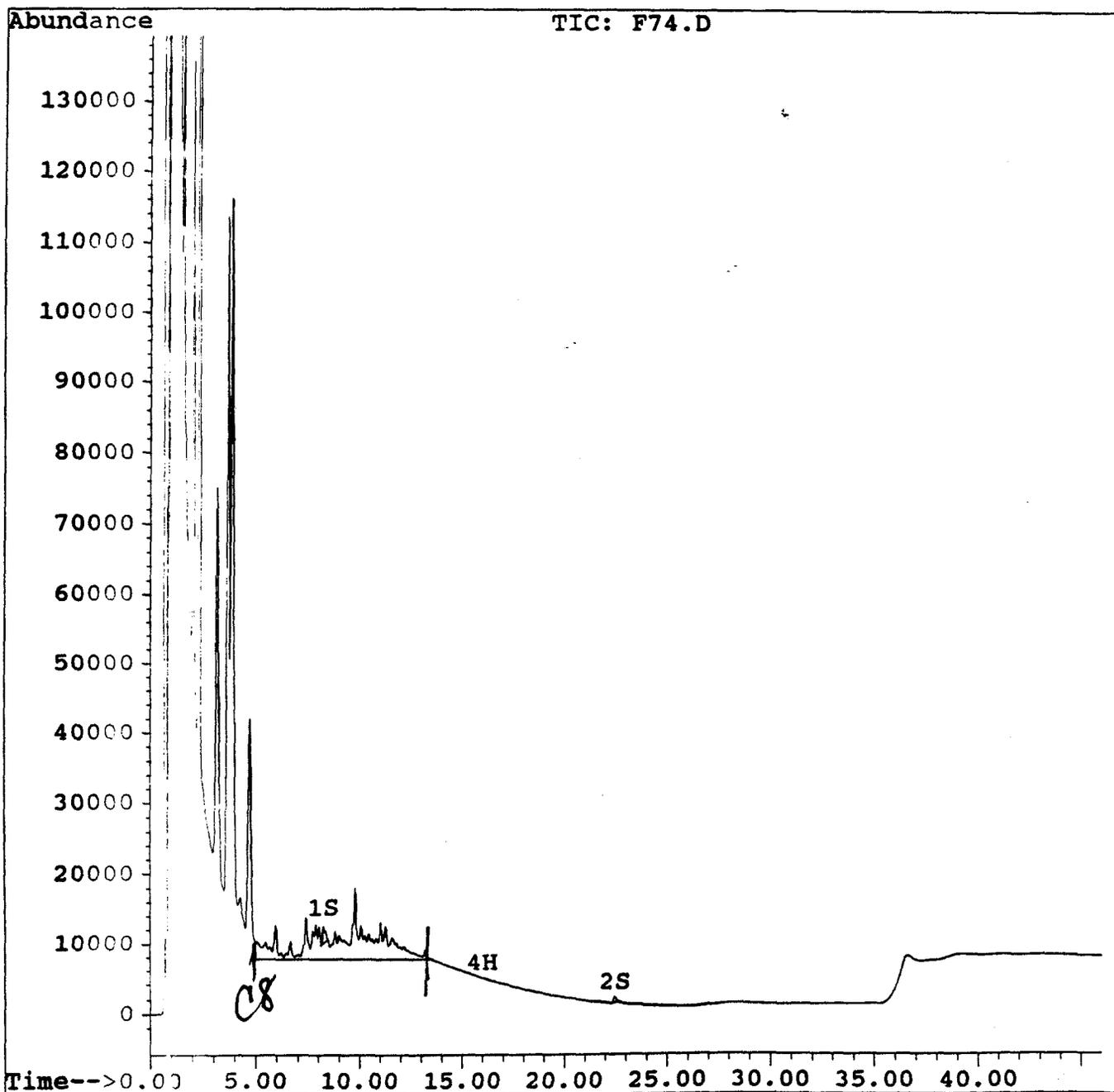
Quantitation Report

Data File : C:\HPCHEM\5\DATA\12-18-96\F74.D
Acq On : 21 Dec 96 08:07 PM
Sample : 617940
Misc : BATCH #S-6054
Quant Time: Dec 22 15:25 1996

Vial: 74
Operator: ALEX
Inst : GC TPH
Multiplr: 1.00

Method : C:\HPCHEM\5\METHODS\TPHFN2.M
Title :
Last Update : Fri Nov 22 09:49:27 1996
Response via : Multiple Level Calibration

Volume Inj. :
Signal Phase :
Signal Info :



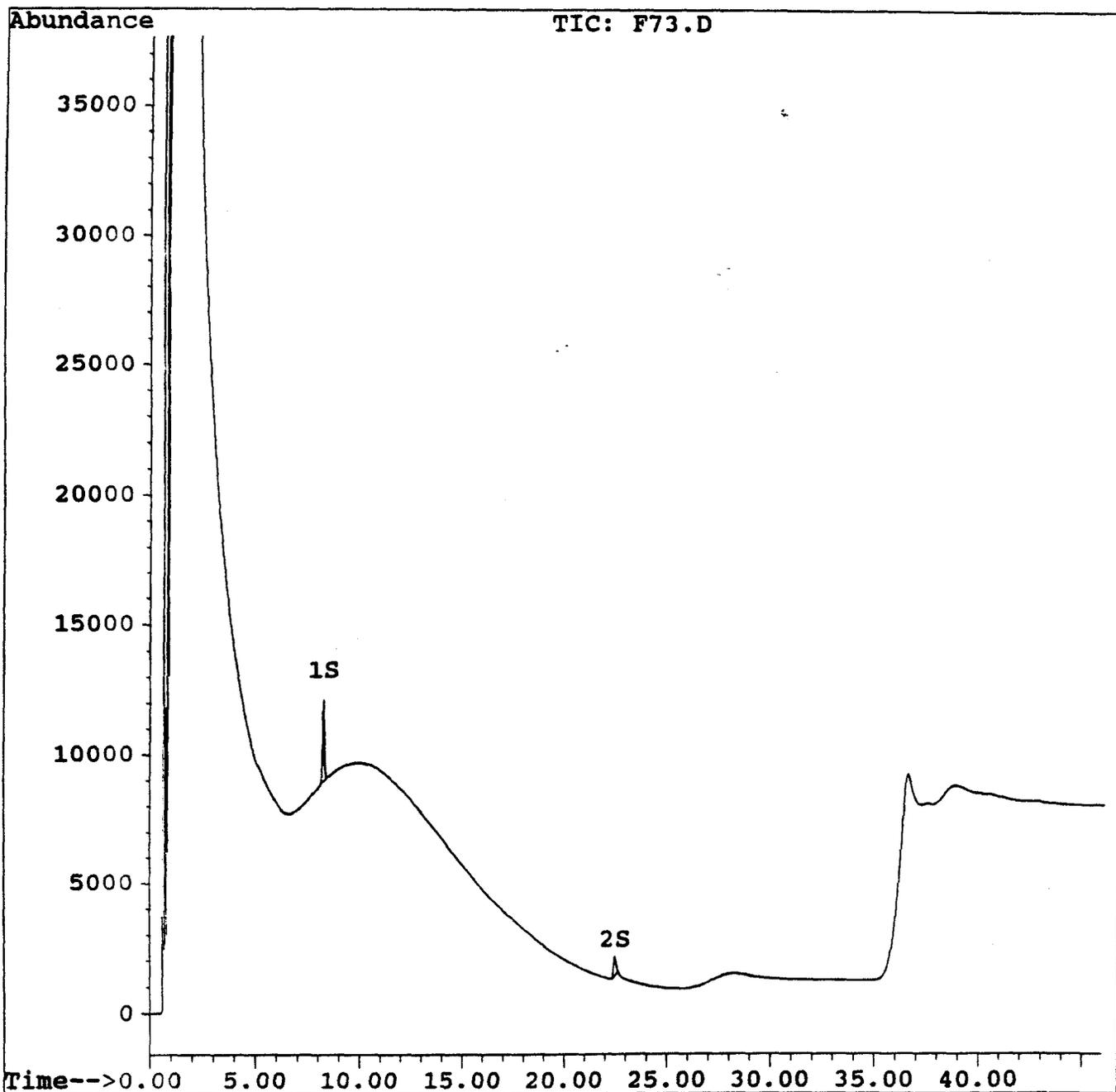
Quantitation Report

Data File : C:\HPCHEM\5\DATA\12-18-96\F73.D
Acq On : 21 Dec 96 07:11 PM
Sample : 617939
Misc : BATCH #S-6054
Quant Time: Dec 22 15:22 1996

Vial: 73
Operator: ALEX
Inst : GC TPH
Multiplr: 1.00

Method : C:\HPCHEM\5\METHODS\TPHFN2.M
Title :
Last Update : Fri Nov 22 09:49:27 1996
Response via : Multiple Level Calibration

Volume Inj. :
Signal Phase :
Signal Info :



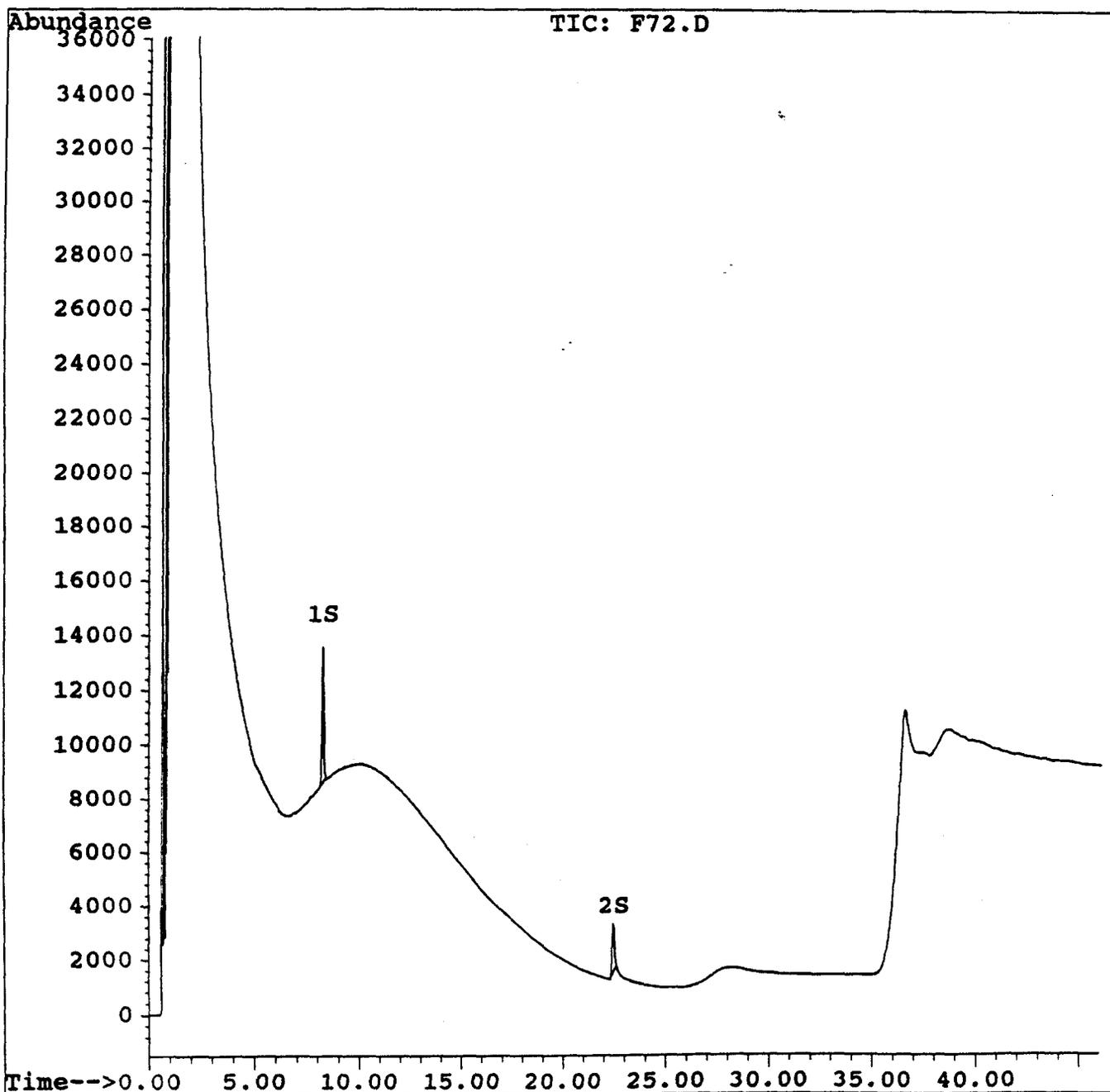
Quantitation Report

Data File : C:\HPCHEM\5\DATA\12-18-96\F72.D
Acq On : 21 Dec 96 06:14 PM
Sample : 617938
Misc : BATCH #S-6054
Quant Time: Dec 22 15:20 1996

Vial: 72
Operator: ALEX
Inst : GC TPH
Multiplr: 1.00

Method : C:\HPCHEM\5\METHODS\TPHFN2.M
Title :
Last Update : Fri Nov 22 09:49:27 1996
Response via : Multiple Level Calibration

Volume Inj. :
Signal Phase :
Signal Info :



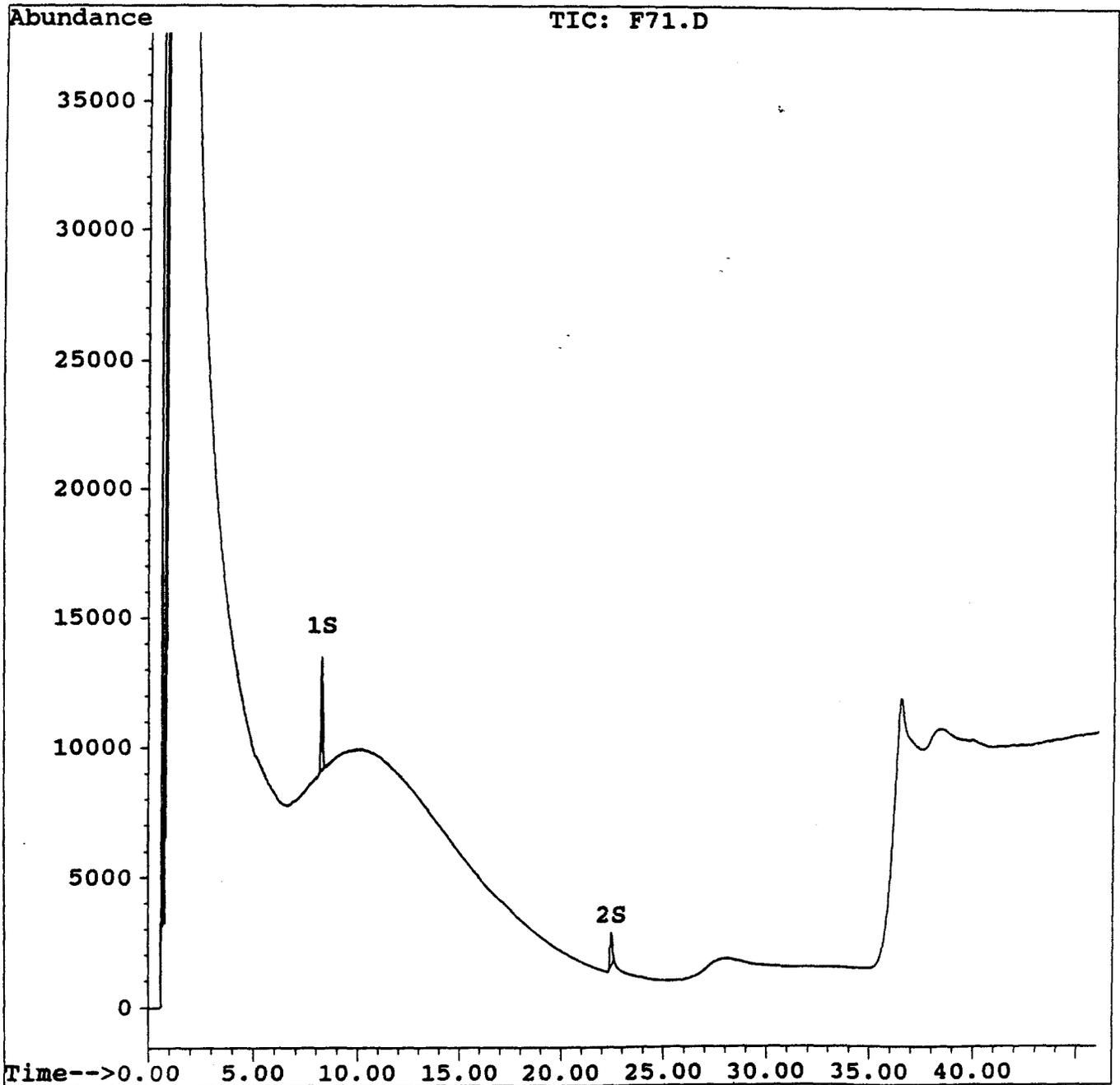
Quantitation Report

Data File : C:\HPCHEM\5\DATA\12-18-96\F71.D
Acq On : 21 Dec 96 05:18 PM
Sample : 617937
Misc : BATCH #S-6054
Quant Time: Dec 22 15:17 1996

Vial: 71
Operator: ALEX
Inst : GC TPH
Multiplr: 1.00

Method : C:\HPCHEM\5\METHODS\TPHFN2.M
Title :
Last Update : Fri Nov 22 09:49:27 1996
Response via : Multiple Level Calibration

Volume Inj. :
Signal Phase :
Signal Info :



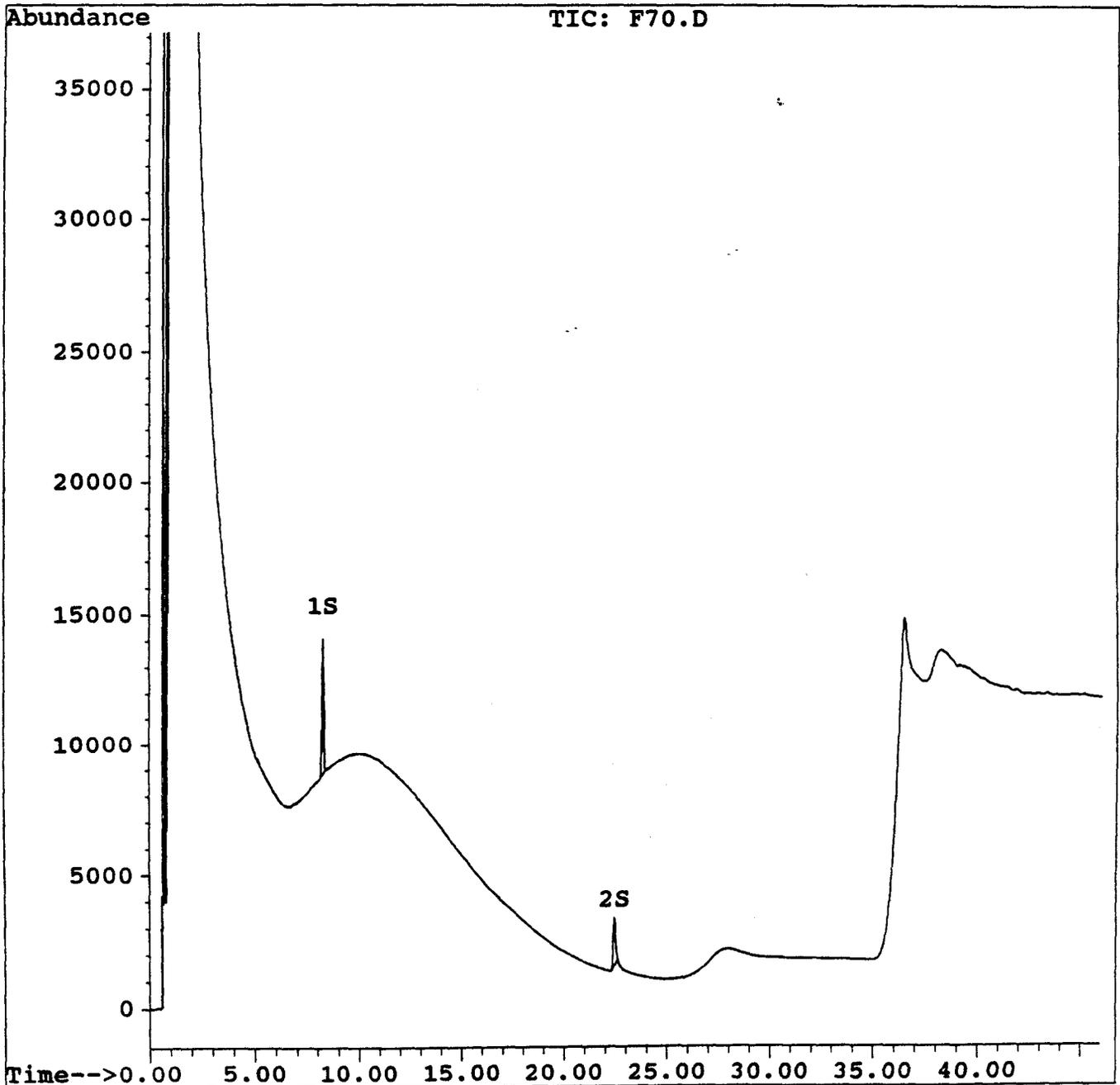
Quantitation Report

Data File : C:\HPCHEM\5\DATA\12-18-96\F70.D
Acq On : 21 Dec 96 04:22 PM
Sample : 617934
Misc : BATCH #S-6054
Quant Time: Dec 22 15:13 1996

Vial: 70
Operator: ALEX
Inst : GC TPH
Multiplr: 1.00

Method : C:\HPCHEM\5\METHODS\TPHFN2.M
Title :
Last Update : Fri Nov 22 09:49:27 1996
Response via : Multiple Level Calibration

Volume Inj. :
Signal Phase :
Signal Info :



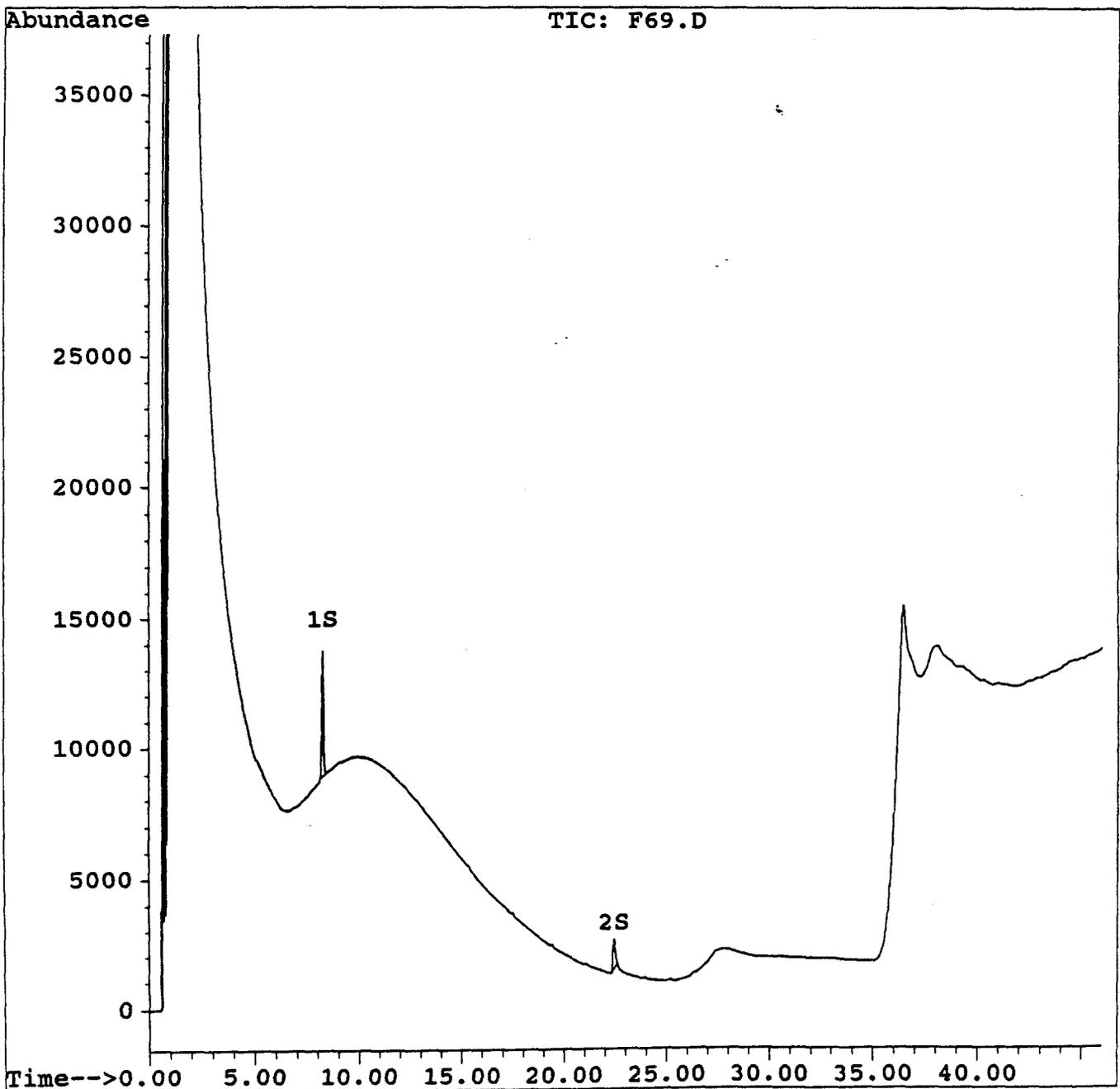
Quantitation Report

Data File : C:\HPCHEM\5\DATA\12-18-96\F69.D
Acq On : 21 Dec 96 03:25 PM
Sample : 617931
Misc : BATCH #S-6054
Quant Time: Dec 22 15:10 1996

Vial: 69
Operator: ALEX
Inst : GC TPH
Multiplr: 1.00

Method : C:\HPCHEM\5\METHODS\TPHFN2.M
Title :
Last Update : Fri Nov 22 09:49:27 1996
Response via : Multiple Level Calibration

Volume Inj. :
Signal Phase :
Signal Info :



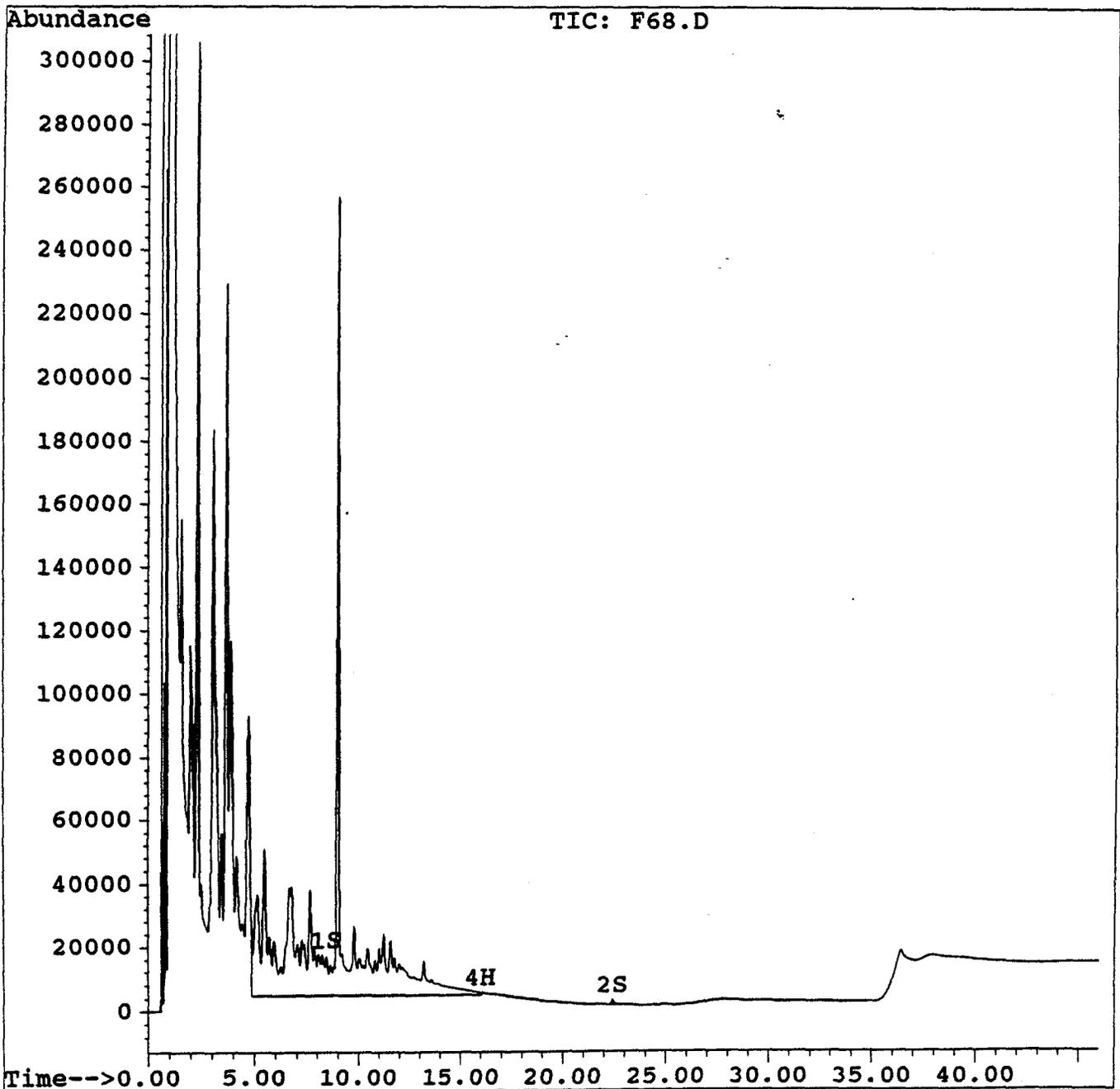
Quantitation Report

Data File : C:\HPCHEM\5\DATA\12-18-96\F68.D
Acq On : 21 Dec 96 02:28 PM
Sample : 617930
Misc : BATCH #S-6054
Quant Time: Dec 22 15:00 1996

Vial: 68
Operator: ALEX
Inst : GC TPH
Multiplr: 1.00

Method : C:\HPCHEM\5\METHODS\TPHFN2.M
Title :
Last Update : Fri Nov 22 09:49:27 1996
Response via : Multiple Level Calibration

Volume Inj. :
Signal Phase :
Signal Info :



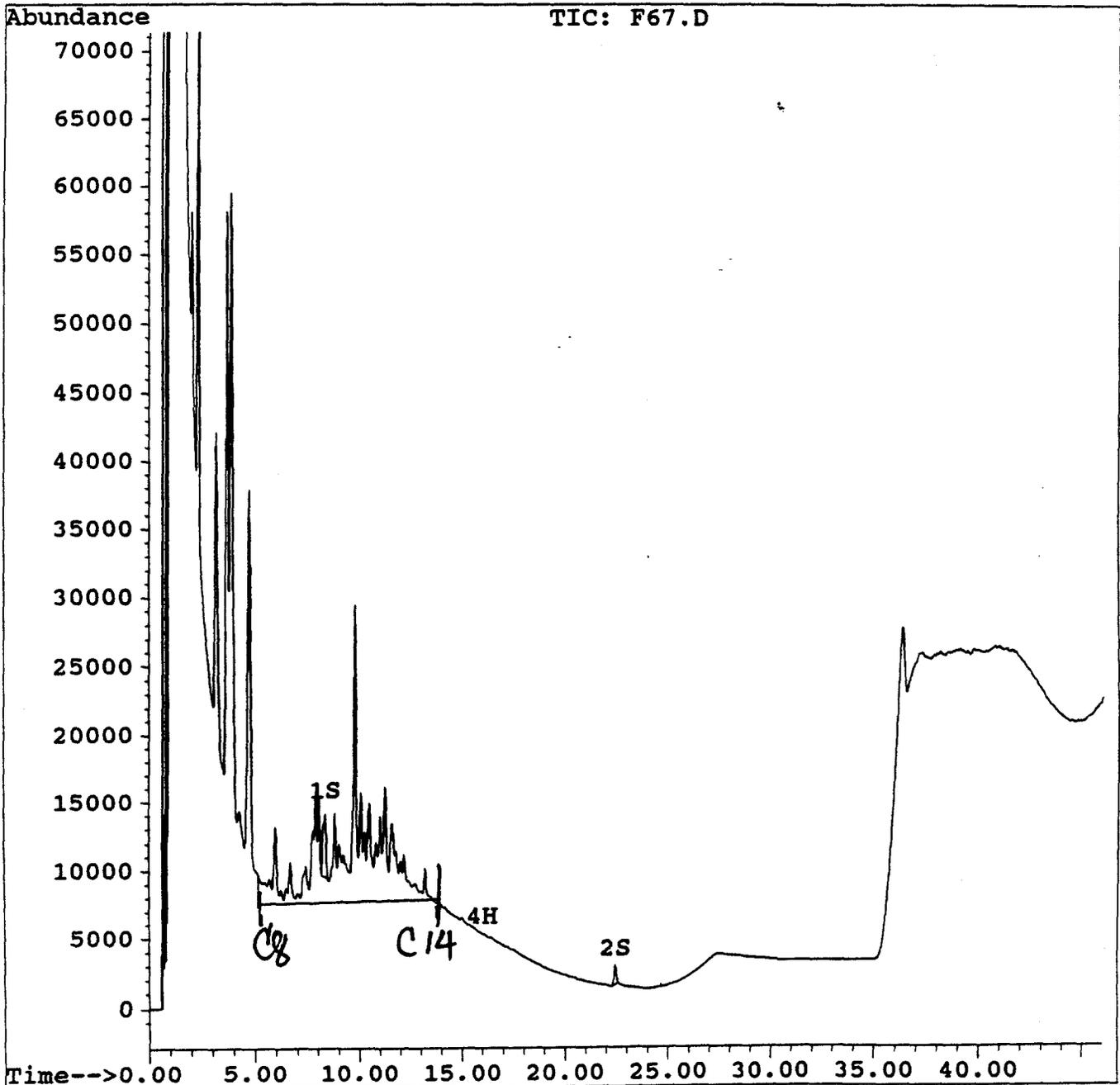
Quantitation Report

Data File : C:\HPCHEM\5\DATA\12-18-96\F67.D
Acq On : 21 Dec 96 10:42 AM
Sample : 617927
Misc : BATCH #S-6054
Quant Time: Dec 22 15:01 1996

Vial: 67
Operator: ALEX
Inst : GC TPH
Multiplr: 1.00

Method : C:\HPCHEM\5\METHODS\TPHFN2.M
Title :
Last Update : Fri Nov 22 09:49:27 1996
Response via : Multiple Level Calibration

Volume Inj. :
Signal Phase :
Signal Info :



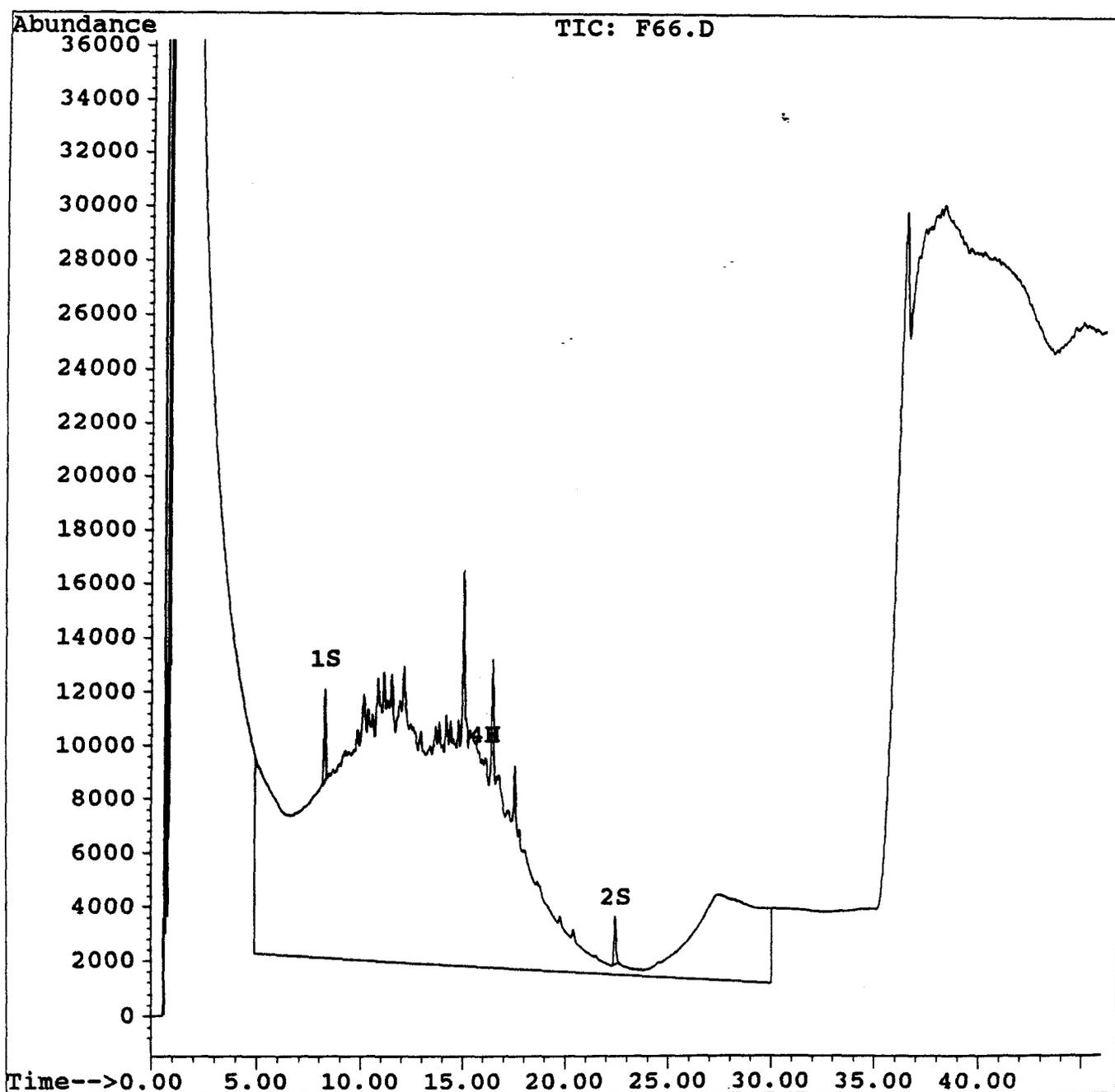
Quantitation Report

Data File : C:\HPCHEM\5\DATA\12-18-96\F66.D
Acq On : 21 Dec 96 09:46 AM
Sample : 617917
Misc : BATCH #S-6054
Quant Time: Dec 22 14:50 1996

Vial: 66
Operator: ALEX
Inst : GC TPH
Multiplr: 1.00

Method : C:\HPCHEM\5\METHODS\TPHFN2.M
Title :
Last Update : Fri Nov 22 09:49:27 1996
Response via : Multiple Level Calibration

Volume Inj. :
Signal Phase :
Signal Info :



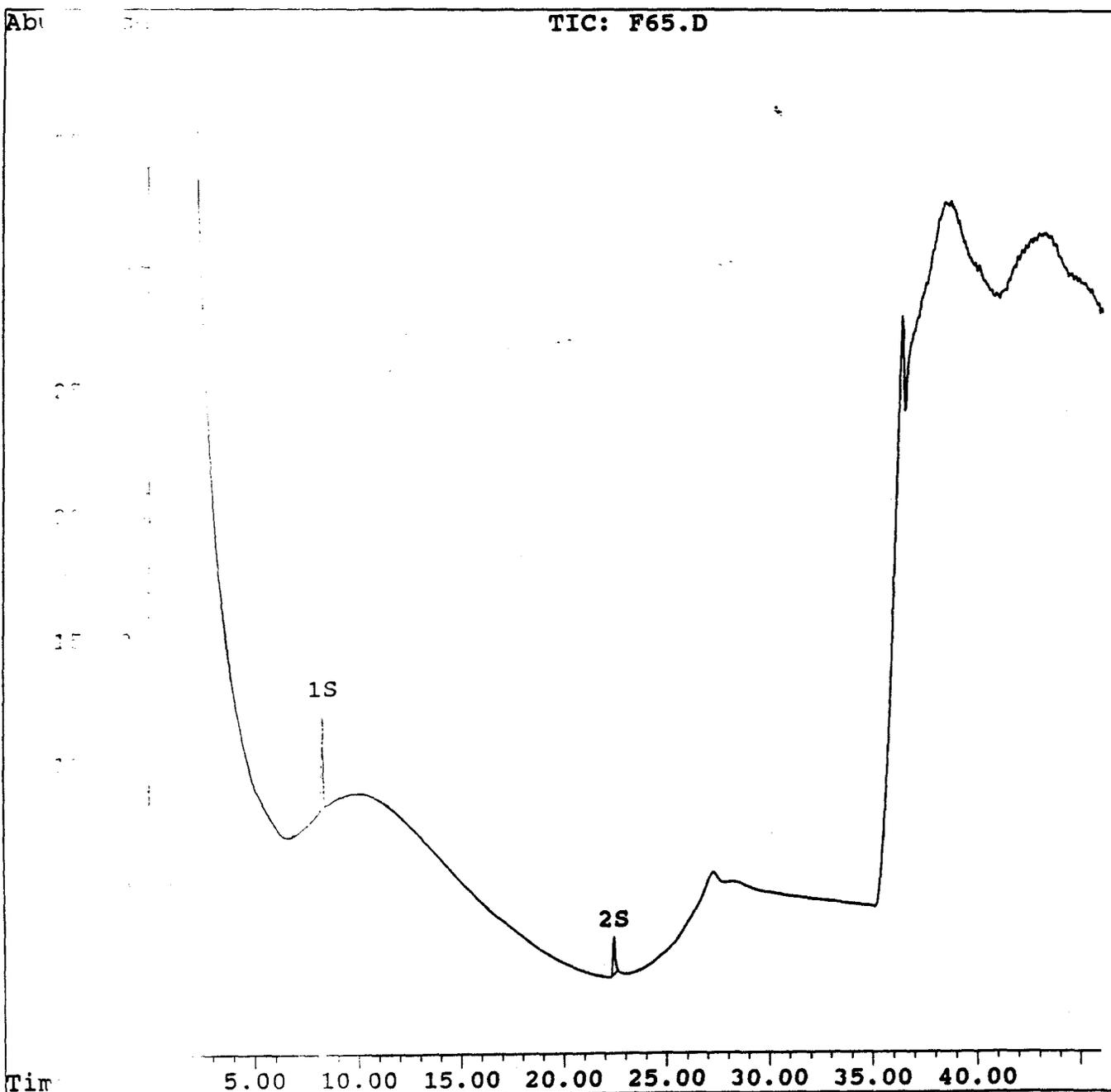
Quantitation Report

Data File : C:\HPCHEM\5\DATA\12-18-96\F65.D
Acq Date : 21 Dec 96 08:50 AM
Sample : 617916
Batch : BATCH #S-6054
Date Time: Dec 22 14:46 1996

Vial: 65
Operator: ALEX
Inst : GC TPH
Multiplr: 1.00

Method : C:\HPCHEM\5\METHODS\TPHFN2.M
Time :
Last Update : Fri Nov 22 09:49:27 1996
Processing via : Multiple Level Calibration

Vial Inj. :
Sample Phase :
Sample Info :



Quantitation Report

Date: C:\HPCHEM\5\DATA\12-18-96\F64.D
Acq: 21 Dec 96 07:55 AM
Sample: 617915
Method: BATCH #S-6054
Date: Dec 22 14:43 1996

Vial: 64
Operator: ALEX
Inst: GC TPH
Multiplr: 1.00

Method: C:\HPCHEM\5\METHODS\TPHFN2.M
Title:
Last Update: Fri Nov 22 09:49:27 1996
Reporting: Multiple Level Calibration

Vial: :
Sample: :
Date: :

