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SOUTH TEXAS PROJECT

MAIN COOLING RESERVOIR PERFORMANCE EVALUATION FOR FILLING TO ELEVATION 35

SEPTEMBER 15, 1986

HARZA
ENGINEERING COMPANY

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September 15, 1986

Mr. A. Matiuk
Project Engineering Manager
South Texas Project
Bechtel Energy Corporation
5400 Westheimer Court
Houston, Texas 77056

ST-XH-YB-22

Subject: Report on Main Cooling Reservoir
Performance During Filling to Water Surface El. 35

Dear Mr. Matiuk:

Harza is pleased to present the attached report describing the performance of the South Texas Project Main Cooling Reservoir (MCR) during filling to pool El. +35 (MSL).

Reservoir response to filling was limited primarily to changes in flow from relief wells and changes in foundation piezometer readings. There were no indications of instability and, with the exception of piezometers, there were no instrument reading changes for the embankment or appurtenant concrete structures that could be correlated with renewed reservoir filling.

Small boils were noted in portions of the MCR perimeter drainage ditches. Additional areas along the ditches were identified with marginal factors of safety against uplift. None of the features observed or identified to date, however, seriously threaten reservoir integrity at pool El. 35. The boils observed have been filtered or surrounded by sandbags to prevent movement of foundation materials. All suspect areas are visited and inspected regularly by Harza site staff.

Construction of additional relief wells and filtered seepage exits in selected reaches of the drainage ditches will be required to improve safety prior to continued reservoir filling. Design is being performed by Harza and is nearing completion. Construction is scheduled to start in January 1987, which will allow filling to continue in the latter half of 1987. Full-time monitoring of reservoir performance should continue until remedial work and reservoir filling are completed, and adequate reservoir performance has been demonstrated.

Our report provides an overview of the following major topics:

- Status of MCR and Related Features Prior to Initiation of Filling to El. 35

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- Filling Plan and History
- Rationale for Implementing Controlled Filling
- Inspections and Emergency Preparations During Filling Period
- Embankment Performance
- General Underseepage Control System Performance
- Detailed Evaluation of Specific Embankment Reaches, including the Power Block Area from Station 640+00 to Station 40+00.

Instrumentation plots and reading tabulations of various types are attached to the report to document reservoir performance.

I hope the attached report fulfills your needs. We look forward to continuing our association with Bechtel Energy Corporation.

Very truly yours,

David R. Baier, P.E., P.G.
Project Manager

Attachment

DBB/mmg

South Texas Project

Main Cooling Reservoir
Performance During Filling to Water Surface El. 35

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SOUTH TEXAS PROJECT

MAIN COOLING RESERVOIR

PERFORMANCE DURING FILLING TO WATER SURFACE ELEVATION 35

1.0 PURPOSE OF REPORT

The purpose of this report is to document the performance of the Main Cooling Reservoir (MCR) during filling from pool El. 28 to pool El. 35.

2.0 STATUS OF MCR AND RELATED FEATURES PRIOR TO FILLING TO EL. 35

Harza became involved in the South Texas Project in July 1983. At that time the reservoir water surface was just below El. 28. The pool remained at about El. 28 during the period September 1983 to August 1985. During this period remedial construction work on various water pipe penetrations through the MCR embankment was completed. This work is described in previous Harza reports.

In August 1985 the pipe penetration remedial work and relief well repair/replacement work had progressed to the point where reservoir filling could proceed and a program was developed to fill the reservoir from El. 28 to El. 35 with a monitoring program, as described in detail later in this report. The normal maximum operating MCR water level is El. 49. There were no visible indications of embankment distress or unsafe seepage conditions at reservoir El. 28.

In August 1985 the collector ditches around the MCR were in need of maintenance. Relocated Little Robbins Slough (RLRS) and the Plant Area Drainage Ditch (PADD) (see Exhibit 1, MCR Plan) contained stands of cattails that made inspection difficult. Direct observation of the bottom of certain reaches of PADD and RLRS was also restricted due to water standing in areas where the ditch invert had been lowered by erosion.

The onset of filling coincided with a distinct improvement in mowing practice in the ditches which greatly improved inspectability. However, the ditch inverts were lower than designed in areas of Relocated Little Robbins Slough and the resulting deep water created some loss of inspectability. This condition was confined for the most part to approximately 5,500 feet of the Slough from Station 370+00 to Station 425+00. However, depth and clarity of water in this area was such that major boils, if they had developed, would still have been observable. Upstream of Station 425+00 the water became more shallow and the Slough was completely inspectable during normal flow periods.

3.0 RATIONALE FOR IMPLEMENTING CONTROLLED FILLING

A controlled filling program was adopted to elicit greater response from the MCR underseepage control system and the array of piezometers used for embankment and foundation monitoring than had been observed at pool El. 28. The program was designed to develop a better understanding of the underseepage control system performance. The underseepage system had not responded significantly to the small head differential across the embankment at pool

El. 28. Annual changes in natural groundwater levels were larger than computed changes from underseepage. Filling to El. 35 would develop greater underseepage control system responses and more clearly identify the extent of any remedial work that might be necessary to improve safety at operating pool levels.

4.0 FILLING PLAN AND HISTORY

The plan for reservoir filling was to fill the reservoir to El. 35 and hold it at that level for a sustained period. The performance of the reservoir could then be evaluated and any remedial work could be implemented to permit filling of the reservoir in stages to its maximum normal operating level of El. 49. A key part of the filling plan was the ability to stop filling before reaching El. 35 if unfavorable conditions should develop.

The rate at which the reservoir can be filled is a function of water availability in the Colorado River (which is the source of water for filling the MCR) and the capacity and utilization of the make-up water pumps. After filling began during August, 1985 the reservoir water surface reached the desired goal of El. 35 on November 16, 1985. Exhibit 2 is a reservoir water surface hydrograph during the filling period.

5.0 SITE ORGANIZATION AND INSPECTIONS DURING FILLING PERIOD

The MCR embankment and appurtenant structures were closely monitored during the filling period. Houston Lighting and Power Company (HL&P),

Bechtel, Ebasco, McClelland Engineers (MEI), Harza, and the Board of Consultants were all participants in various aspects of the monitoring program. HL&P were responsible mainly for administration of the MCR maintenance program and worked closely with Bechtel, MEI and Harza. Harza was responsible for overall inspections and evaluation of the MCR embankment, preparation of weekly reports, and coordination with the maintenance contractor. MEI was responsible for underseepage investigations, ditch flow measurements, and frequent inspection for boils in the site drainage ditches. Security guards, mowing and maintenance staff were also instructed to watch for detrimental signs when performing their normal duties and to report observations to the Harza Resident Engineer through HL&P Operations.

The Harza inspection program was performed in accordance with Harza's Technical Services Contract with Bechtel. The Harza work included one complete reservoir area tour by foot or horseback once a week. The entire reservoir was toured by car or truck daily on both the toe road and crest road. Certain areas of special interest, such as boils, were visited daily. Modes of transportation during inspection were foot, horseback, four wheel all terrain vehicle (ATV), and pick-up truck.

Reading of embankment instruments was conducted by Ebasco Services in accordance with project specifications. During the filling period relief wells and piezometers were read twice monthly. Results of readings were sent to Bechtel for processing. Raw data packages were provided to Harza and MEI. The data was processed using Bechtel's GEMP computer program which produces hydrographs for each piezometer and provides cross-sectional plots of

piezometer readings at 34 instrumented cross sections around the reservoir. Turnaround time from submission of raw data packages by Ebasco to production of appropriate hydrographs and charts by Bechtel using the GEMP program was approximately two weeks.

6.0 EMERGENCY PROCEDURES DURING FILLING

A plan of operations was developed prior to reservoir filling to identify the functions and responsibilities of all members of the reservoir filling team in emergency situations if they should develop. The plan was designed so that the Harza Resident Engineer at the STP project site is the focus of operations in the unlikely event of an emergency situation. Designated personnel of Harza, Bechtel and HL&P had the authority to stop pumping of water into the reservoir to prevent further rise in reservoir elevation.

Stockpiles of fill material, gravel and sandbags were set up at Stations 105+00, 225+00, 370+00, and 580+00 around the MCR. The freeboard portion of the MCR embankment could be removed to provide sources of weighting material. Construction equipment for use during repair is permanently available on site.

7.0 EMBANKMENT PERFORMANCE DURING RESERVOIR FILLING

The MCR embankment is a rolled earth structure with a central sand core founded on a natural clay top stratum. The clay stratum overlies a silty sand which in turn overlies an alternating sequence of clay and sand units. There is no seepage cutoff in the sand units beneath the embankment.

The embankment and appurtenant structures are instrumented with fifty-seven settlement points, twenty-two structural benchmarks, twelve inclinometers, and thirty-one open standpipe piezometers that measure pore water pressures in the embankment sand core. The remaining 362 piezometers in the MCR area measure pore water pressures in the foundation sand.

No changes in embankment piezometer, settlement point or inclinometer readings were noted during or subsequent to filling that could be correlated with filling the reservoir. Piezometer hydrographs for the period April 1984 to April 1986 for the 31 embankment piezometers are shown on Exhibits 4 through 63 along with hydrographs for the remaining 362 foundation piezometers. There were no visual indications of embankment response to renewed reservoir filling. Pipe and structural penetrations through the embankment were also apparently unaffected by renewed filling.

8.0 GENERAL UNDERSEEPAGE CONTROL SYSTEM PERFORMANCE

8.1 Design Background

Relief wells have been provided in MCR reaches where foundation borings taken on the embankment centerline during the original design encountered shallow sand layers. The relief wells, located along drainage ditches beyond the downstream toe of the embankment, were designed to relieve static head and/or to intercept part of the seepage in the sand layer(s). Drainage ditches are provided around the reservoir to collect surface runoff and flows

from the relief wells. The critical locations for design of seepage and uplift control are the ditch inverts.

In general, the wells were designed to reduce uplift gradients up through the bottoms of the ditches to safe values. The original design criteria limited the uplift gradient for top stratum heave failures to about 0.65 with the reservoir at El. 49. In areas where the clay top stratum is thin, (less than 4 feet thick), the wells were designed to intercept 50 to 75 percent of the estimated seepage. In these areas the well spacing would be too close to economically control uplift gradient for top stratum heave.

The relief wells are located along the drainage ditches which are downstream of the embankment toe. Depending on stratigraphy, this feature of the design may result in areas where the sand does not extend as far downstream as the line of relief wells, yet extends beyond the embankment downstream toe. This condition would be typified by relief wells that do not flow while adjacent piezometers (between the downstream toe of the embankment and the line of relief wells) show relatively high water levels due to lack of pressure relief. This condition was identified in the Kelly Lake reach of the Plant Area Drainage Ditch during filling (See paragraph 9.3 below) and is termed a "blocked seepage exit". Additional relief wells were installed in the Kelly Lake reach at the toe of the embankment to relieve pressure.

8.2 Piezometer Observations During Filling

Hydrographs for the period of filling from pool El. 28 to El. 35 for all piezometers in the embankment area are given on Exhibits 4 through 63. Exhibits 64 through 97 are plots of piezometer levels at MCR El. 35 for the 34 instrumented cross sections. For the instrumented sections the piezometer levels are plotted to scale on embankment cross-sections to allow evaluation of gradients in the sand aquifer under the embankment. Water levels in the piezometers have been connected with straight line segments on the Exhibits to approximate the piezometric surface in the sand layer(s).

The clay top stratum passes beneath the embankment and extends upstream under the reservoir. During original design the effective seepage entrance into the underlying aquifer was computed on the basis of empirical data published by the Corps of Engineers from prior studies of levee performance along the Mississippi River. From Exhibits 64 through 97 it is possible to find the location of the effective seepage entrance by extrapolation of the observed piezometric data and then to compare the calculated location of the effective seepage entrance and the actual estimated location based on filling data. The effective seepage entrance distance found using actual piezometer data was shorter but generally compared well with the effective seepage distances calculated during original design (See Table 1).

Piezometer readings at both El. 28 and El. 35 are shown on Exhibits 98 through 131. These Exhibits are computer generated longitudinal stratigraphic

profiles around the reservoir at the line of relief wells using the Harza Instrument Monitoring System (HIMS) computer program develop to aid the site staff in their day to day engineering evaluations. The stratigraphic information on these profiles is based on available piezometer logs at the line of relief wells. Piezometer levels and relief well flows are plotted from data packages supplied by Ebasco. During subsequent filling periods, plots similar to Exhibits 98 through 131 will be generated monthly for review by site monitoring staff.

The piezometer readings taken at reservoir water surface El. 28, and the readings taken in April 1986 after the reservoir reached El. 35, are nearly coincident and within one foot of each other for long lengths of ditch. Areas where the El. 28 and El. 35 readings are significantly different are limited to reaches where the top stratum is thick and there are either no relief wells provided, or the relief well spacing exceeds 100 feet. Table 2 is a listing of piezometers along the well line where the difference between El. 28 and El. 35 readings is thought to be significant (greater than a 2-foot change) and probably represents phenomena other than seasonal variation in regional groundwater levels.

Piezometer response to reservoir filling was rapid during the filling period and, with some exceptions, there has been little change since pool El. 35 was reached. Table 3 is a listing of (i) all piezometers along the relief well line that have risen by more than 0.5 feet during the period January to May 1986 (a stable period) and (ii) those relief wells that have increased in flow more than 1 gpm during the same period. Comparatively large changes in both piezometer readings and relief well flows occur together in the vicinity of Station 435+00. Greatest piezometric reading changes are noted between Stations 125+00 and 165+00 where there are no relief wells and a horizontal drainage blanket was incorporated in the original design. These areas are discussed further in paragraph 9.6.

8.3 Uplift Factors of Safety at El. 35

Factors of safety against uplift heave at reservoir El. 35 have been computed for all embankment area piezometers. The criteria against which the adequacy of the computed factors of safety are assessed was discussed at the sixth meeting of the Board of Consultants on January 3, 1986. At the meeting the Board of Consultants recommended using 1.5 as an appropriate minimum factor of safety for the MCR against top stratum uplift. The factor of safety was to be taken against the critical gradient for the material in question which is defined as the submerged unit weight of the soil divided by the unit weight of water. Harza reviewed unit weights for 72 tests from samples of clay top stratum taken from around the reservoir. The result is an average critical gradient of about 1.0. This is the exit gradient across the top stratum in the ditch inverts for which the factor of safety would be 1.0.

Applying a factor of safety of 1.5 reduces the permissible uplift gradient to 0.67.

The calculated piezometric head in the drainage ditch inverts for a factor of safety of 1.5 is plotted on Exhibits 98 through 131. This line is a plot of projected allowable head in that particular location based on the stratigraphy. From the Exhibits it can be seen that the factor of safety is below 1.5 in the ditch inverts at pool El. 35 in the areas listed on Table 4.

The areas identified on the Table include portions of Relocated Little Robbins Slough (RLRS), portions of the Plant Area Drainage Ditch (PADD) and various other ditches, some of which are concrete-lined. While the locations listed on the Table have theoretical uplift factors of safety of less than 1.5 (and some have factors of safety less than 1.0), there are no visual indications of instability or dangerous seepage phenomena at the above or any other locations around the MCR. Small boils have developed in many of these areas, especially those areas with a thin top stratum. Most larger boils have been filtered and are regularly observed. Remedial work is required in these low safety factor areas to achieve a factor of safety of 1.5 and to filter all boils before reservoir filling resumes. Sand drains, relief wells or filtered seepage exits are recommended. Layout of new wells or drains will be based on projected uplift pressures at reservoir El. 49.

8.4 Gradients under MCR Embankment

Hydraulic gradients under the MCR embankment have been computed from piezometer readings at water surface El. 35 for each of the 34 instrumented embankment sections on Exhibits 64 through 97. The maximum computed straight line gradient is 0.053 at Station 160+00. This is an area where there are no relief wells and a horizontal sand drainage blanket is provided under the downstream shell of the embankment. With the exception of this one area where complex stratigraphy may make the concept of straight line gradient construction inappropriate, the computed gradients are less than 0.03 for the entire MCR. A gradient of 0.04 has been established by Harza from review of failures at other projects as a conservative threshold straight line hydraulic gradient from the effective seepage entrance in the reservoir to the line of relief wells. If an observed gradient exceeds this value, investigative actions will be implemented. Piezometer readings to date do not indicate the need for any remedial action based on this criteria.

9.0 EVALUATION OF SPECIFIC EMBANKMENT REACHES

9.1 Power Block Reach-Station 640+00 to Station 40+00

No signs of instability or seepage were noted in the embankment, toe ditches, or Plant Area Drainage Ditch in the Power Block Reach except for small pin boils at Station 32+00. The small boils have been sandbagged to increase head on the boils and prevent movement of sand. The area is visited by Harza engineers daily.

This reach contains 110 piezometers, or about 28% of all piezometers in the MCR embankment area. The clay top stratum is over 20 feet thick at Station 640+00 and averages about 15 feet thick from Station 642+00 to Station 0+00. Top stratum thickness generally exceeds 10 feet from Station 0+00 to about Station 20+00 where, according to available borings, the top stratum thins gradually and is exposed in the PADD invert at Station 40+00.

Piezometer levels in portions of the Power Block Reach are affected by the Power Block construction area dewatering system. From GEMP plots (Exhibits 4 through 63), the extent of the effect is from about Station 0+00 to Station 20+00. The effect of the Power Block dewatering system and piezometric levels under the embankment is indicative of stratigraphic continuity rather than blocked seepage exits.

Straight line hydraulic gradients under the embankment calculated using El. 35 piezometer readings are less than 0.04 for the entire Power Block Reach.

The small boils noted at Station 32+00 in the PADD invert occur in a location where the top stratum is thin and the relief well system was designed for seepage interception. The boils are not actively piping material from the foundation and the water from the boils is clear. The area is visited and inspected daily. A filtered seepage exit should be constructed in this location as part of an overall PADD rehabilitation program before reservoir filling resumes.

9.2 Plant Area Drainage Ditch - Station 40+00 to Station 92+50

Small boils and seeps were observed in this reach during filling. Ditch and slough mowing practice improved greatly at the beginning of filling from El. 28 to El. 35. As a result, it is difficult to determine if the boils observed during filling developed because of renewed filling, or if the boils had been in existence for long periods with the reservoir at El. 28 and had only become visible when ditch maintenance improved. Locations of boils observed in the PADD are listed on Table 5.

The boils are located inside or adjacent to those areas where, according to available stratigraphic data, the top stratum is less than 4 feet thick or at the edges of areas where sand is exposed on the ditch bottom. None of the boils observed produces a significant amount of material. The largest boils noted were about 1 inch in diameter at the bottom of the throat. All of the larger boils have been sandbagged to raise the head around the boils, or the boils have been filtered with filter cloth and aggregate. This has virtually eliminated sand movement. Smaller boils have been flagged for identification. A filtered seepage exit will be constructed in the ditch invert for this entire reach beginning in Spring, 1987.

Review of GEMP piezometer plots at the three instrumented cross sections in this reach does not indicate the presence of blocked seepage exits to the relief well line that could result in unacceptable piezometer levels between the embankment and the relief wells when reservoir filling resumes.

9.3 Plant Area Drainage Ditch - Station 92+50 to Station 115+00 - Kelly Lake Area

The reach of the embankment opposite Kelly Lake between Station 92+50 and Station 115+00 along the Plant Area Drainage Ditch has been a matter of concern for several years. Borings have indicated that the sand aquifer extends beyond the relief wells in portions of this reach and could theoretically be exposed in the bottom of Kelly Lake. The initial concern was that the relief wells might not intercept sufficient underseepage and that flow-by in the aquifer into the lake could cause boil development in the lake which would be difficult to detect in the 3 to 5 foot deep lake water.

During reservoir filling an area opposite Kelly Lake near Station 102+50 exhibited both high relief well flows, and high piezometer levels in the area between the wells and the embankment toe on the embankment side of the Heavy Haul Road. Uplift factors of safety in the area between the dam toe and the line of the relief wells were approaching unity. A program of additional subsurface drilling was performed to help analyze stratigraphy in the area and gather data to explain the observed piezometer and well behavior. From the borings it was concluded that the sand layer became thinner in the direction of the wells and disappeared just beyond the wells, between the wells and Kelly Lake. The result was a blocked seepage exit which caused an increase in head in the aquifer and correspondingly higher flows from the adjacent relief wells.

In response to this situation MEI designed a system of 7 new relief wells connected to a common buried header on the embankment side of the Heavy Haul Road about 60 feet closer to the embankment than the line of the original relief wells. The new wells were installed in November, 1985 and have performed well since that time. Factors of safety with respect to underseepage in this area are acceptable for pool El. 35. Some of the piezometers in the area show factors of safety less than 1.5, but the heads are considered to be due to groundwater, rather than underseepage.

A detailed study on the issues relative to the Kelly Lake area was completed in December 1985. The study report, later submitted to the Project, did not indicate immediate concerns in the area. Exhibit 131 is a cross section near Kelly Lake that shows the typical blocked seepage exit conditions encountered.

9.4 Concrete Lined Collector Ditches

From Exhibits 98 through 131, it can be seen that there are several areas of the concrete lined ditches with high piezometric levels. Minor cracking in the concrete at several of these locations was monitored. No movements have been detected and the detection program has been abandoned. The areas are visited regularly by Harza inspectors.

9.6 Station 130+00 to 165+00

Comparatively large increases in piezometer levels have been noted in the area near Station 133+00 since January, 1986. This is an area where there are no relief wells, but a horizontal drainage blanket is incorporated beneath the downstream shell of the embankment. Sands were identified in several areas similar to this at the time of original design, but no major aquifer could be delineated. A horizontal sand drain was provided and connected to the central embankment sand core in similar areas around the reservoir. There are no signs of instability or seepage in the area. While the piezometers have risen since filling was completed, the pressures are measured in a sand unit over 15 feet below the surface. Factors of safety as indicated by these piezometers are greater than 1.5 at pool El. 35 and for projected piezometric levels at pool El. 49.

9.7 Relocated Little Robbins Slough

9.7.1 Boils and Seeps

Small boils and seeps were noted in Relocated Little Robbins Slough during reservoir filling. Size and method of treatment for these boils are similar to those for the boils observed in the PADD. Locations of boils observed are listed on Table 6. As with the boils observed in the PADD, the boils noted in RLRS are located in areas with thin top stratum or at the edges of areas where sand is exposed on the bottom of the Slough. Filtered seepage exits will be constructed in these areas beginning in Spring, 1987.

9.7.2 Boils at Station 433+50

Boils in the bottom of the Slough at Station 433+50 developed in an area which was previously thought to have a thick clay top stratum. The first boil in this area was discovered in April 1986. Exploratory borings were taken to analyze the stratigraphy in the area subsequent to discovery of additional boils. Small sand lenses were found. The boils continued to develop and a small slump on the bank of the Slough occurred. The area was repaired with filter cloth and coarse concrete aggregate. The repaired areas are performing adequately, but more durable long-term repairs will be accomplished prior to renewed reservoir filling.

9.7.3 Slumps at Station 375+00

A number of small slumps were noted on both banks of Relocated Little Robbins Slough during filling. These are small features that are to be expected as a result of steeper banks where the invert is lower than designed due to erosion. There was, however, one larger slide on the reservoir side of the Slough at Station 375+00 near the area where Relocated Little Robbins Slough rejoins the natural water course. The slide in this area does not affect embankment stability at this time and is scheduled for repairs in the near future. All slumps are scheduled for repair as part of the remedial work planned in Relocated Little Robbins Slough.

10.0 CONCLUSIONS AND RECOMMENDATIONS

Controlled filling has resulted in a better understanding of the underseepage control system. The site organization responsible for monitoring the reservoir during periods of filling has proved to be effective. While areas of concern have been identified, the procedures for monitoring and treating these areas have proven satisfactory. It is Harza's opinion that the reservoir could be held at El. 35 indefinitely in its present condition without major remedial work if the present level of surveillance continues. If the reservoir is to be raised to higher levels, remedial work is recommended. Until such work is completed, the present program of monitoring and observation should be continued.

Harza concurs with the Board of Consultants that the minimum uplift factor of safety at the South Texas Project MCR should be 1.50 and that all boils should be filtered.

From Exhibit 97 through Exhibit 130 it can be concluded that there are lengths of the ditches, Slough, and Spillway Channel that will require remedial work before reservoir filling to higher water surface elevations begins again. In areas of thick top stratum and low factors of safety, additional relief wells are indicated. For blocked seepage exit conditions relief wells should be located at the toe of the embankments. Wells should be designed to limit uplift factors of safety to a maximum of 1.5 for projected uplift pressures at pool El. 49. In areas where the top stratum is thin or non-existent or if boils develop filtered seepage exits should be provided.

Details of providing filtered seepage exits are presently being studied along with the evaluation of methods to restore the invert of Relocated Little Robbins Slough and PADD to design grade. The alternatives being studied at this time include granular filters with well-graded riprap or heavy duty geotextile filter fabric in combination with a uniformly graded riprap. Several methods of installing filtered exits in the areas where the top clay stratum is thin and the ditches are concrete-lined are also being studied to determine the most effective and economical approach.

In other localized areas where problems may develop positive seepage control measures will be employed.

MCR remedial construction is scheduled to begin in January 1987. In the interim, reservoir water surface elevation should be permitted to fall to El. 33 to accomodate precipitation from the 100-year maximum monthly rainfall. No make-up water should be pumped into the reservoir if the pool is above El. 33. Detailed MCR instrument monitoring and inspection should continue.

Table 1

Distance to Effective Source of Seepage[1/]

Station	Piezometers (P-)	Source of Seepage (ft) Design[2/]	Observed @ MCR Pool El. 35[2/]	Deviation (%)
2+55	0-1, 1-1, 2-1	820	760	-7
7+00	5-7	-	890	-
11+00	9-11	-	870	-
20+00	13-15, 168	3250	2810	-14
40+20	17-19, 170	980	1640	67
59+20	21-23, 172	970	1020	5
79+80	25-27, 174	1040	1570	51
100+20	29-31, 176	1100	580	-47
105+00	143-145	-	490	-
140+40	34-36, 178	660	720	9
160+00	38-40, 180	-	410	-
180+25	42-44, 182	890	570	-36
200+20	46-48, 184	980	920	-6
219+80	50-52, 186	1020	2710	166
226+40	53-55, 188	1070	1640	53
240+00	57-59, 190	1080	1610	49
250+00	60, 152, 153	1110	970	-13
260+25	61-63, 192	1000	1150	15
283+00	64-66, 194	2080	1460	-30
300+00	68-70, 196	1030	900	-13
320+00	72-74, 198	1000	1130	13
359+60	77-79, 200	1100	1100	0
380+00	81-83, 202	4800	1480	-69
400+50	85-87, 204	2750	950	-65
420+00	89-91, 206	2600	1550	-40
440+20	93-94, 208	1290	1030	-20
460+10	97-99, 210	2330	1260	-46
491+00	101-103, 212	4850	1450	-70
511+00	105-107, 214	1670	900	-46
531+00	109-111, 216	1660	960	-42
550+50	113-115, 218	1950	940	-52
570+35	116-118, 220	940	1230	31
590+00	120-122, 222	730	430	-41
610+00	124-125, 224	1080	890	-18
629+00	128-130, 226	2250	970	-57

1/ Horizontal distance from effective source of seepage in the reservoir to the landside embankment toe.

2/ Calculated by MEI.

Table 2

Piezometers On Well-Line with Two (2) Feet or More Difference Between Reservoir El. 28 and El. 35 Readings

Piezometers (P-)	Station	Differences between El. 28 and El. 35 Readings
310	25+00	2.00
236	135+00	2.70
237	140+00	3.10
238	145+00	2.80
37	150+00	2.70
239	155+50	2.10
240	159+80	2.20
52	219+80	2.10
56	230+95	2.20
58	240+00	2.30
63	260+25	2.00
259	262+25	2.00
138	266+00	2.20
139	272+00	2.40
140	278+00	2.20
84	389+50	2.00
159	405+00	2.00
88	410+00	2.10
95	440+20	2.30
96	450+50	3.20
99	460+10	2.30
104	501+00	2.10
108	521+00	2.00
111	531+00	3.00
246	536+50	2.50
112	541+00	2.30
115	550+50	2.10
119	580+40	2.60
275	593+45	2.70
276	597+00	3.20
250	615+00	2.30
127	619+00	2.50
252	634+00	2.30
131	639+00	2.20
290	644+20	2.30
292	646+80	2.10
278	648+00	2.20
244	649+40	2.00

Table 3

Comparison of Data Packages from January 1986 and May 1986

PIEZOMETERS ALONG THE LINE OF RELIEF WELLS WITH MORE THAN 0.5 FEET CHANGE

PIEZOMETER	STATION	PIEZOMETER	STATION
P-8	7+00	P-268	416+55
P-331	97+50	P-269	427+50
P-338	100+00	P-271	443+25
P-236	135+00	P-272	446+90
P-237	140+00	P-273	454+45
P-238	145+00	P-256	545+00

This represents less than 5% of all piezometers along the line of relief wells.

RELIEF WELLS WITH MORE THAN 1 GPM CHANGE

WELL	STATION	WELL	STATION
80	79+80	512	392+40
83	81+00	544	434+17
206	205+60	547A	437+65
212 (-)	208+00	549A	439+35
406	303+00	551	440+89
416	307+00	552A	442+35
431	313+00	570	463+00
435	314+60	571A	465+40
436	315+18	572A	467+25
441	317+00	574	470+00
504	377+00	575	471+75
505	379+00	577	475+25
506	381+00	578	477+25
510	388+20	584A	477+00
511	390+40	(-) = DECREASE	

This represents about 20% of all relief wells.

Table 4

Areas with Ditch Factor of Safety Less Than 1.5

Piezometer Number	Station	Measured Piezometric Level	Calculated Piezometric Level FS = 1.5	Calculated F.S. at El. 35
P322	37+50	18.0	17.6	1.03*
P324	38+80	18.0	17.7	1.16*
P394	40+20	18.5	18.1	1.22*
P397	59+60	18.8	18.2	1.12
P399	70+20	18.4	17.7	1.09
P280	83+45	17.5	16.8	1.00
P31	100+20	18.3	17.7	1.26
P32	110+00	17.4	14.4	0.38*
P37	150+00	19.7	17.6	0.88
P41	170+40	17.0	16.2	1.16
P281	185+24	13.5	11.9	0.67*
P83	380+00	12.9	10.6	1.34
P265	384+00	11.3	10.5	1.32
P84	389+50	13.8	9.3	0.99
P266	391+40	11.5	9.5	1.28
P88	410+00	16.0	11.1	1.02
P268	416+55	11.8	10.7	1.46
P91	420+00	11.9	11.2	1.33
P269	427+50	10.4	8.6	1.02
P92	430+00	11.7	9.0	0.93
P270	435+60	12.4	8.4	0.62
P95	440+20	14.7	10.7	1.11
P274	485+00	16.3	15.5	1.40
P111	531+00	22.9	21.9	1.34
P118	570+35	21.6	20.9	1.32

* Denotes area with top stratum less than 2 feet thick.

The above piezometer locations represent about 15% of all piezometer locations around the reservoir on the relief well line.

Table 5

Location of Boils
Plant Area Drainage Ditch

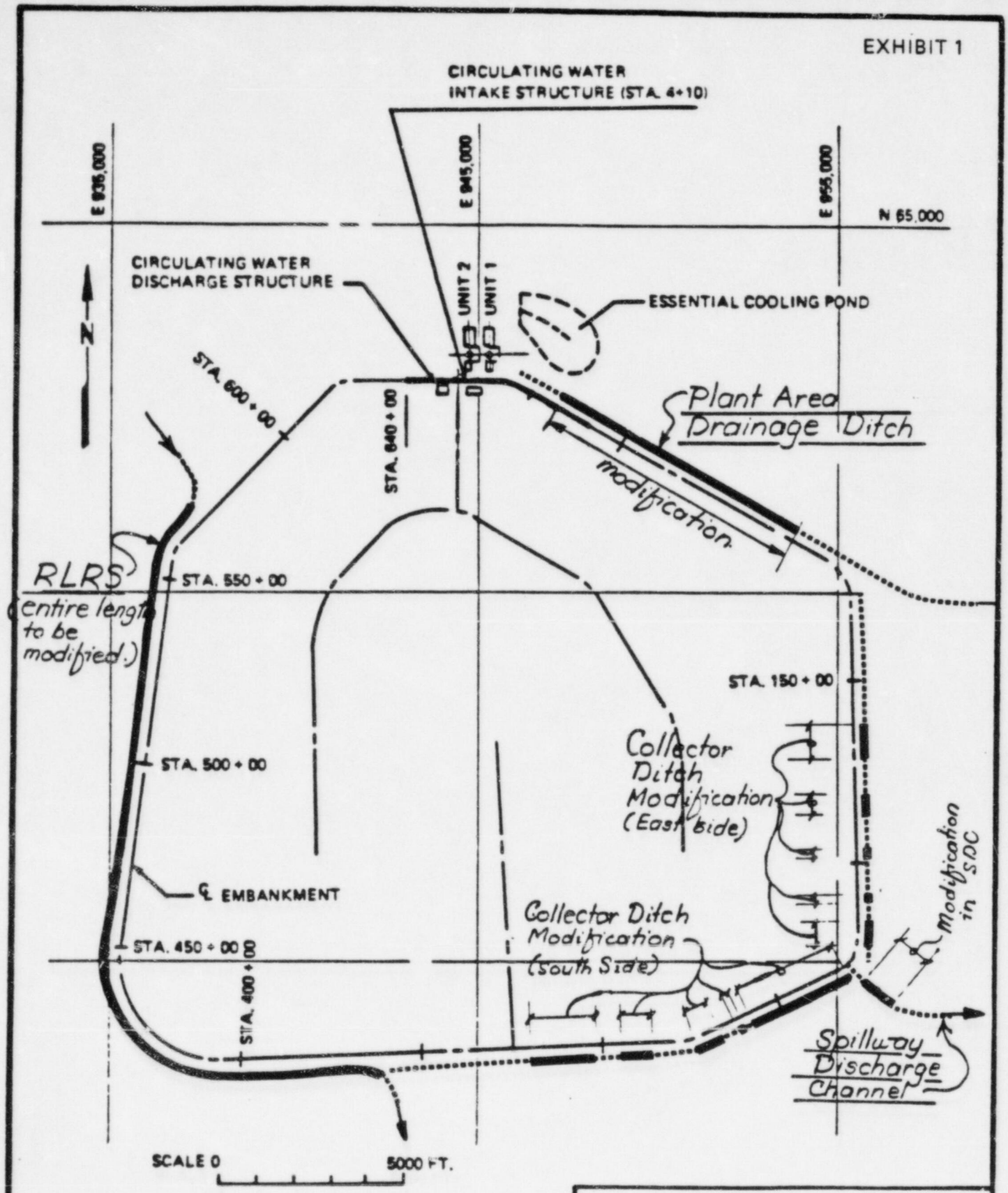
Station	Description
49+00	Pin Boils
66+00	Small Boils
80+00	Small Boils
81+00	Small Boils
81+50	Small Boils
84+00	Small Boils
84+50	Small Boils
86+00	Seepage
114+00	Seepage

Table 6

Location of Boils
Relocated Little Robbins Slough

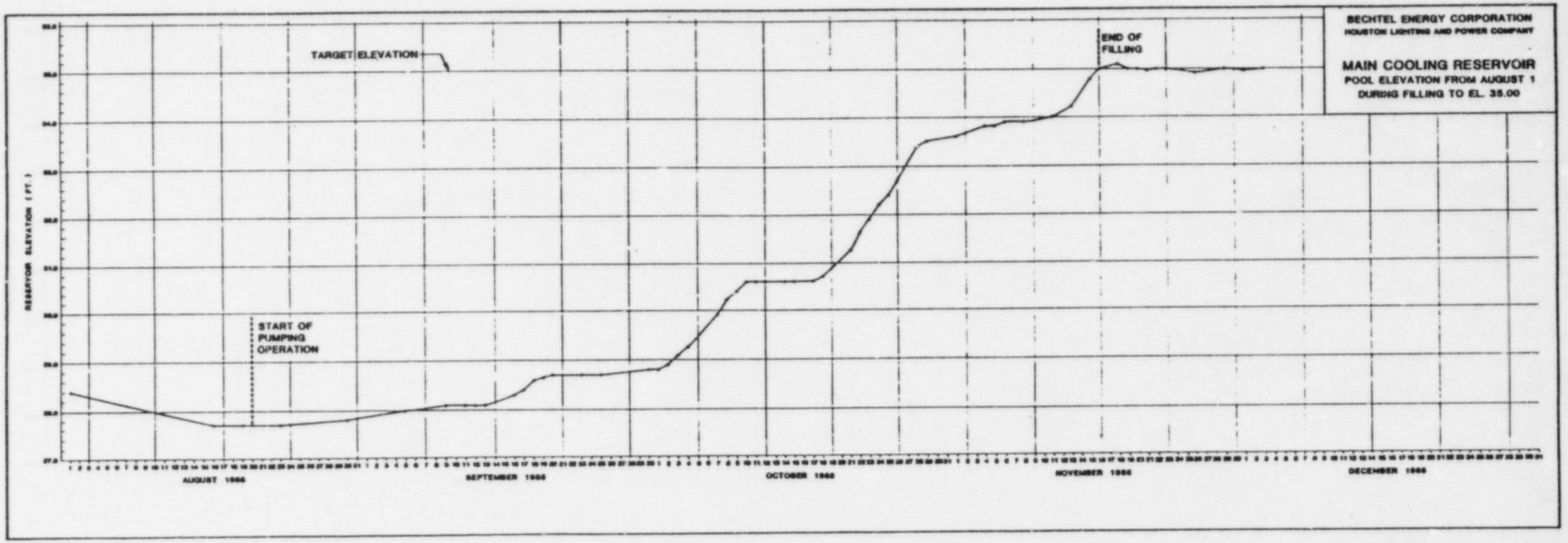
Station	Description
433+50	Small Boils
443+50	Small Boils
443+75	Small Boils
445+75	Small Boils
446+95	Small Boils
442+00	Small Boils
447+50	Small Boils
448+00	Small Boils
448+50	Small Boils
454+00	Pin Boils
455+25	Pin Boils & Seepage
456+50	Pin Boils
459+50	Small Boils
460+00	Seepage
497+50	Seepage
506+00	Seepage
544+00	Pin Boils
545+00	Seepage
547+50	Pin Boils
548+30	Seepage
552+10	Seepage
554+40	Boils

EXHIBIT 1



MAIN COOLING
RESERVOIR
KEY PLAN

EXHIBIT 2


BECHTEL ENERGY CORPORATION
HOUSTON LIGHTING AND POWER COMPANY
MAIN COOLING RESERVOIR
POOL ELEVATION FROM AUGUST 1
DURING FILLING TO EL. 35.00
TARGET ELEVATION
END OF FILLING
START OF PUMPING OPERATION
RESERVOIR ELEVATION (FT.)
AUGUST 1986
SEPTEMBER 1986
OCTOBER 1986
NOVEMBER 1986
DECEMBER 1986

MAIN COOLING RESERVOIR PIEZOMETER DATA

Reference Drawing: 9Y51 0-H-1163

Piez. No.	Embank. Station	Tip* Elev.	Location**	Piez. No.	Embank. Station	Tip* Elev.	Location**
P0-1(14)	2 + 65	-8.0	A	P32	110 + 00	-18.0	D
P0-2(14)	2 + 70	-16.0	A	P33	120 + 20	-23.0	C
P0-3(14)	2 + 75	-50.0	A	P34	130 + 40	-7.0	A
P1-1	2 + 65	-8.0	B	P35	130 + 40	-7.0	B
P1-2	2 + 70	-16.0	B	P36	130 + 40	-7.0	C
P1-3	2 + 75	-50.0	B	P37	150 + 00	-24.0	C
P2-1	2 + 65	-8.0	C	P38	160 + 00	0.0	A
P2-2	2 + 70	-16.0	C	P39	160 + 00	0.0	B
P2-3	2 + 75	-50.0	C	P40	160 + 00	0.0	C
P3-1	2 + 65	-8.0	400'(1)	P41	170 + 40	-3.0	C
P3-2	2 + 70	-16.0	400'(1)	P42	180 + 25	-1.0	A
P3-3	2 + 75	-50.0	400'(1)	P43	180 + 25	-1.0	B
P4	3 + 39	+9.0	C	P44	180 + 25	-1.0	C
P5	7 + 00	-6.0	A	P45	190 + 40	-2.0	C
P6	7 + 00	-6.0	B	P46	200 + 20	-7.0	A
P7	7 + 00	-6.0	C	P47	200 + 20	-7.0	B
P8	7 + 00	-6.0	415'(1)	P48	200 + 20	-7.0	C
P9	11 + 00	-1.0	A	P49	209 + 80	-16.0	C
P10	11 + 00	-1.0	B	P50	219 + 80	-25.0	A
P11	11 + 00	-1.0	C	P51	219 + 80	-25.0	B
P12(14)	11 + 00	-1.0	400'(1)	P52	219 + 80	-25.0	C
P13	20 + 00	-15.0	A	P53	226 + 40	-20.0	A
P14	20 + 00	-15.0	B	P54	226 + 40	-20.0	B
P15	20 + 00	-15.0	C	P55	226 + 40	-20.0	C
P16	30 + 00	-8.0	C	P56	230 + 20	-17.0	C
P17	40 + 20	-10.0	A	P57	240 + 00	-23.0	A
P18	40 + 20	-10.0	B	P58	240 + 00	-23.0	B
P19	40 + 20	-10.0	C	P59	240 + 00	-23.0	C
P20	49 + 80	-9.0	C	P60	250 + 00	-21.0	C
P21	59 + 60	-9.0	A	P61	260 + 25	-13.0	A
P22	59 + 60	-9.0	B	P62	260 + 25	-13.0	B
P23	59 + 60	-9.0	C	P63	260 + 25	-13.0	C
P24	70 + 20	-16.0	C	P64	283 + 00	-9.0	A
P25	79 + 80	-15.0	A	P65	283 + 00	-9.0	B
P26	79 + 80	-15.0	B	P66	283 + 00	-9.0	C
P27	79 + 80	-15.0	C	P67	290 + 25	-16.0	C
P28	89 + 20	-9.0	C	P68	300 + 00	-19.0	A
P29	100 + 20	-5.0	A	P69	300 + 00	-19.0	B
P30	100 + 20	-5.0	B	P70	300 + 00	-19.0	C
P31	100 + 20	-5.0	D	P71	310 + 00	-25.0	C

MAIN COOLING RESERVOIR PIEZOMETER DATA

Reference Drawing: 9Y51 O-H-1163

Piez. No.	Embank. Station	Tip* Elev.	Location**	Piez. No.	Embank. Station	Tip* Elev.	Location**
P72	320 + 00	-8.0	A	P112	541 + 00	-10.0	C
P73	320 + 00	-8.0	B	P113	550 + 50	-3.0	A
P74	320 + 00	-8.0	C	P114	550 + 50	-3.0	B
P75	330 + 25	-21.0	C	P115	550 + 50	-3.0	C
P76	350 + 00	-17.0	C	P116	570 + 35	-11.0	A
P77	359 + 60	-0.0	A	P117	570 + 35	-11.0	B
P78	359 + 60	-0.0	B	P118	570 + 35	-11.0	C
P79	359 + 60	-0.0	C	P119	580 + 40	-13.0	C
P80	370 + 20	-26.0	C	P120	590 + 40	+4.0	A
P81	380 + 00	-24.0	A	P121	590 + 40	+4.0	B
P82	380 + 00	-24.0	B	P122	590 + 40	+4.0	C
P83	380 + 00	-24.0	C	P123	601 + 00	-12.0	C
P84	389 + 50	-24.0	C	P124	610 + 00	-12.0	A
P85	400 + 50	-22.0	A	P125	610 + 00	-12.0	B
P86	400 + 50	-22.0	B	P126	610 + 00	-6.0	C
P87	400 + 50	-22.0	C	P127	619 + 00	-13.0	C
P88	410 + 00	-23.0	C	P128	629 + 00	-13.0	A
P89	420 + 00	-22.0	A	P129	629 + 00	-13.0	B
P90	420 + 00	-22.0	B	P130	629 + 00	-13.0	C
P91	420 + 00	-22.0	C	P131	639 + 00	-14.0	C
P92	430 + 00	-22.0	C	P132(14)	652 + 20	-16.0	A
P93	440 + 20	-4.0	A	P133(14)	652 + 00	-16.0	B
P94	440 + 20	-4.0	B	P134	652 + 00	-16.0	C
P95	440 + 20	-4.0	C	P135	652 + 00	-16.0	400'(1)
P96	450 + 50	-4.0	C	P136	245 + 00	-6.6	C
P97	460 + 10	-22.0	A	P137	255 + 05	-6.7	C
P98	460 + 10	-22.0	B	P138	265 + 95	-8.3	C
P99	460 + 10	-22.0	C	P139	272 + 05	-12.8	C
P100	470 + 90	-20.0	C	P140	278 + 00	-12.4	C
P101	491 + 00	-22.0	A	P141	233 + 95	-13.8	C
P102	491 + 00	-22.0	B	P142	248 + 40	-10.8	C
P103	491 + 00	-22.0	C	P143	105 + 00	0.0	A
P104	501 + 00	-16.0	C	P144	105 + 00	-4.5	B
P105	511 + 00	-22.0	A	P145	105 + 00	-7.5	C
P106	511 + 00	-22.0	B	P146	135 + 00	16.8	A
P107	511 + 00	-22.0	C	P147	135 + 00	19.2	B
P108	521 + 00	-15.0	C	P148	153 + 70	17.6	A
P109	531 + 00	-13.0	A	P149	153 + 50	17.3	B
P110	531 + 00	-13.0	B	P150	270 + 00	15.8	A
P111	531 + 00	-13.0	C	P151	269 + 80	16.1	B

MAIN COOLING RESERVOIR PIEZOMETER DATA

Reference Drawing: 9Y51 0-H-1163

Piez. No.	Embank. Station	Tip* Elev.	Location**	Piez. No.	Embank. Station	Tip* Elev.	Location**
P152	250 + 00	-8.8	A	P192	260 + 25	-11.1	(6)
P153	250 + 00	-3.8	B	P193	283 + 00	16.2	(5)
P154	559 + 50	24.9	A	P194	283 + 00	-13.5	(6)
P155	559 + 50	23.9	B	P195	300 + 00	15.5	(5)
P156	318 + 00	-3.8	A	P196	300 + 00	-4.8	(6)
P157	318 + 00	-5.0	B	P197	320 + 00	15.5	(5)
P158	365 + 10	-13.2	A	P198	320 + 00	-8.5	(6)
P159	405 + 00	-13.8	C	P199	359 + 60	16.0	(5)
P160	(2)	-16.7	-	P200	359 + 60	-17.3	(6)
P161	(3)	-17.9	-	P201	380 + 00	22.1	(5)
P162	(4)	-17.1	-	P202	380 + 00	-16.8	(6)
P163	7 + 00	26.4	(5)	P203	400 + 50	29.5	(5)
P164	Deleted from Program			P204	400 + 50	-16.8	(6)
P165	11 + 00	26.9	(5)	P205	420 + 00	23.1	(5)
P166	Deleted from Program			P206	420 + 00	-10.5	(6)
P167	20 + 00	26.7	(5)	P207	440 + 20	24.6	(5)
P168	20 + 00	2.3	(7)	P208	440 + 20	-12.6	(6)
P169	40 + 20	26.4	(5)	P209	460 + 10	26.7	(5)
P170	40 + 20	6.9	(7)	P210	460 + 10	-12.0	(6)
P171	59 + 60	24.0	(5)	P211	491 + 00	26.6	(5)
P172	59 + 60	2.3	(7)	P212	491 + 00	-14.2	(6)
P173	79 + 80	25.5	(5)	P213	511 + 00	24.2	(5)
P174	79 + 80	-4.9	(7)	P214	511 + 00	-23.0	(6)
P175	100 + 20	22.3	(5)	P215	531 + 00	23.9	(5)
P176	100 + 20	-8.7	(7)	P216	531 + 00	-47.3	(6)
P177	130 + 40	22.2	(5)	P217	550 + 50	26.4	(5)
P178	130 + 40	7.8	(6)	P218	550 + 50	7.3	(6)
P179	160 + 00	18.9	(5)	P219	570 + 35	29.1	(5)
P180	160 + 00	-0.3	(6)	P220	570 + 35	-9.0	(6)
P181	180 + 25	16.2	(5)	P221	590 + 40	26.2	(5)
P182	180 + 25	-2.7	(6)	P222	590 + 40	6.4	(6)
P183	200 + 20	20.3	(5)	P223	610 + 00	27.3	(5)
P184	200 + 20	-3.6	(6)	P224	610 + 00	-1.5	(6)
P185	219 + 80	19.7	(5)	P225	629 + 00	29.0	(5)
P186	219 + 80	-19.3	(6)	P226	629 + 00	2.4	(6)
P187	Deleted from Program			P227	652 + 50	29.3	(5)
P188	226 + 40	-7.3	(6)	P228(14)	652 + 00	-8.8	(7)
P189	240 + 00	19.0	(5)	P229	115 + 00	-5.5	450' (8)
P190	240 + 00	-18.7	(6)	P230	115 + 00	-4.5	900' (8)
P191	260 + 25	17.3	(5)	P231	Deleted from Program		

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MAIN COOLING RESERVOIR PIEZOMETER DATA

Reference Drawing: 9Y51 0-H-1163

Piez. No.	Embank. Station	Tip* Elev.	Location**	Piez. No.	Embank. Station	Tip* Elev.	Location**
P232	Deleted from Program			P272	446 + 90	-21.3	D
P233	547 + 00	1.4	450'(8)	P273	454 + 45	-19.5	D
P234	547 + 00	-13.3	900'(8)	P274	485 + 00	-4.9	D
P235	125 + 50	-11.1	D	P275	593 + 45	-2.6	D
P236	135 + 00	-9.0	D	P276	597 + 00	-3.0	D
P237	140 + 00	-22.0	D	P277	605 + 00	-11.6	D
P238	145 + 00	-21.4	D	P278	648 + 00	-14.8	D
P239	155 + 50	-22.0	D	P279	19 + 00	-10.9	D
P240	159 + 80	-22.8	D	P280	83 + 45	-0.6	D
P241	175 + 00	-2.6	C	P281	185 + 24	-0.1	D
P242	497 + 00	-19.2	D	P282	187 + 75	-1.2	D
P243	506 + 50	-16.6	D	P283	195 + 05	-5.0	D
P244	516 + 50	-10.2	D	P284	201 + 80	-8.3	D
P245	526 + 50	-15.0	D	P285	212 + 80	-10.1	D
P246	536 + 50	-14.2	D	P286	217 + 00	-15.7	D
P247	555 + 50	4.2	D	P287	639 + 00	2.3	A
P248	559 + 50	-54.4	C	P288	641 + 60	1.3	C
P249	565 + 00	-15.3	D	P289	641 + 60	-14.9	A
P250	615 + 00	-4.7	C	P290	644 + 20	1.5	C
P251	625 + 00	0.9	C	P291	644 + 20	-11.6	A
P252	634 + 00	-6.2	C	P292	646 + 80	-1.7	C
P253	115 + 00	-18.9	C	P293	646 + 80	-6.6	A
P254	440 + 80	-17.6	D	P294	649 + 40	-16.2	C
P255	465 + 80	-17.5	D	P295	649 + 40	-8.9	A
P256	545 + 00	-0.7	D	P296	655 + 00	-7.6	C
P257	248 + 00	-10.2	D	P297(14)	655 + 00	-6.3	A
P258	248 + 80	-10.1	D	P298	04 + 87	-1.3	C
P259	262 + 25	-12.9	D	P299	04 + 87	-2.3	A
P260	294 + 75	-12.3	D	P300	09 + 00	-1.6	C
P261	340 + 00	-23.1	D	P301	09 + 00	0.4	A
P262	344 + 00	-24.4	D	P302	13 + 25	0.8	C
P263	358 + 00	-2.0	D	P303	13 + 25	-0.2	A
P264	362 + 00	-25.8	D	P304	15 + 50	1.1	C
P265	384 + 00	-19.6	D	P305	15 + 50	0.4	A
P266	391 + 40	-20.7	D	P306	17 + 75	-16.1	C
P267	395 + 00	-25.2	D	P307	17 + 75	-2.5	A
P268	416 + 55	-23.4	D	P308	22 + 50	-7.9	C
P269	427 + 50	-20.7	D	P309	22 + 50	-18.8	A
P270	435 + 60	-24.9	D	P310	25 + 00	-1.5	C
P271	443 + 25	-22.4	D	P311	25 + 00	-18.1	A

MAIN COOLING RESERVOIR PIEZOMETER DATA

Reference Drawing: 9Y51 0-H-1163

Piez. No.	Embank. Station	Tip* Elev.	Location**	Piez. No.	Embank. Station	Tip* Elev.	Location**
P312	27 + 50	-1.1	C	P352(PZ23)	653 + 96	26.7	151(11)
P313	27 + 50	-10.3	A	P353(PZ22)	654 + 44	18.0	190(11)
P314	30 + 00	-10.4	A	P354(PZ21)	654 + 90	26.8	150(11)
P315	32 + 55	-3.5	C	P355(PZ20)	0 + 39	25.2	190(11)
P316	32 + 55	-19.5	A	P356(PZ19W)	0 + 57	25.8	151(11)
P317	35 + 00	-15.3	C	P357(PZ19S)	0 + 89	25.9	134(11)
P318	35 + 00	-20.2	A	P358(PZ19)	0 + 89	27.1	151(11)
P319	37 + 65	-18.8	C	P359(PZ19N)	0 + 89	26.1	170(11)
P320	37 + 65	2.2	A	P360(PZ19E)	1 + 21	26.1	151(11)
P321	35 + 10	3.6	D	P361(PZ18)	1 + 37	27.2	190(11)
P322	37 + 50	-10.1	D	P362(PZ17)	1 + 89	26.0	151(11)
P323	34 + 40	-0.1	D	P363(PZ16)	2 + 39	19.3	190(11)
P324	38 + 80	3.4	D	P364(PZ15)	3 + 20	17.3	151(11)
P325	32 + 55	10.7	D	P365(PZ14)	3 + 70	23.7	190(11)
P326	Deleted from Program			P366(PZ13)	4 + 15	-1.1	151(11)
P327(K-1)	92 + 50	-0.0	B	P367(PZ12)	4 + 70	0.8	190(11)
P328(K-2)	92 + 50	-4.4	C	P368(PZ11)	5 + 20	12.4	151(11)
P329(K-3)	92 + 50	1.3	(10)	P369(PZ10A)	5 + 20	12.5	189(11)
P330(K-4)	97 + 50	-6.7	C	P370(PZ10)	5 + 70	-1.0	189(11)
P331(K-5)	97 + 50	-6.5	(10)	P371(PZ9)	6 + 20	10.0	152(11)
P332(K-6)	102 + 50	-11.5	B	P372(PZ8)	6 + 69	8.5	190(11)
P333(K-7)	102 + 50	-0.3	C	P373(PZ7)	7 + 15	8.7	151(11)
P334(K-8)	107 + 50	8.8	C	P374(PZ6)	7 + 69	1.0	190(11)
P335(K-9)	107 + 50	-5.7	(10)	P375(PZ5)	8 + 20	8.6	152(11)
P336(K-10)	115 + 00	-9.2	(10)	P376(PZ4)	9 + 01	9.2	190(11)
P337(K-11)	102 + 50	-8.9	(10)	P377(PZ3)	9 + 39	8.6	151(11)
P338(K-12)	100 + 00	-8.1	(10)	P378	99 + 93	-10.6	(9)
P339(K-13)	102 + 50	14.8	C	P379	180 + 93	-1.0	(9)
P340(K-14)	102 + 50	10.0	D	P380	181 + 18	-1.6	(9)
P341(PZ30)	130 + 69	31.3	A	P381	319 + 70	-11.4	(9)
P342(PZ31)	130 + 82	30.4	A	P382	319 + 86	-10.0	(9)
P343(PZ32)	130 + 95	30.2	A	P383	448 + 18	-5.4	(9)
P344(PZ29)	650 + 99	20.3	172(11)	P384	448 + 43	-5.9	(9)
P345(PZ28)	651 + 59	17.0	190(11)	P385	448 + 85	-4.3	(9)
P346(PZ26A)	651 + 90	24.9	190(11)	P386	570 + 35	-0.4	(9)
P347(PZ26)	652 + 46	18.5	190(11)	P387	570 + 77	2.2	(9)
P348(PZ24A)	652 + 94	26.5	190(11)	P388	570 + 88	1.6	(9)
P349(PZ25)	652 + 95	27.3	151(11)	P389(SP1)	225 + 88	11.1	243(11),(12)
P350(PZ24)	653 + 40	25.6	190(11)	P390(SP2)	226 + 10	20.8	172(11),(12)
P351(PZ22A)	653 + 94	26.6	190(11)	P391(SP3)	225 + 89	26.0	77(11),(12)

MAIN COOLING RESERVOIR PIEZOMETER DATA

3

Reference Drawing: 9Y51 0-H-1163

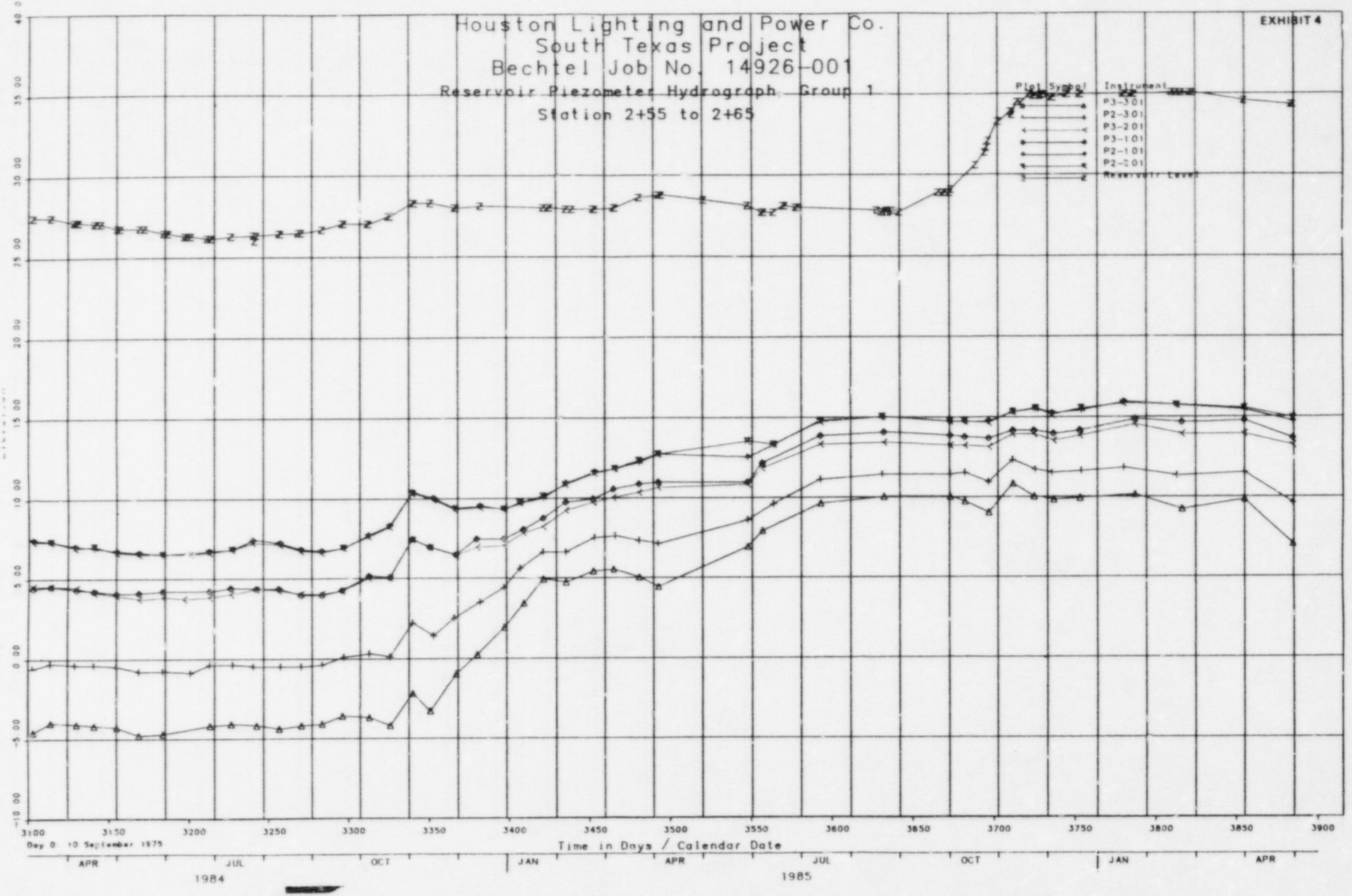
Piez. No.	Embank. Station	Tip* Elev.	Location**	Piez. No.	Embank. Station	Tip* Elev.	Location**
P392(TP1)	225 + 25	6.8	293(11),(13)				
P393(TP2)	226 + 69	5.8	293(11),(13)				
P394	40 + 20	Later	(15b)				
P395	40 + 20	Later	(15a)				
P396	49 + 80	Later	(15b)				
P397	59 + 60	Later	(15b)				
P398	59 + 60	Later	(15a)				
P399	70 + 20	Later	(15b)				
P400	79 + 70	Later	(15b)				

MAIN COOLING RESERVOIR PIEZOMETER DATA

*Tip Elevation refers to bottom of screen.
**See Figure 3 for locations A, B, C and D with respect to embankment centerline.

A = Crest-downstream edge
B = Downstream berm
C = Relief well line on other area away from toe except covered by note 10.
D = Near Heavy Haul Road

NOTES:
(1) Left of embankment centerline per embankment section on Figure 3.
(2) N 361,399.61 E 2,946,267.22
(3) N 360,898.79 E 2,947,070.52
(4) N 361,017.61 E 2,947,895.63
(5) At upstream edge of crest.
(6) On upstream berm (inside Reservoir).
(7) On upstream floor of Reservoir near embankment toe.
(8) Approximate distance from upstream toe of embankment.
(9) Along line of relief wells.
(10) Vicinity of Kelly Lake beyond relief well line.
(11) Distance downsteam of embankment center line.
(12) In spillway chute
(13) On bank of stilling basin
(14) Destroyed or Damaged as of January 24, 1986.
(15) These piezometers were installed in June 1986 per recommendation from Harza Engineering Co. for monitoring PADD. The piezometers are located on edge of side slopes.
(a) These piezometers are on north side of ditch.
(b) These piezometers are on south side of ditch.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South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph Group 1
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P2-301
P3-201
P3-101
P2-101
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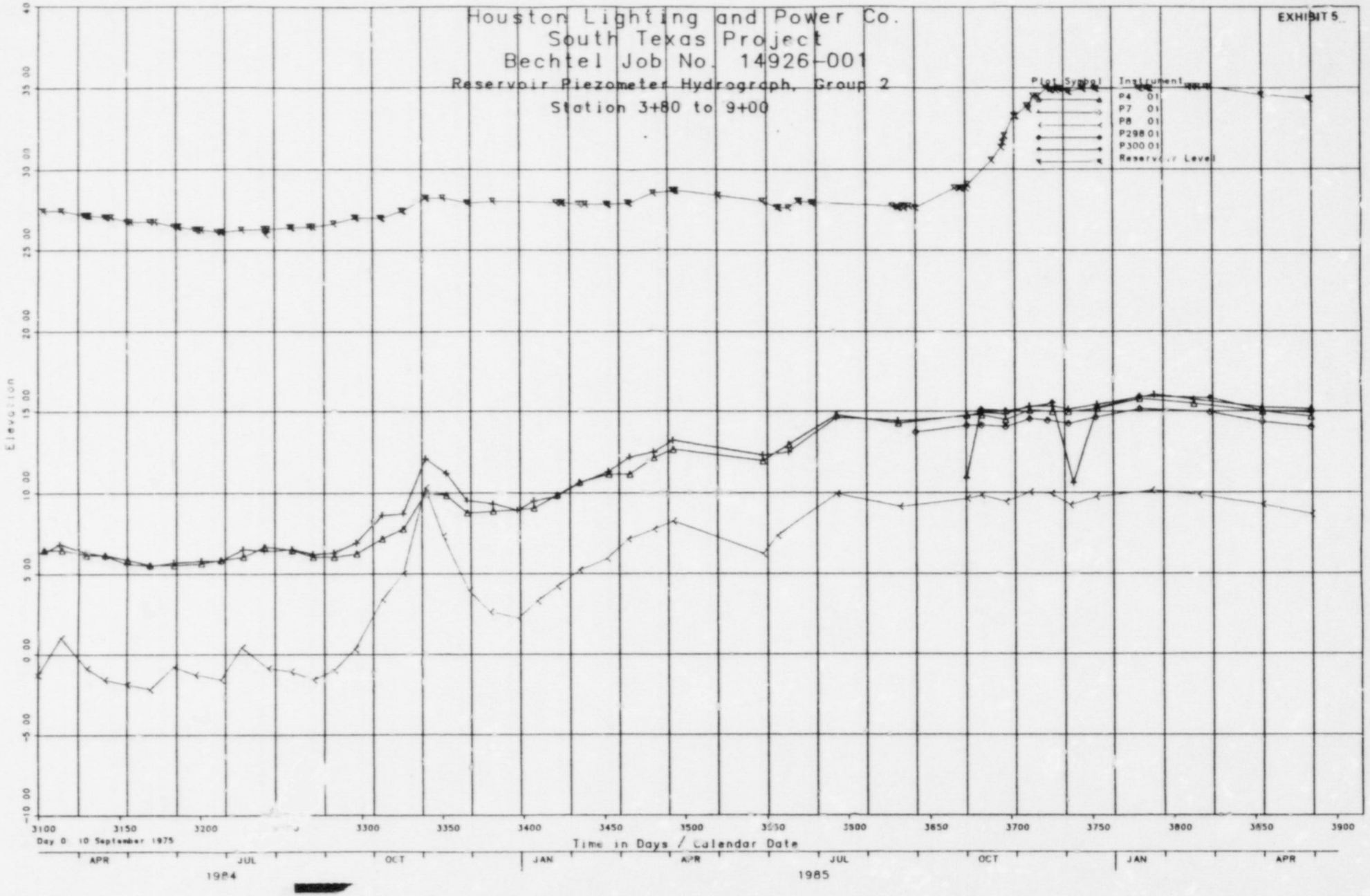
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Plot Symbol
Instrument
P4 01
P7 01
P8 01
P298 01
P300 01
Reservoir Level
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30 00
25 00
20 00
15 00
10 00
5 00
0 00
-5 00
-10 00
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3150
3200
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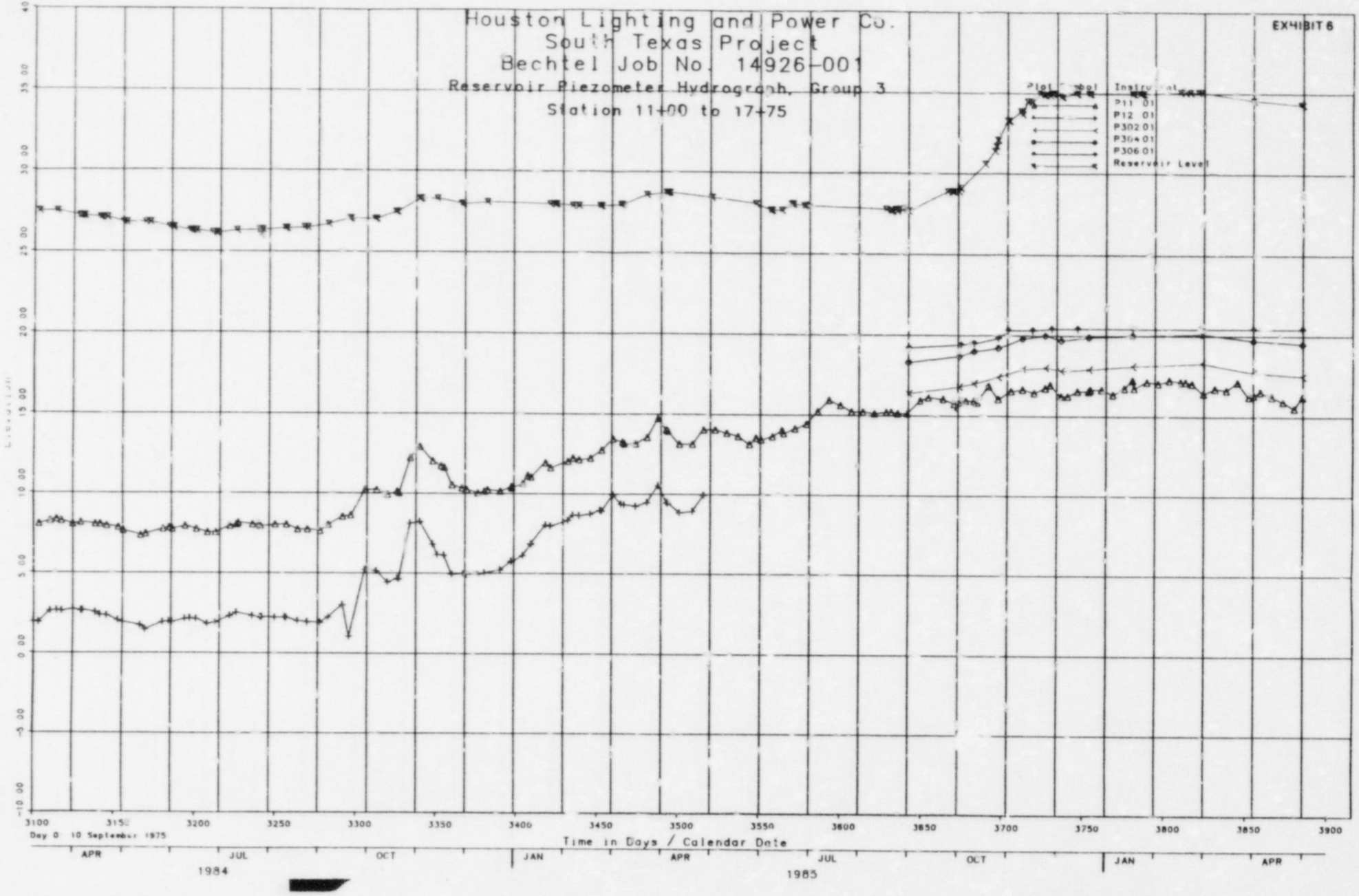
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Reservoir Piezometer Hydrograph, Group 3
Station 11+00 to 17+75
EXHIBIT 6
Piezometer
Instrument
P11 01
P12 01
P302 01
P304 01
P306 01
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30.00
25.00
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15.00
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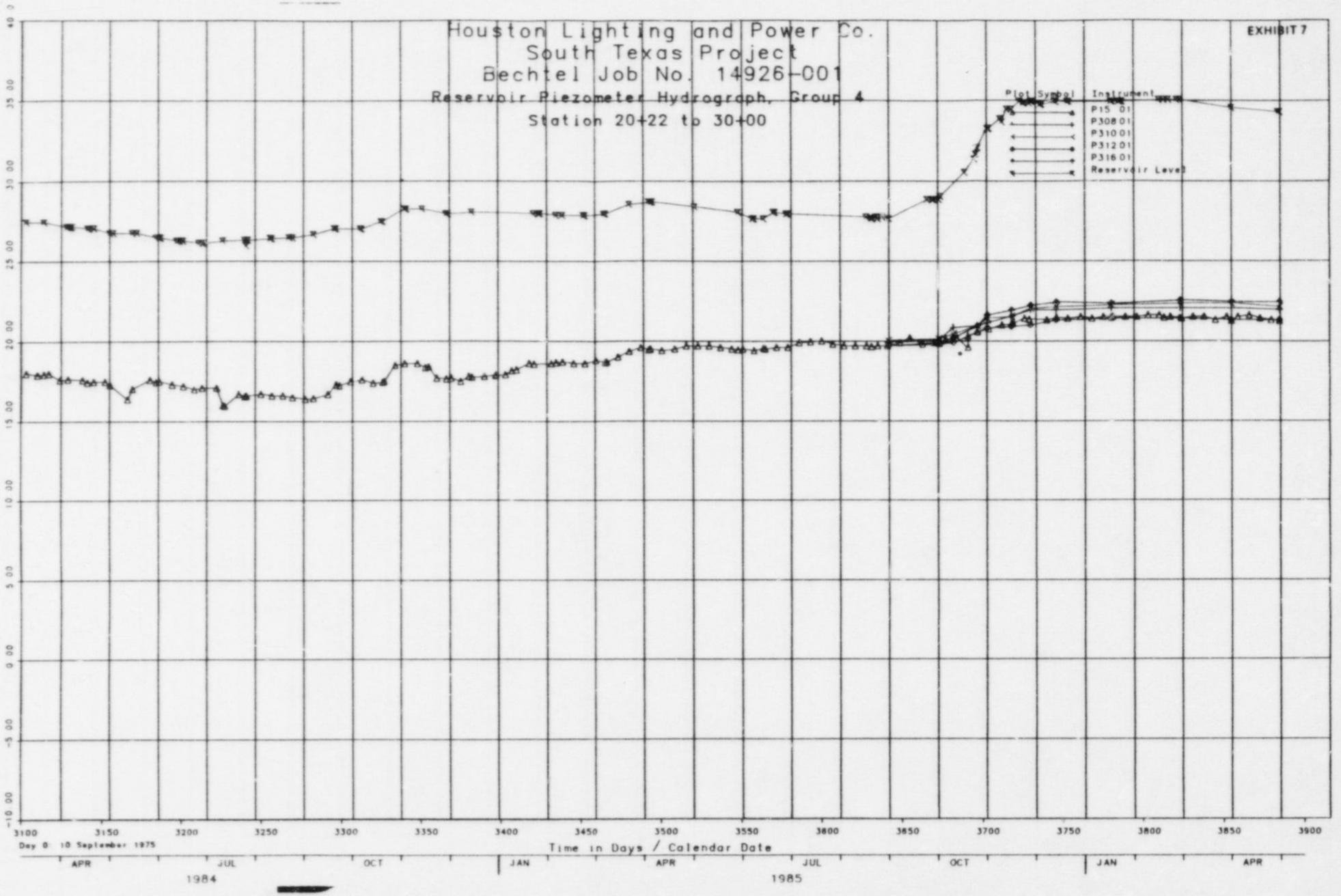
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South Texas Project
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EXHIBIT 7
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P308 01
P310 01
P312 01
P316 01
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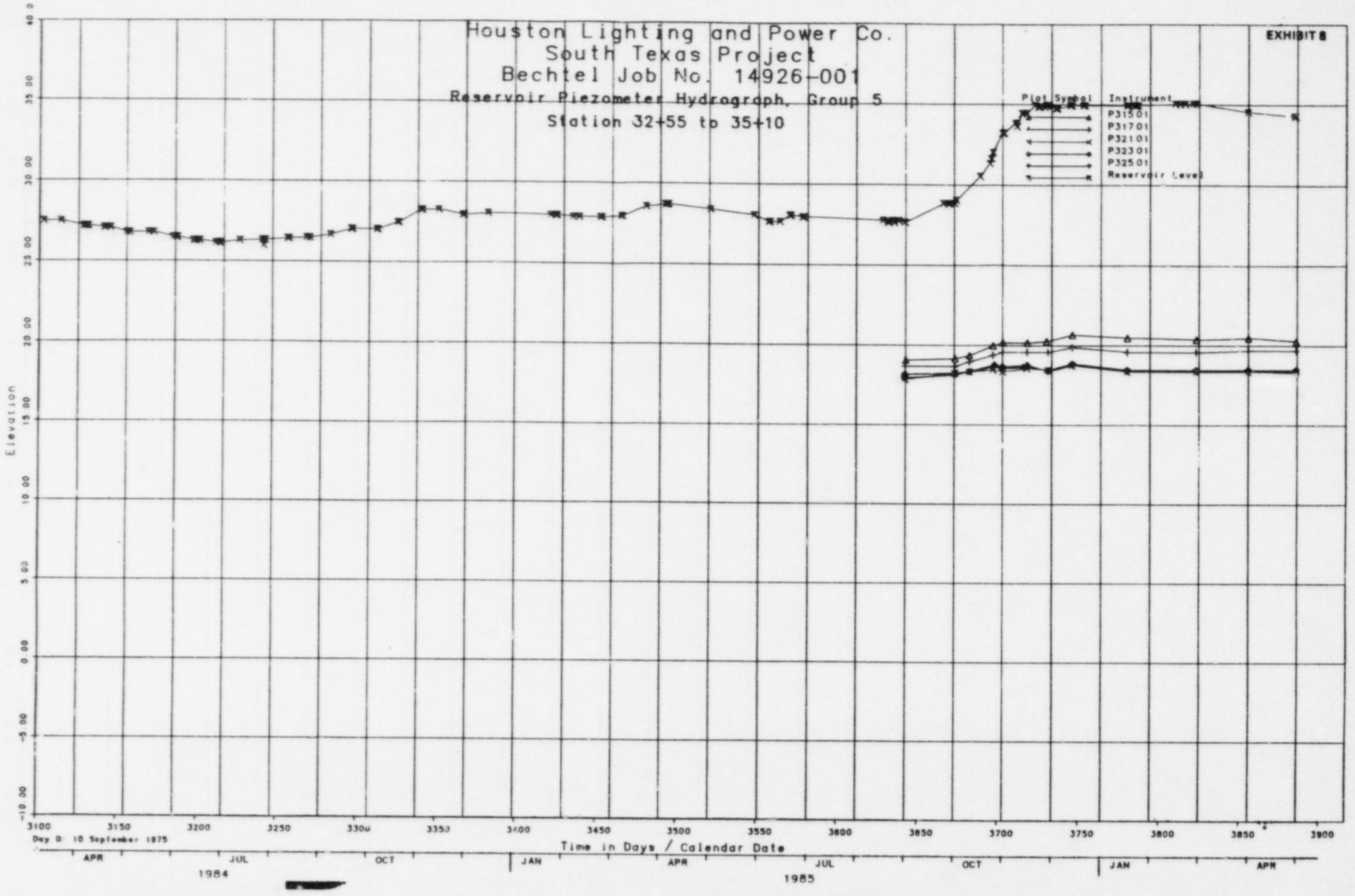
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South Texas Project
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Station 32+55 to 35+10
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Instrument
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P31701
P32101
P32301
P32501
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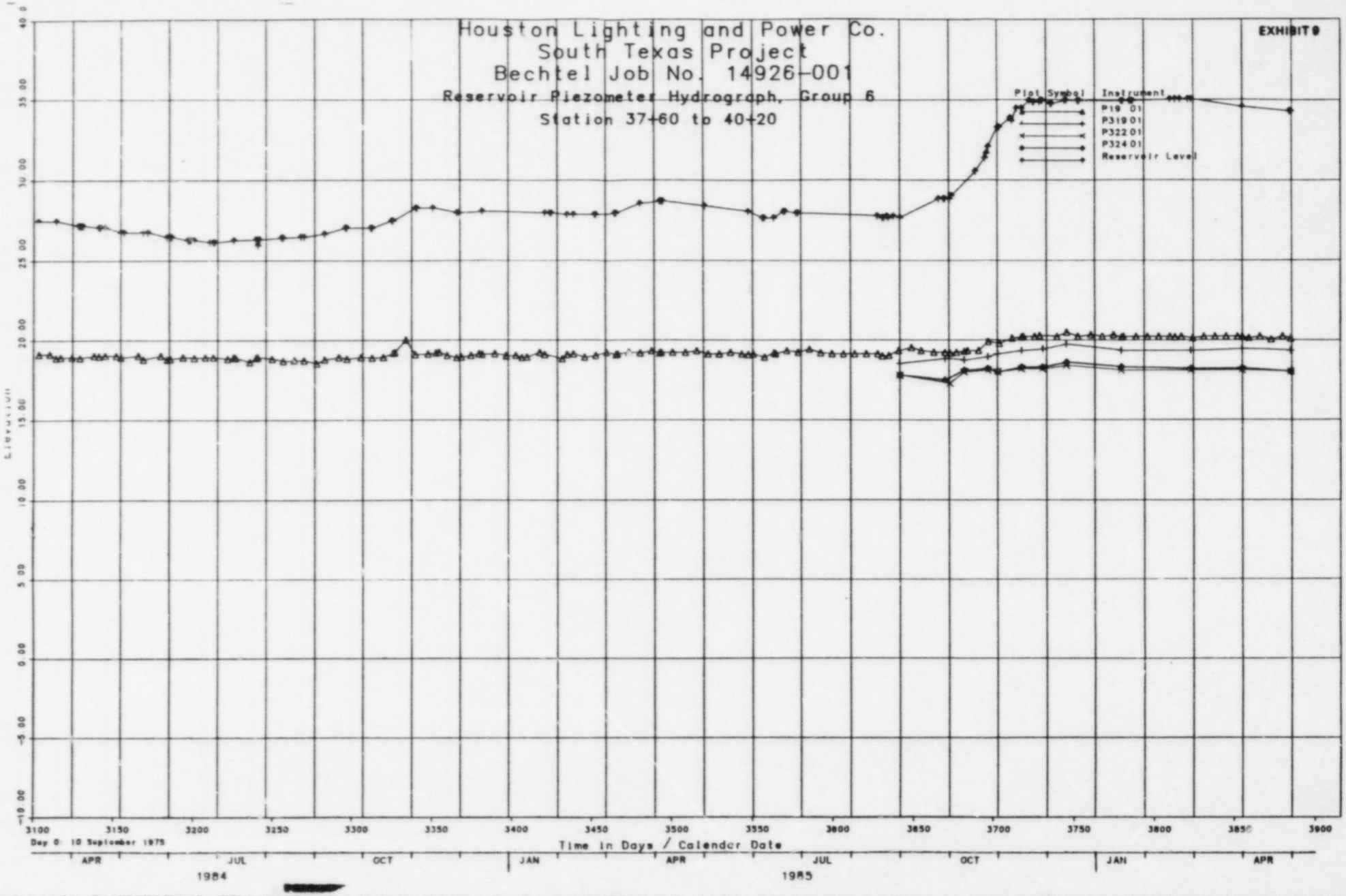
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Instrument
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P322 01
P324 01
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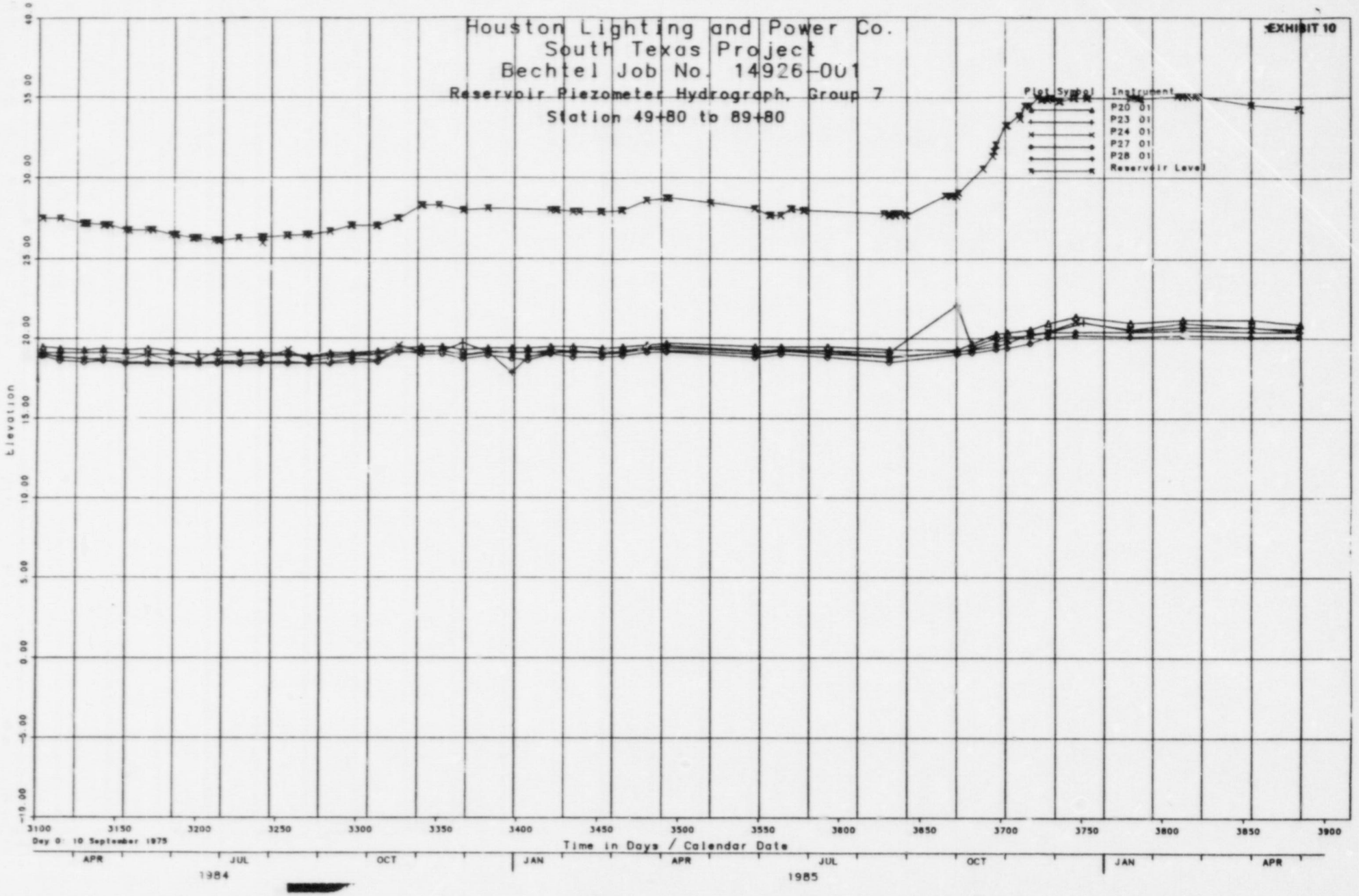
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South Texas Project
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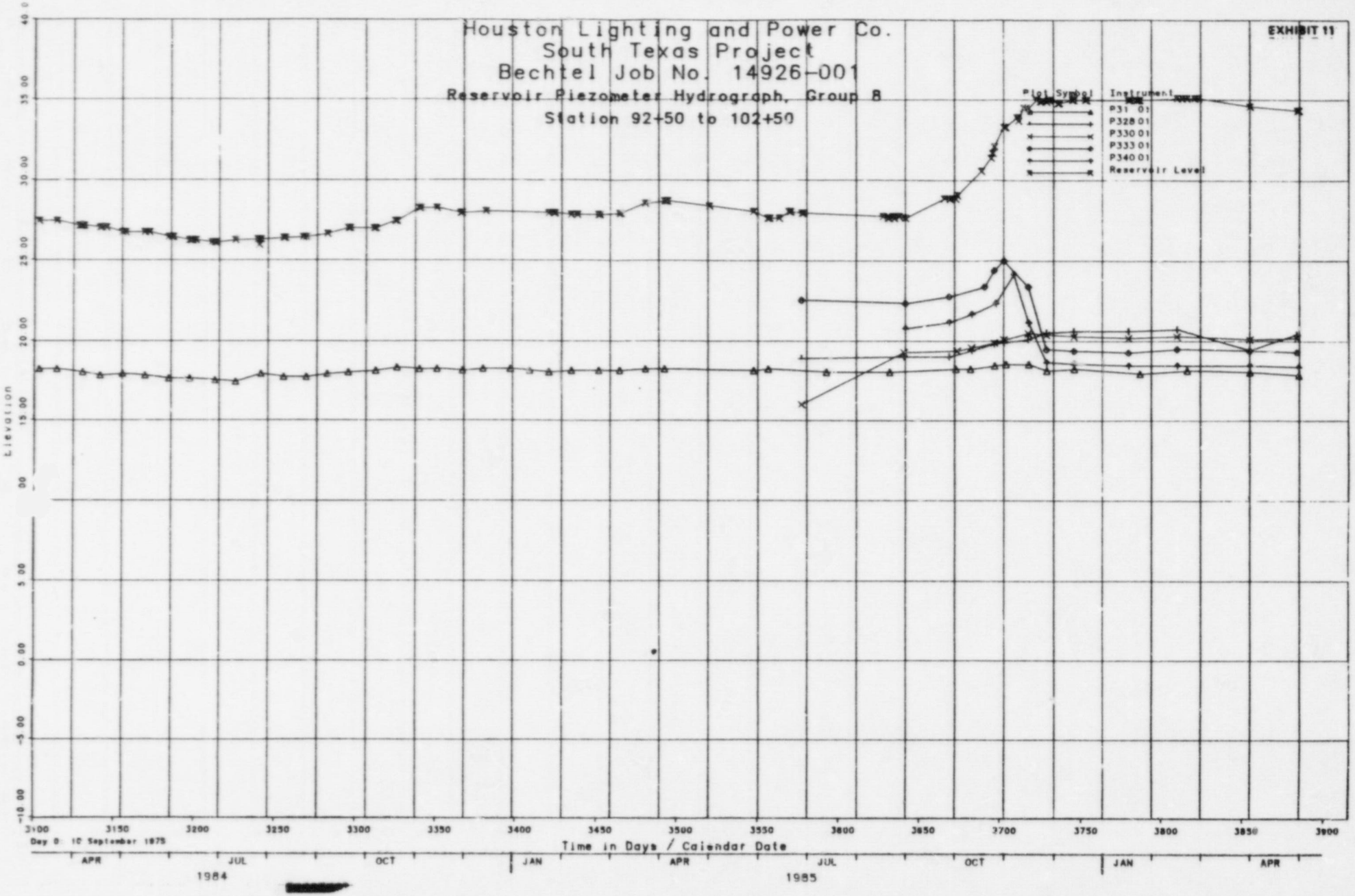
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P331 01
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P333 01
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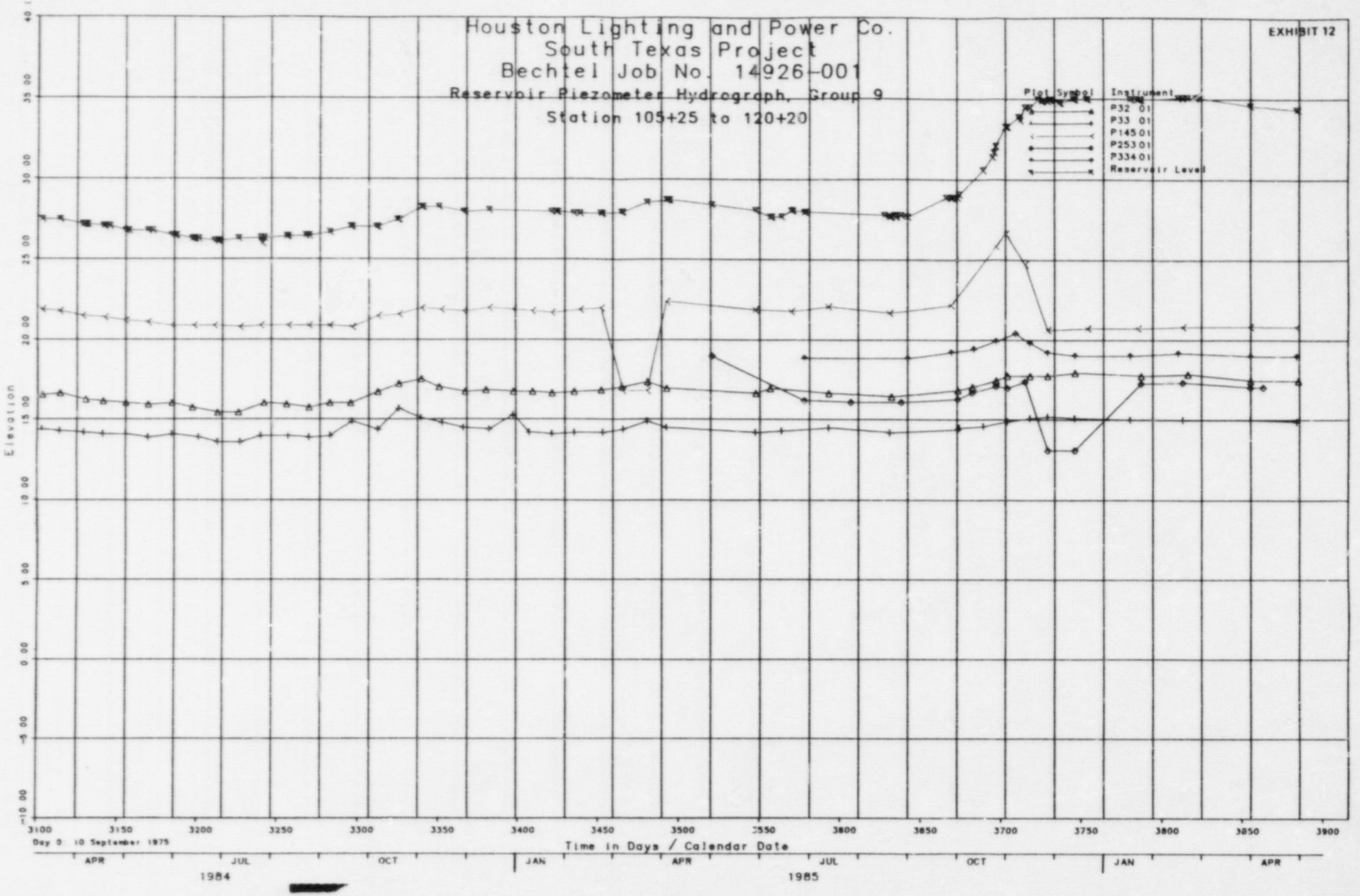
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P145 01
P253 01
P334 01
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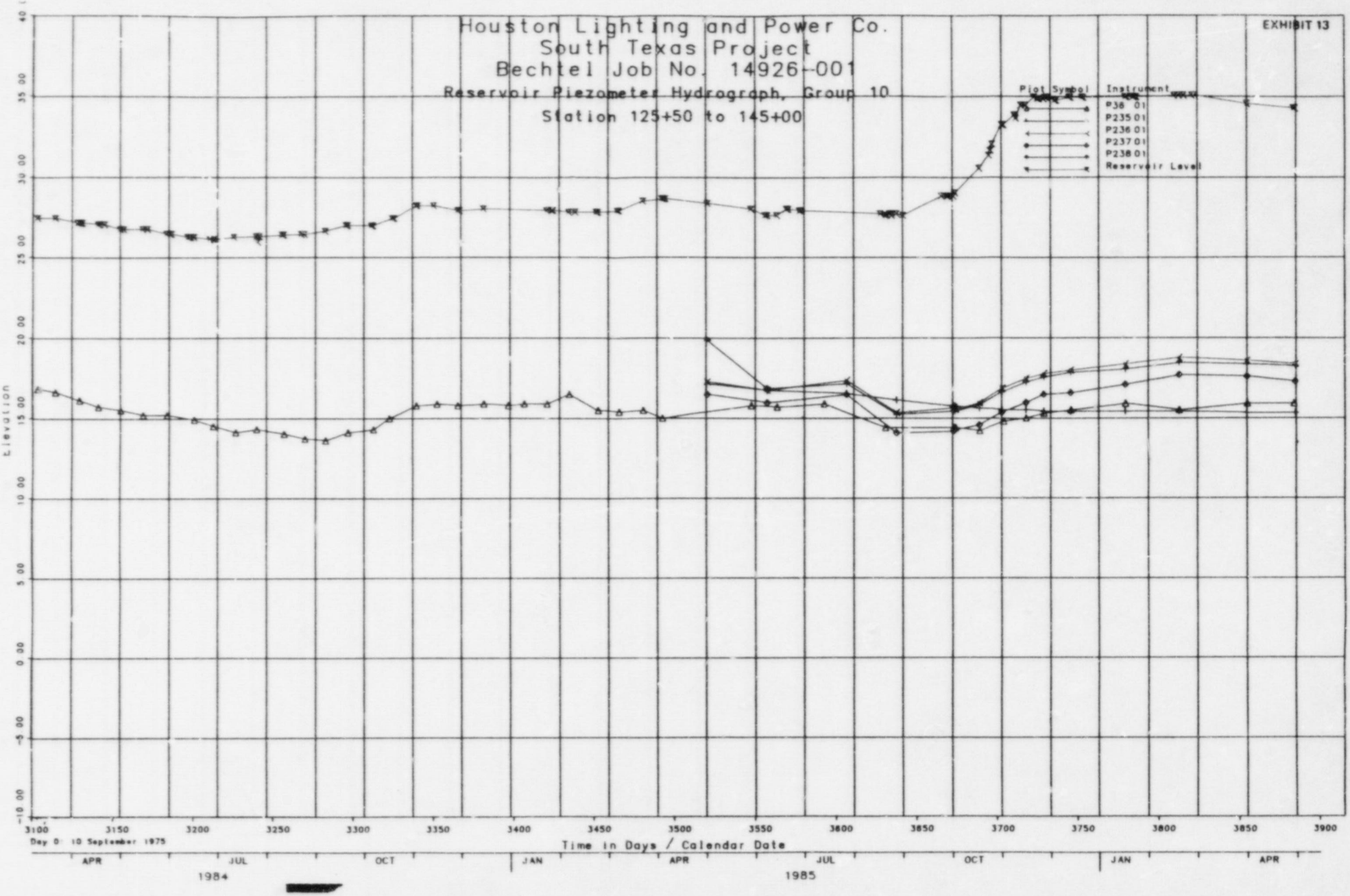
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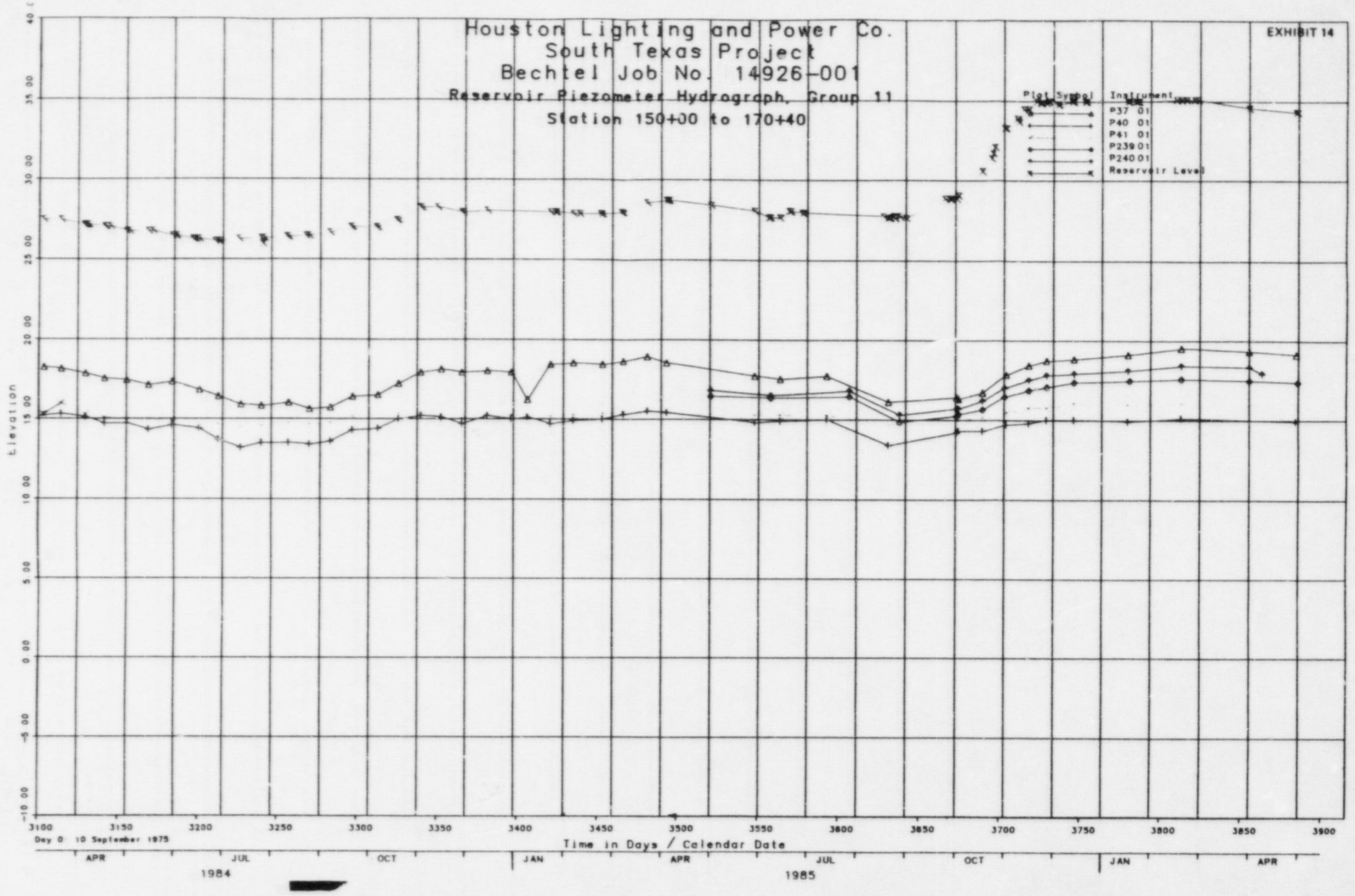
Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
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P239 01
P240 01
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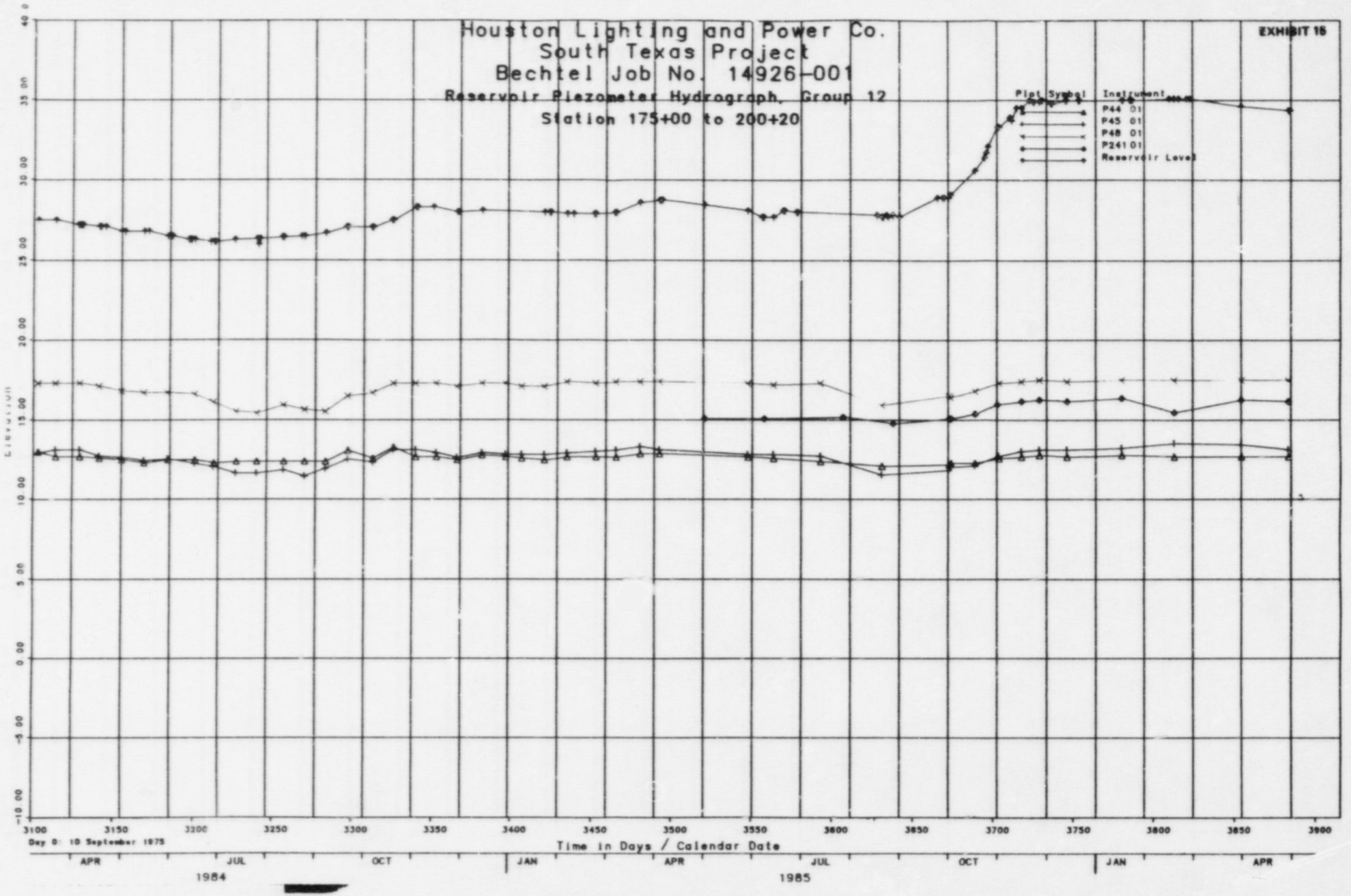
Houston Lighting and Power Co.
South Texas Project
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P48 01
P241 01
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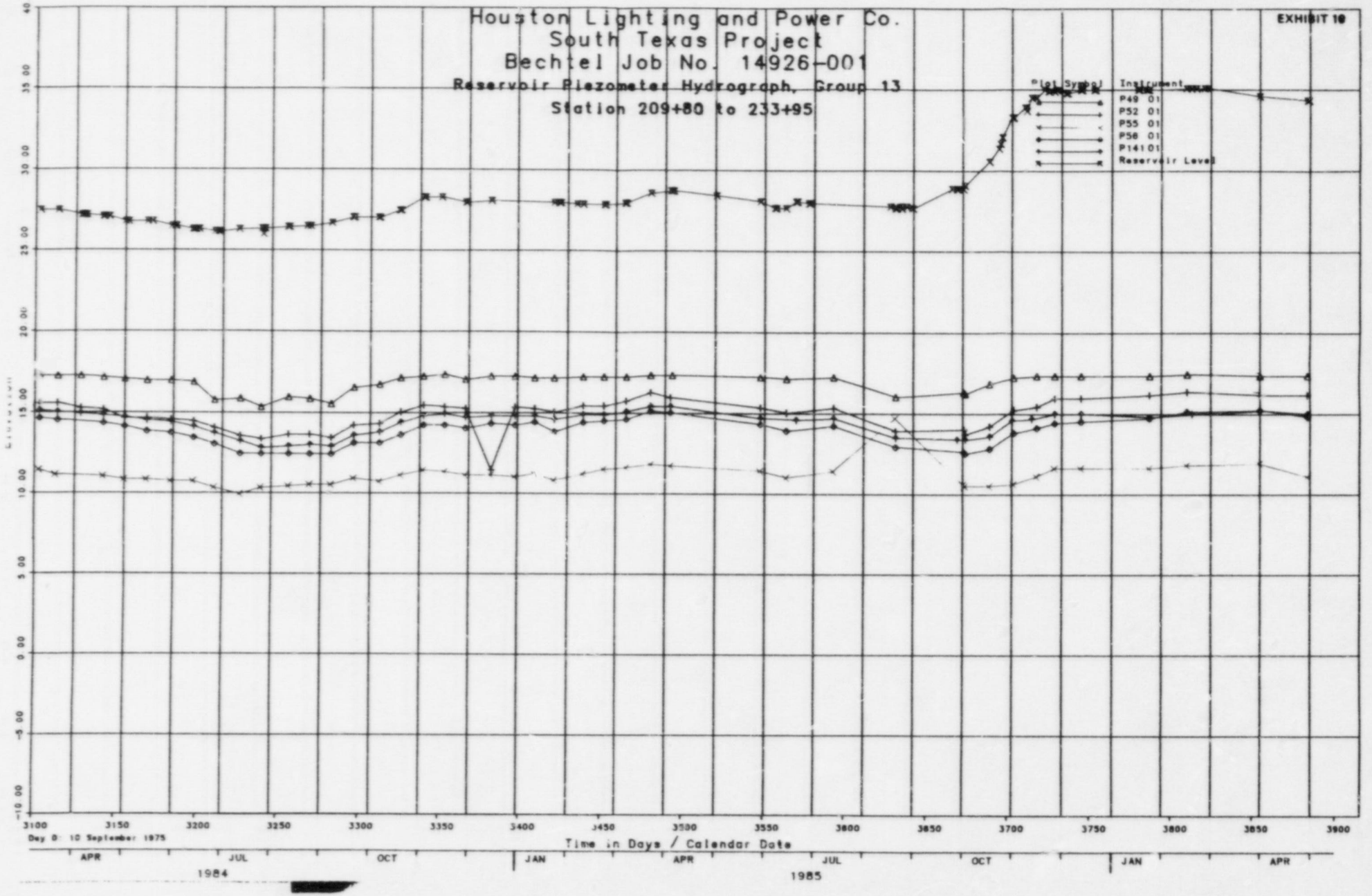
Houston Lighting and Power Co.
South Texas Project
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Reservoir Piezometer Hydrograph, Group 13
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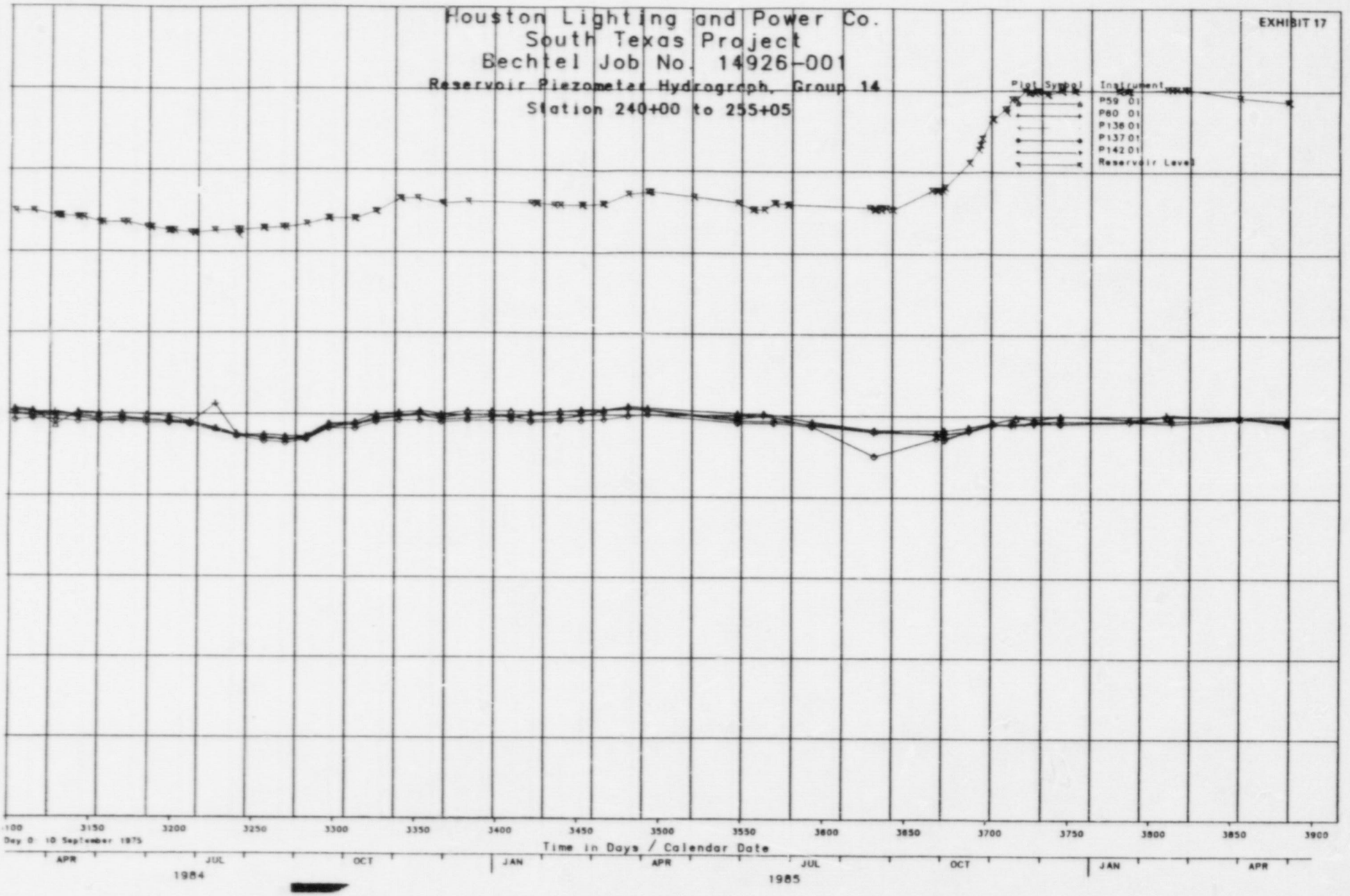
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South Texas Project
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Station 240+00 to 255+05
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P142 01
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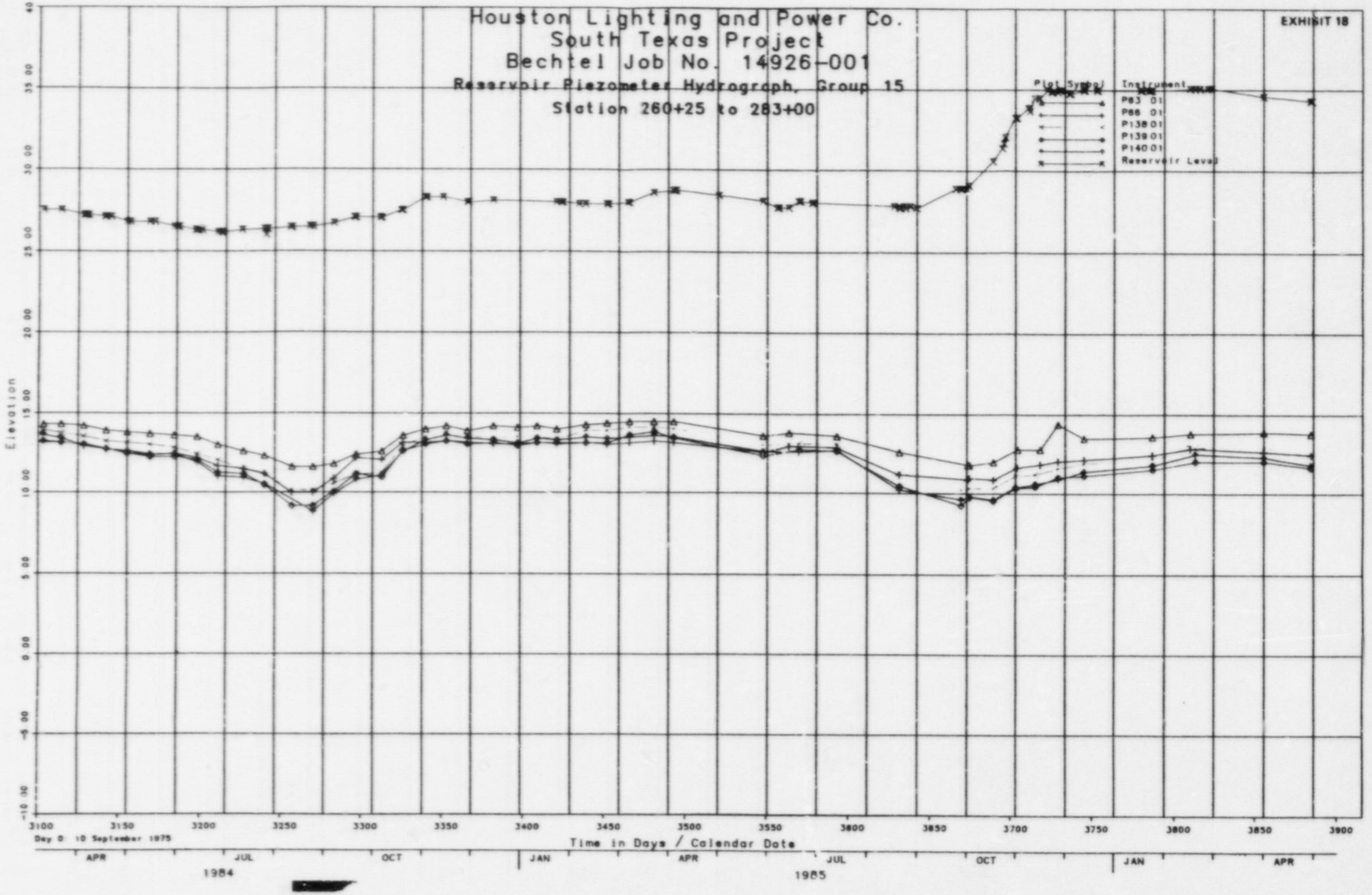
EXHIBIT 18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P139 01
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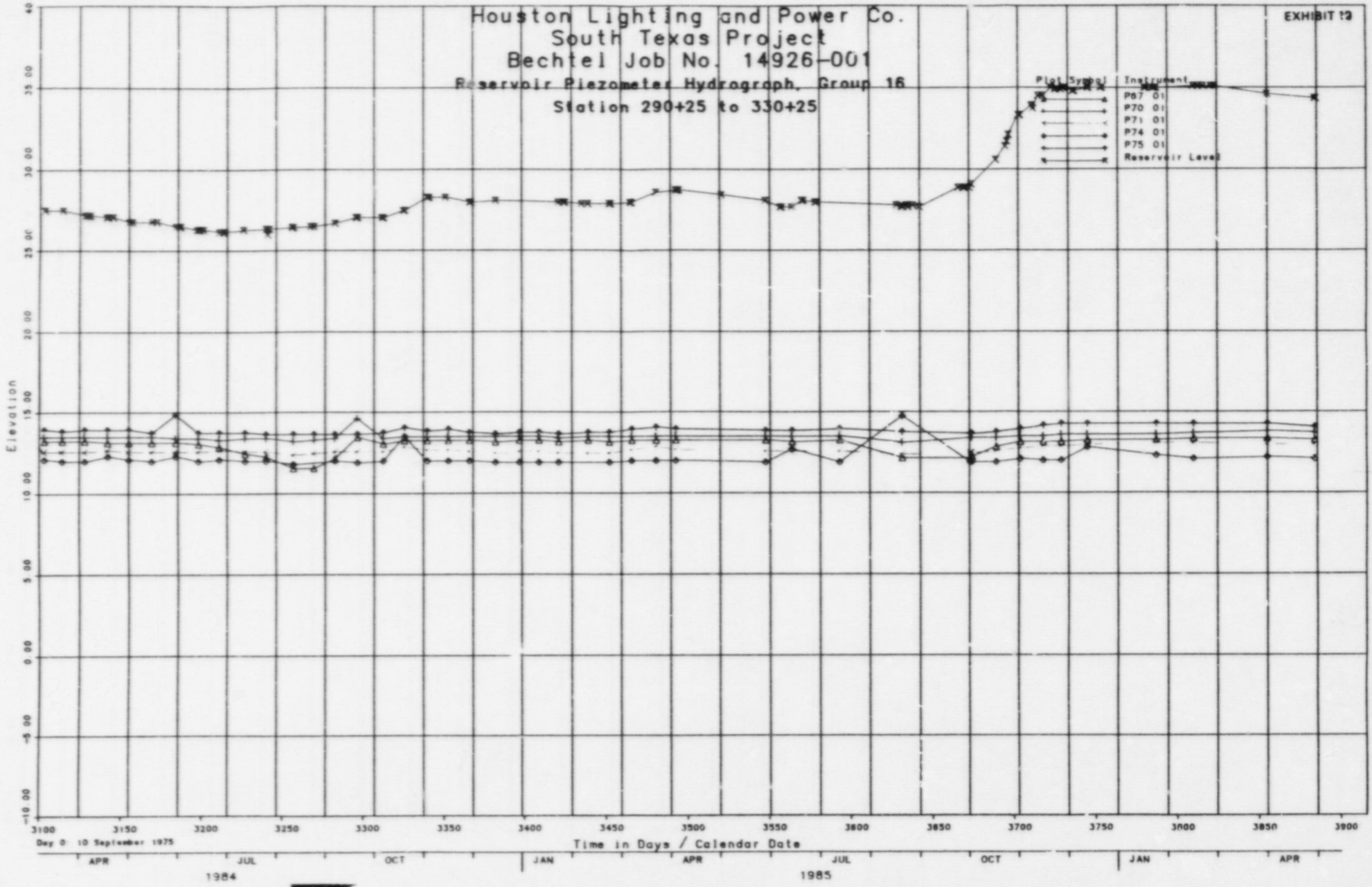
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Reservoir Piezometer Hydrograph, Group 16
Station 290+25 to 330+25
EXHIBIT 12
Plot Symbol
Instrument
P67 01
P70 01
P71 01
P74 01
P75 01
Reservoir Level
Elevation
40 00
35 00
30 00
25 00
20 00
15 00
10 00
5 00
0 00
-5 00
-10 00
3100
3150
3200
3250
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3700
3750
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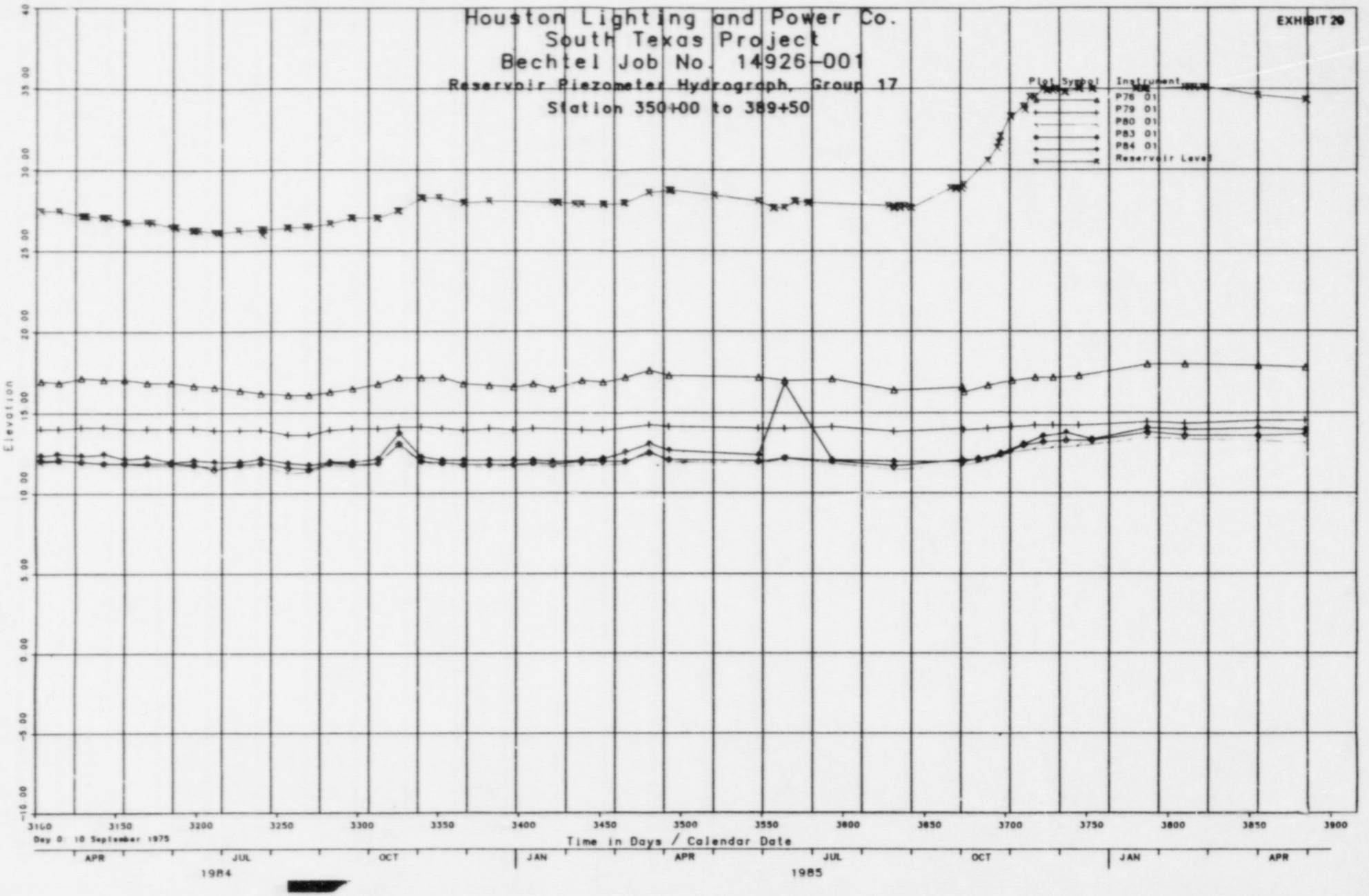
Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Group 17
Station 350+00 to 389+50
EXHIBIT 20
Plot Symbol
Instrument
P78 01
P79 01
P80 01
P83 01
P84 01
Reservoir Level
Elevation
40.00
35.00
30.00
25.00
20.00
15.00
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5.00
0.00
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3250
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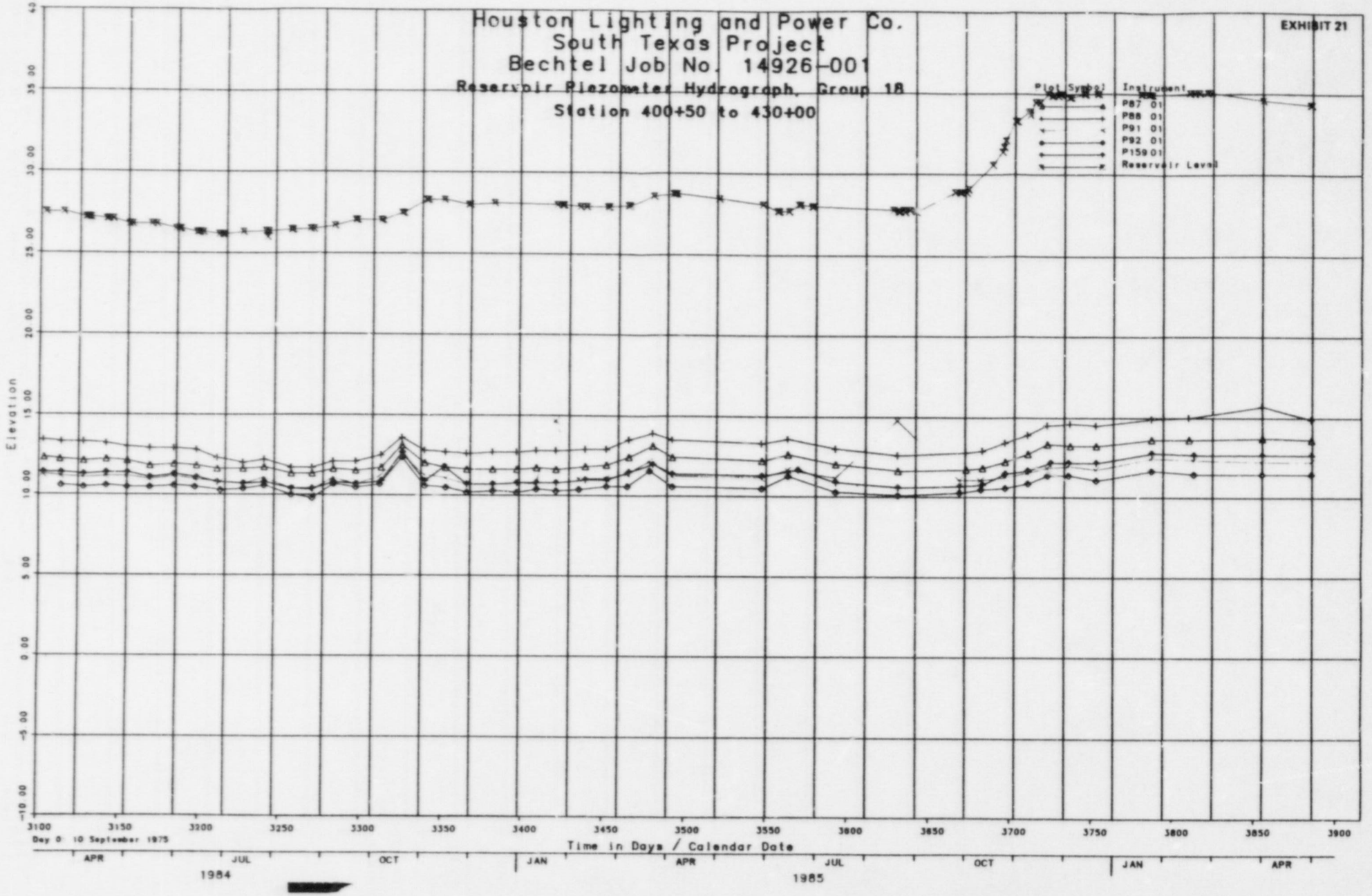
Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Group 18
Station 400+50 to 430+00
EXHIBIT 21
Plot Symbol
Instrument
P87 01
P88 01
P91 01
P92 01
P159 01
Reservoir Level
Elevation
40 00
35 00
30 00
25 00
20 00
15 00
10 00
5 00
0 00
-5 00
-10 00
3100
3150
3200
3250
3300
3350
3400
3450
3500
3550
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3650
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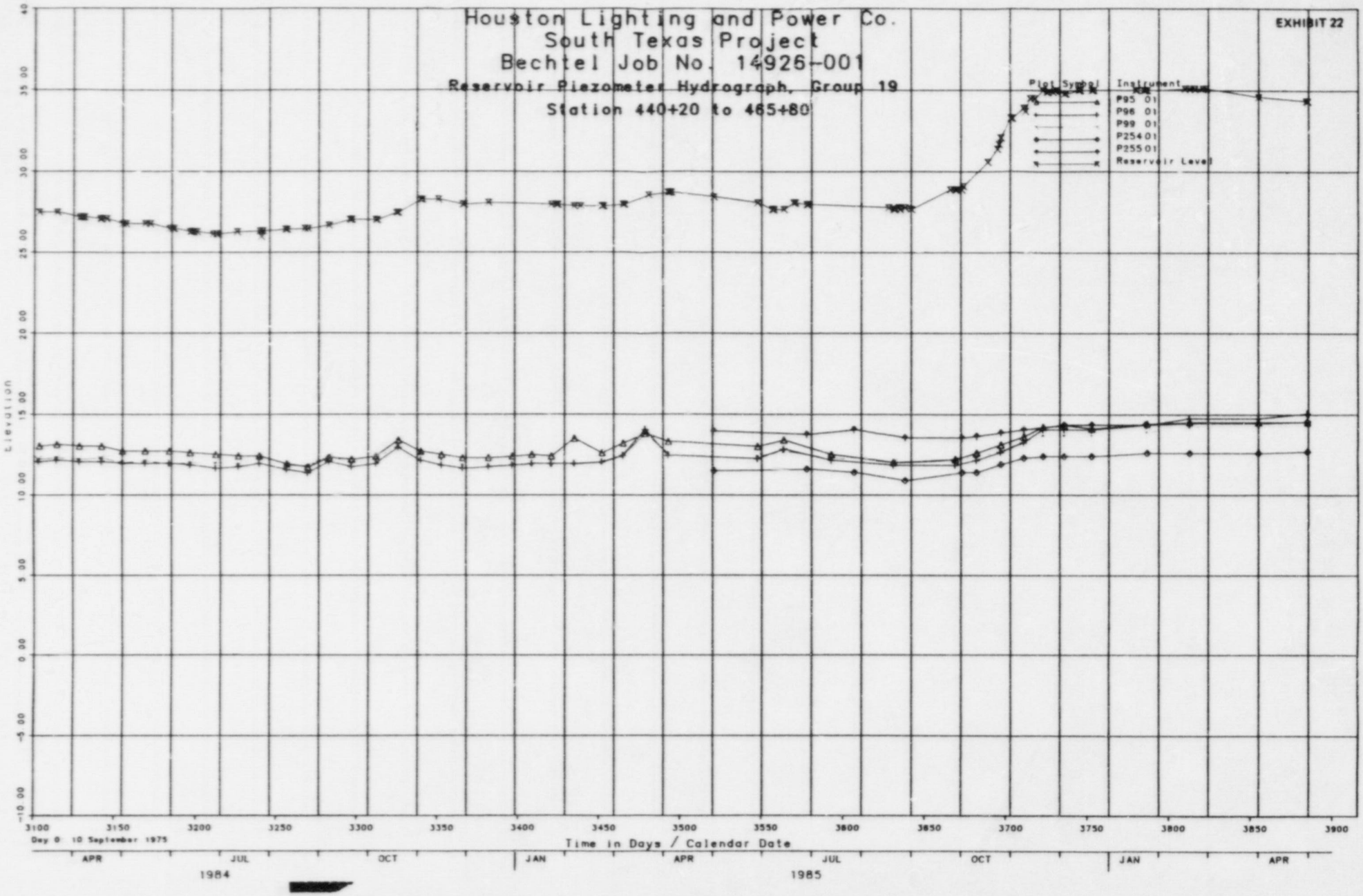
Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Group 19
Station 440+20 to 465+80
EXHIBIT 22
Plot Symbol
Instrument
P95 01
P96 01
P99 01
P254 01
P255 01
Reservoir Level
Elevation
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
-5.00
-10.00
3100
3150
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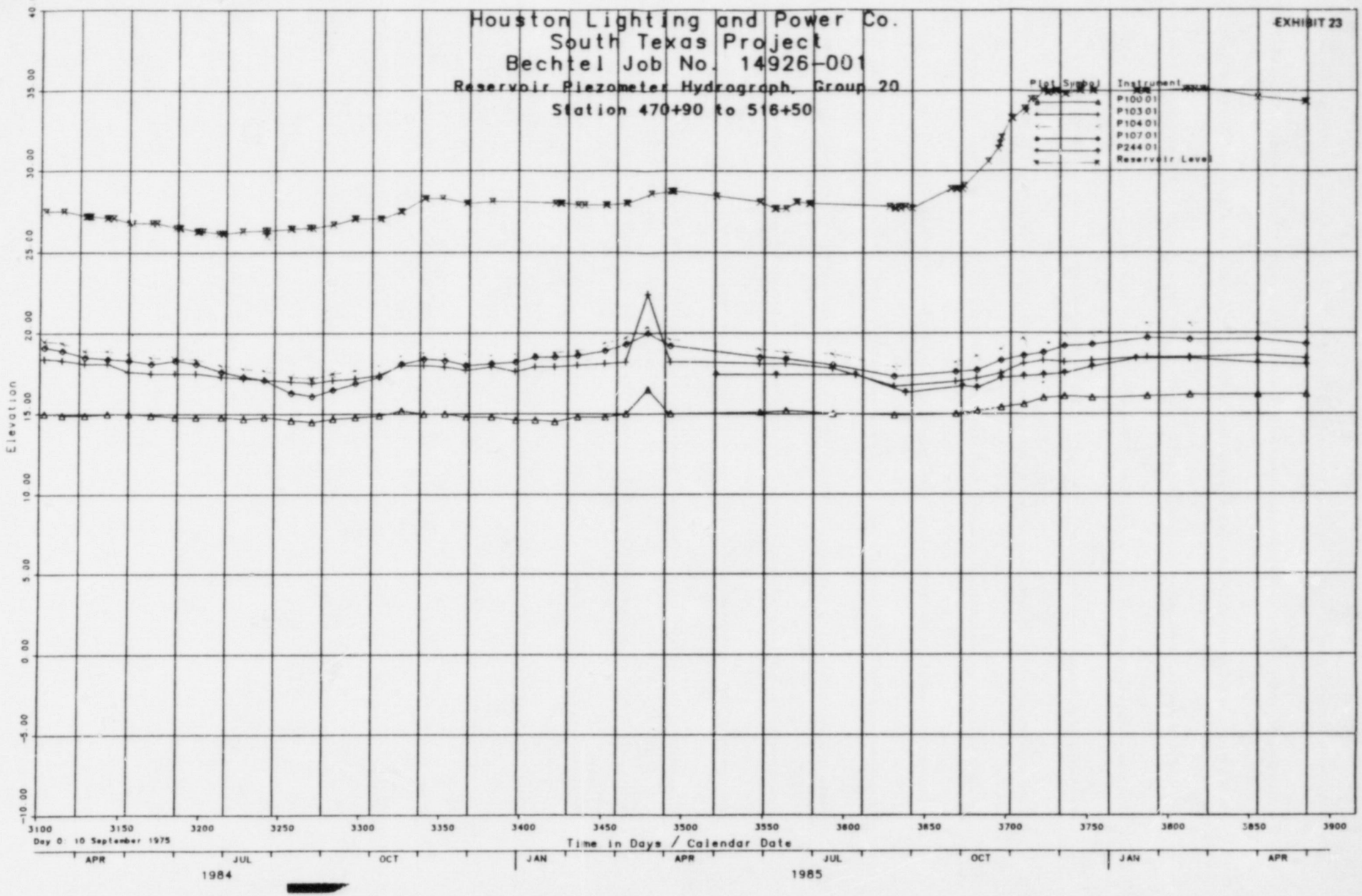
EXHIBIT 23


Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Group 20
Station 470+90 to 516+50
Plot Symbol
Instrument
P100 01
P103 01
P104 01
P107 01
P244 01
Reservoir Level
Elevation
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
-5.00
-10.00
3100
3150
3200
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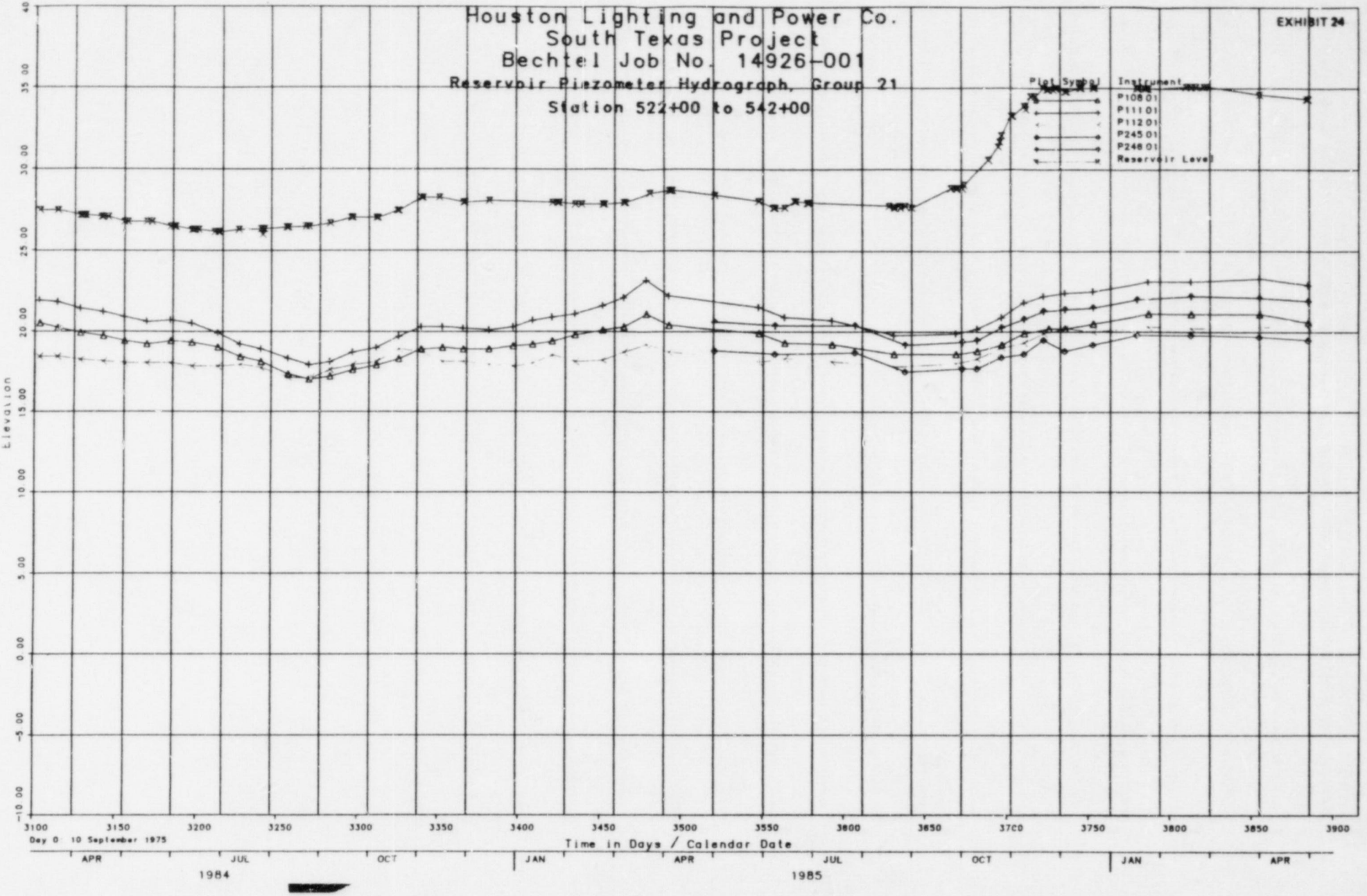
Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Group 21
Station 522+00 to 542+00
EXHIBIT 24
Plot Symbol
Instrument
P108 01
P111 01
P112 01
P245 01
P248 01
Reservoir Level
Elevation
40
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
-5.00
-10.00
3100
3150
3200
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3700
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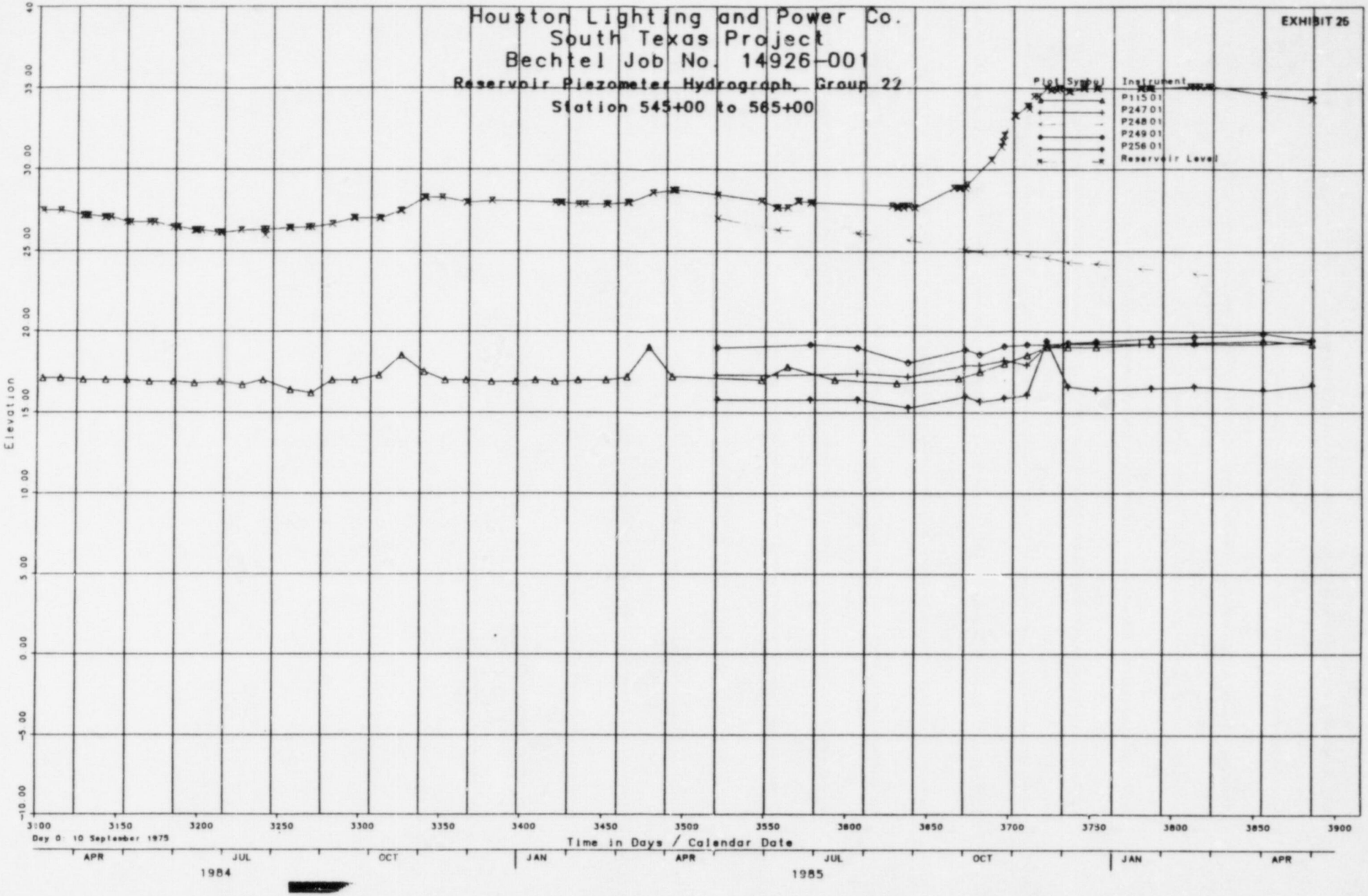
Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Group 22
Station 545+00 to 565+00
EXHIBIT 25
Plot Symbol
Instrument
P115 01
P247 01
P248 01
P249 01
P256 01
Reservoir Level
Elevation
40
35 00
30 00
25 00
20 00
15 00
10 00
5 00
0 00
-5 00
-10 00
3100
3150
3200
3250
3300
3350
3400
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3550
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3650
3700
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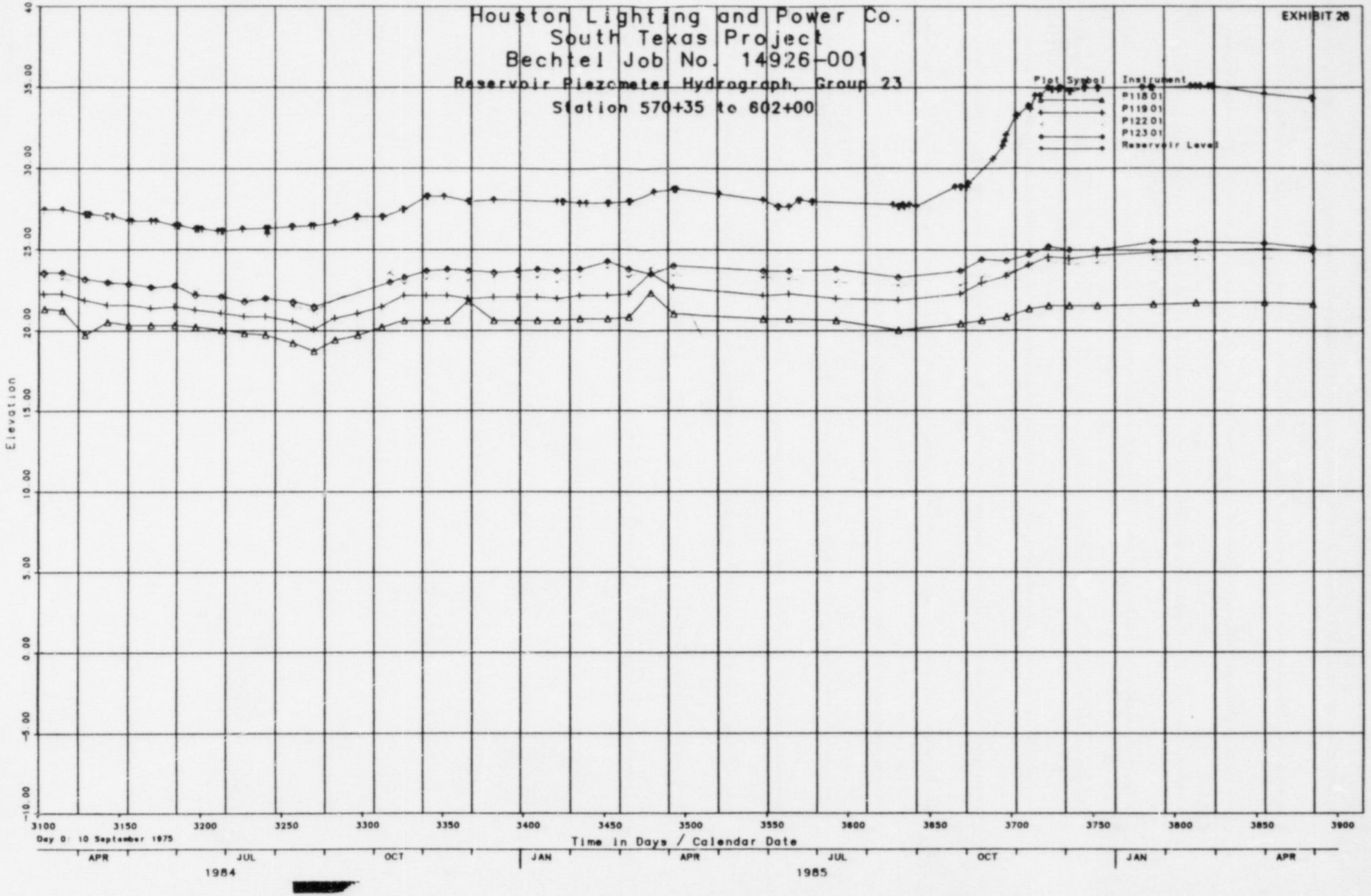
Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Group 23
Station 570+35 to 602+00
EXHIBIT 26
Plot Symbol
Instrument
P11801
P11901
P12201
P12301
Reservoir Level
Elevation
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35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
-5.00
-10.00
3100
3150
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3250
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3350
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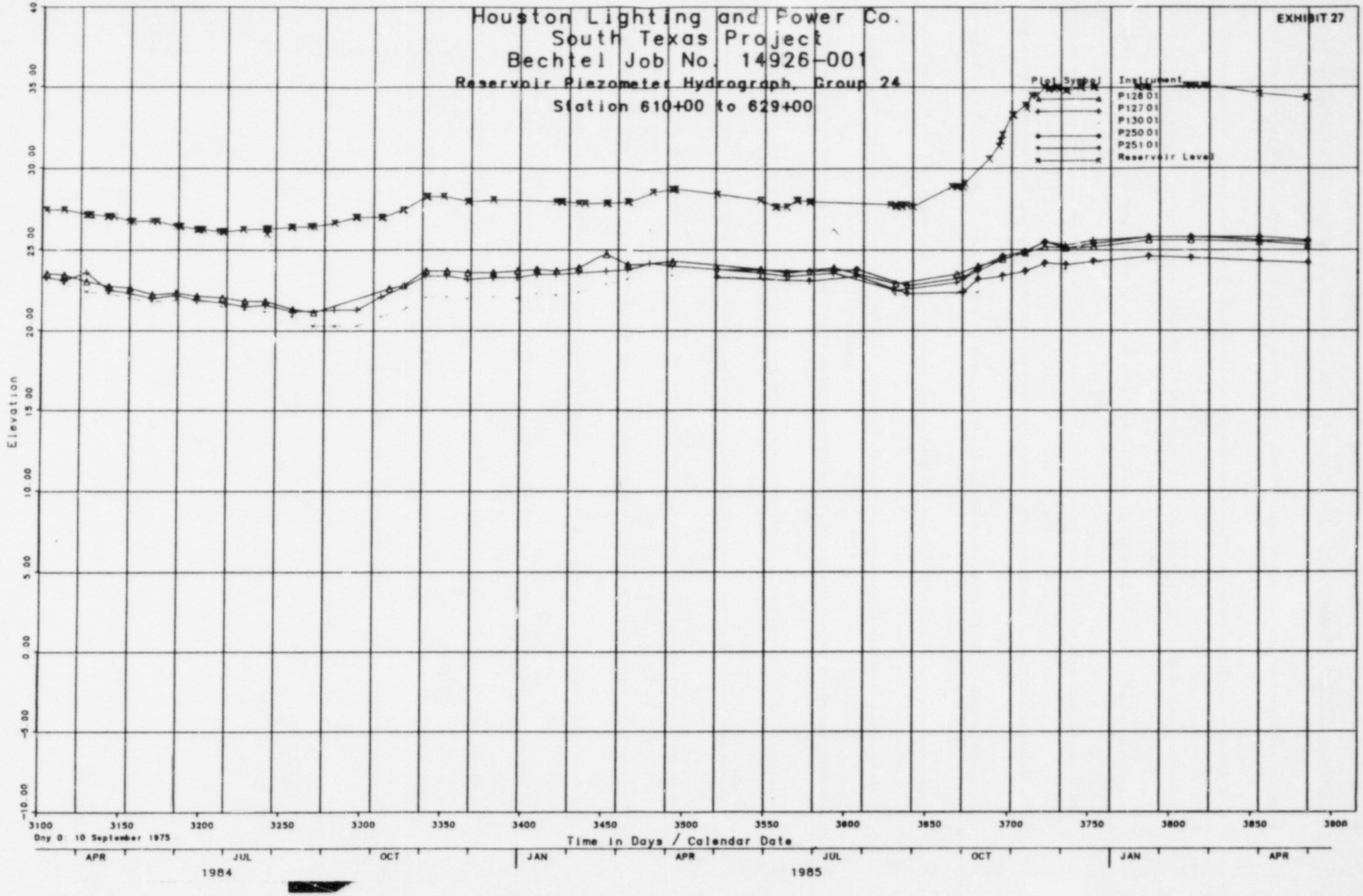
Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Group 24
Station 610+00 to 629+00
EXHIBIT 27
Plot Symbol
Instrument
P12801
P12701
P13001
P25001
P25101
Reservoir Level
Elevation
40
35.00
30.00
25.00
20.00
15.00
10.00
5.00
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-10.00
3100
3150
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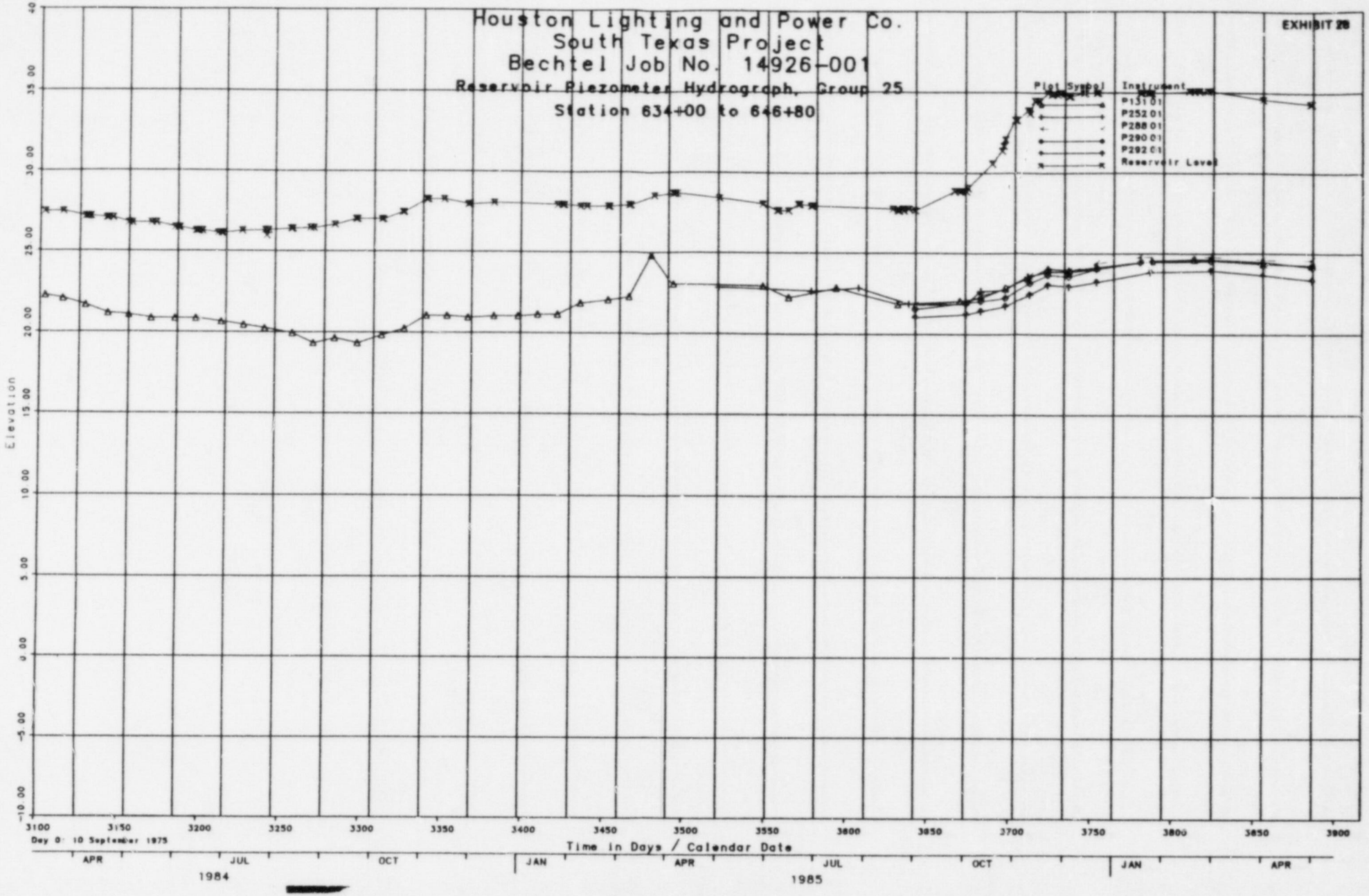
Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Group 25
Station 634+00 to 646+80
EXHIBIT 2B
Plot Symbol
Instrument
P131 01
P252 01
P288 01
P290 01
P292 01
Reservoir Level
Elevation
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
-5.00
-10.00
3100
3150
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3250
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3450
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3550
3600
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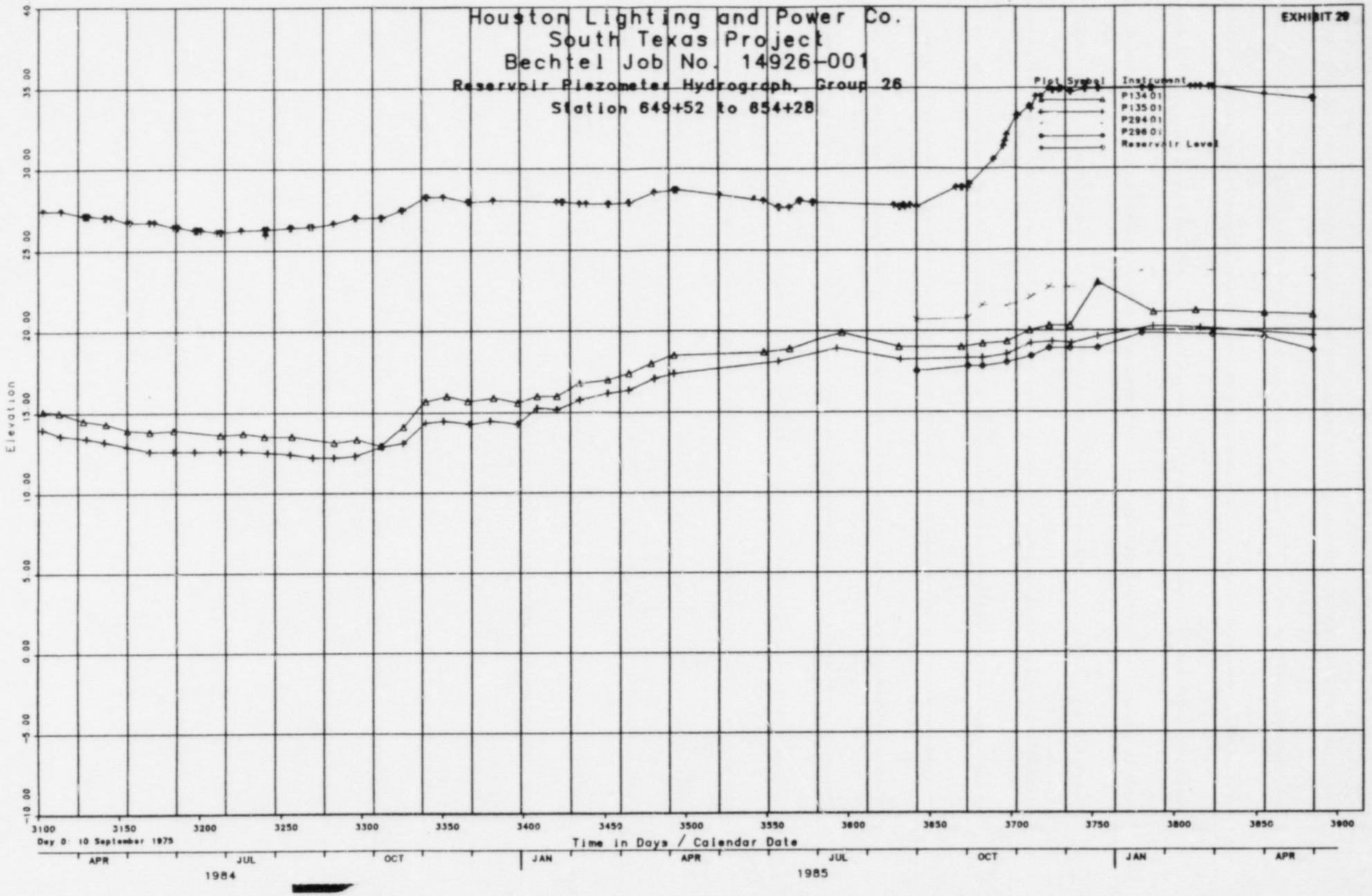
Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Group 26
Station 649+52 to 654+28
EXHIBIT 29
Plot Symbol
Instrument
P134.01
P135.01
P294.01
P296.01
Reservoir Level
Elevation
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35.00
30.00
25.00
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15.00
10.00
5.00
0.00
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-10.00
3100
3150
3200
3250
3300
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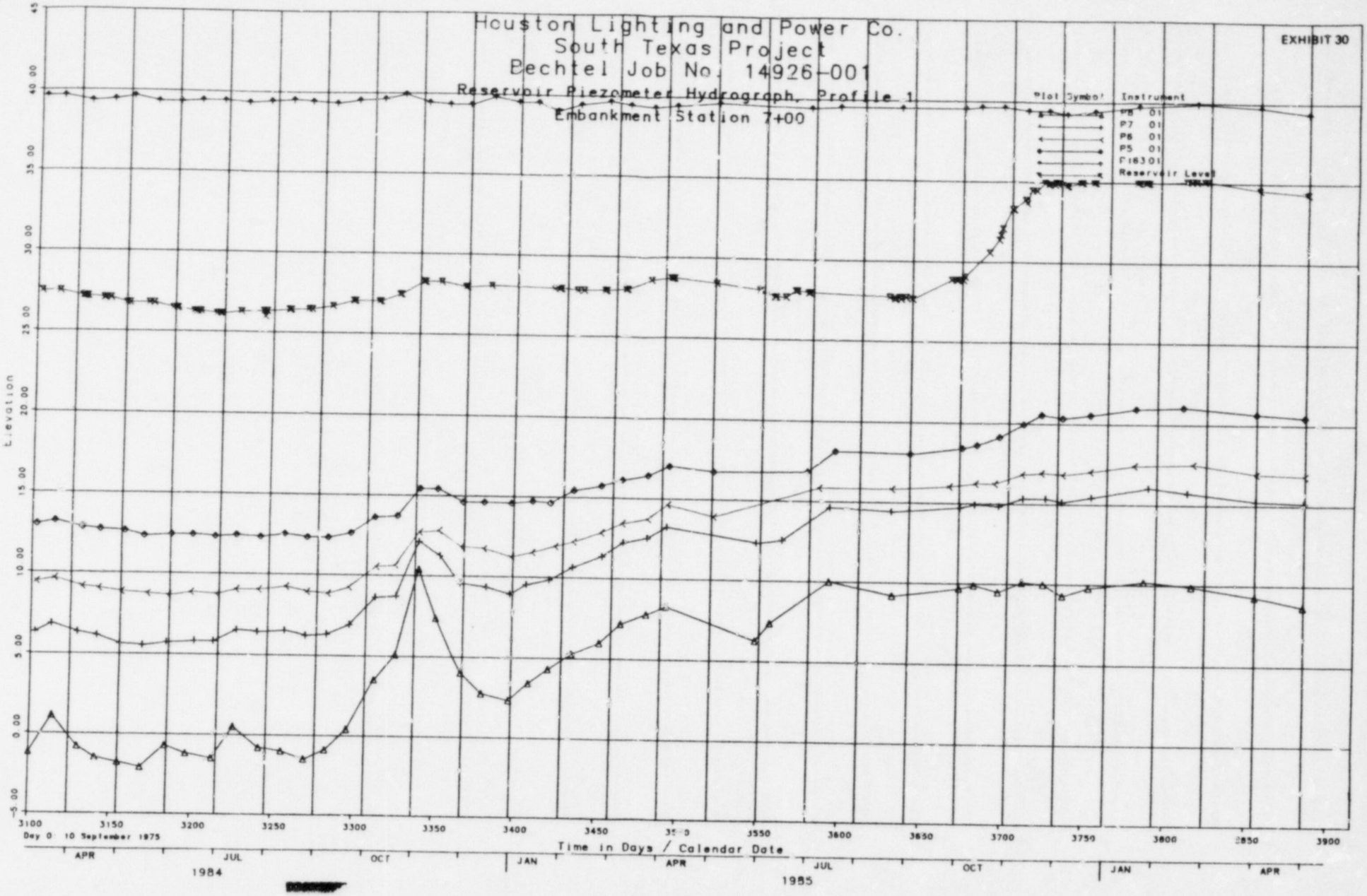
Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Profile 1
Embankment Station 7+00
EXHIBIT 30
Plot Symbol
Instrument
P8 01
P7 01
P6 01
P5 01
P163 01
Reservoir Level
Elevation
45
40 00
35 00
30 00
25 00
20 00
15 00
10 00
5 00
0 00
-5 00
3100
3150
3200
3250
3300
3350
3400
3450
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3550
3600
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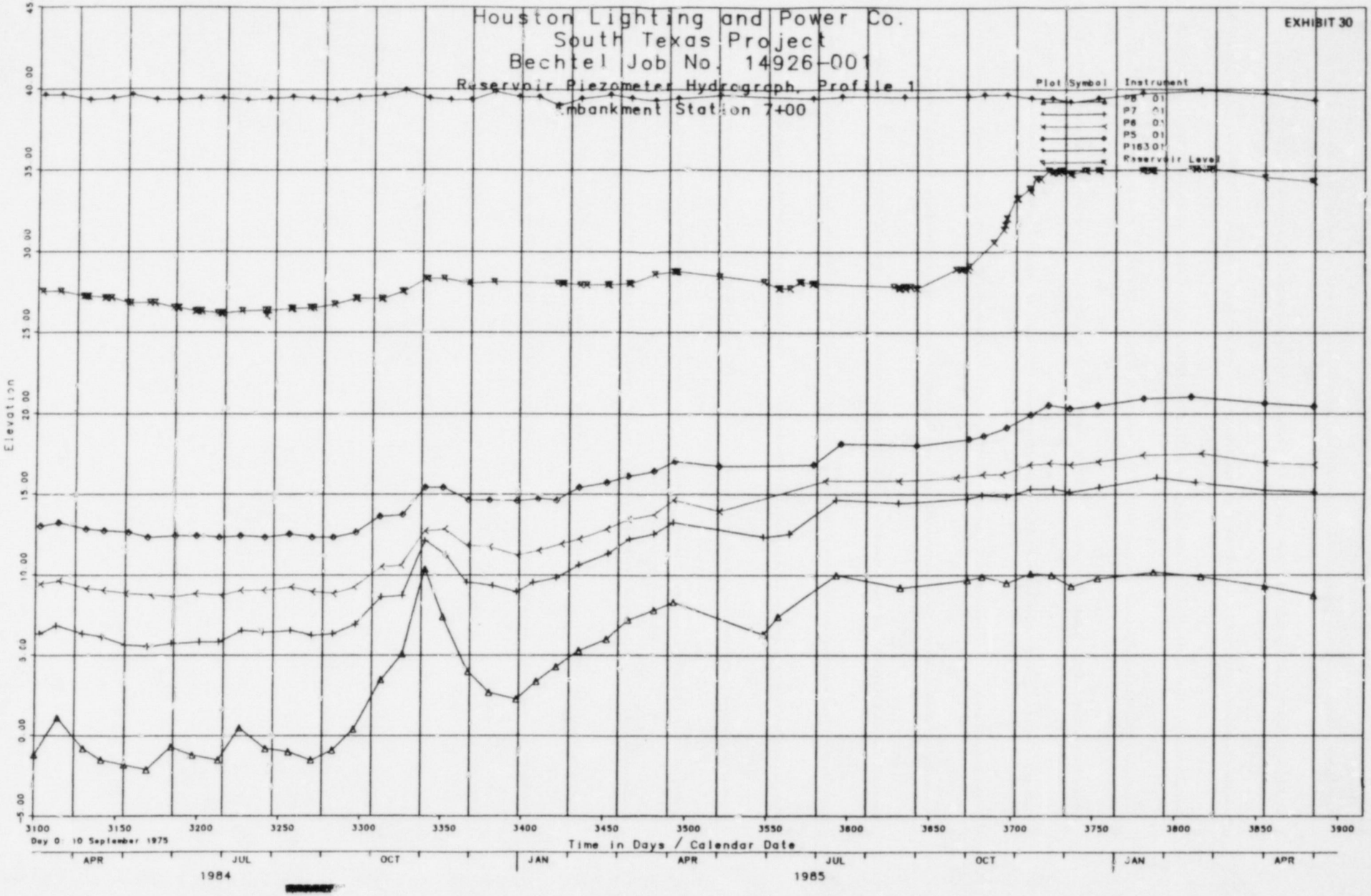
Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Profile 1
Embankment Station 7+00
EXHIBIT 30
Plot Symbol
Instrument
P8 01
P7 01
P6 01
P5 01
P183 01
Reservoir Level
Elevation
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
3.00
0.00
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3100
3150
3200
3250
3300
3350
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3500
3550
3600
3650
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3750
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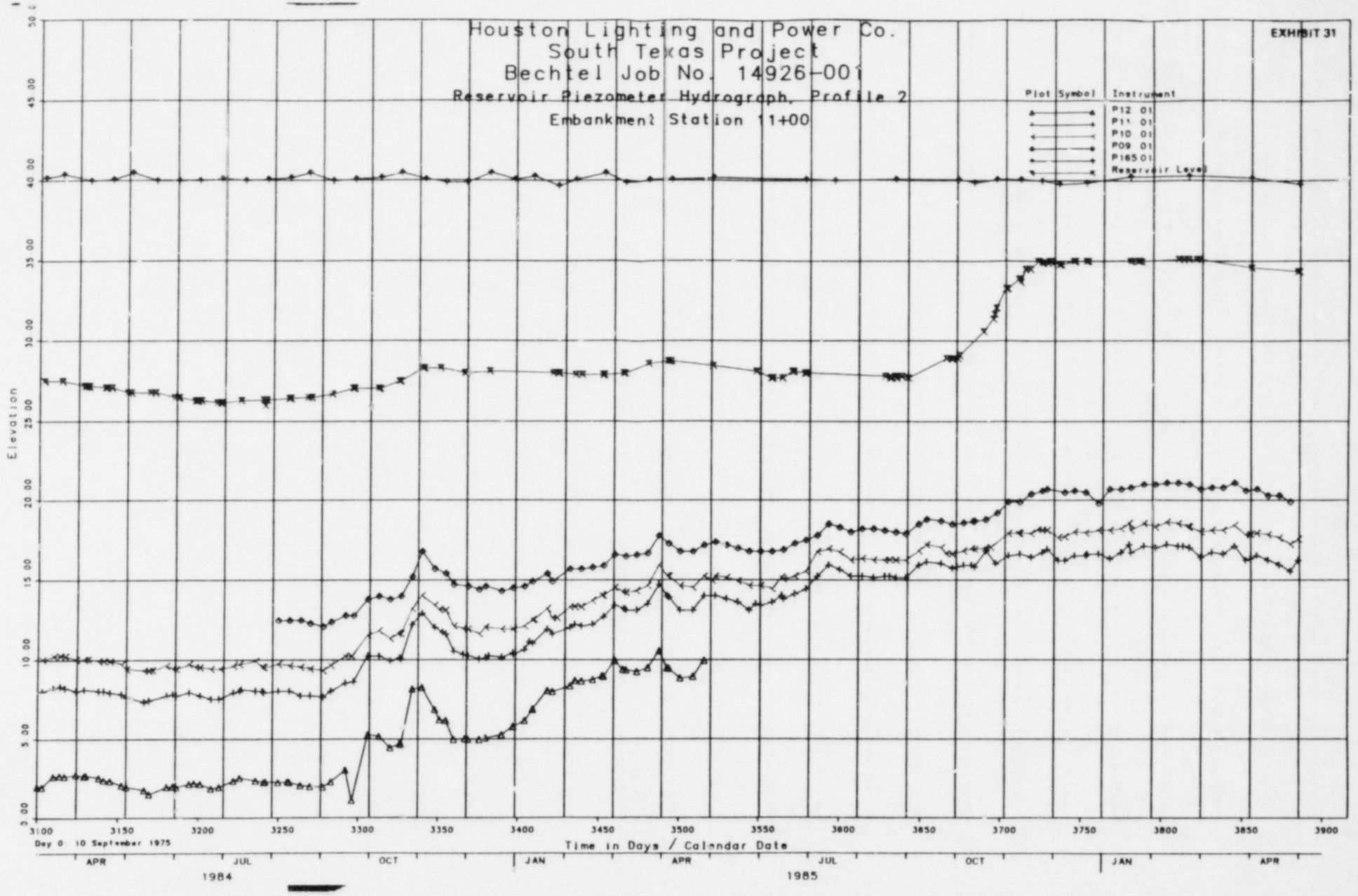
Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Profile 2
Embankment Station 11+00
EXHIBIT 31
Plot Symbol
Instrument
P12 01
P11 01
P10 01
P09 01
P165 01
Reservoir Level
Elevation
50.00
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
3100
3150
3200
3250
3300
3350
3400
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3550
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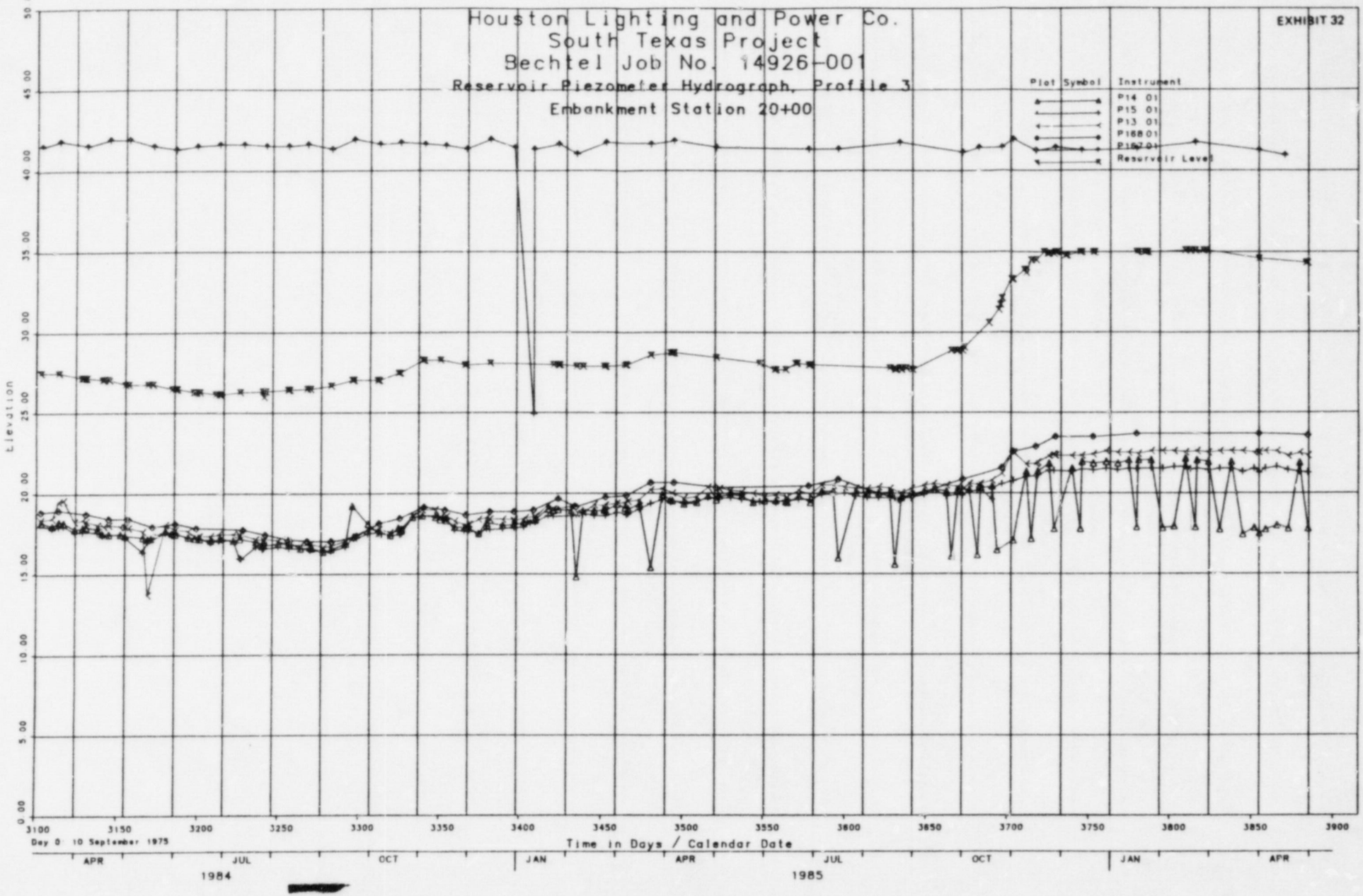
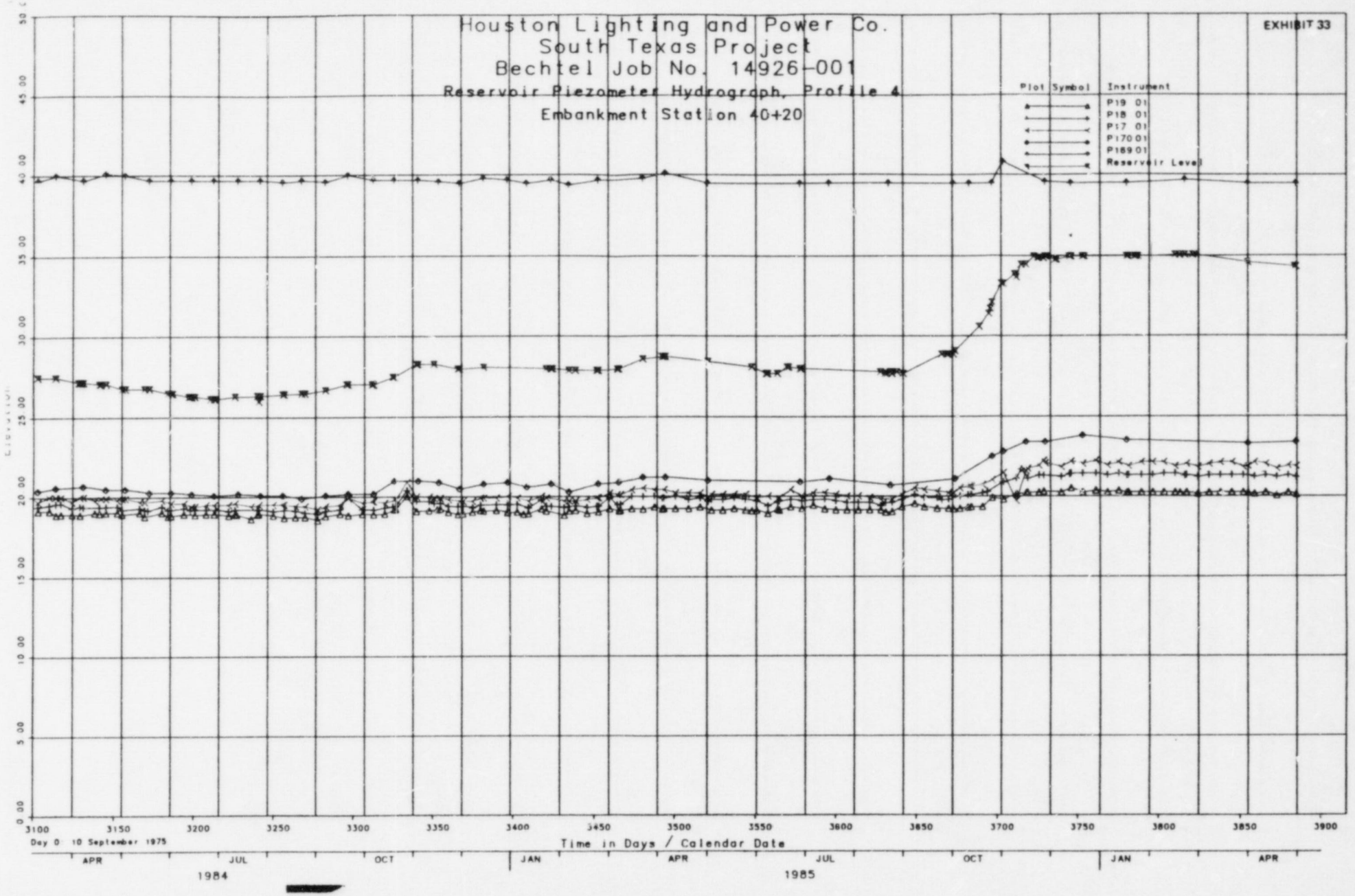
EXHIBIT 32

Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Profile 3
Embankment Station 20+00




Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Profile 4
Embankment Station 40+20
EXHIBIT 33
Plot Symbol
Instrument
P19 01
P18 01
P17 01
P170 01
P189 01
Reservoir Level
Elevation
0.00
5.00
10.00
15.00
20.00
25.00
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35.00
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3100
3150
3200
3250
3300
3350
3400
3450
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Time in Days / Calendar Date
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EXHIBIT 34

Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Profile 5
Embankment Station 59+60

Plot Symbol	Instrument
	P23 01
	P22 01
	P21 01
	P172 01
	P171 01
	Reservoir Level

Elevation

50 00
45 00
40 00
35 00
30 00
25 00
20 00
15 00
10 00
5 00
0 00

3100 3150 3200 3250 3300 3350 3400 3450 3500 3550 3600 3650 3700 3750 3800 3850 3900

Day 0 10 September 1975

Time in Days / Calendar Date

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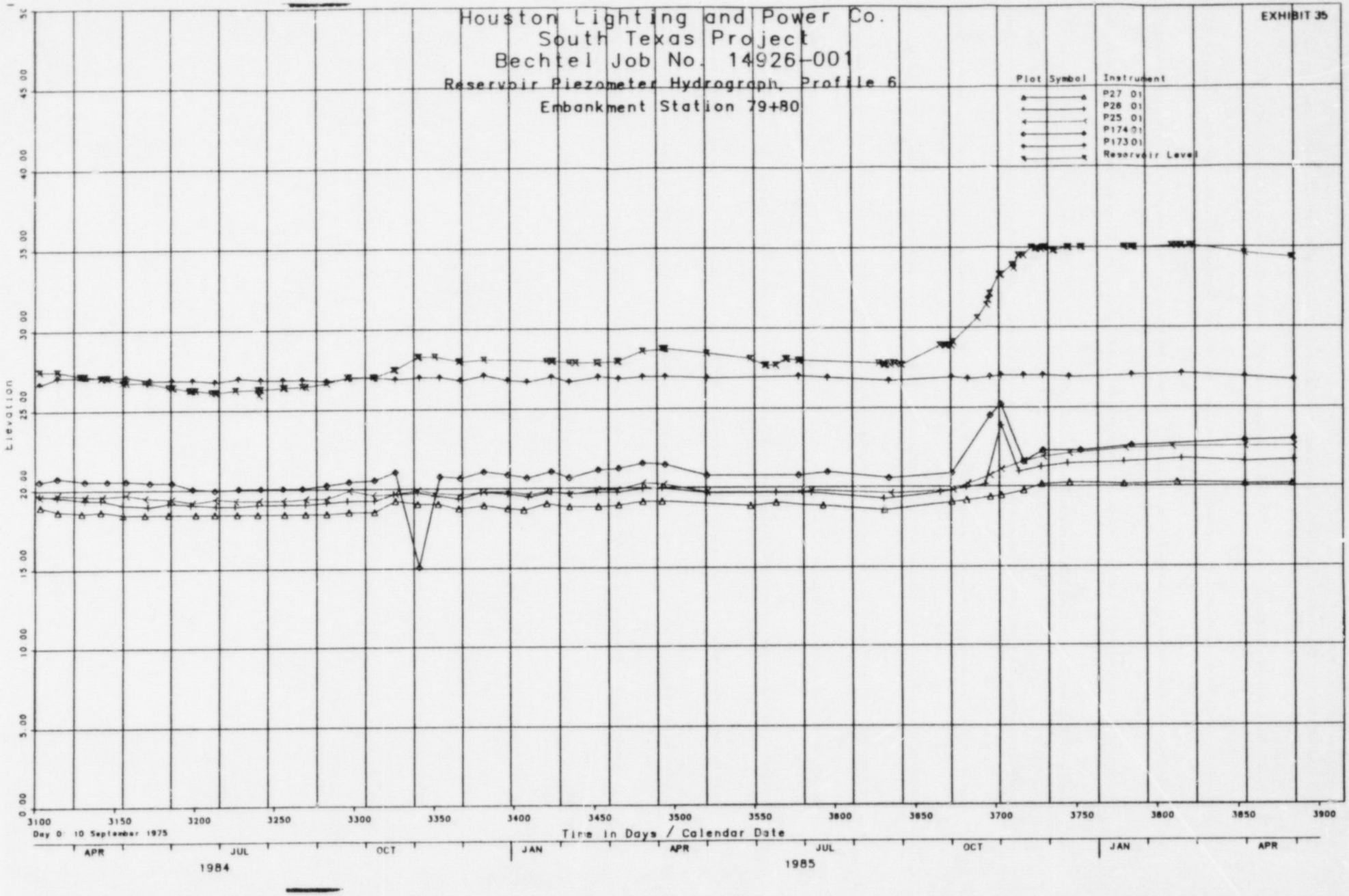
Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Profile 6
Embankment Station 79+80
EXHIBIT 35
Plot Symbol
Instrument
P27 01
P28 01
P25 01
P174 01
P173 01
Reservoir Level
Elevation
0.00
5.00
10.00
15.00
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25.00
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35.00
40.00
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3150
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3250
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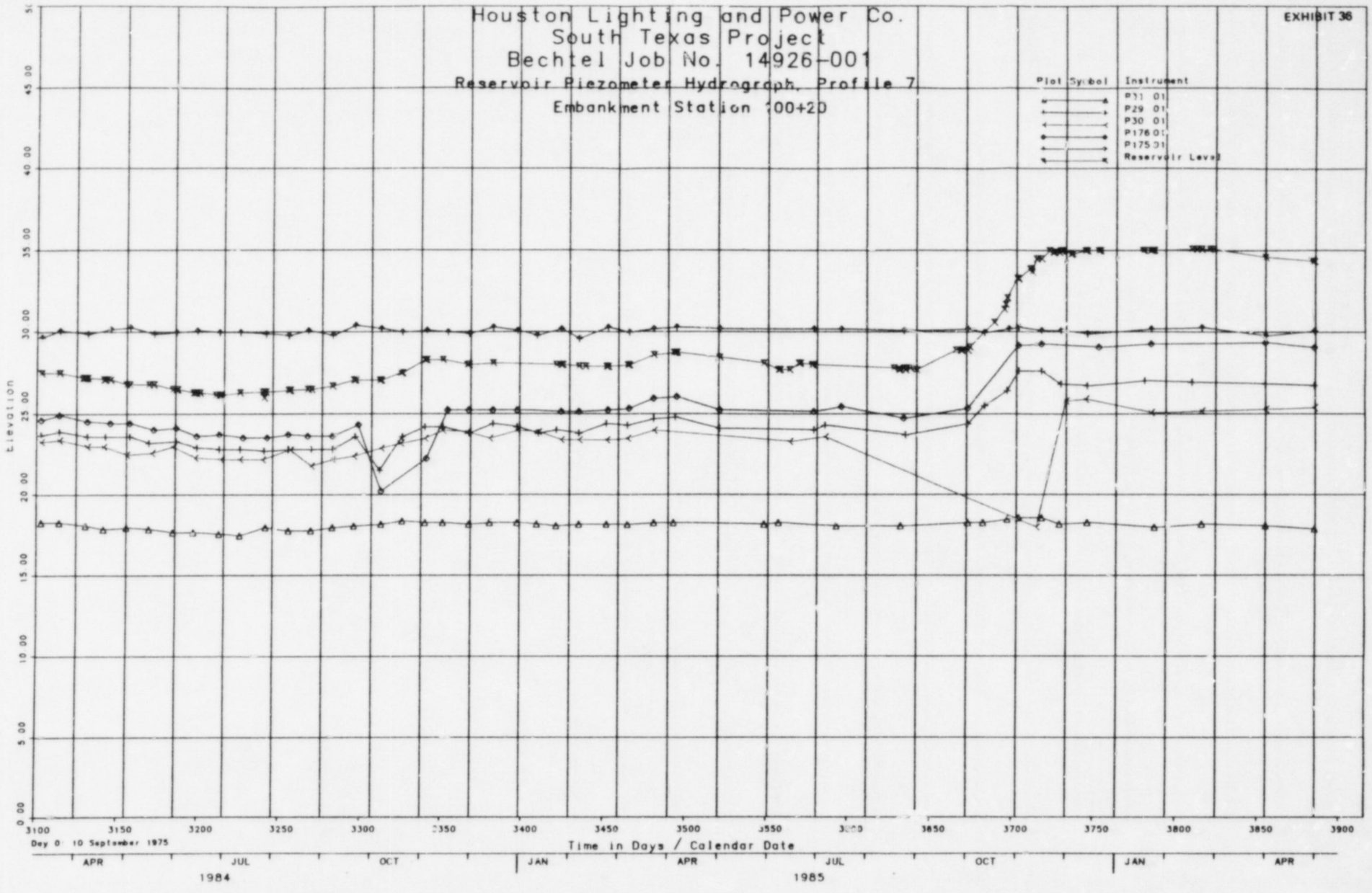
Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Profile 7
Embankment Station 100+20
EXHIBIT 36
Plot Symbol
Instrument
P31 01
P29 01
P30 01
P176 01
P175 01
Reservoir Level
Elevation
0.00
5.00
10.00
15.00
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3200
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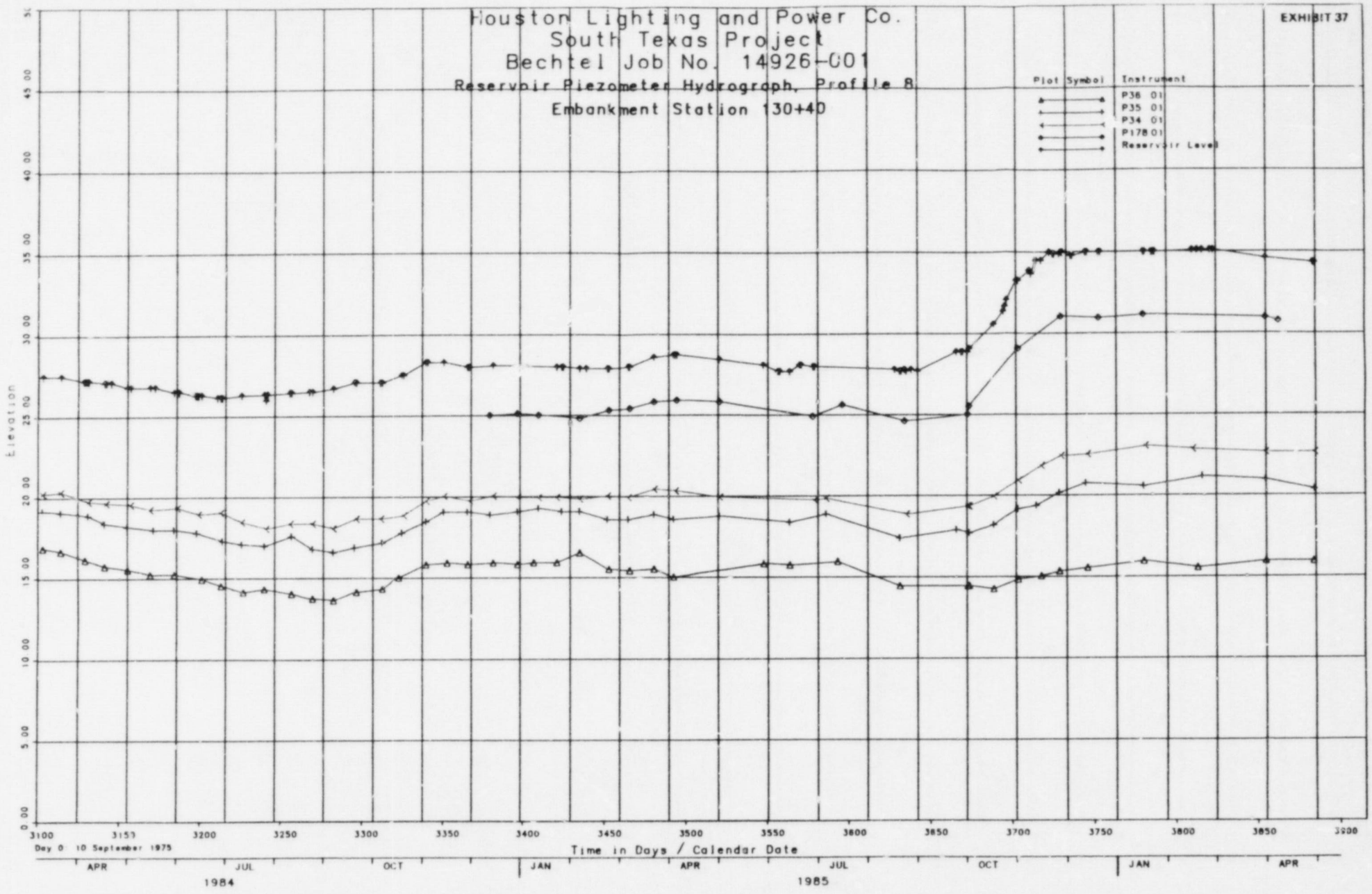
Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Profile 8
Embankment Station 130+40
EXHIBIT 37
Plot Symbol
Instrument
P36 01
P35 01
P34 01
P178 01
Reservoir Level
Elevation
0.00
5.00
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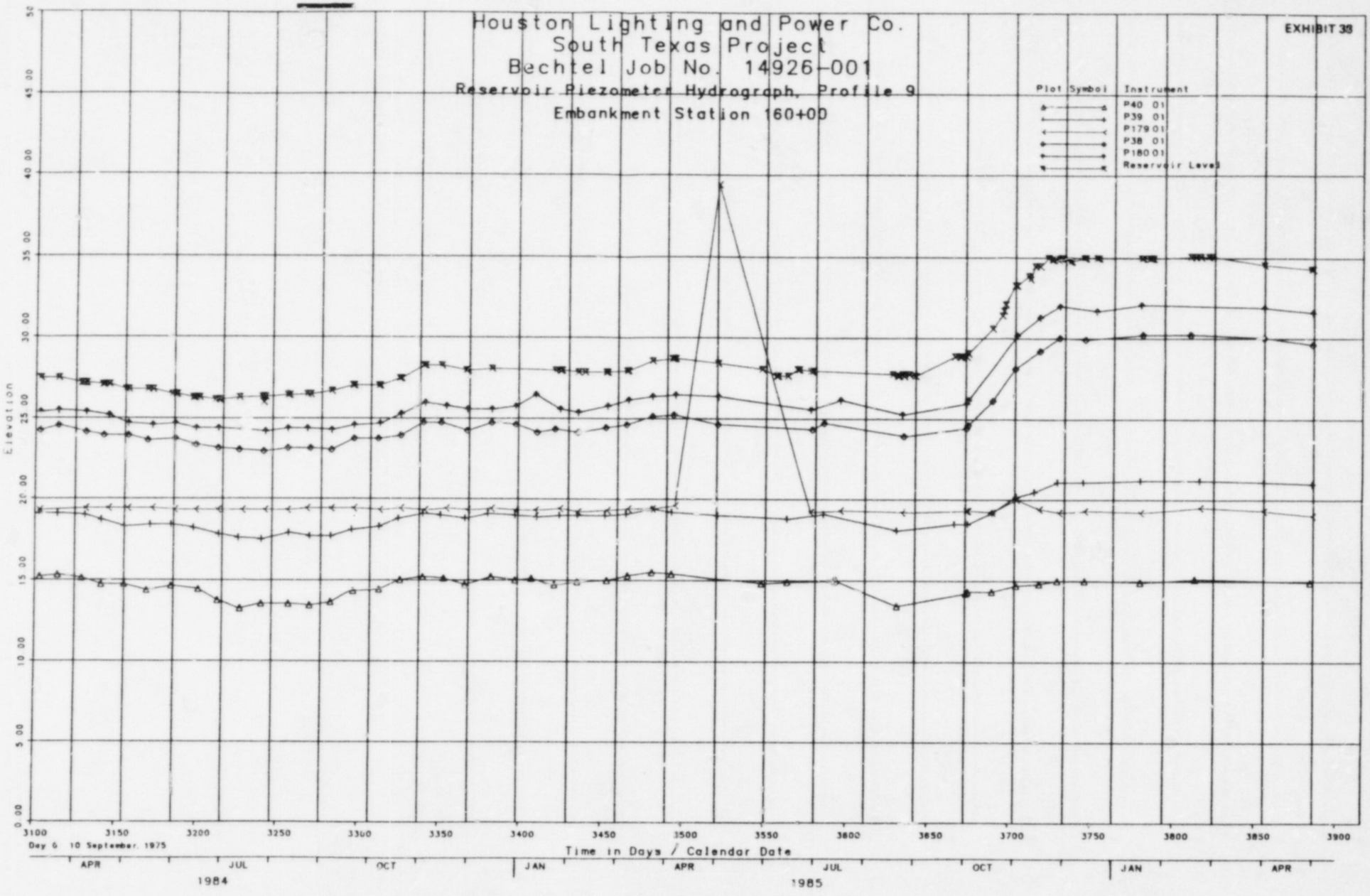
EXHIBIT 38

Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Profile 9
Embankment Station 160+00



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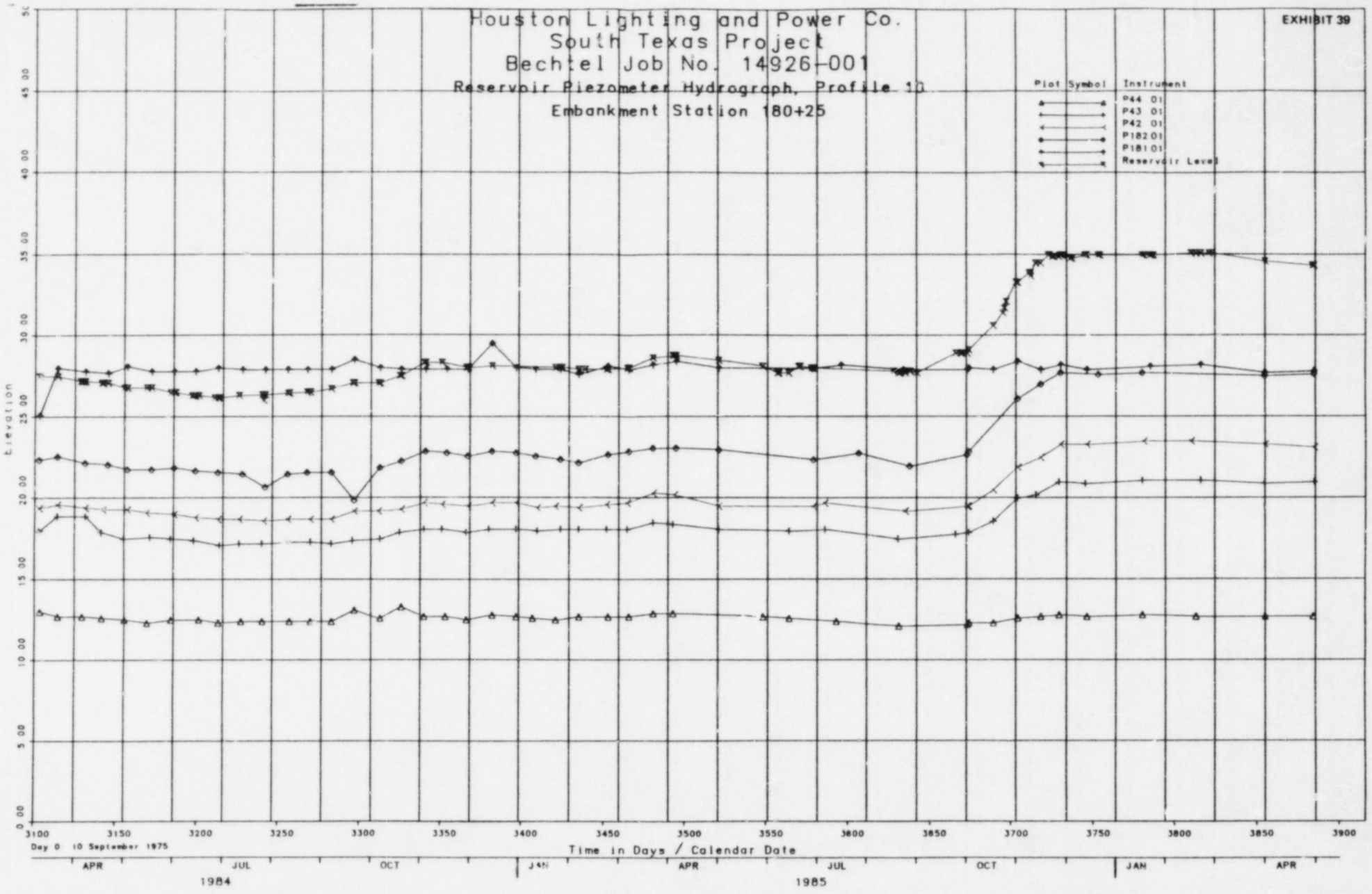
Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Profile 10
Embankment Station 180+25
Plot Symbol
Instrument
P44 01
P43 01
P42 01
P182 01
P181 01
Reservoir Level
Elevation
0.00
5.00
10.00
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3750
3800
3850
3900
Day 0 10 September 1975
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EXHIBIT 40

Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Profile 11
Embankment Station 200+20

Plot Symbol	Instrument
	P48 01
	P47 01
	P46 01
	P184 01
	P183 01
	Reservoir Level

Elevation

0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
45.00

3100 3150 3200 3250 3300 3350 3400 3450 3500 3550 3600 3650 3700 3750 3800 3850 3900

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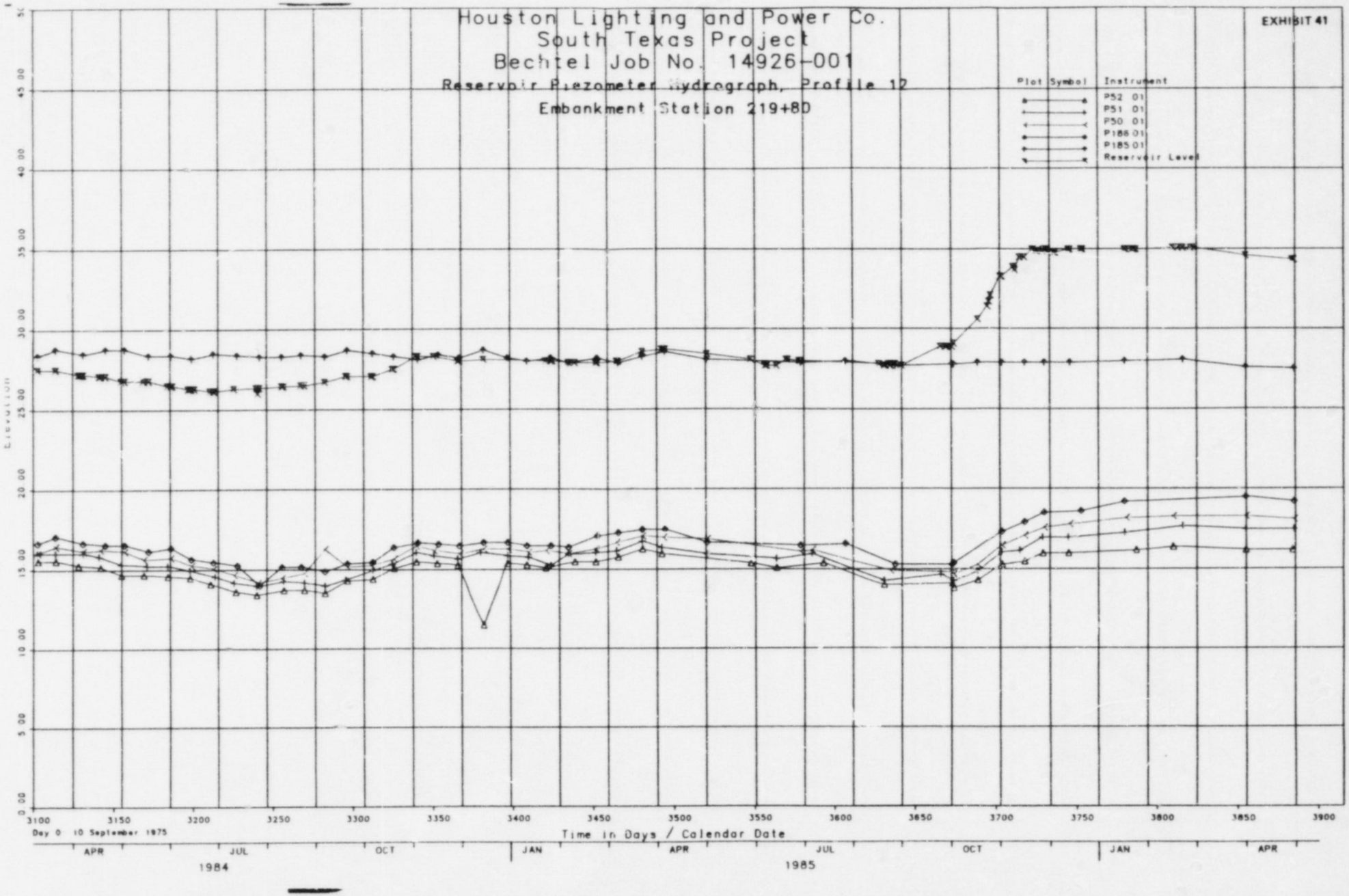
Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Profile 12
Embankment Station 219+80
EXHIBIT 41
Plot Symbol
Instrument
P52 01
P51 01
P50 01
P188 01
P185 01
Reservoir Level
Elevation
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
45.00
3100
3150
3200
3250
3300
3350
3400
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3500
3550
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3650
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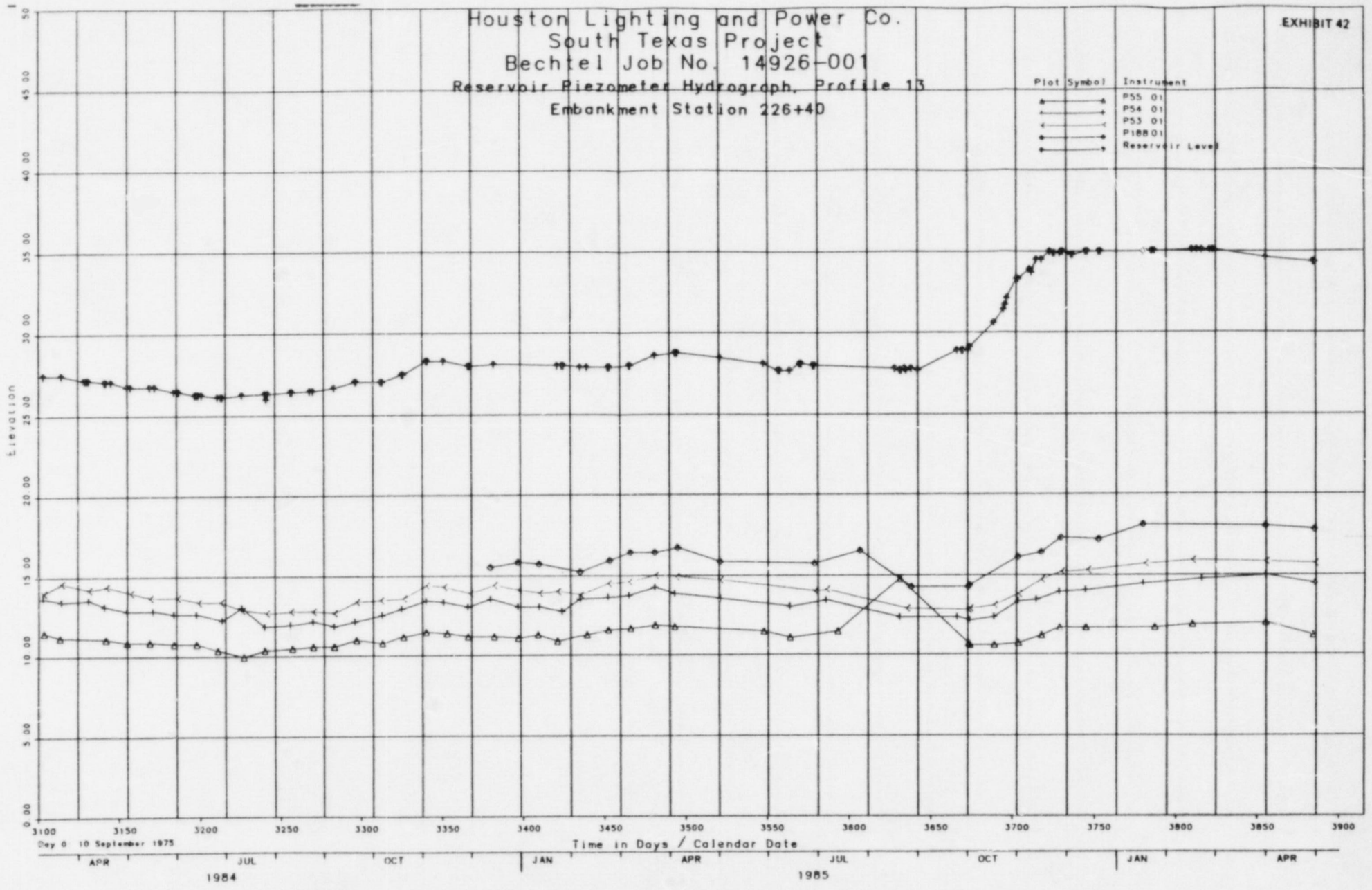
Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Profile 13
Embankment Station 226+40
EXHIBIT 42
Plot Symbol
Instrument
P55 01
P54 01
P53 01
P188 01
Reservoir Level
Elevation
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
45.00
50
3100
3150
3200
3250
3300
3350
3400
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3500
3550
3600
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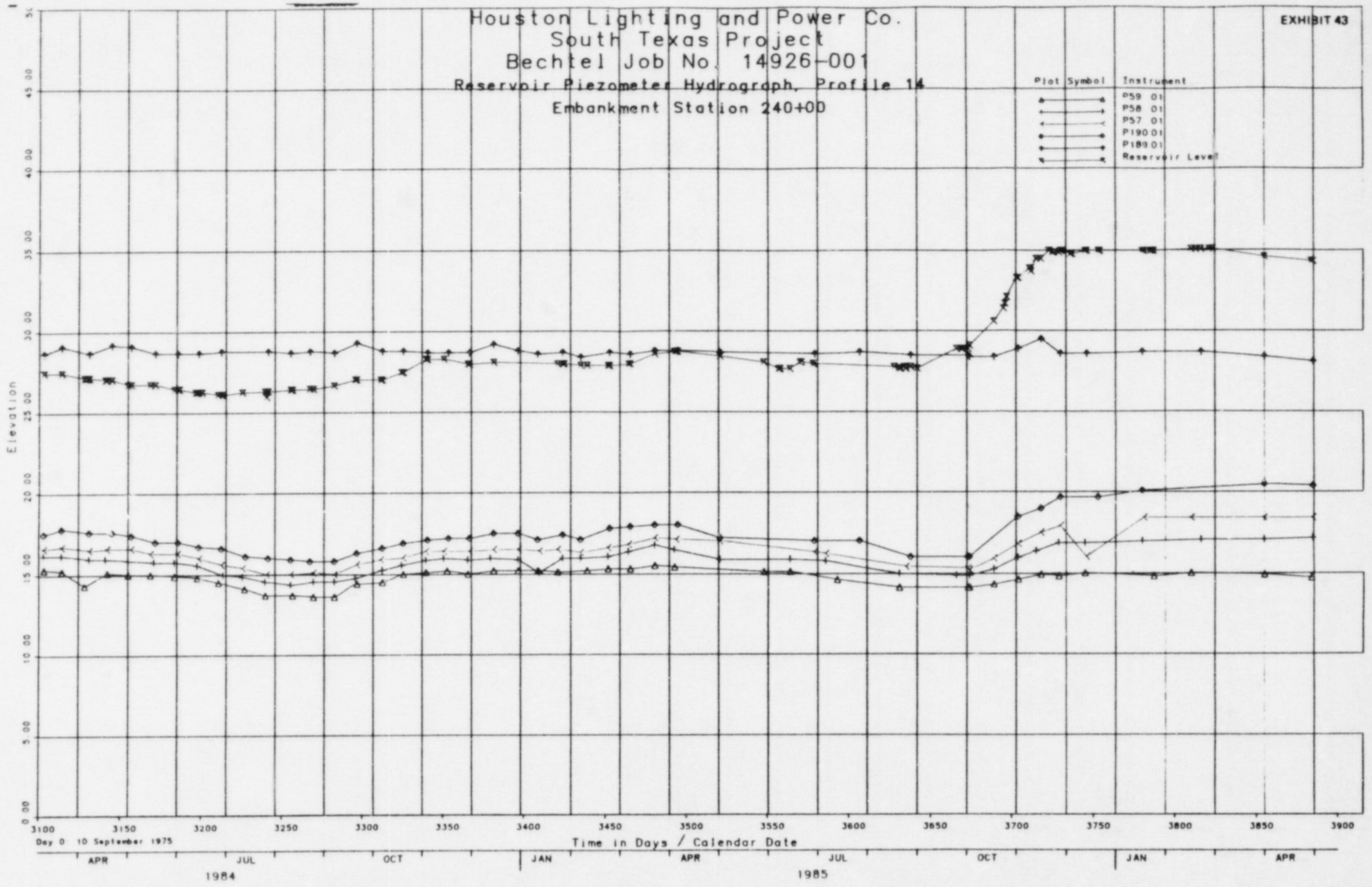
Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Profile 14
Embankment Station 240+00
EXHIBIT 43
Plot Symbol
Instrument
P59 01
P58 01
P57 01
P190 01
P189 01
Reservoir Level
Elevation
0 00
5 00
10 00
15 00
20 00
25 00
30 00
35 00
40 00
45 00
3100
3150
3200
3250
3300
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3400
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EXHIBIT 44

Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Profile 15
Embankment Station 260+25

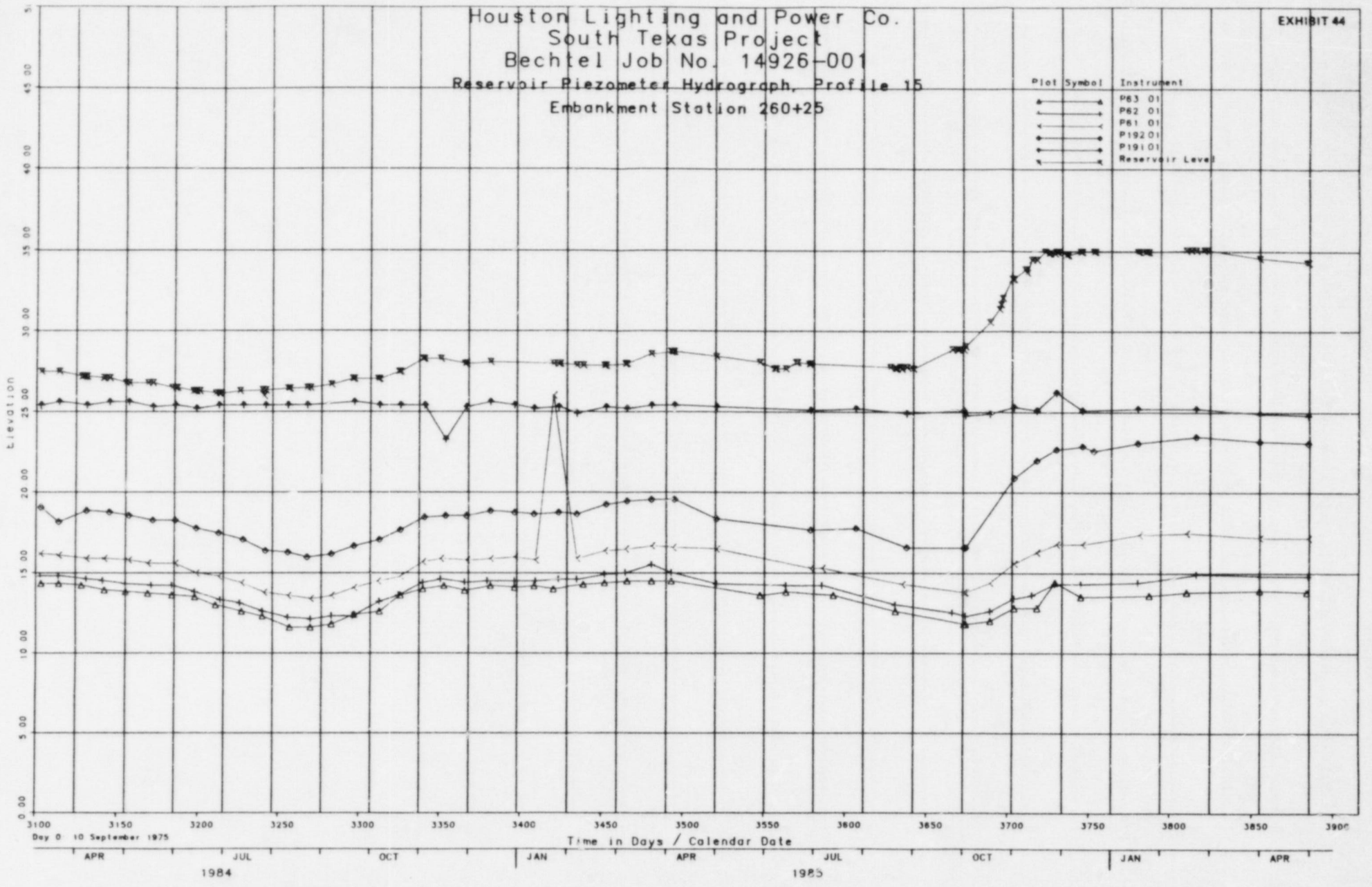
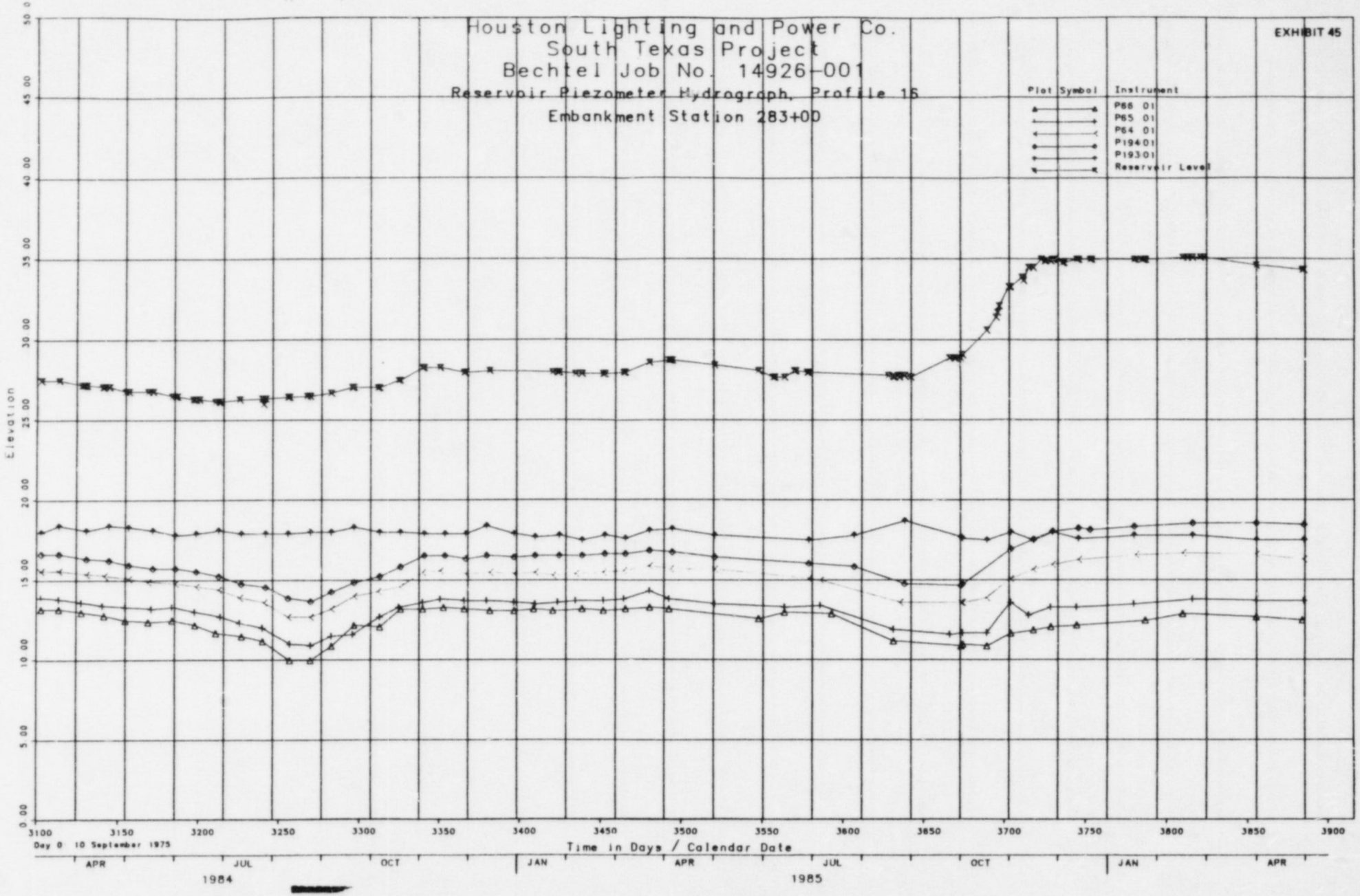


EXHIBIT 45


Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Profile 15
Embankment Station 283+00
Plot Symbol
Instrument
P66 01
P65 01
P64 01
P194 01
P193 01
Reservoir Level
Elevation
50.00
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
3100
3150
3200
3250
3300
3350
3400
3450
3500
3550
3600
3650
3700
3750
3800
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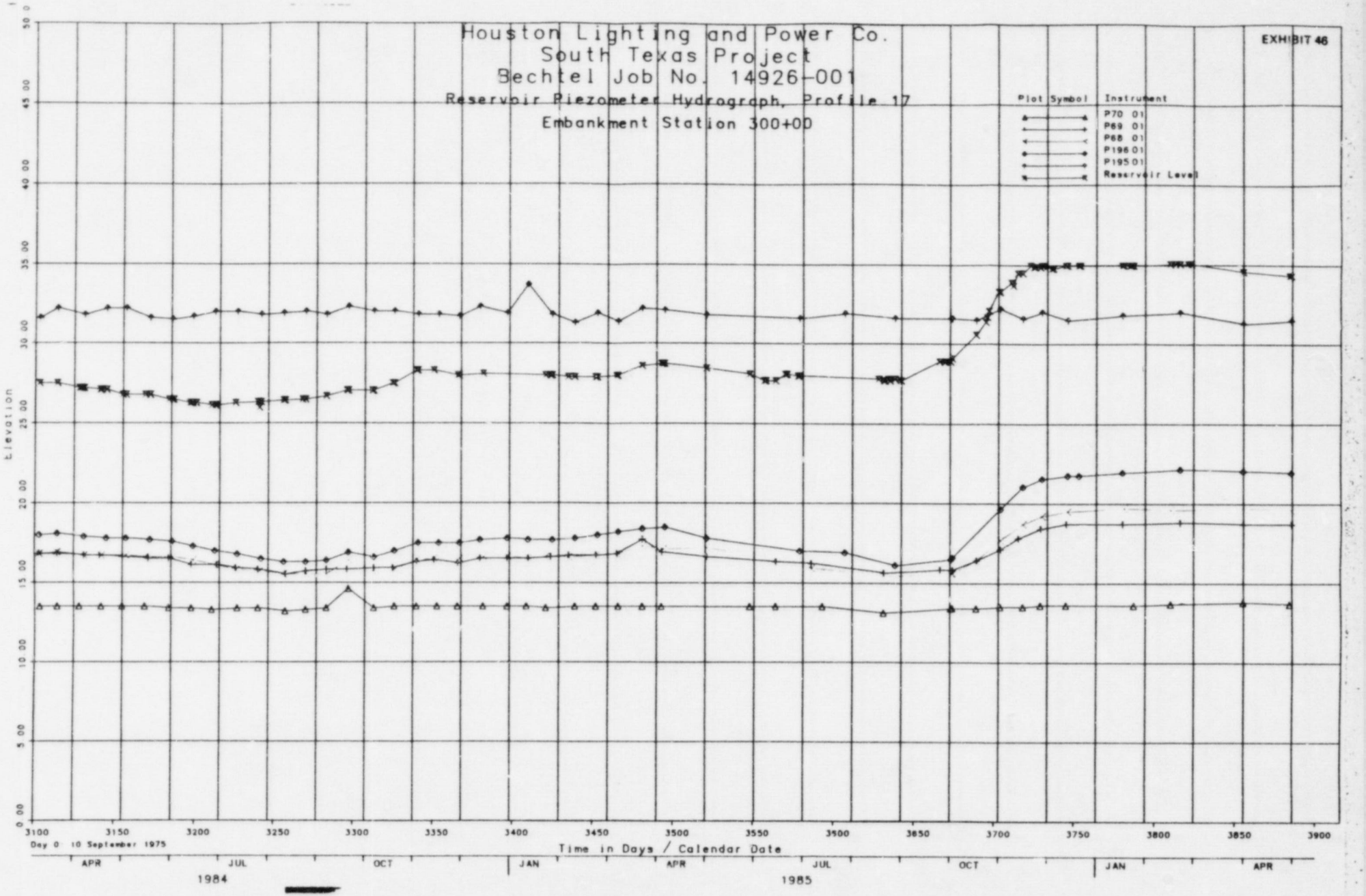
Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Profile 17
Embankment Station 300+00
EXHIBIT 46
Plot Symbol
Instrument
P70 01
P69 01
P68 01
P196 01
P195 01
Reservoir Level
Elevation
50 00
45 00
40 00
35 00
30 00
25 00
20 00
15 00
10 00
5 00
0 00
3100
3150
3200
3250
3300
3350
3400
3450
3500
3550
3600
3650
3700
3750
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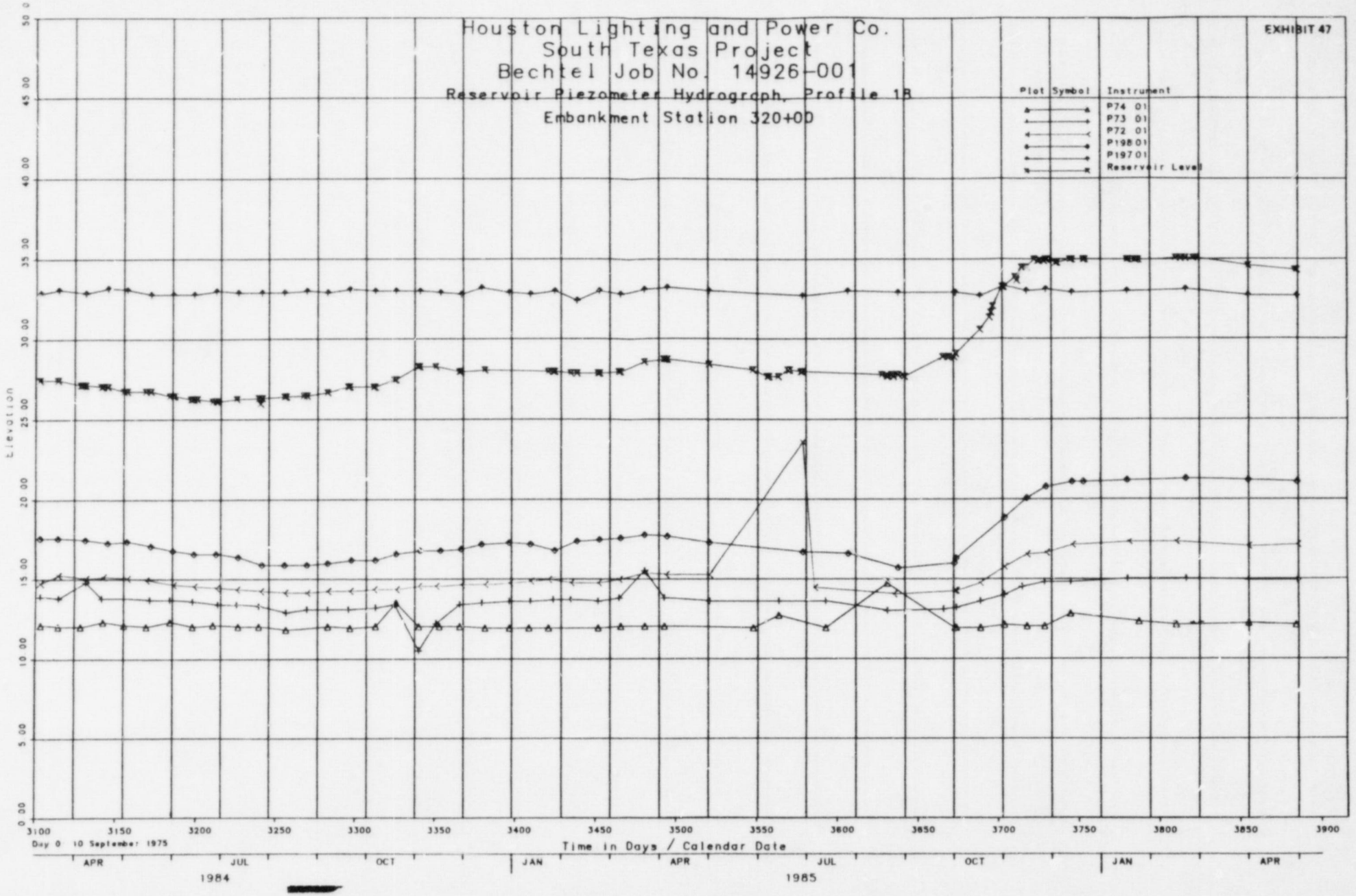
Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Profile 1B
Embankment Station 320+00
EXHIBIT 47
Plot Symbol
Instrument
P74 01
P73 01
P72 01
P198 01
P197 01
Reservoir Level
Elevation
50 00
45 00
40 00
35 00
30 00
25 00
20 00
15 00
10 00
5 00
0 00
3100
3150
3200
3250
3300
3350
3400
3450
3500
3550
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3650
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3750
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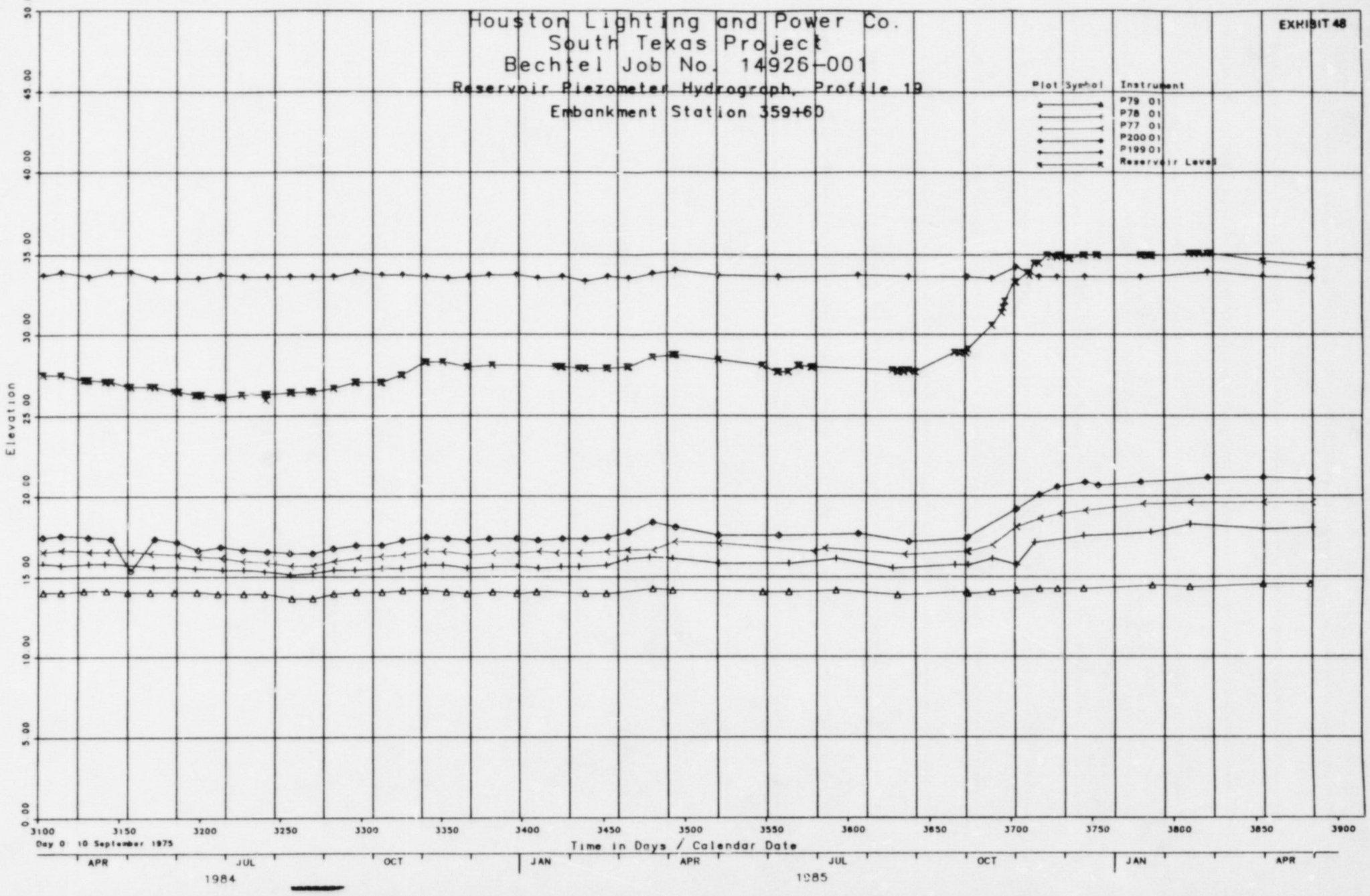
Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Profile 19
Embankment Station 359+60
EXHIBIT 48
Plot Symbol
Instrument
P79 01
P78 01
P77 01
P200 01
P199 01
Reservoir Level
Elevation
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
45.00
50.0
3100
3150
3200
3250
3300
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3400
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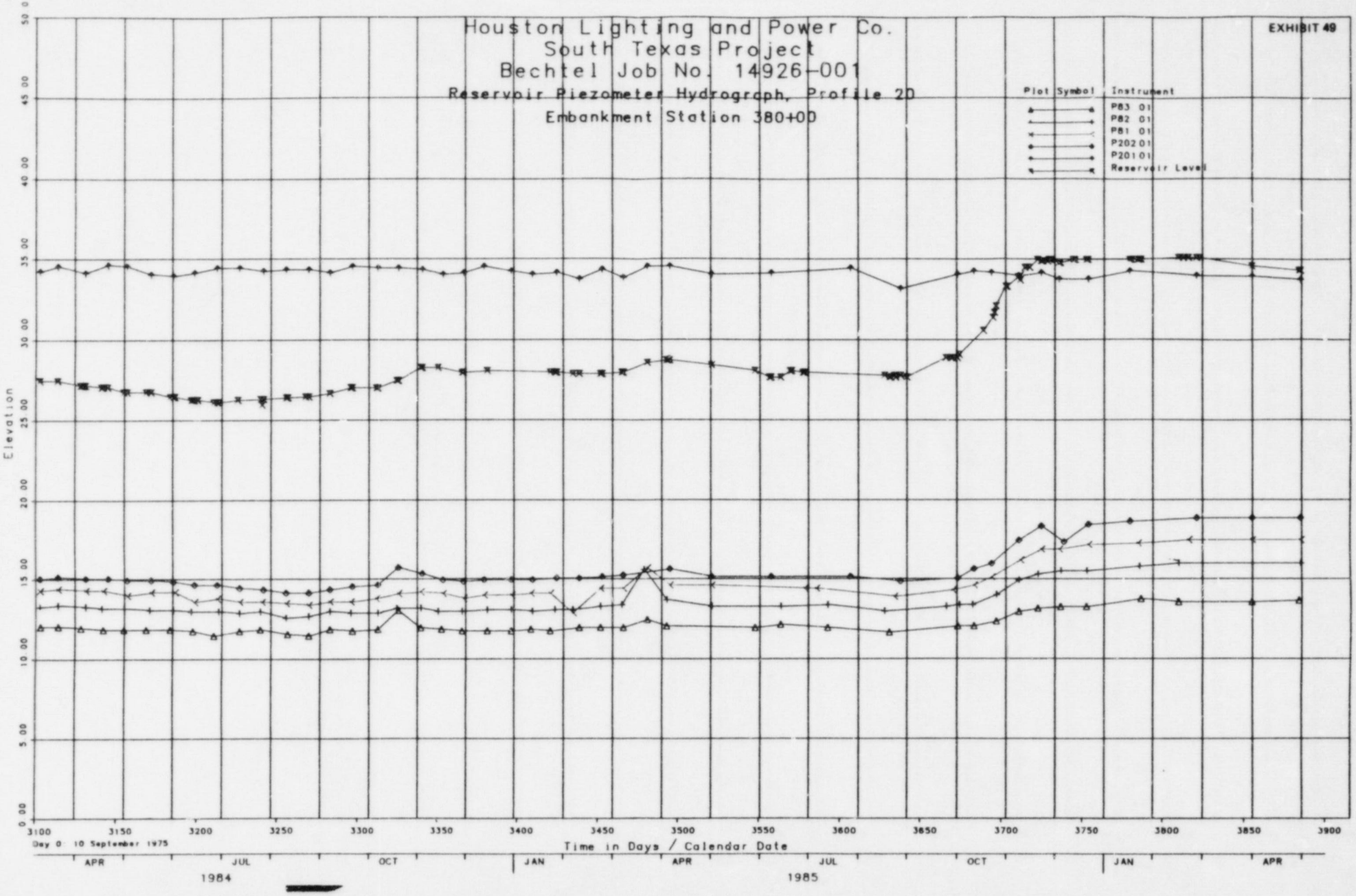
EXHIBIT 49


Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Profile 20
Embankment Station 380+00
Plot Symbol
Instrument
P83 01
P82 01
P81 01
P202 01
P201 01
Reservoir Level
Elevation
50.0
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
3100
3150
3200
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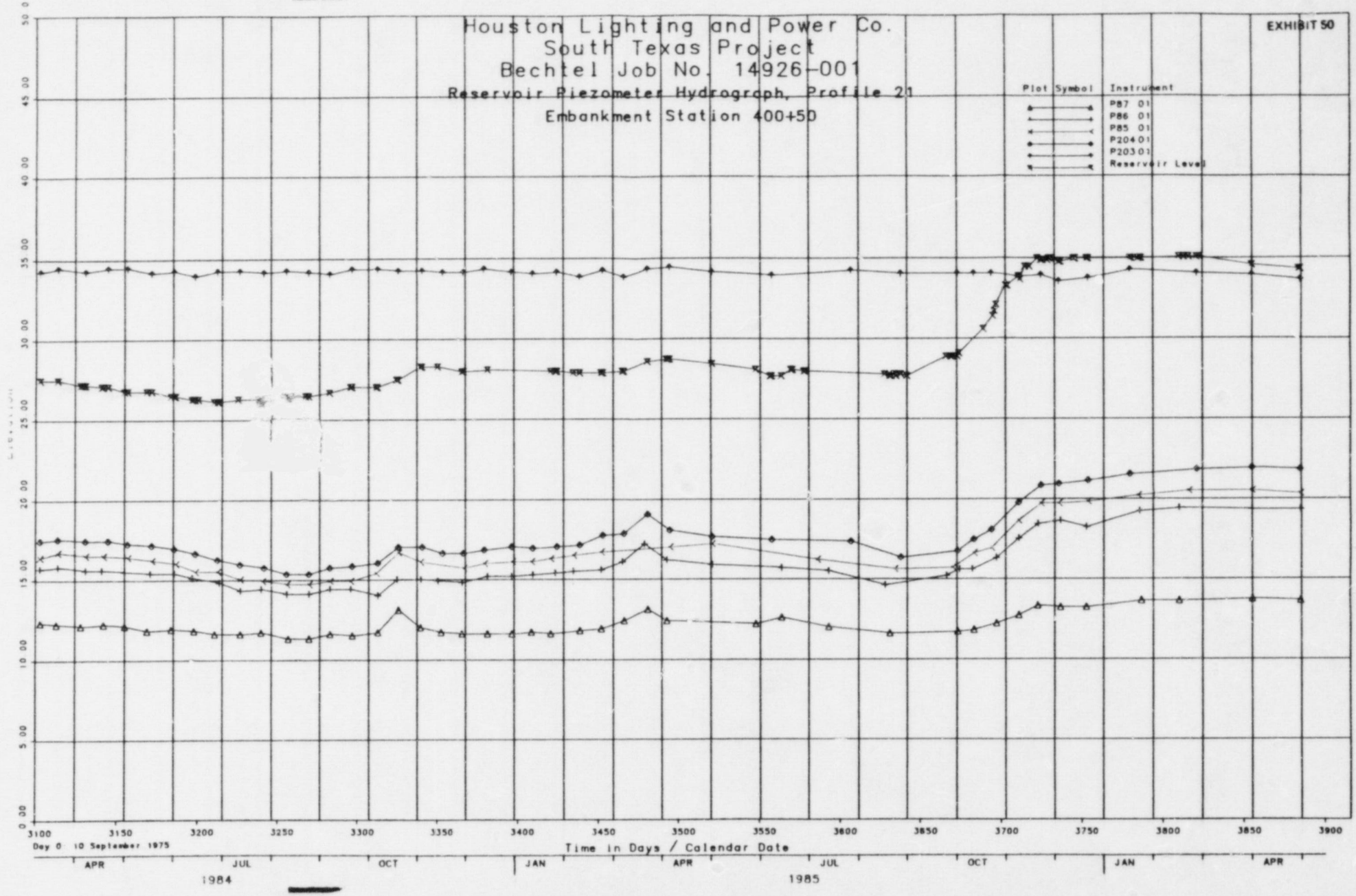
Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Profile 21
Embankment Station 400+50
EXHIBIT 50
Plot Symbol
Instrument
P87 01
P86 01
P85 01
P204 01
P203 01
Reservoir Level
Elevation
50 00
45 00
40 00
35 00
30 00
25 00
20 00
15 00
10 00
5 00
0 00
3100
3150
3200
3250
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3350
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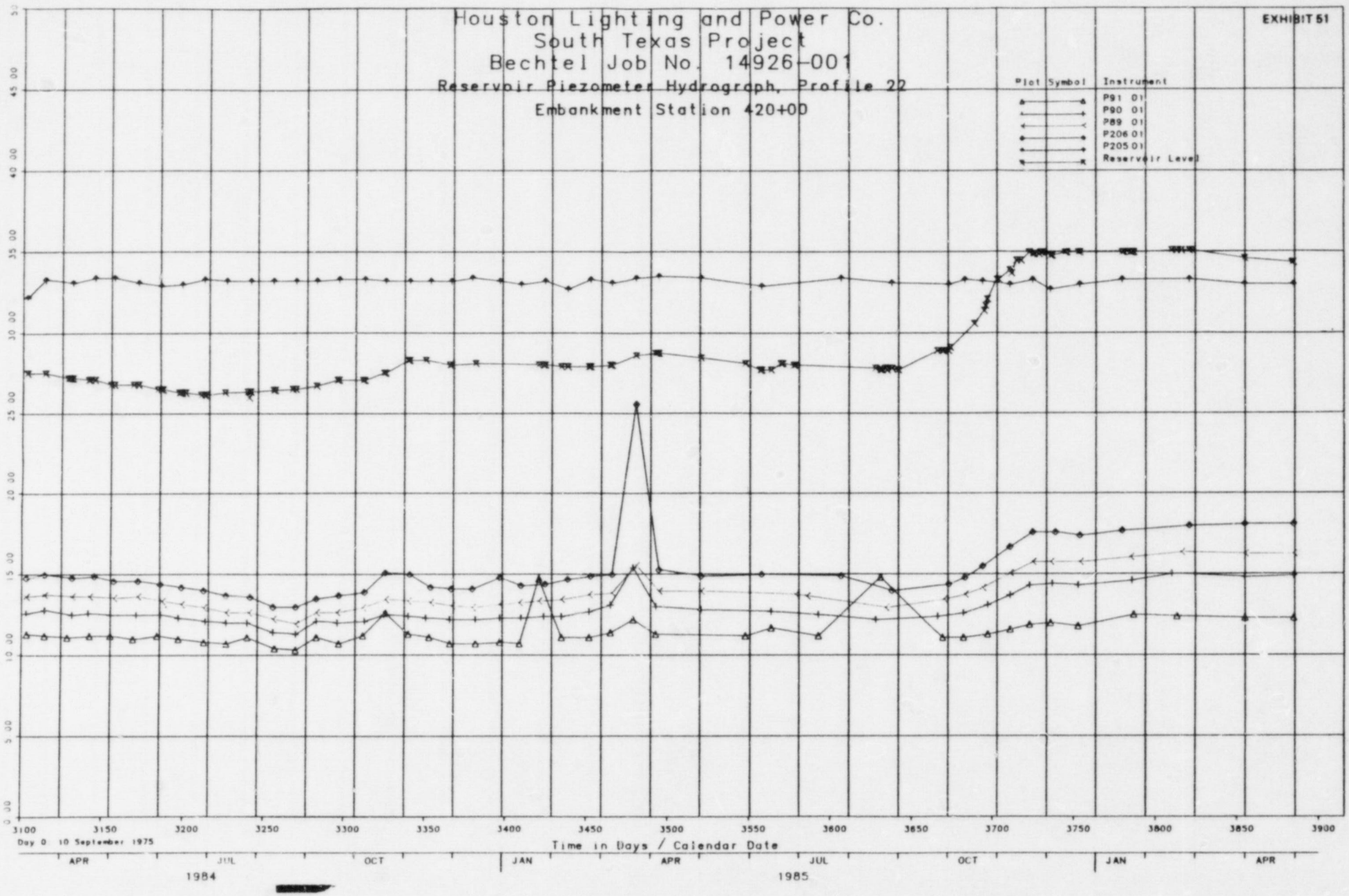
Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Profile 22
Embankment Station 420+00
EXHIBIT 51
Plot Symbol
Instrument
P91 01
P90 01
P89 01
P206 01
P205 01
Reservoir Level
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
3100
3150
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3250
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3350
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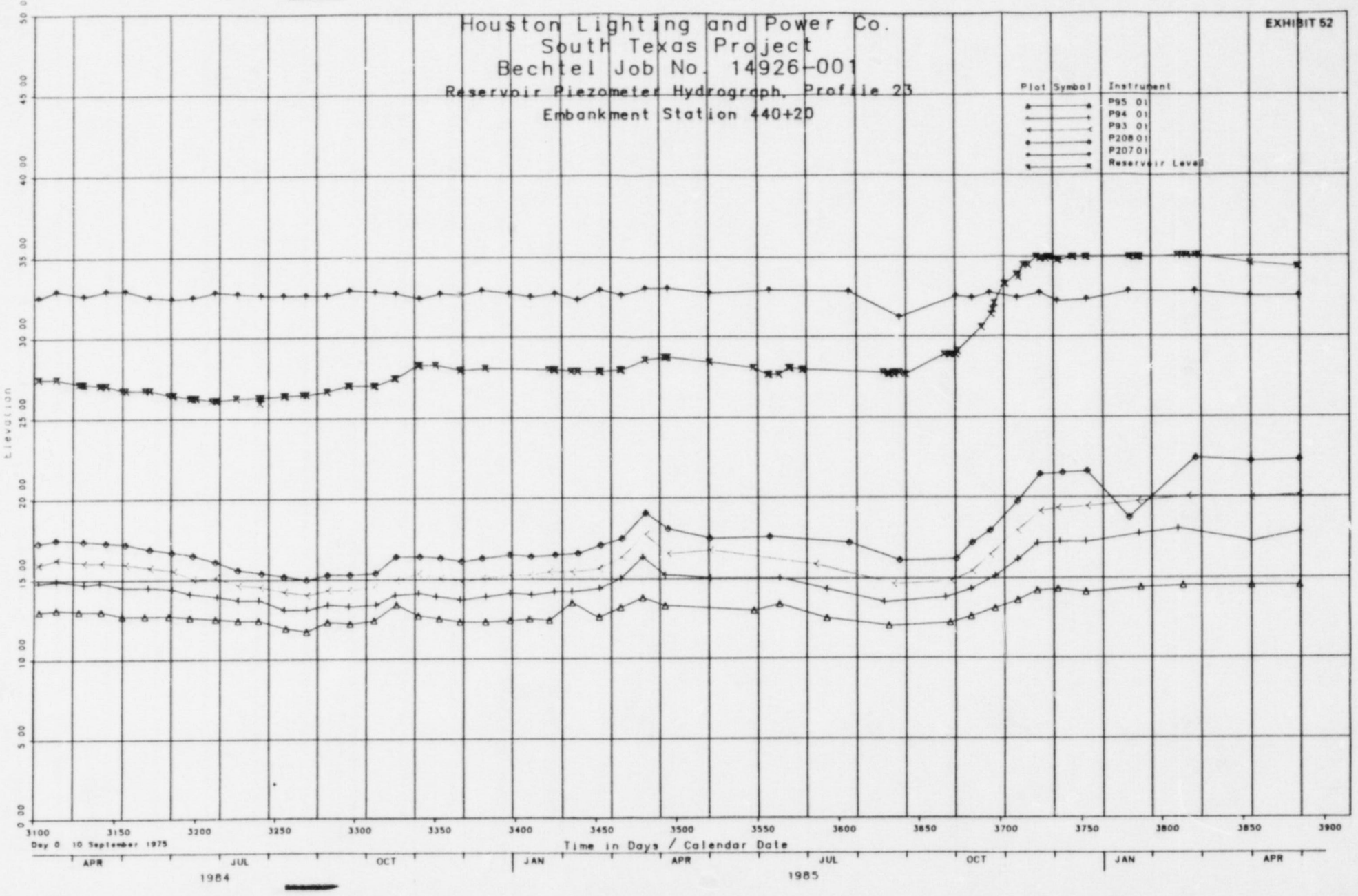
Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Profile 23
Embankment Station 440+20
EXHIBIT 52
Plot Symbol
Instrument
P95 01
P94 01
P93 01
P208 01
P207 01
Reservoir Level
Elevation
50.00
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
3100
3150
3200
3250
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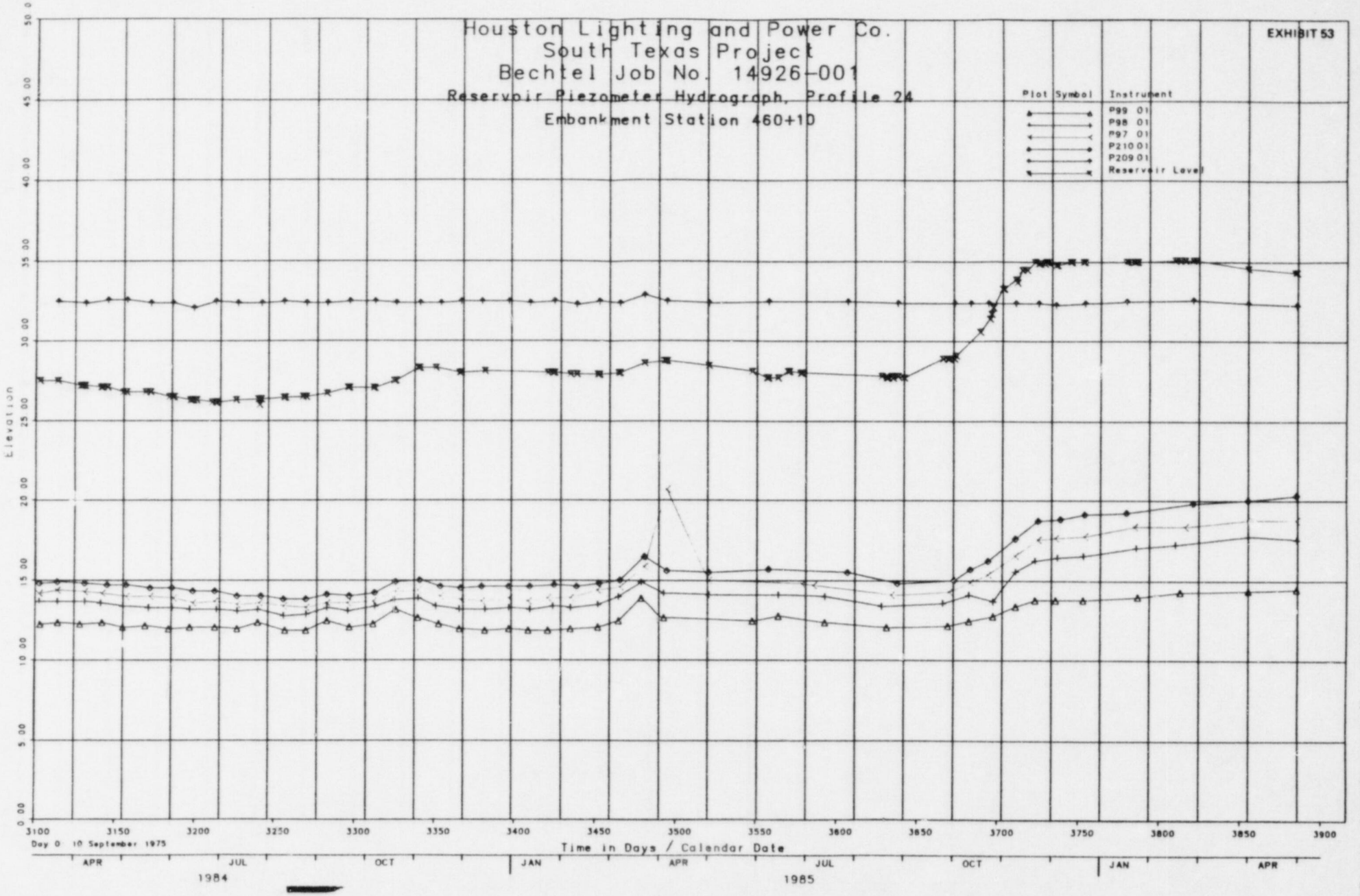
Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Profile 24
Embankment Station 460+10
EXHIBIT 53
Plot Symbol
Instrument
P99 01
P98 01
P97 01
P210 01
P209 01
Reservoir Level
Elevation
50.0
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
3100
3150
3200
3250
3300
3350
3400
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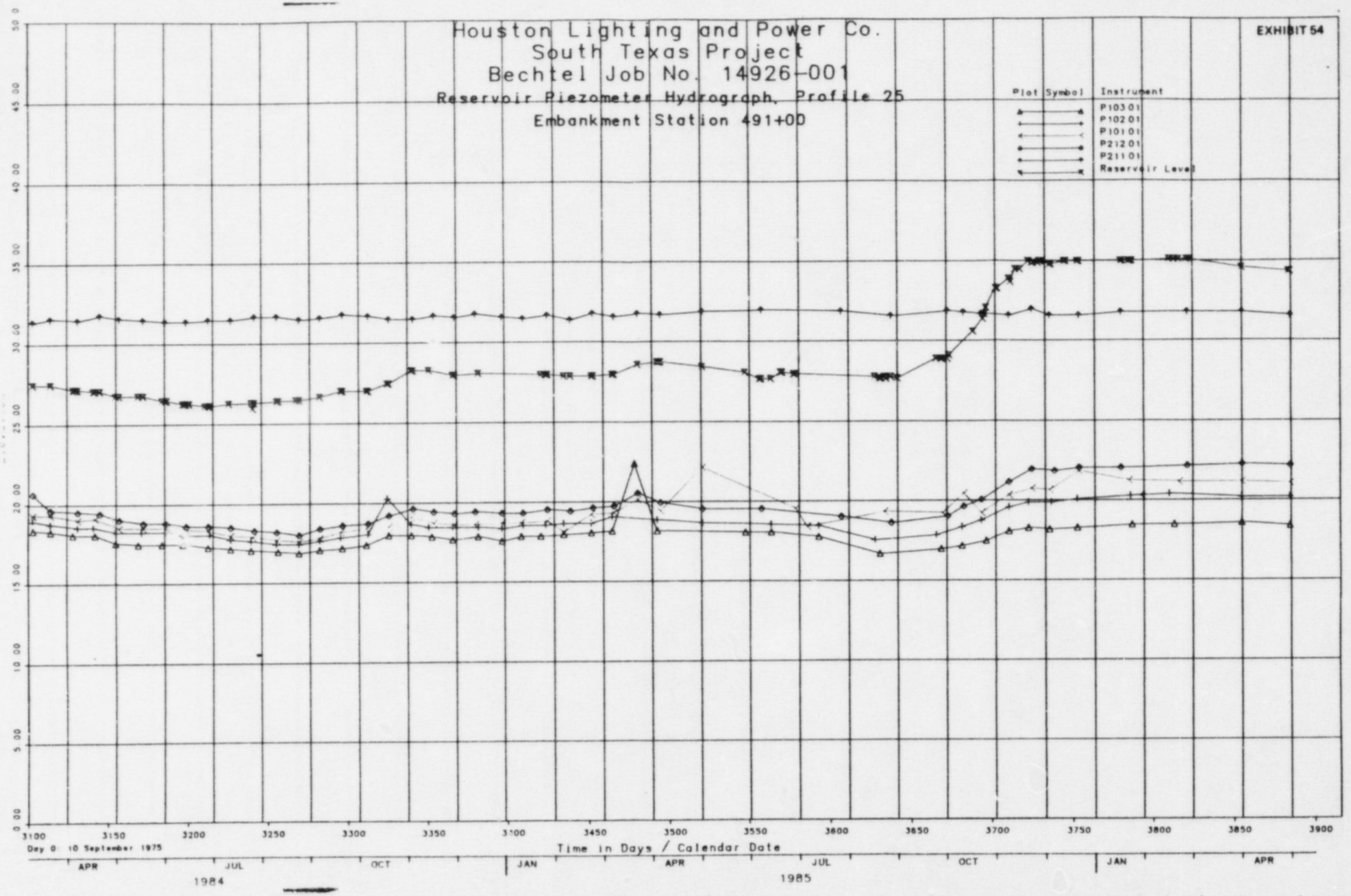
Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Profile 25
Embankment Station 491+00
EXHIBIT 54
Plot Symbol
Instrument
P103 01
P102 01
P101 01
P212 01
P211 01
Reservoir Level
50 00
45 00
40 00
35 00
30 00
25 00
20 00
15 00
10 00
5 00
0 00
3100
3150
3200
3250
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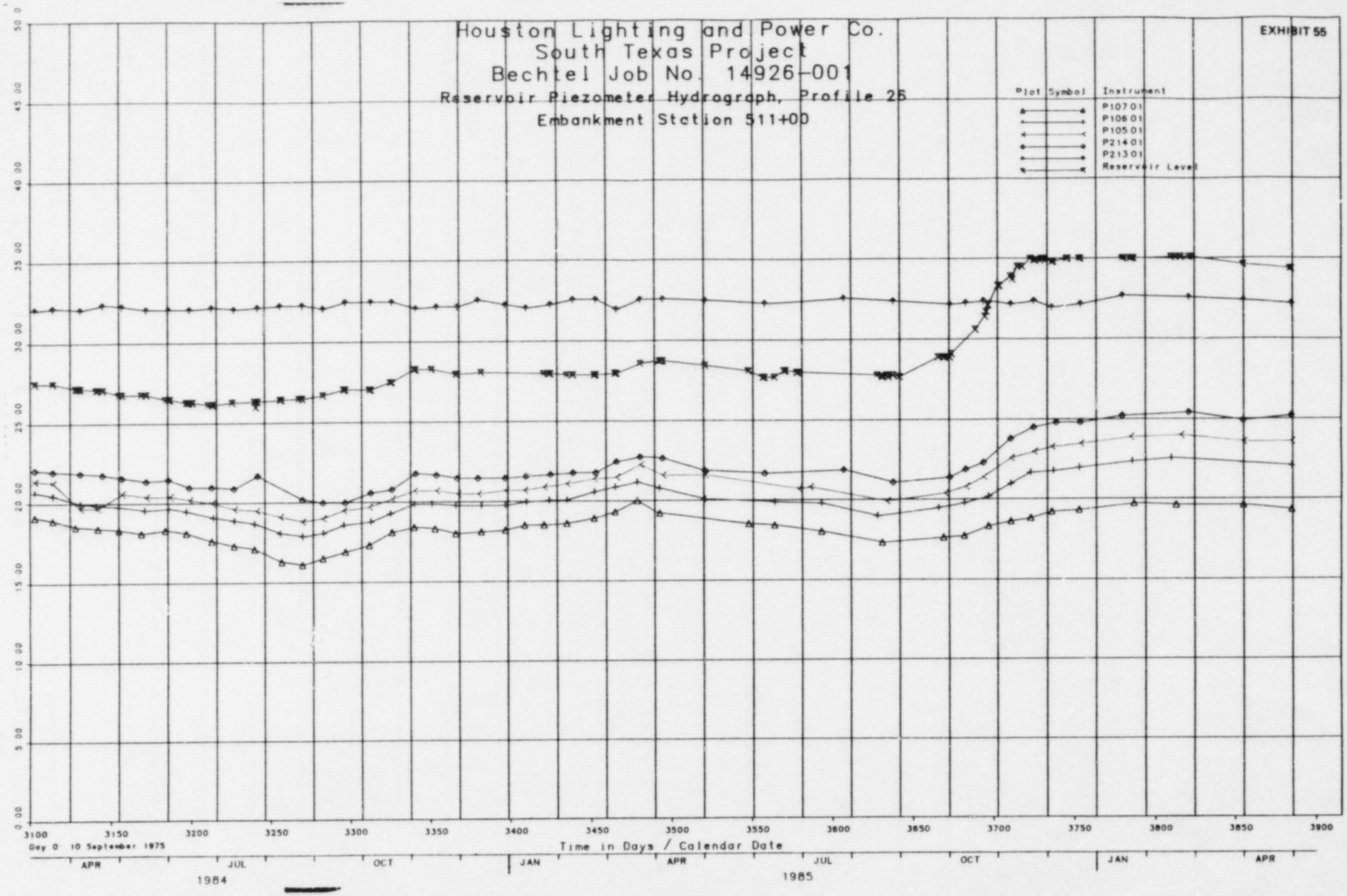
Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Profile 25
Embankment Station 511+00
EXHIBIT 55
Plot Symbol
Instrument
P107 01
P106 01
P105 01
P214 01
P213 01
Reservoir Level
50 00
45 00
40 00
35 00
30 00
25 00
20 00
15 00
10 00
5 00
0 00
3100
3150
3200
3250
3300
3350
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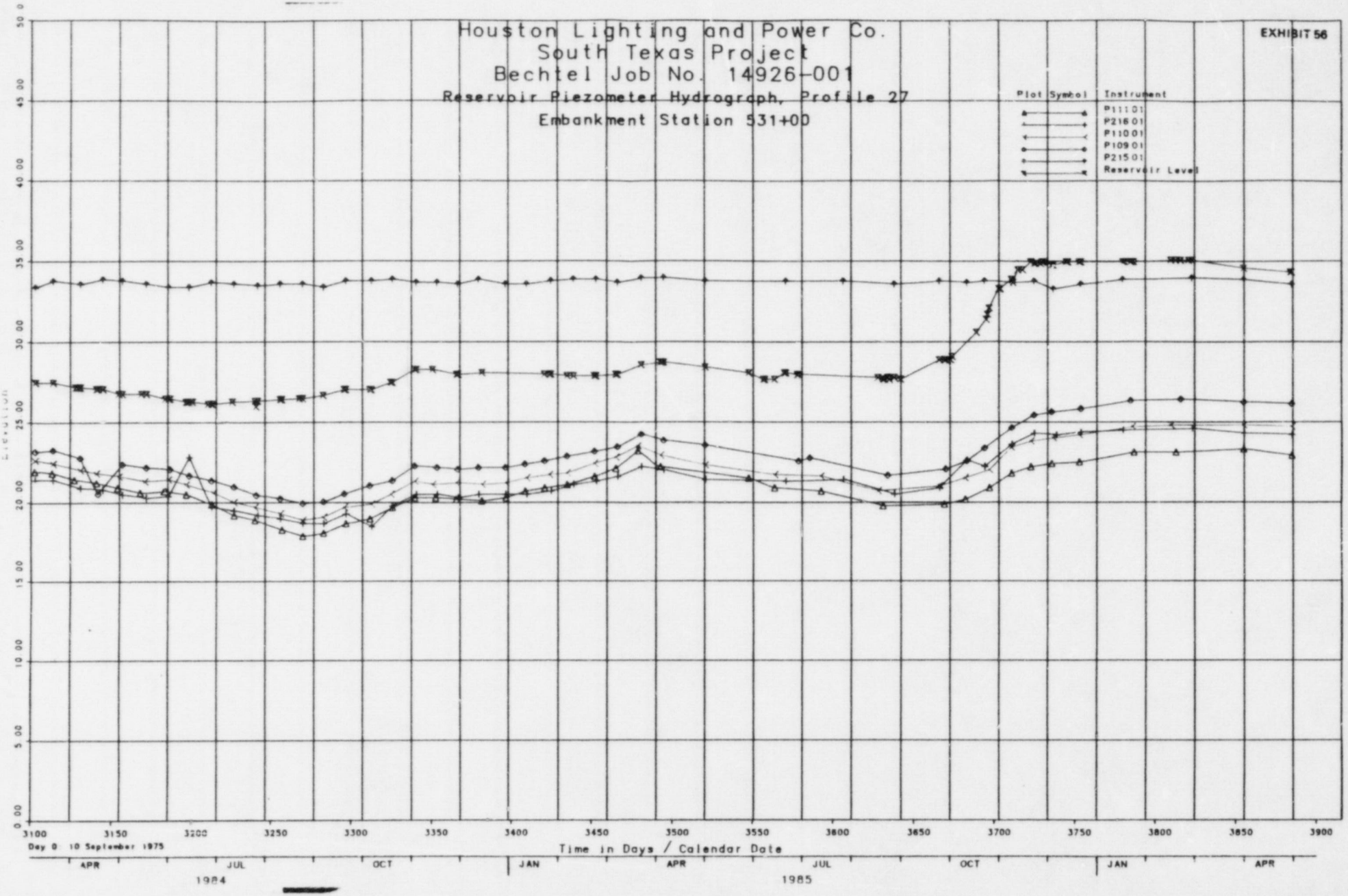
Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Profile 27
Embankment Station 531+00
EXHIBIT 56
Plot Symbol
Instrument
P11101
P21601
P11001
P10901
P21501
Reservoir Level
Elevation
50 00
45 00
40 00
35 00
30 00
25 00
20 00
15 00
10 00
5 00
0 00
3100
3150
3200
3250
3300
3350
3400
3450
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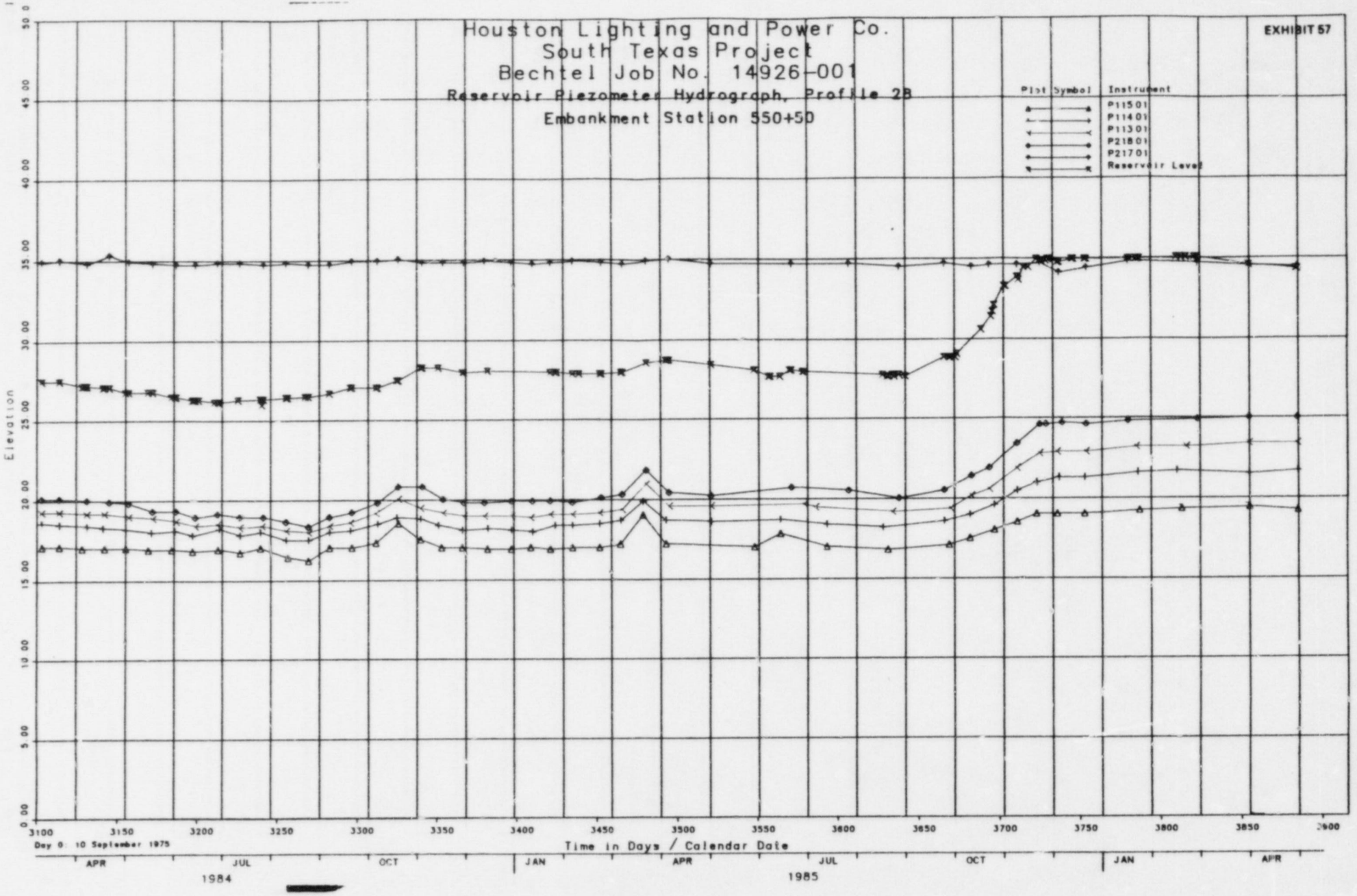
Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Profile 2B
Embankment Station 550+50
EXHIBIT 57
Plot Symbol
Instrument
P11501
P11401
P11301
P21801
P21701
Reservoir Level
Elevation
50.00
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
3100
3150
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3250
3300
3350
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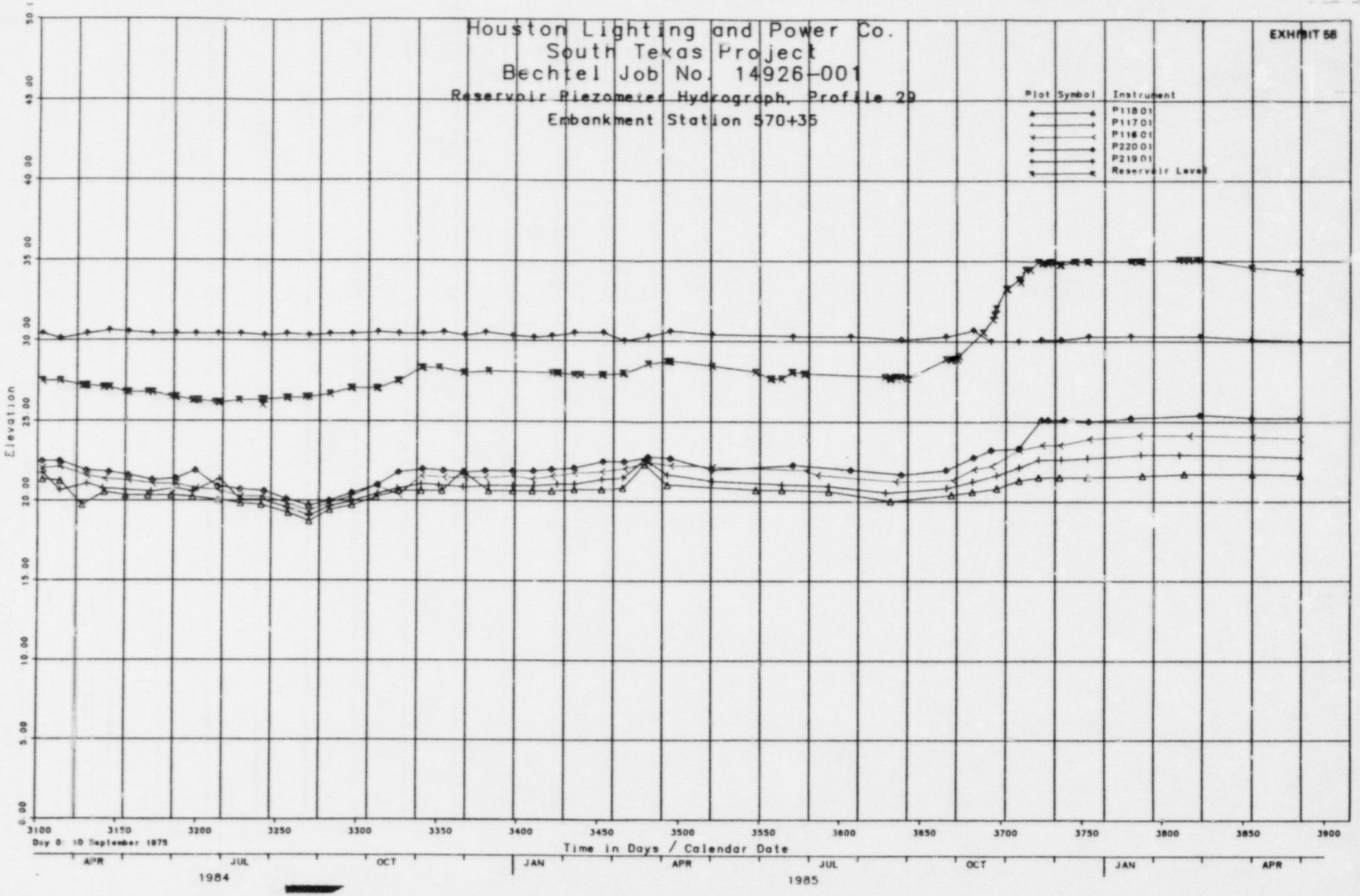
Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Profile 29
Embankment Station 570+35
EXHIBIT 58
Plot Symbol
Instrument
P11801
P11701
P11601
P22001
P21901
Reservoir Level
Elevation
0.00
5.00
10.00
15.00
20.00
25.00
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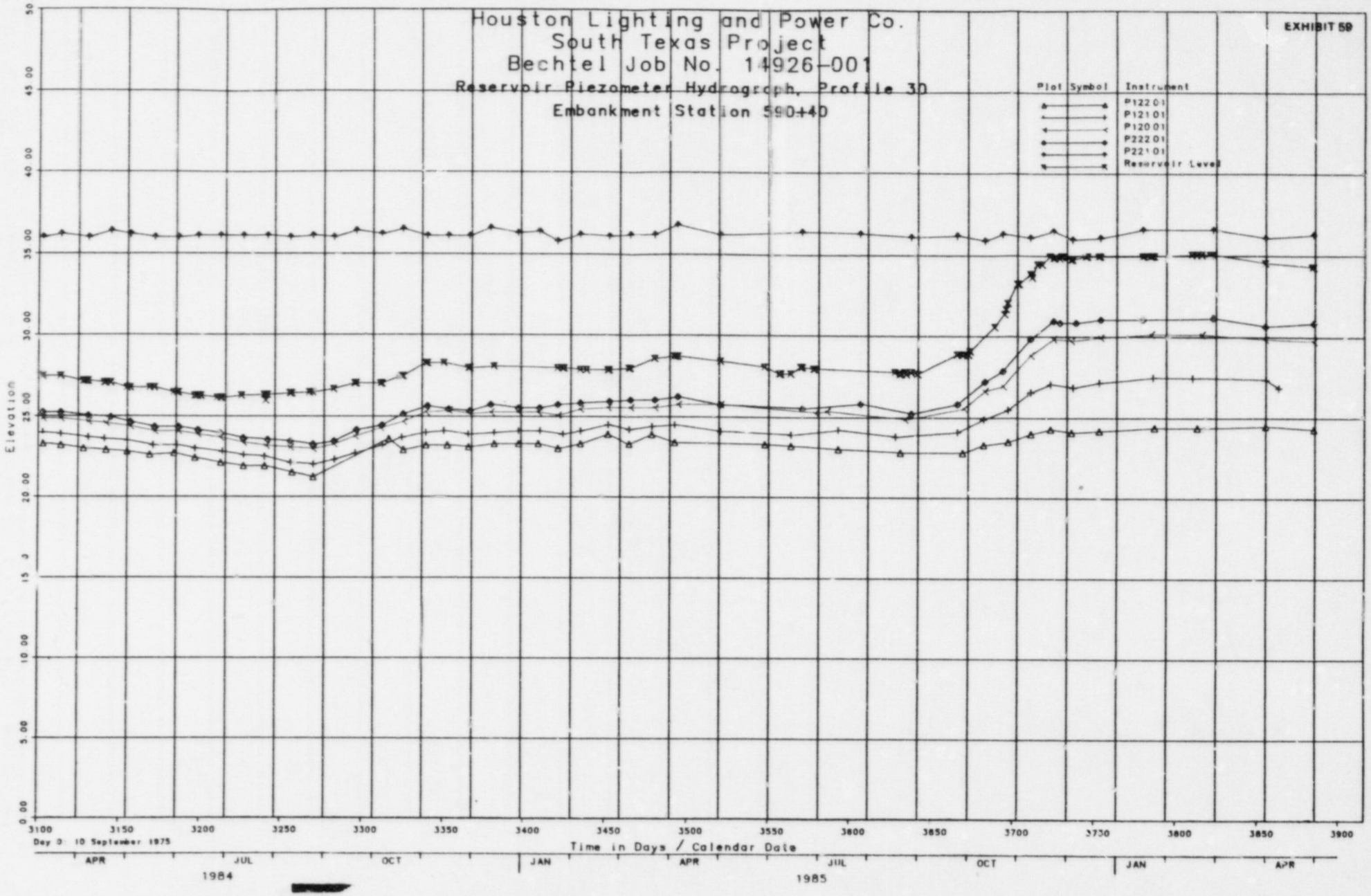
Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Profile 30
Embankment Station 590+40
EXHIBIT 59
Plot Symbol
Instrument
P12201
P12101
P12001
P22201
P22101
Reservoir Level
Elevation
0.00
5.00
10.00
15.00
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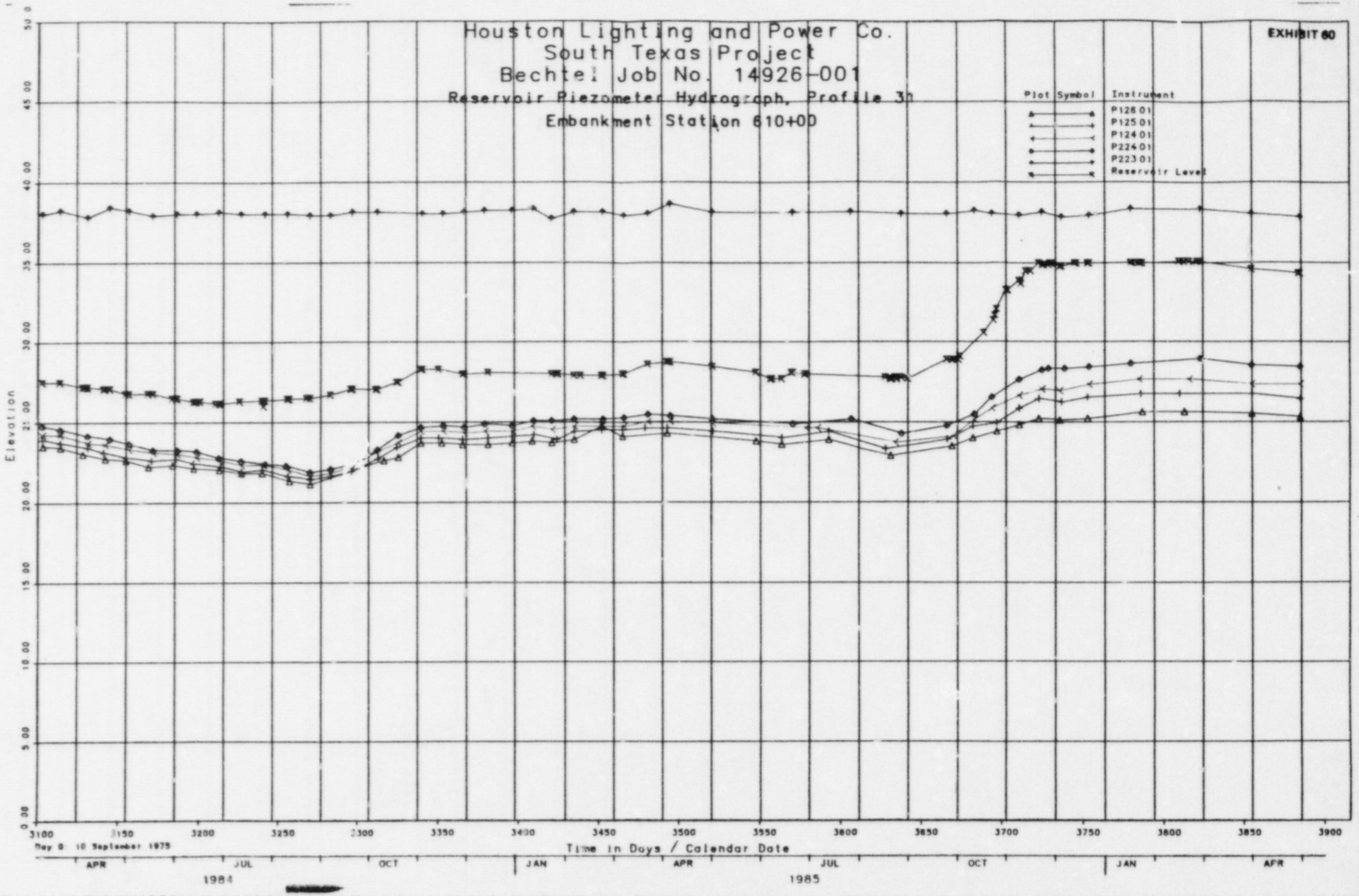
Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Profile 3h
Embankment Station 610+00
EXHIBIT 60
Plot Symbol
Instrument
P128 01
P125 01
P124 01
P224 01
P223 01
Reservoir Level
Elevation
Time in Days / Calendar Date
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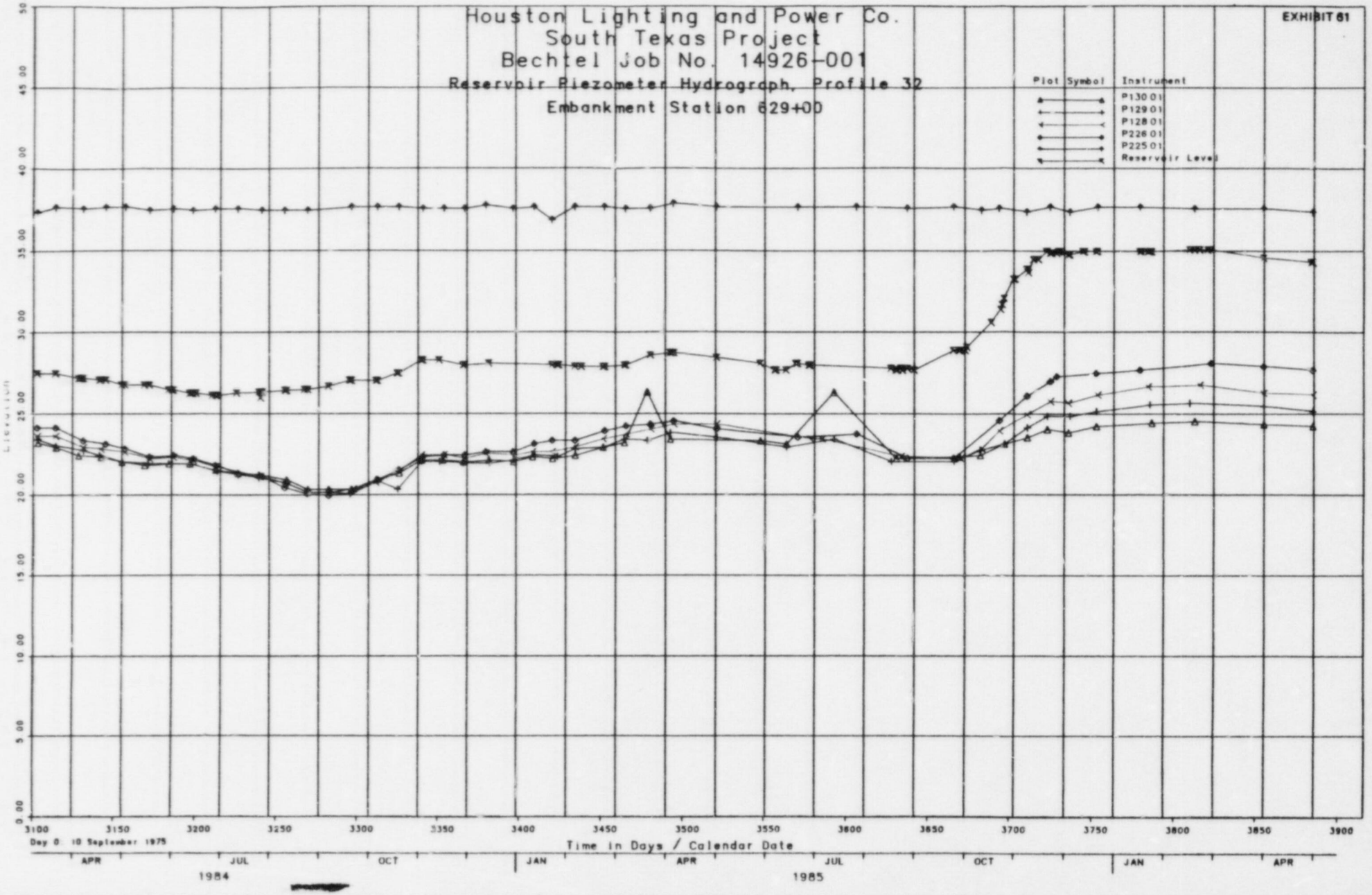
1985

EXHIBIT 61


Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Profile 32
Embankment Station 629+00
Plot Symbol
Instrument
P130 01
P129 01
P128 01
P226 01
P225 01
Reservoir Level
50.00
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
3100
3150
3200
3250
3300
3350
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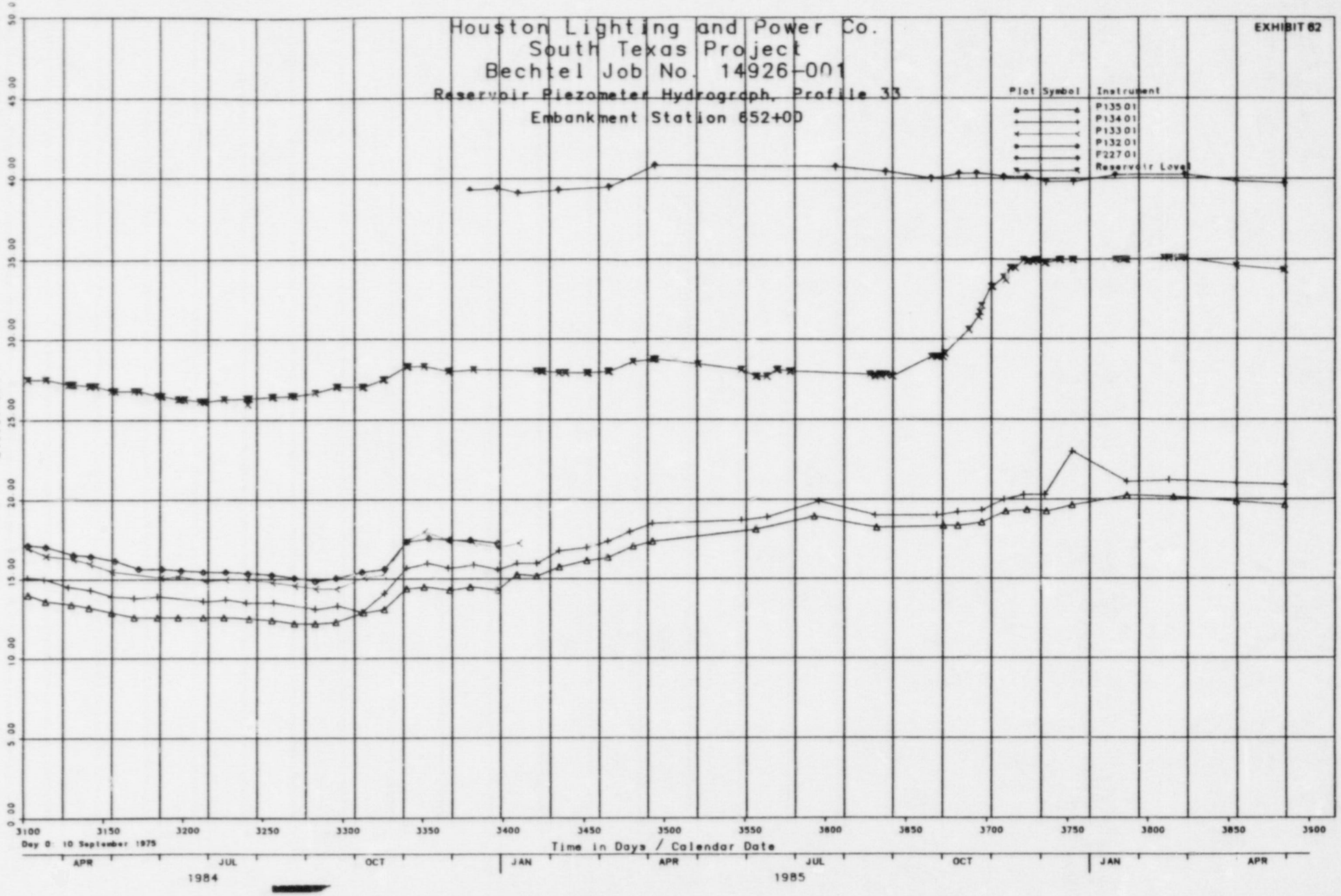
3500
3550
3600
3650
3700
3750
3800
3850
3900
Day 0: 10 September 1975
Time in Days / Calendar Date
APR
JUL
OCT
JAN
APR
JUL
OCT
JAN
APR
1984
1985


Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Profile 33
Embankment Station 652+00
EXHIBIT 82
Plot Symbol
Instrument
P13501
P13401
P13301
P13201
P22701
Reservoir Level
50.00
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
3100
3150
3200
3250
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3650
3700
3750
3800
3850
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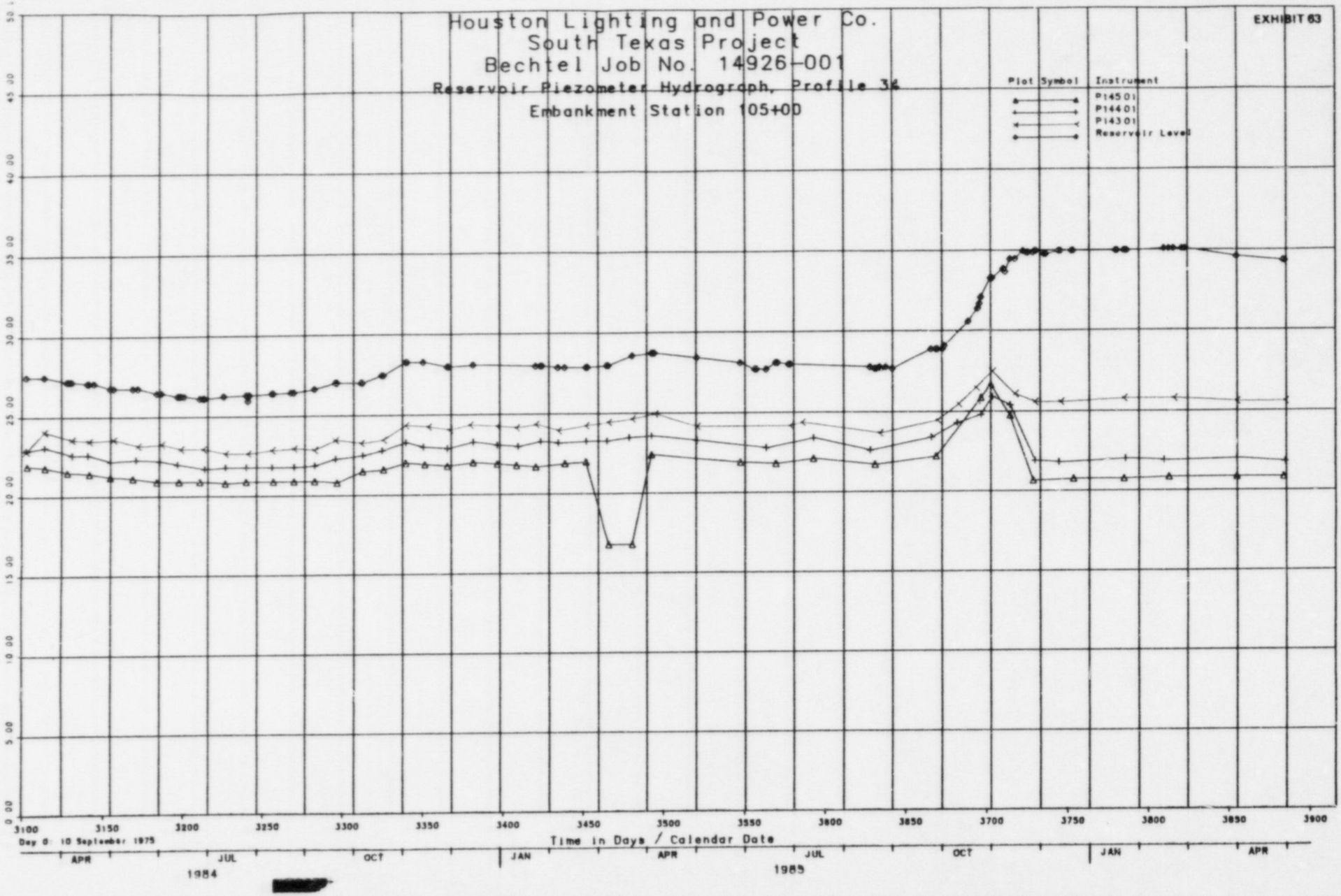
Day 0: 10 September 1975
Time in Days / Calendar Date
APR
JUL
OCT
JAN
APR
JUL
OCT
JAN
APR
1984
1985


Houston Lighting and Power Co.
South Texas Project
Bechtel Job No. 14926-001
Reservoir Piezometer Hydrograph, Profile 3&
Embankment Station 105+00
EXHIBIT 63
Plot Symbol
Instrument
P14501
P14401
P14301
Reservoir Level
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
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3100
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3200
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3650
3700
3750
3800
3850
3900
Day 0: 10 September 1975
Time in Days / Calendar Date
APR
JUL
OCT
JAN
APR
JUL
OCT
JAN
APR
1984
1985

EXHIBIT 64

PROFILE 1

EMBANKMENT STATION 7+00

SOUTH TEXAS PROJECT

14926-001

22-JAN-86

0.00 40.00 80.00 120.00

SCALE IN FEET

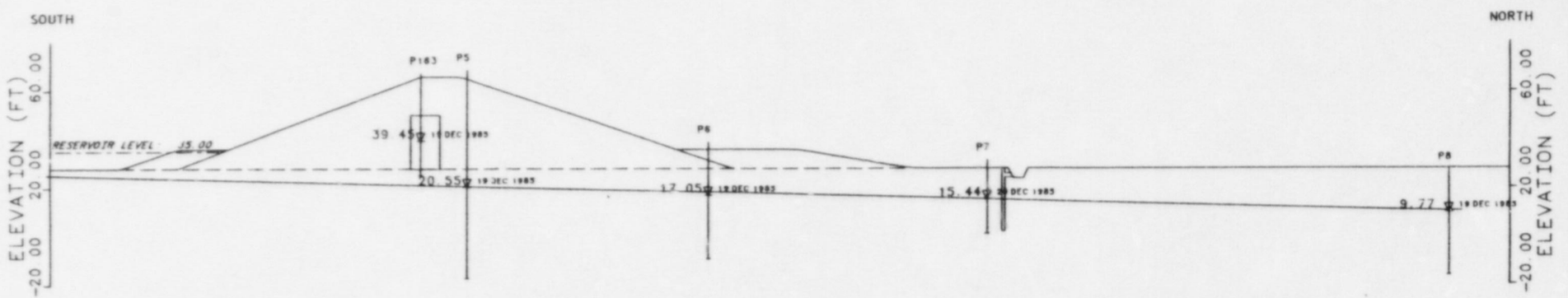

EXHIBIT 65

PROFILE 2

EMBANKMENT STATION 11+00

SOUTH TEXAS PROJECT

14926-001

22-JAN-86

0.00 40.00 80.00 120.00

SCALE IN FEET

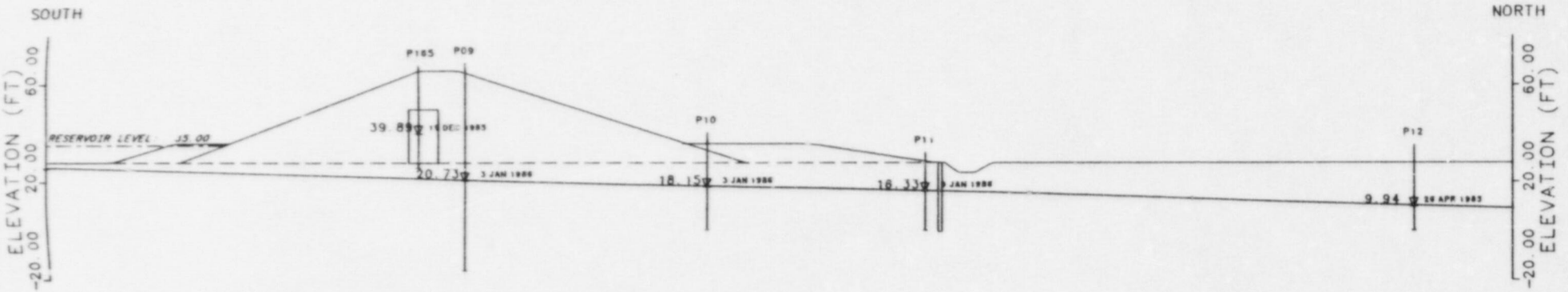

EXHIBIT 65

PROFILE 2

EMBANKMENT STATION 11+00

SOUTH TEXAS PROJECT

14926-001

22-JAN-86

0.00 40.00 80.00 120.00

SCALE IN FEET

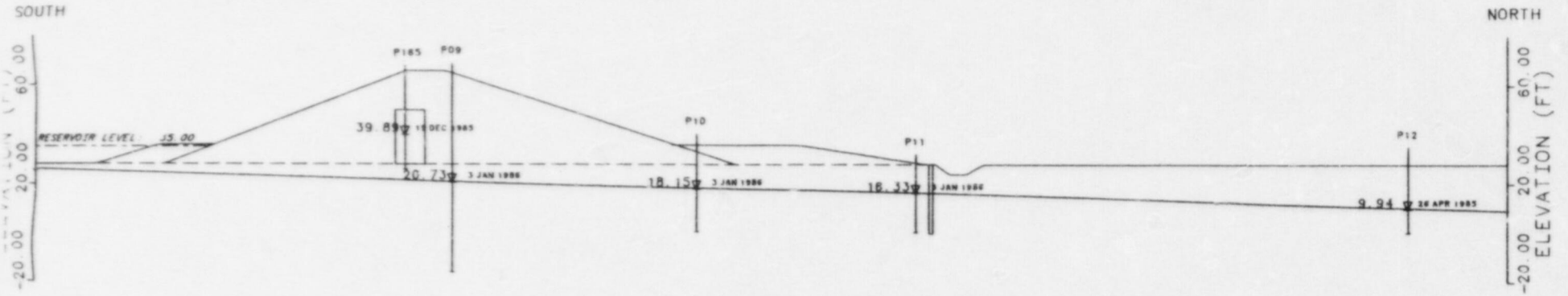

EXHIBIT 66

PROFILE 3

EMBANKMENT STATION 20+00

SOUTH TEXAS PROJECT

14926-001

22-JAN-96

0.00 40.00 80.00 120.00

SCALE IN FEET

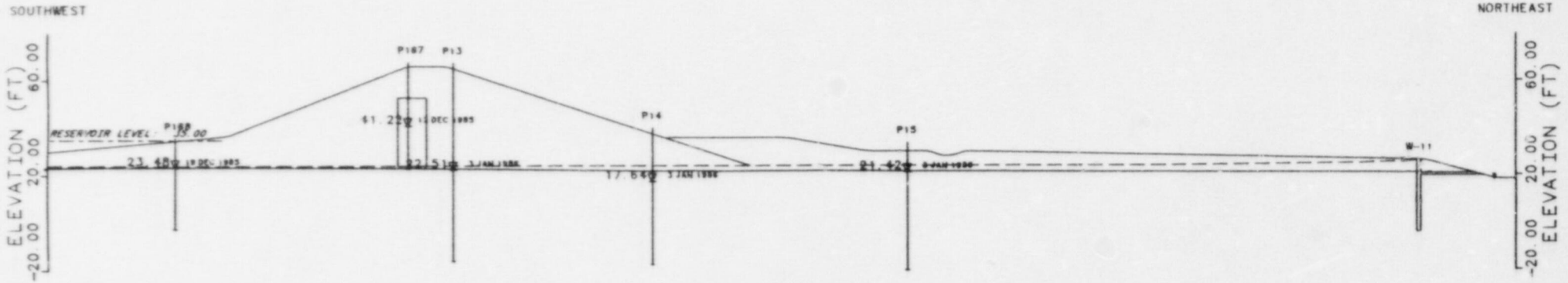

EXHIBIT 67

PROFILE 4

EMBANKMENT STATION 40+20

SOUTH TEXAS PROJECT

14926-001

22-JAN-86

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SCALE IN FEET

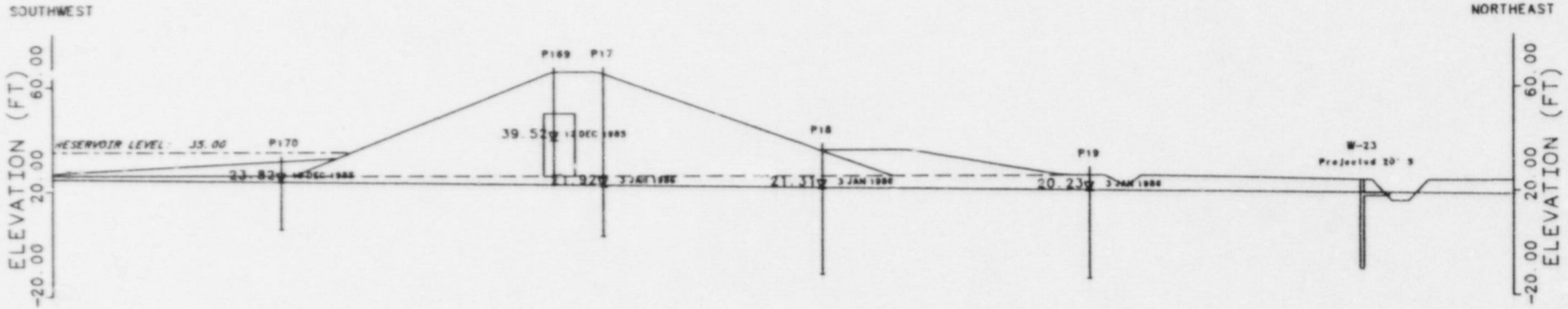

EXHIBIT 68

PROFILE 5

EMBANKMENT STATION 59+60

SOUTH TEXAS PROJECT

14926-001

22-JAN-86

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SCALE IN FEET

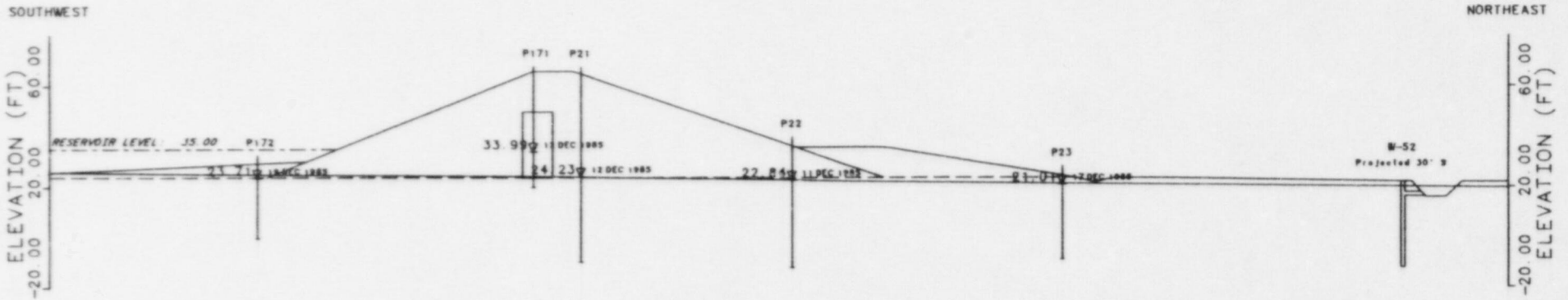

EXHIBIT 69

PROFILE 6

EMBANKMENT STATION 79+80

SOUTH TEXAS PROJECT

14926-001

22-JAN-86

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SCALE IN FEET

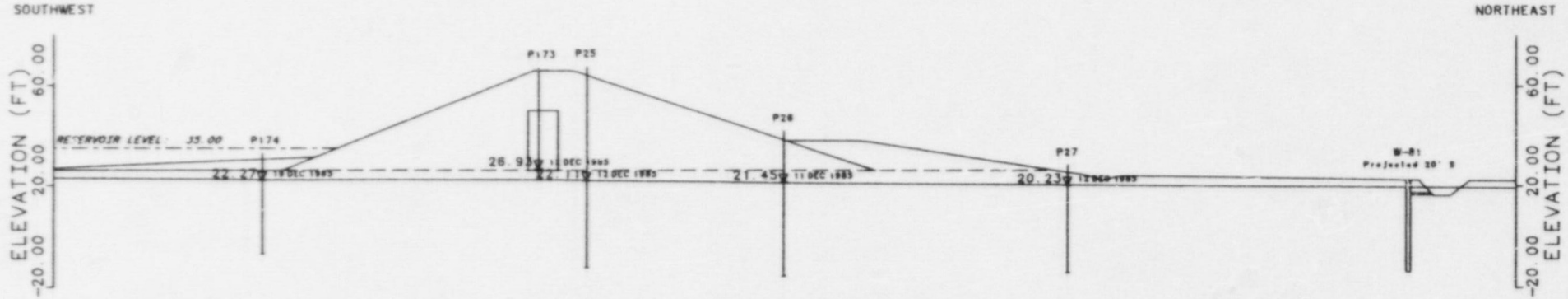

EXHIBIT 70

PROFILE 7

EMBANKMENT STATION 100+20

SOUTH TEXAS PROJECT

14926-001

22-JAN-86

0.00 40.00 80.00 120.00

SCALE IN FEET

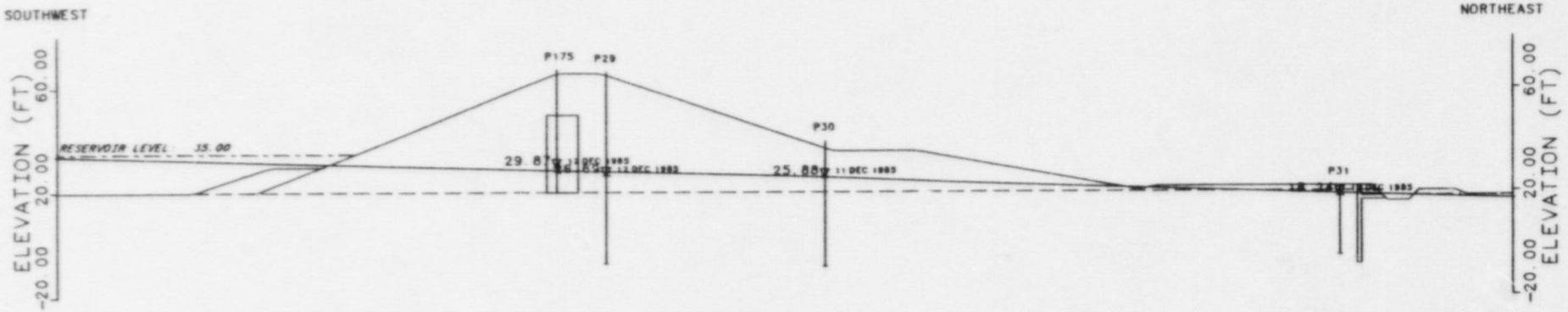

EXHIBIT 71

PROFILE 8

EMBANKMENT STATION 130+40

SOUTH TEXAS PROJECT

14926-001

22-JAN-86

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SCALE IN FEET

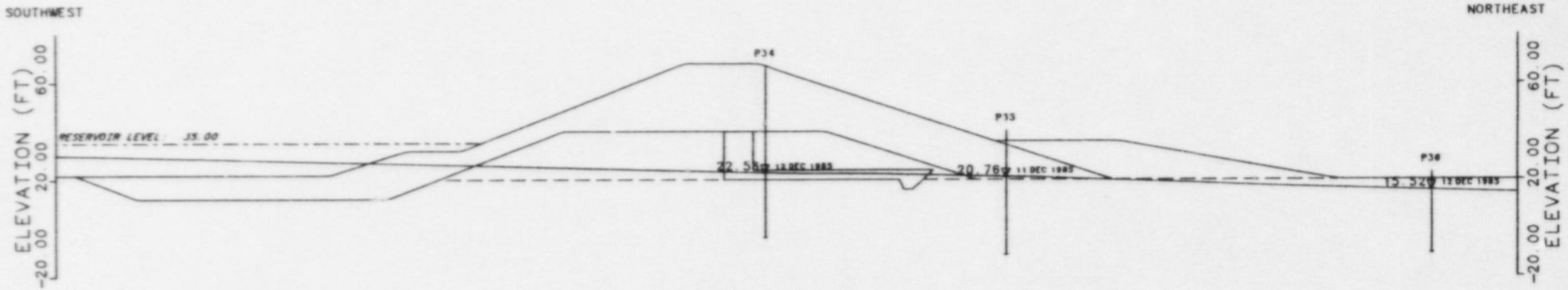

EXHIBIT 72

PROFILE 9

EMBANKMENT STATION 160+00

SOUTH TEXAS PROJECT

14926-001

22-JAN-86

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SCALE IN FEET

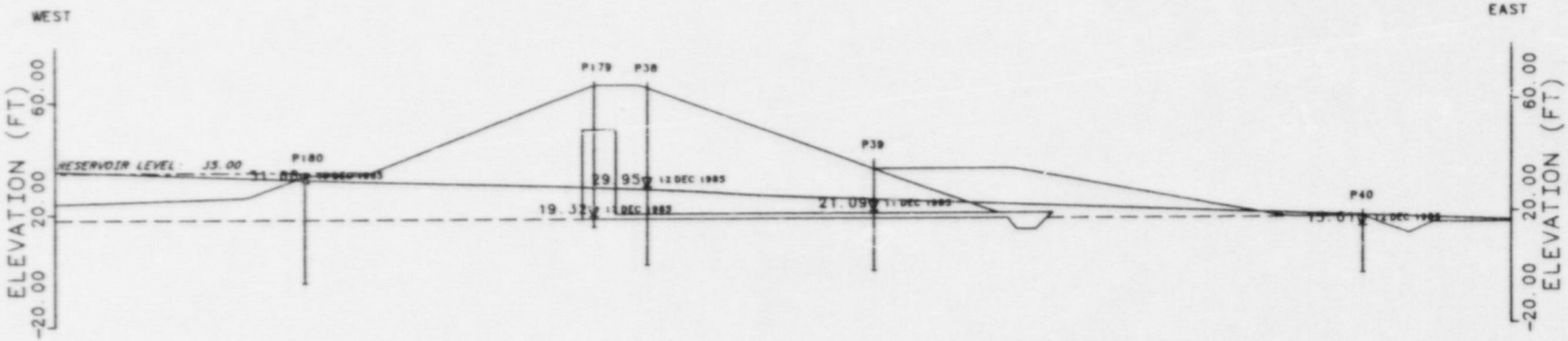

EXHIBIT 73

PROFILE 10

EMBANKMENT STATION 180+25

SOUTH TEXAS PROJECT

14926-001

22-JAN-86

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SCALE IN FEET

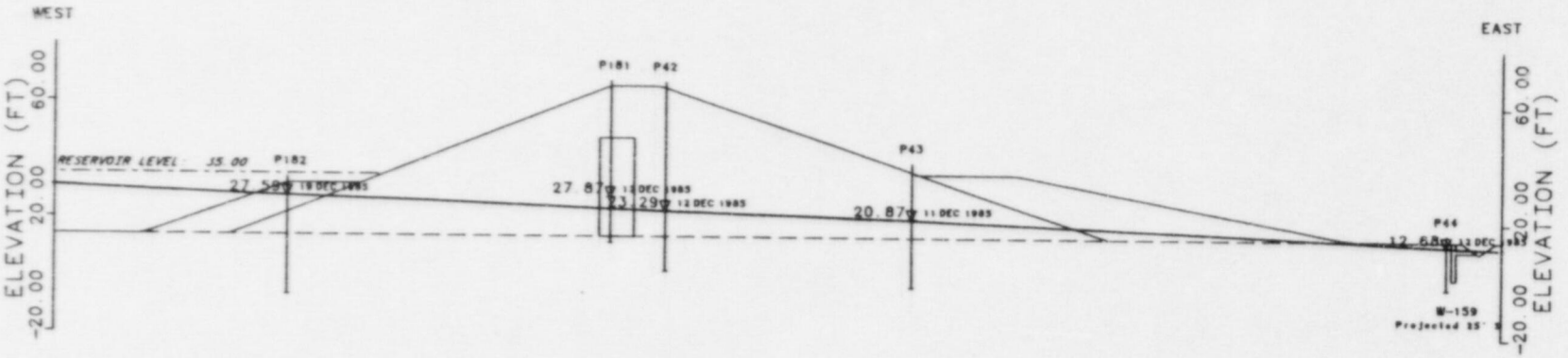

EXHIBIT 74

PROFILE 11

EMBANKMENT STATION 200+20

SOUTH TEXAS PROJECT

14926-001

22-JAN-86

0.00 40.00 80.00 120.00

SCALE IN FEET

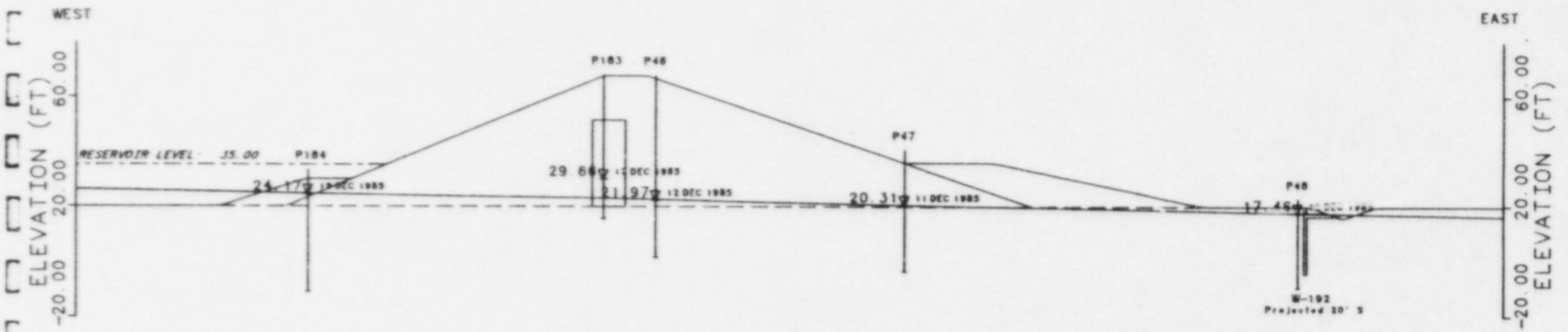

EXHIBIT 75

PROFILE 12

EMBANKMENT STATION 219+80

SOUTH TEXAS PROJECT

14926-001

22-JAN-86

0.00 40.00 80.00 120.00

SCALE IN FEET

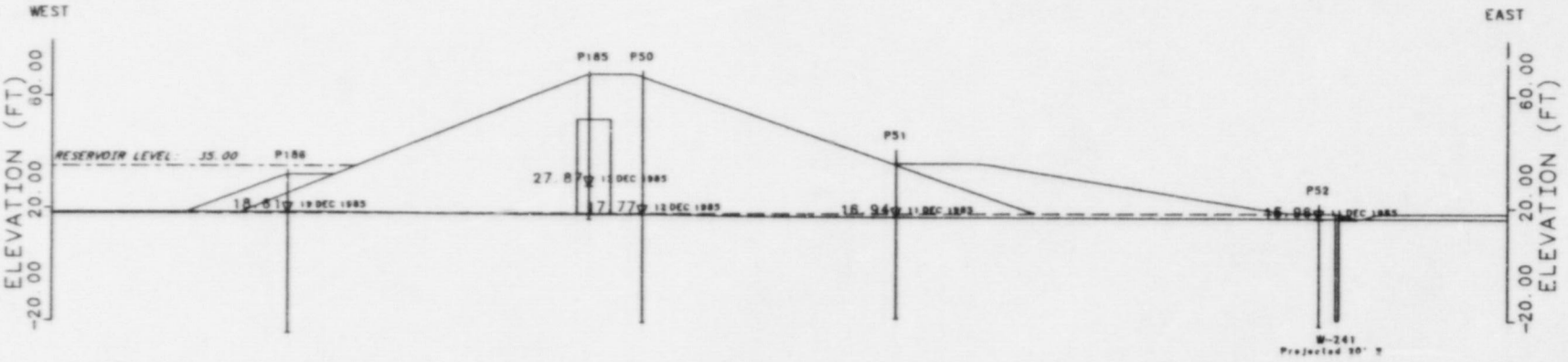

EXHIBIT 76

PROFILE 13

EMBANKMENT STATION 226+40

SOUTH TEXAS PROJECT

14926-001

22-JAN-86

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SCALE IN FEET

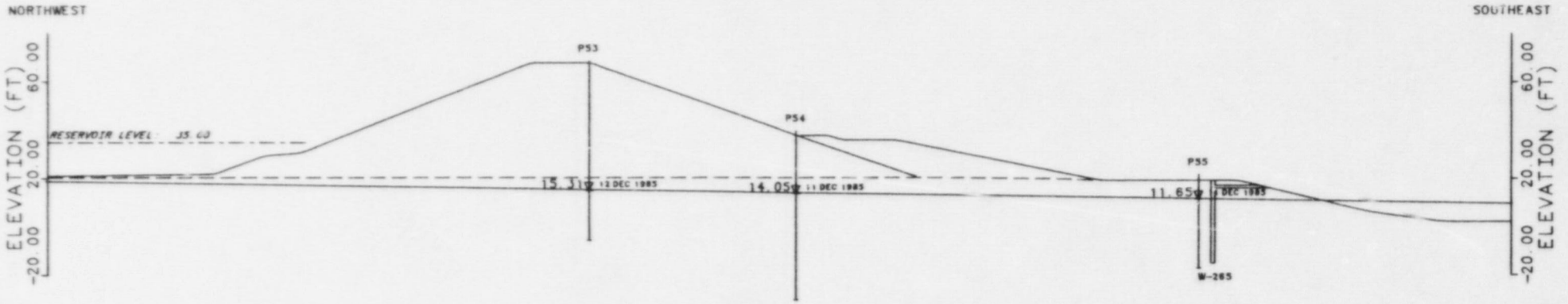

EXHIBIT 77

PROFILE 14

EMBANKMENT STATION 240+00

SOUTH TEXAS PROJECT

14926-001

22-JAN-86

0.00 40.00 80.00 120.00

SCALE IN FEET

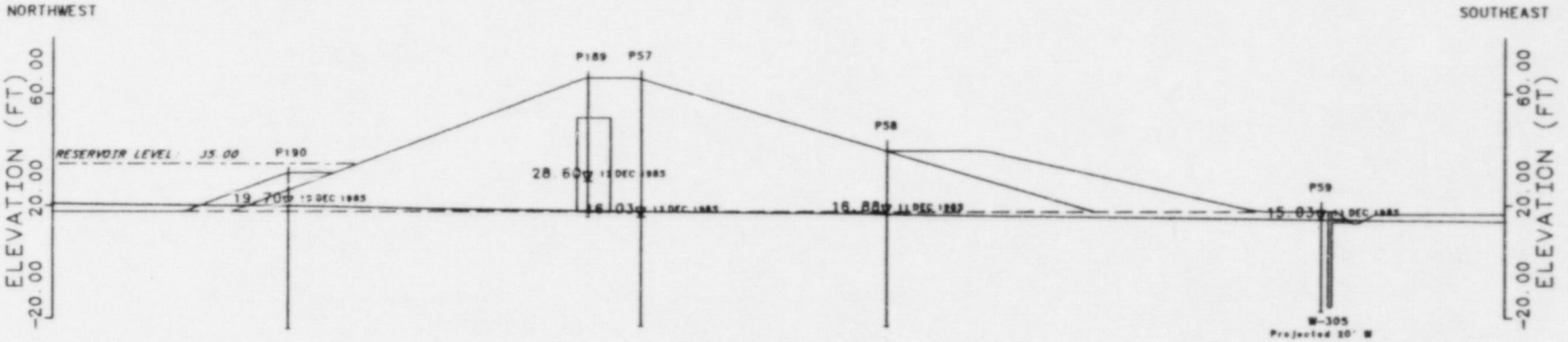

EXHIBIT 78

PROFILE 15

EMBANKMENT STATION 260+25

SOUTH TEXAS PROJECT

14926-001

22-JAN-86

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SCALE IN FEET

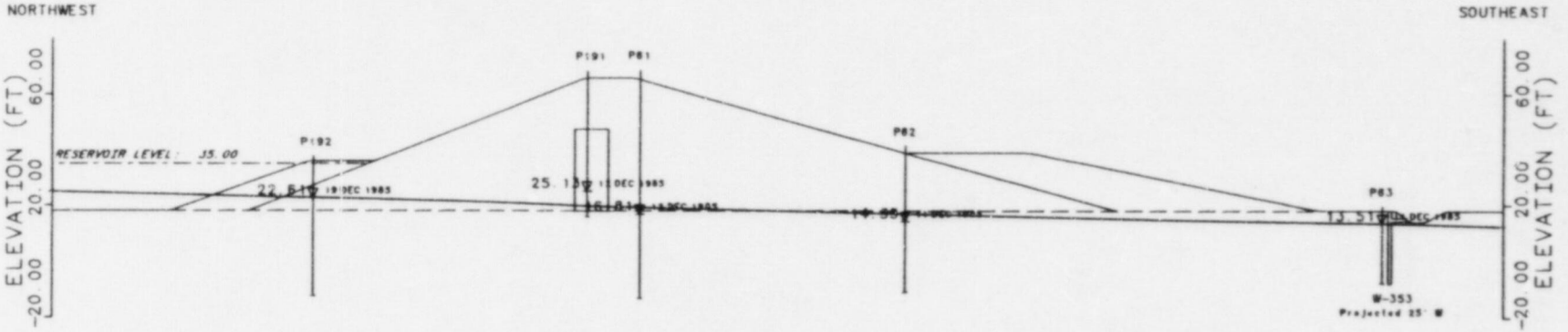

EXHIBIT 79

PROFILE 16

EMBANKMENT STATION 283+00

SOUTH TEXAS PROJECT

14926-001

22-JAN-86

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SCALE IN FEET

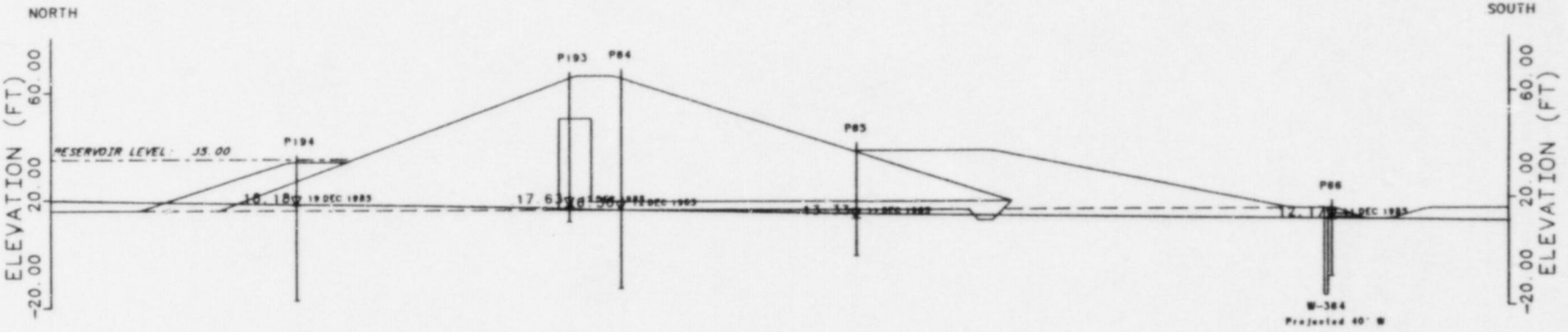

EXHIBIT 80

PROFILE 17

EMBANKMENT STATION 300+00

SOUTH TEXAS PROJECT

14926-001

22-JAN-86

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SCALE IN FEET

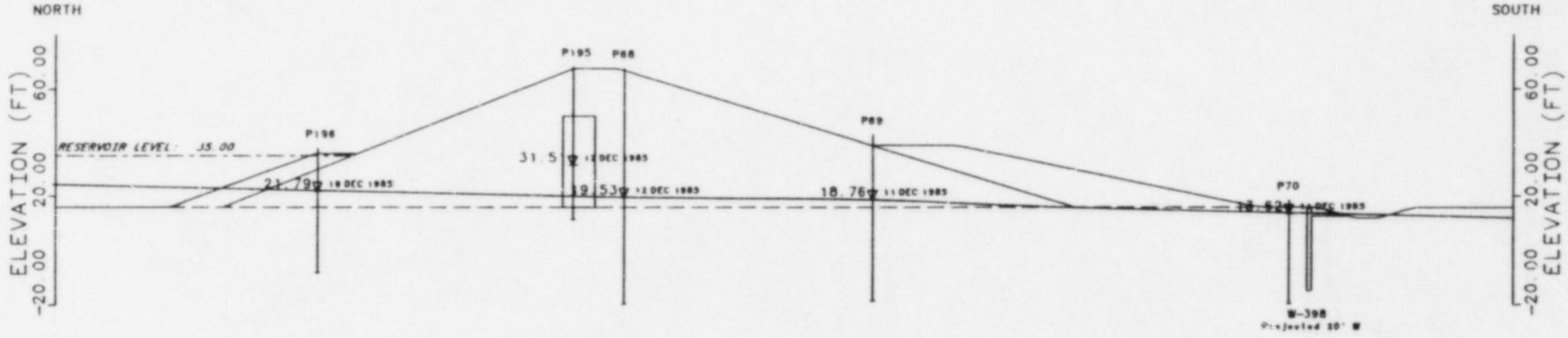

EXHIBIT 81

PROFILE 18

EMBANKMENT STATION 320+00

SOUTH TEXAS PROJECT

14926-001

22-JAN-86

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SCALE IN FEET

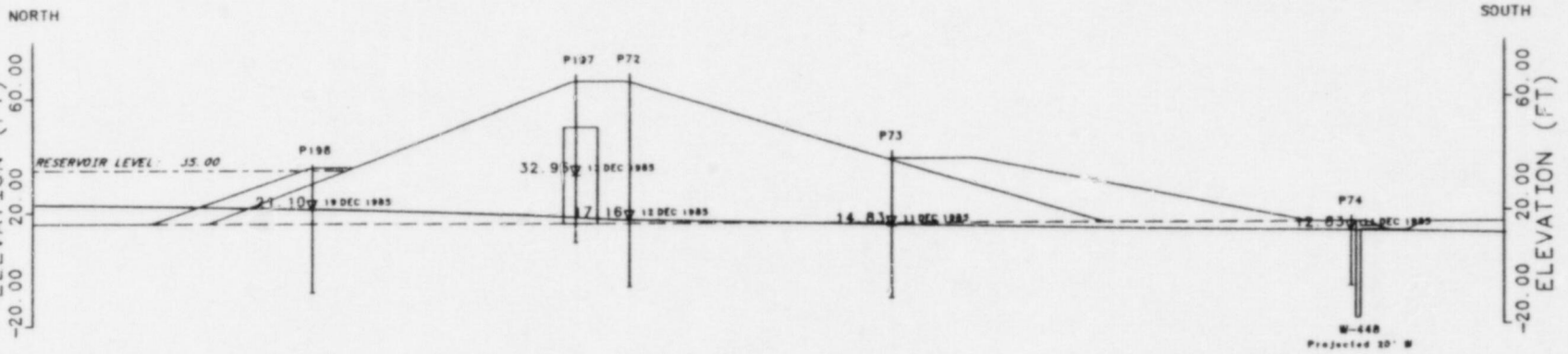

EXHIBIT 82

PROFILE 19

EMBANKMENT STATION 359+60

SOUTH TEXAS PROJECT

14926-001

22-JAN-86

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SCALE IN FEET

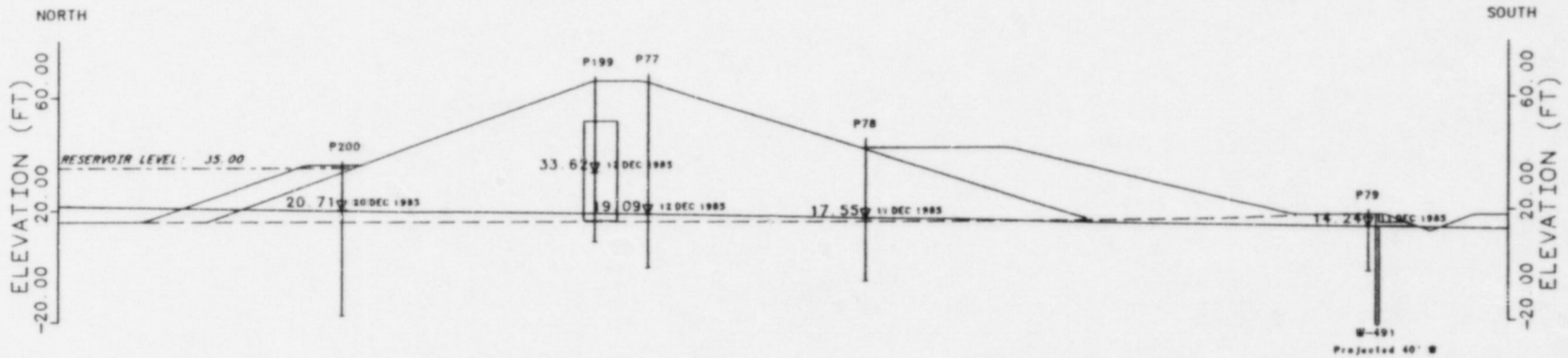

EXHIBIT 83

PROFILE 20

EMBANKMENT STATION 380+00

SOUTH TEXAS PROJECT

14926-001

22-JAN-86

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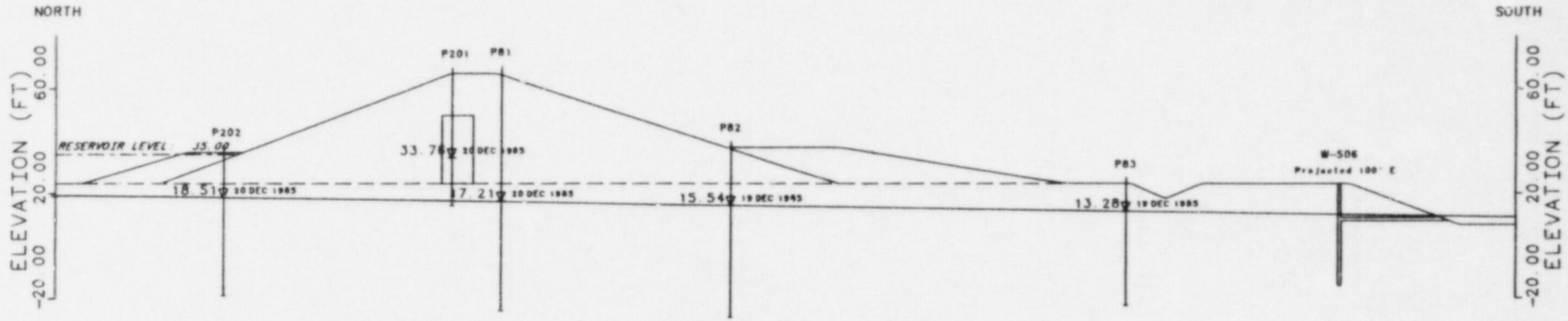

EXHIBIT 84

PROFILE 21

EMBANKMENT STATION 400+50

SOUTH TEXAS PROJECT

14926-001

22-JAN-86

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SCALE IN FEET

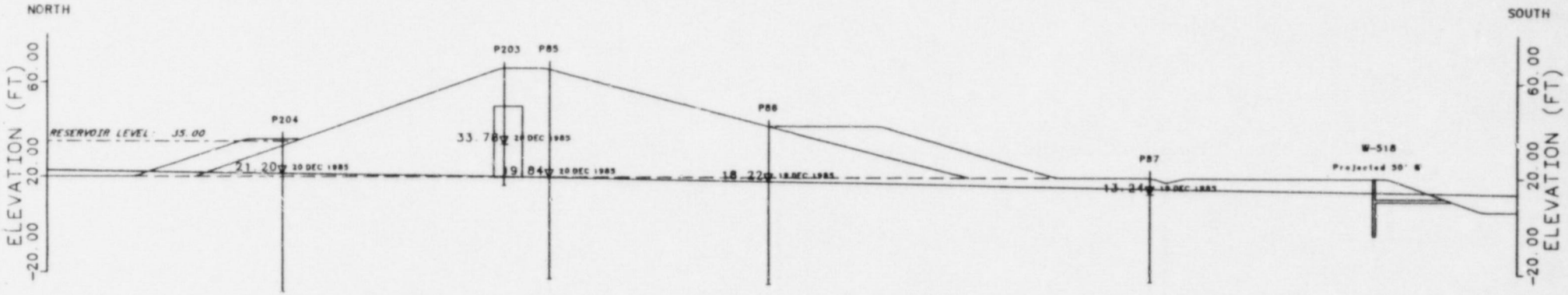

EXHIBIT 85

PROFILE 22

EMBANKMENT STATION 420+00

SOUTH TEXAS PROJECT

14920-001

22-JAN-86

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SCALE IN FEET

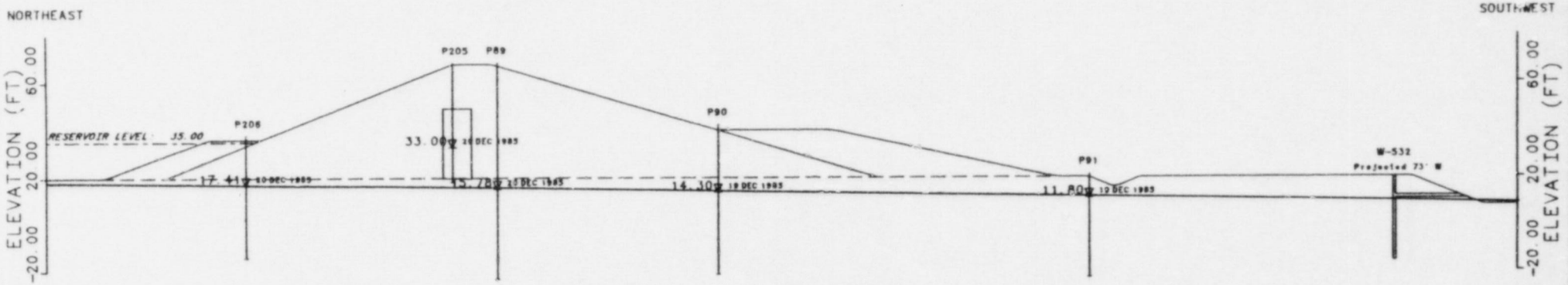

EXHIBIT 86

PROFILE 23

EMBANKMENT STATION 440+20

SOUTH TEXAS PROJECT

14926-001

22-JAN-86

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SCALE IN FEET

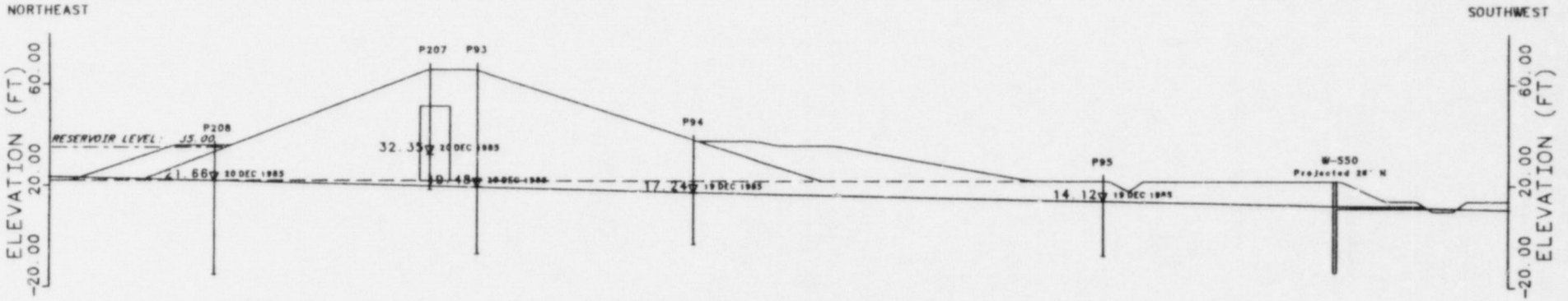

EXHIBIT 87

PROFILE 24

EMBANKMENT STATION 460+10

SOUTH TEXAS PROJECT

14926-001

22-JAN-86

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SCALE IN FEET

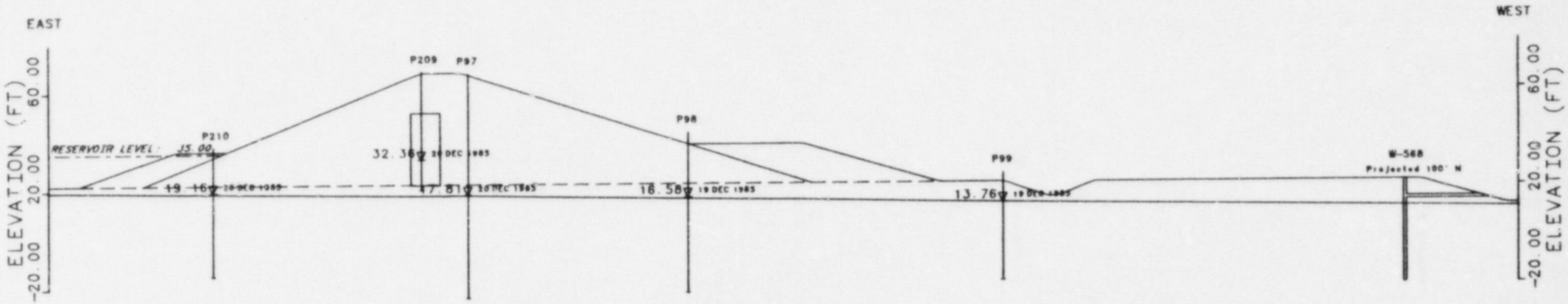

EXHIBIT 88

PROFILE 25

EMBANKMENT STATION 491+00

SOUTH TEXAS PROJECT

14926-001

22-JAN-86

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SCALE IN FEET

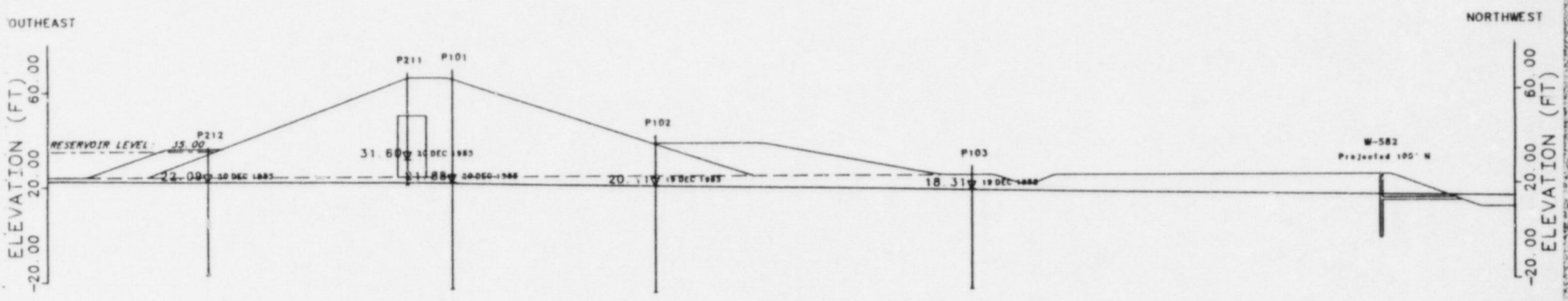

EXHIBIT 89

PROFILE 26

EMBANKMENT STATION 511+00

SOUTH TEXAS PROJECT

14926-001

22-JAN-86

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SCALE IN FEET

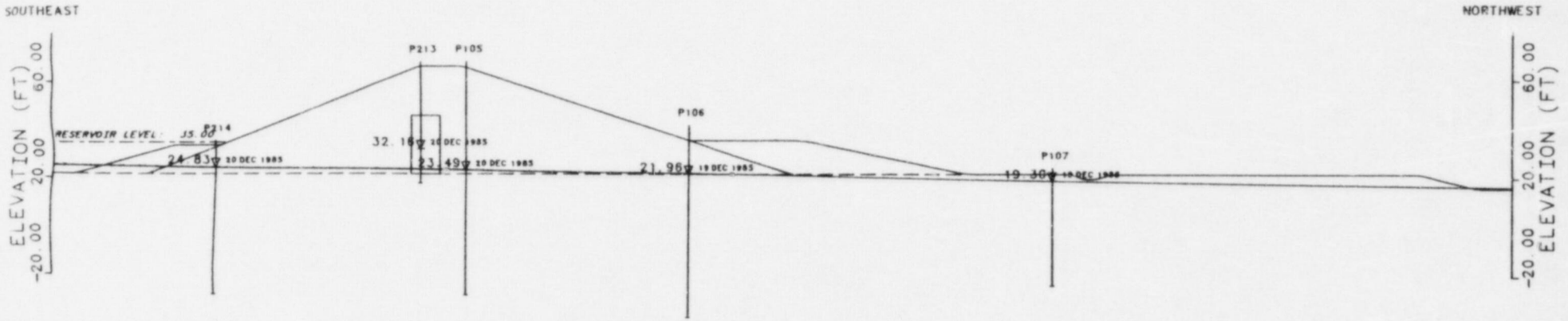

EXHIBIT 90

PROFILE 27

EMBANKMENT STATION 531+00

SOUTH TEXAS PROJECT

14926-001

22-JAN-86

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SCALE IN FEET

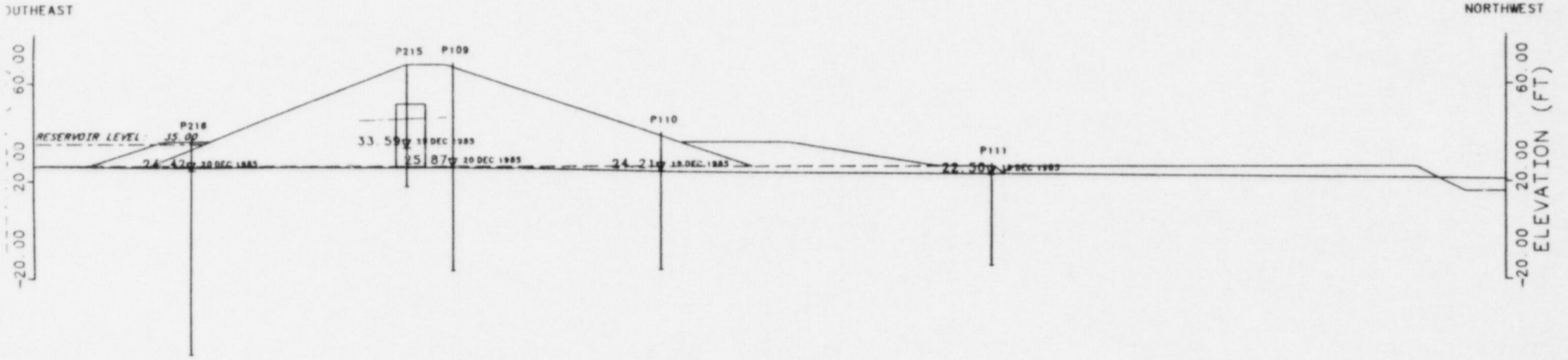

EXHIBIT 91

PROFILE 28

EMBANKMENT STATION 550+50

SOUTH TEXAS PROJECT

14926-001

22-JAN-86

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SCALE IN FEET

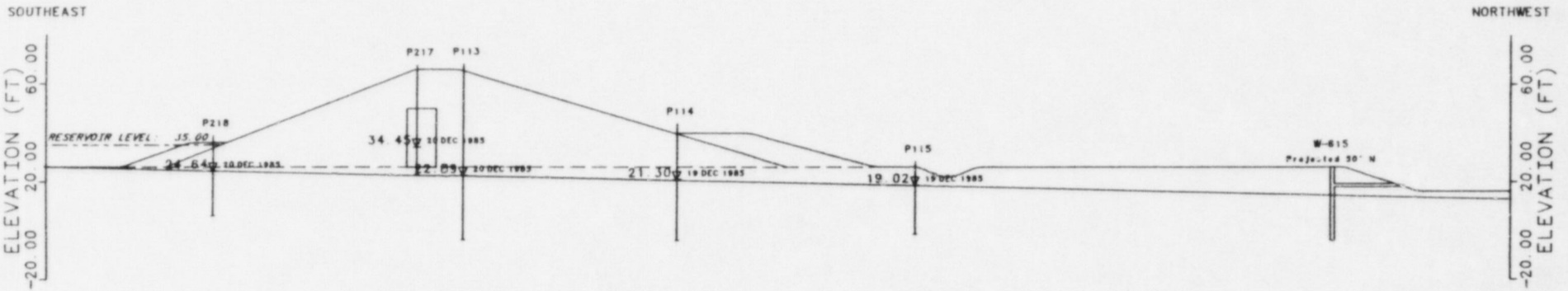

EXHIBIT 92

PROFILE 29

EMBANKMENT STATION 570+35

SOUTH TEXAS PROJECT

14926-001

22-JAN-86

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SCALE IN FEET

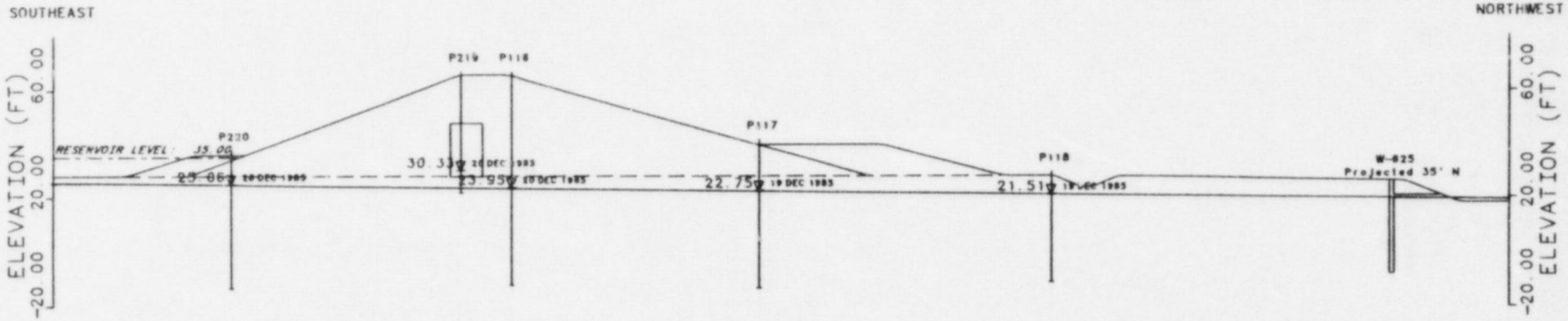

EXHIBIT 03

PROFILE 30

EMBANKMENT STATION 590+40

SOUTH TEXAS PROJECT

14926-001

22-JAN-86

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SCALE IN FEET

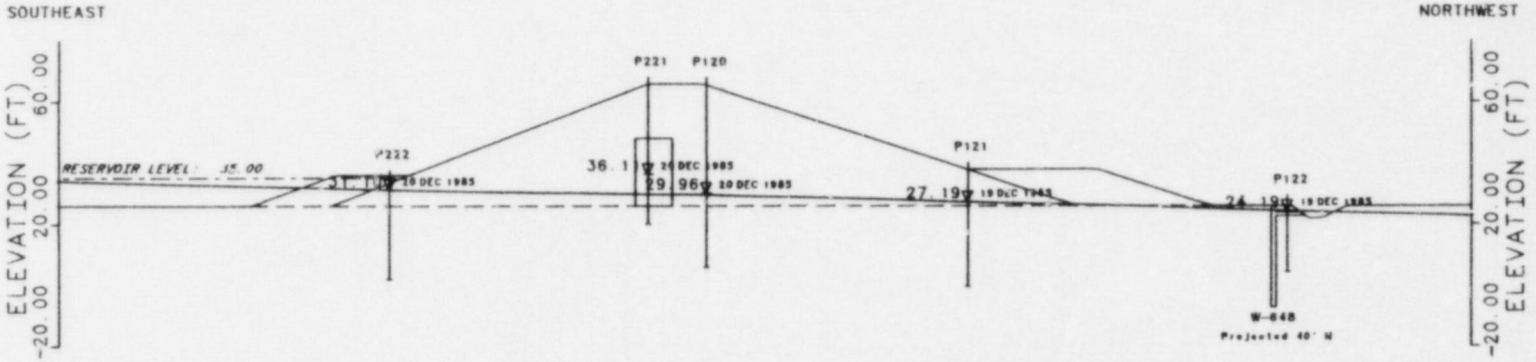

EXHIBIT 24

PROFILE 31

EMBANKMENT STATION 610+00

SOUTH TEXAS PROJECT

14926-001

22-JAN-86

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SCALE IN FEET

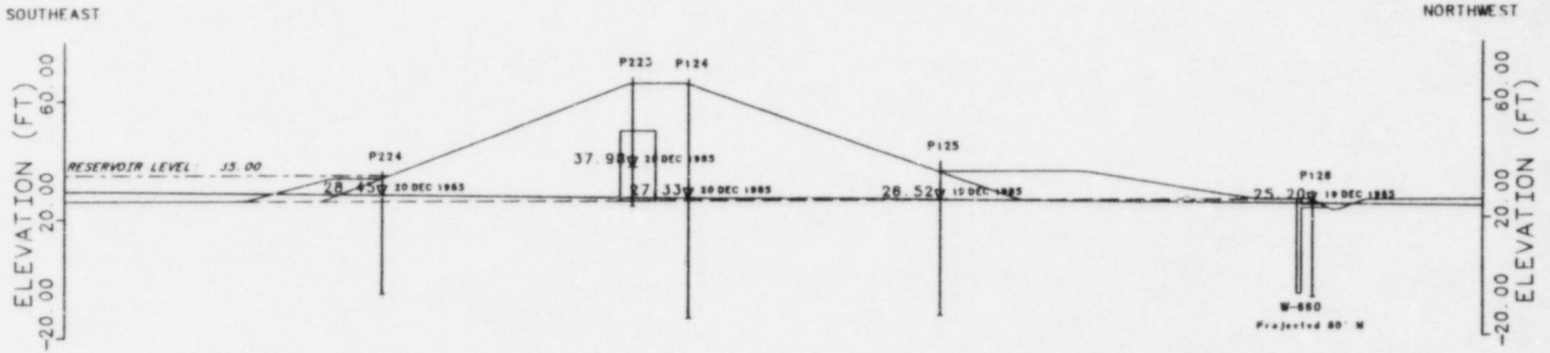

EXHIBIT 95

PROFILE 32

EMBANKMENT STATION 629+00

SOUTH TEXAS PROJECT

14926-001

22-JAN-86

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SCALE IN FEET

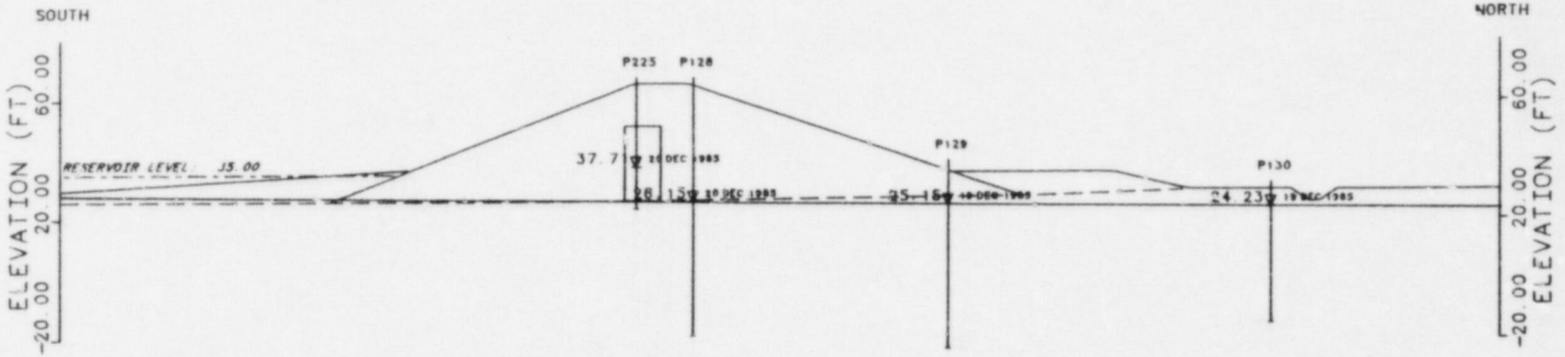

EXHIBIT 96

PROFILE 33

EMBANKMENT STATION 652+00

SOUTH TEXAS PROJECT

14926-001

22-JAN-86

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SCALE IN FEET

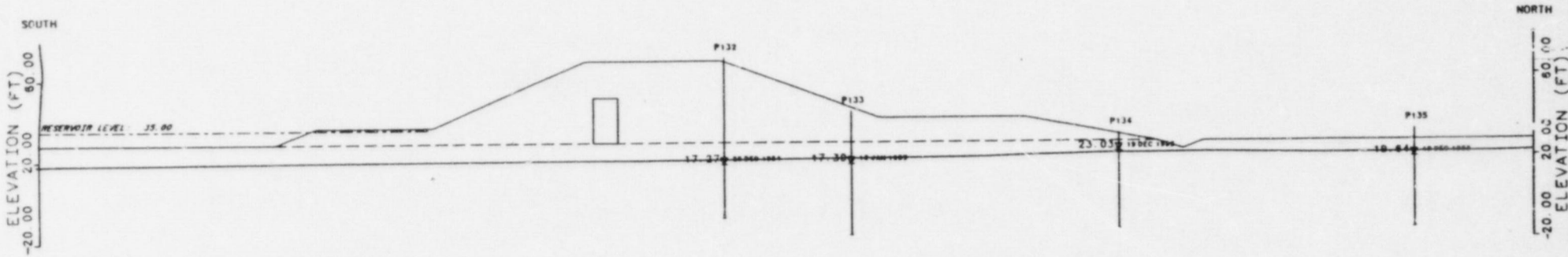


EXHIBIT 97

PROFILE 34

EMBANKMENT STATION 105+00

SOUTH TEXAS PROJECT

14926-001

22-JAN-86

0.00 40.00 80.00 120.00

SCALE IN FEET

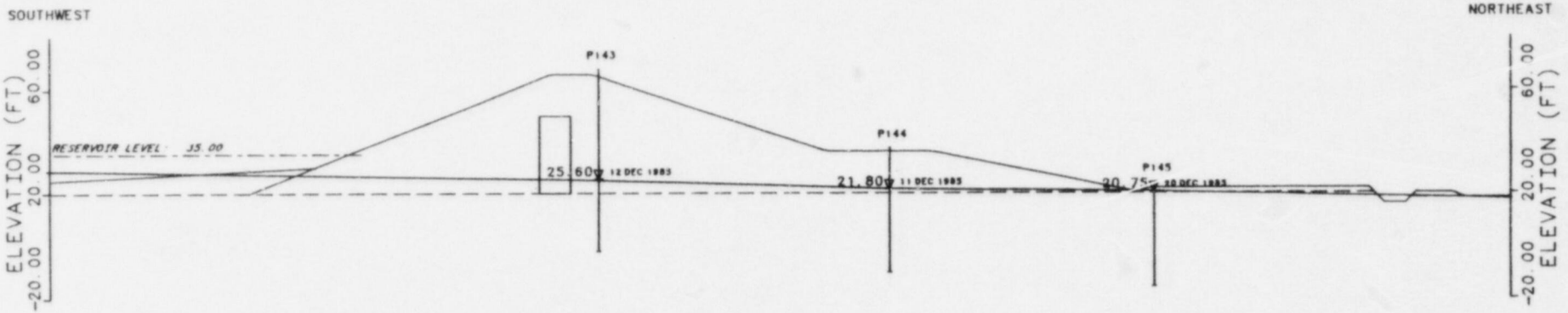


EXHIBIT 98

1534P A1508-RPT.1 7/18 JM

HOUSTON LIGHTING AND POWER COMPANY
SOUTH TEXAS PROJECT
HARZA INSTRUMENT MONITORING SYSTEM
ELEVATION 35 REPORT DESIGN NOTES

1. All geotechnical instrumentation monitoring data covered by Specification 9Y510YS1004 and Attachment 1 (Harza Specification 15348-15) will be stored in data files for checking, analysis and distribution.

2. The Program has been designed to be highly flexible with three linked stages of operation; data storage, data analysis and data output. This allows modifications to any stage of the program to update, improve or adapt for new applications as necessary.

3. Planned developments include electronic data input from the STP time history plots of any instrument or groups of instruments and adaption for use on site based computer equipment.

4. A User and Operation Manual will be developed. Currently there is user-friendly menu system with fail safe option for non-equal operation of the program.

5. Output format can be varied from graphical, (both printed and Tektronix display) to tabular. Graphical output can be varied for number of graphs, length, width and data plotted.

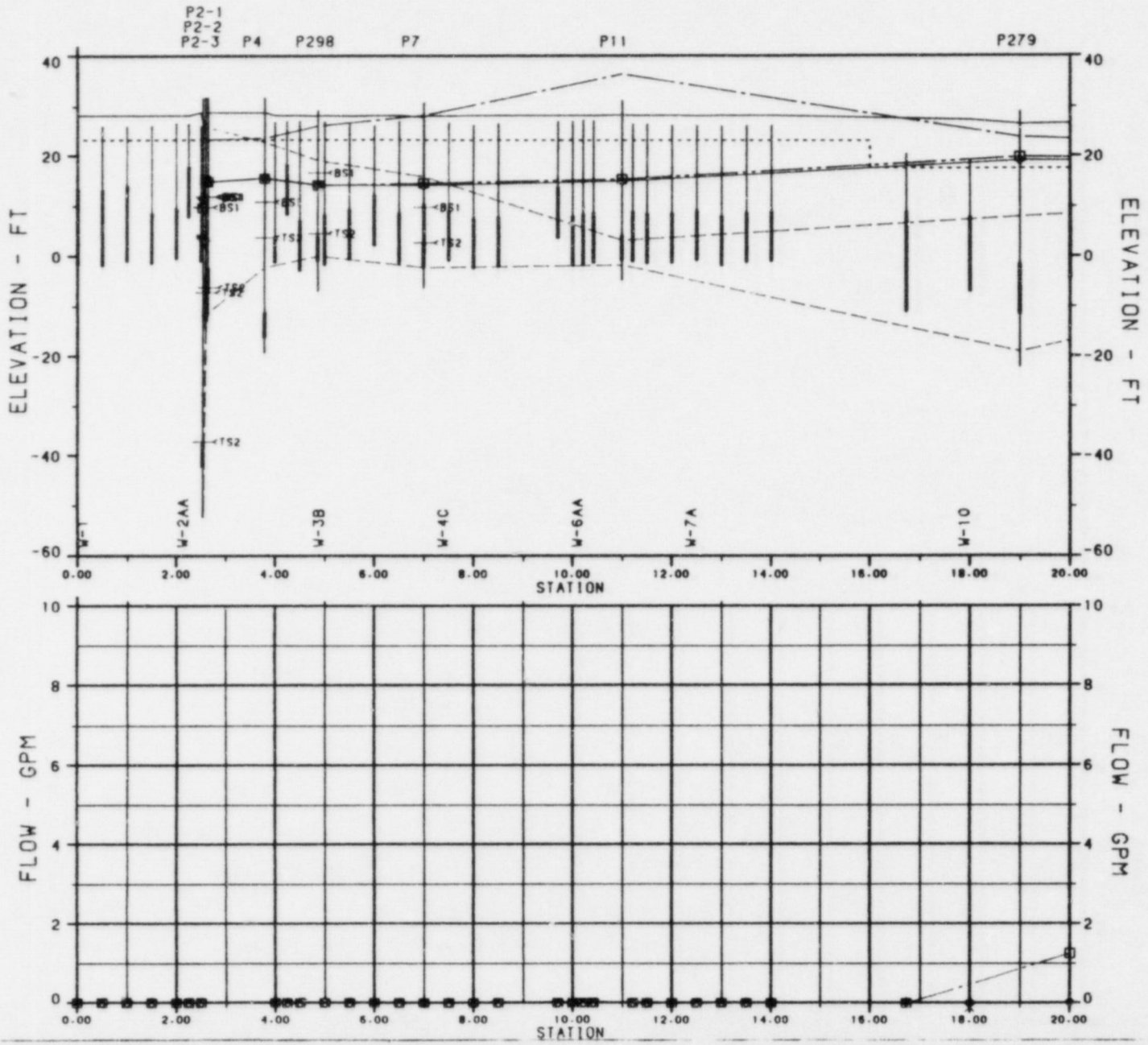
6. The following parameters, assumptions and simplifications are used in the data analysis for these display:

   - Straight-line interpolation between piezometer borehole data. There is no manual interpretation of data.
   - Stratigraphical data from relief well boreholes not yet included.
   - Sand lens plotted as continuous around the MCR which gives most conservative case for analysis.
   - Factor of Safety calculated for critical gradient of 1.0.
   - When the Factor of Safety for piezometric uplift pressure exceeded, a flag is plotted at the piezometer.
   - Where time dependent data (relief well flow or piezometer level) is unavailable, the program indicates "no data" but interpolates from the nearest available data points to plot the connecting lines. A limit of 10 stations applies.
   - Except for along Relocated Little Robins Slough (RLRS only piezometers adjacent to the line of relief wells have been plotted. Along RLRS, piezometers at the toe of the berm have been included. These will be identified.

7. The following modifications are required.

   - The sand lense, Factor of Safety line and piezometer line do not plot from Sta 0+00 until the first piezometer, P-23. This will be corrected.
   - The seven new relief wells at Kelly Lake, Sta 102+00 to Sta 107+00 are not yet included.
   - Additional identification of areas will be added such as Relocated Little Robins Slough, Plant Area Drainage Ditch, Spillway etc.

EXHIBIT 99



LEGEND:

STRATIGRAPHY

- GROUND LEVEL
- TOP OF SAND (TS)
- BOTTOM OF SAND (BS)
- DITCH INVERT
- FACTOR OF SAFETY=1.5
- WARNING (SEE OUTPUT)

INSTRUMENT SYMBOLS:

PIEZOMETER
- TOP OF RISER
- SCREEN
- BOREHOLE BOTTOM

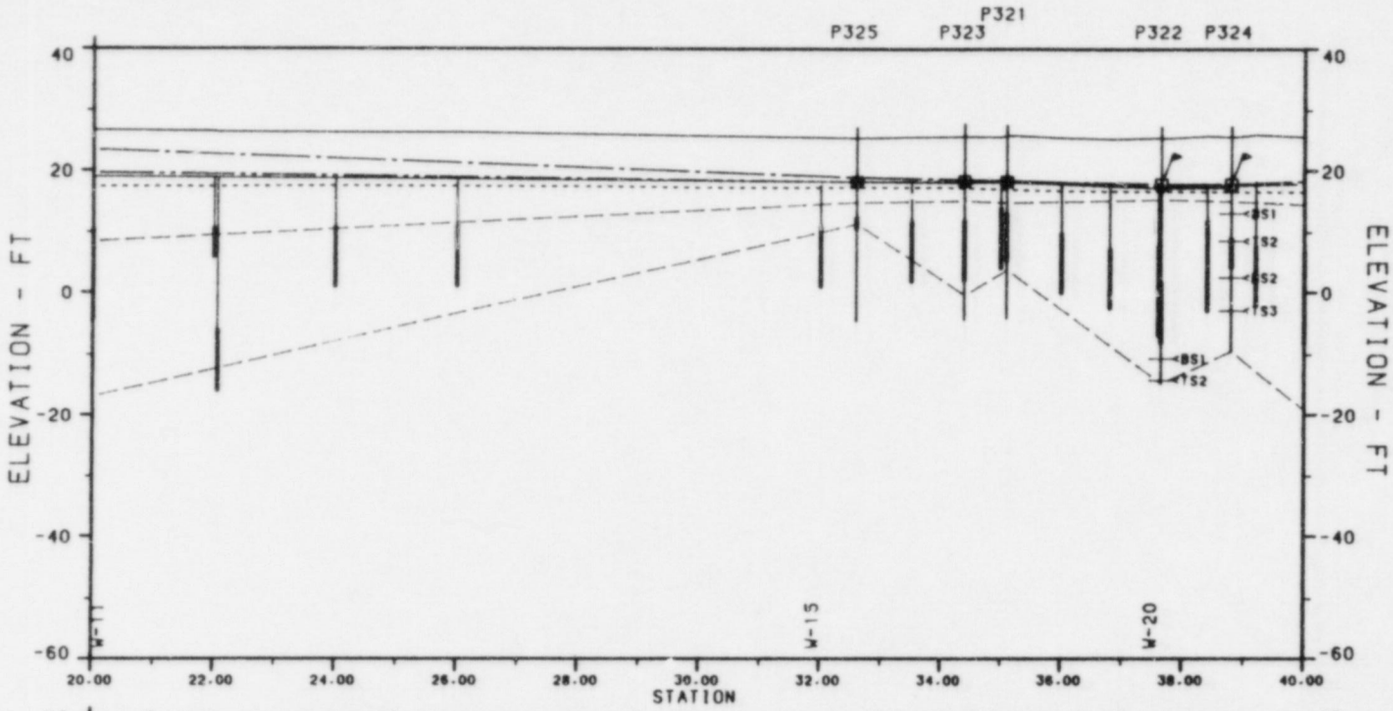
P21

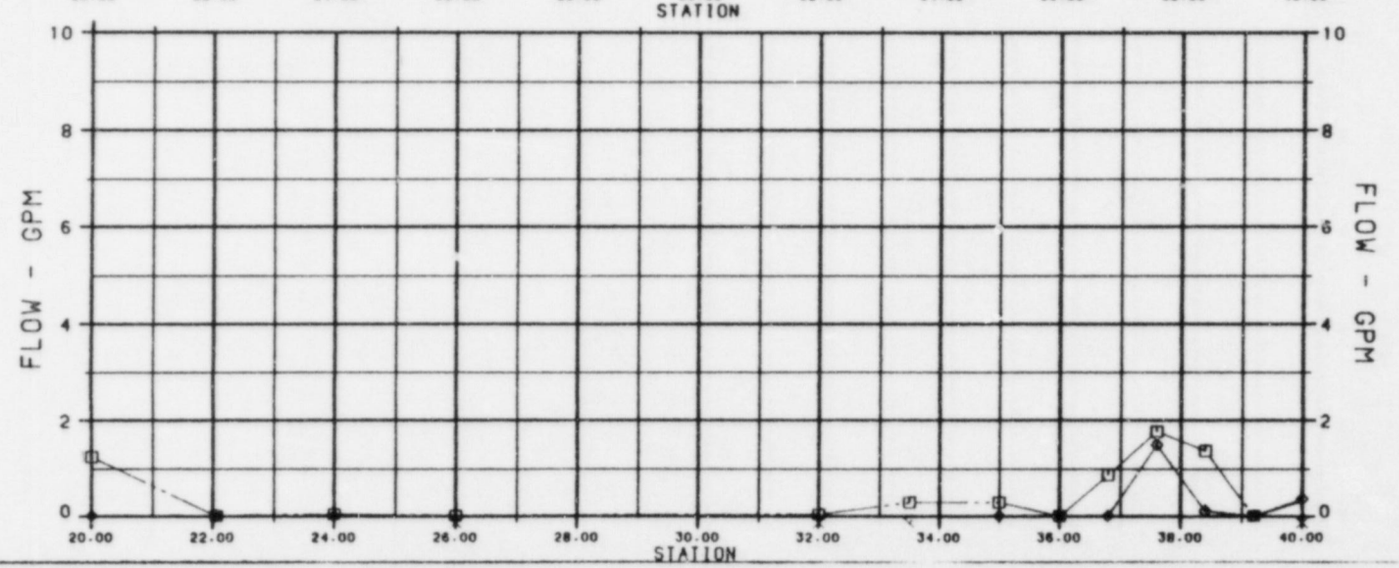
RELIEF WELL
- DISCHARGE ELEV.
- SCREEN
- BOREHOLE BOTTOM

INSTRUMENT TYPE	DATA PACKET NUMBER	DATE
PIEZOMETER	R099	01 SEP 85
RELIEF WELL	R099	01 SEP 85
PIEZOMETER	R117	01 APR 86
RELIEF WELL	R117	01 APR 86
X NO RELIEF WELL DATA		

HOUSTON LIGHTING AND POWER COMPANY
SOUTH TEXAS PROJECT | INSTRUMENTATION
BECHTEL ENERGY CORPORATION
MAIN COOLING RESERVOIR INSTRUMENTATION
HARZA ENGINEERING COMPANY
CHICAGO, IL | 14926 8004

EXHIBIT 100





LEGEND:

STRATIGRAPHY

- GROUND LEVEL
- TOP OF SAND (TS)
- BOTTOM OF SAND (BS)
- DITCH INVERT
- FACTOR OF SAFETY=1.5
- WARNING (SEE OUTPUT)

INSTRUMENT SYMBOLS:

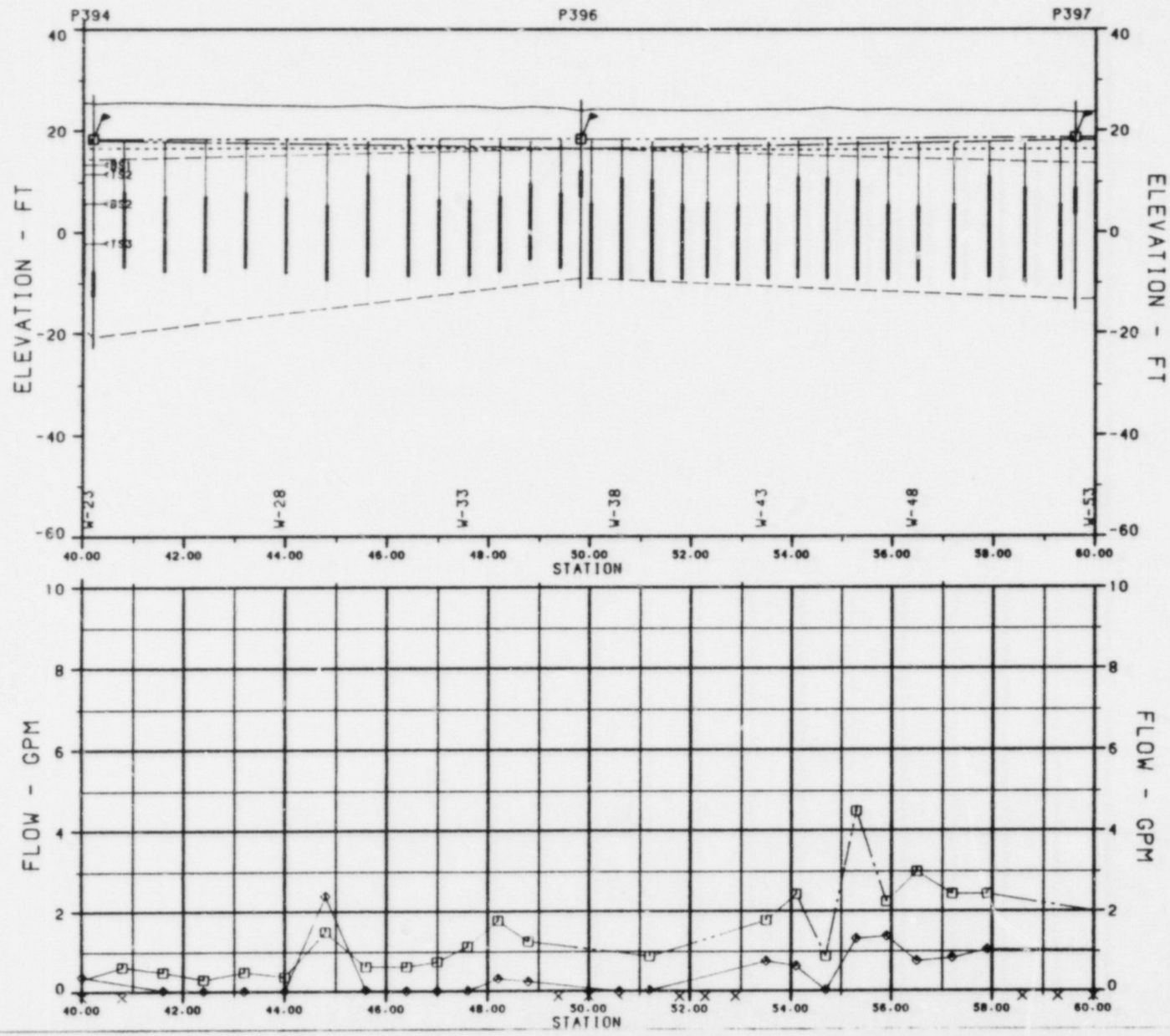
PIEZOMETER: TOP OF RISER, SCREEN, BOREHOLE BOTTOM — P21

RELIEF WELL: DISCHARGE ELEV., SCREEN, BOREHOLE BOTTOM

INSTRUMENT TYPE	DATA PACKET NUMBER	DATE
PIEZOMETER	R099	01 SEP 85
RELIEF WELL	R099	01 SEP 85
PIEZOMETER	R117	01 APR 86
RELIEF WELL	R117	01 APR 86
× NO RELIEF WELL DATA		

HOUSTON LIGHTING AND POWER COMPANY	
SOUTH TEXAS PROJECT	INSTRUMENTATION
BECHTEL ENERGY CORPORATION MAIN COOLING RESERVOIR INSTRUMENTATION	
HARZA ENGINEERING COMPANY	
CHICAGO, IL	14926 8004

EXHIBIT 101



LEGEND:

STRATIGRAPHY

- GROUND LEVEL
- TOP OF SAND (TS)
- BOTTOM OF SAND (BS)
- DITCH INVERT
- FACTOR OF SAFETY=1.5
- WARNING (SEE OUTPUT)

INSTRUMENT SYMBOLS:

PIEZOMETER
- TOP OF RISER
- SCREEN
- BOREHOLE BOTTOM

P21

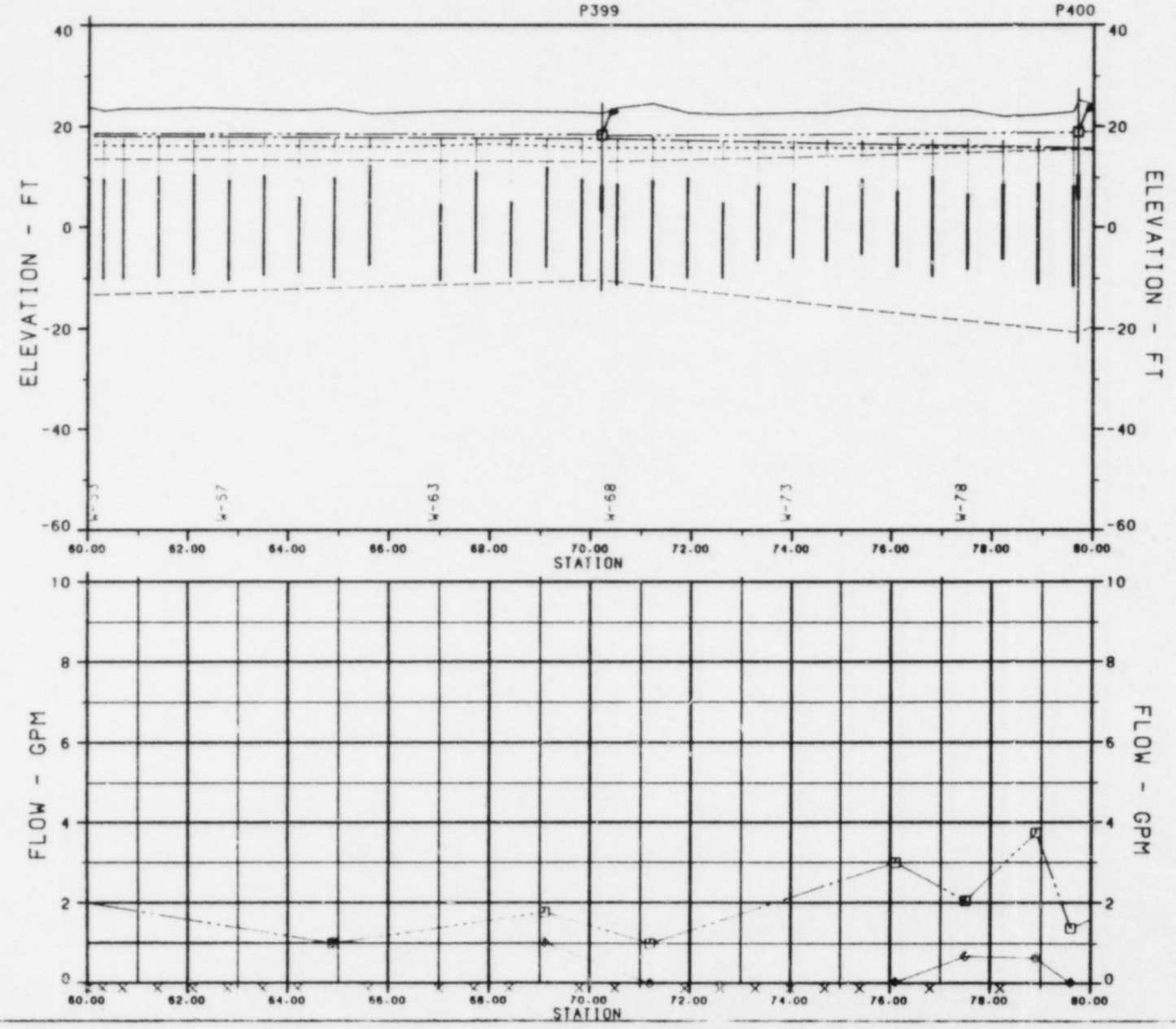
RELIEF WELL
- DISCHARGE ELEV.
- SCREEN
- BOREHOLE BOTTOM

W-1

INSTRUMENT TYPE	DATA PACKET NUMBER	DATE
PIEZOMETER	R099	01 SEP 85
RELIEF WELL	R099	01 SEP 85
PIEZOMETER	R117	01 APR 86
RELIEF WELL	R117	01 APR 86
× NO RELIEF WELL DATA		

HOUSTON LIGHTING AND POWER COMPANY	
SOUTH TEXAS PROJECT	INSTRUMENTATION
BECHTEL ENERGY CORPORATION MAIN COOLING RESERVOIR INSTRUMENTATION	
HARZA ENGINEERING COMPANY	
CHICAGO, IL	14926 8004

EXHIBIT 102



LEGEND:

STRATIGRAPHY

- GROUND LEVEL
- TOP OF SAND (TS)
- BOTTOM OF SAND (BS)
- DITCH INVERT
- FACTOR OF SAFETY=1.5
- WARNING (SEE OUTPUT)

INSTRUMENT SYMBOLS:

PIEZOMETER: TOP OF RISER, SCREEN, BOREHOLE BOTTOM

RELIEF WELL: DISCHARGE ELEV., SCREEN, BOREHOLE BOTTOM

P21

INSTRUMENT TYPE	DATA PACKET NUMBER	DATE
PIEZOMETER	R099	01 SEP 85
RELIEF WELL	R099	01 SEP 85
PIEZOMETER	R117	01 APR 86
RELIEF WELL	R117	01 APR 86
X	NO RELIEF WELL DATA	

HOUSTON LIGHTING AND POWER COMPANY

SOUTH TEXAS PROJECT | INSTRUMENTATION

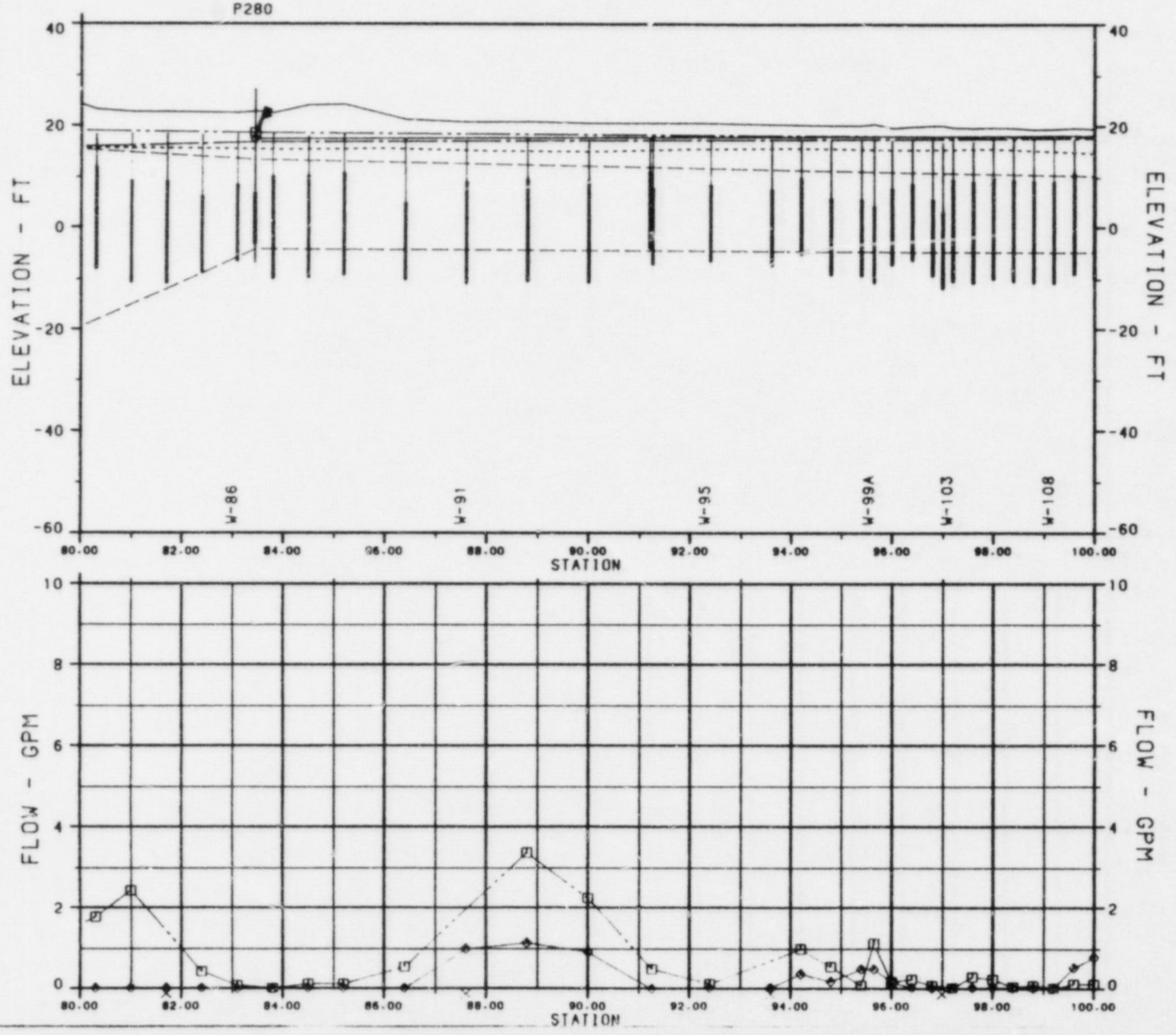
BECHTEL ENERGY CORPORATION

MAIN COOLING RESERVOIR INSTRUMENTATION

HARZA ENGINEERING COMPANY

CHICAGO, IL | 14926 B004

EXHIBIT 103



LEGEND:

STRATIGRAPHY

- GROUND LEVEL
- TOP OF SAND (TS)
- BOTTOM OF SAND (BS)
- DITCH INVERT
- FACTOR OF SAFETY=1.5
- WARNING (SEE OUTPUT)

INSTRUMENT SYMBOLS:

PIEZOMETER
- TOP OF RISER
- SCREEN
- BOREHOLE BOTTOM

P21

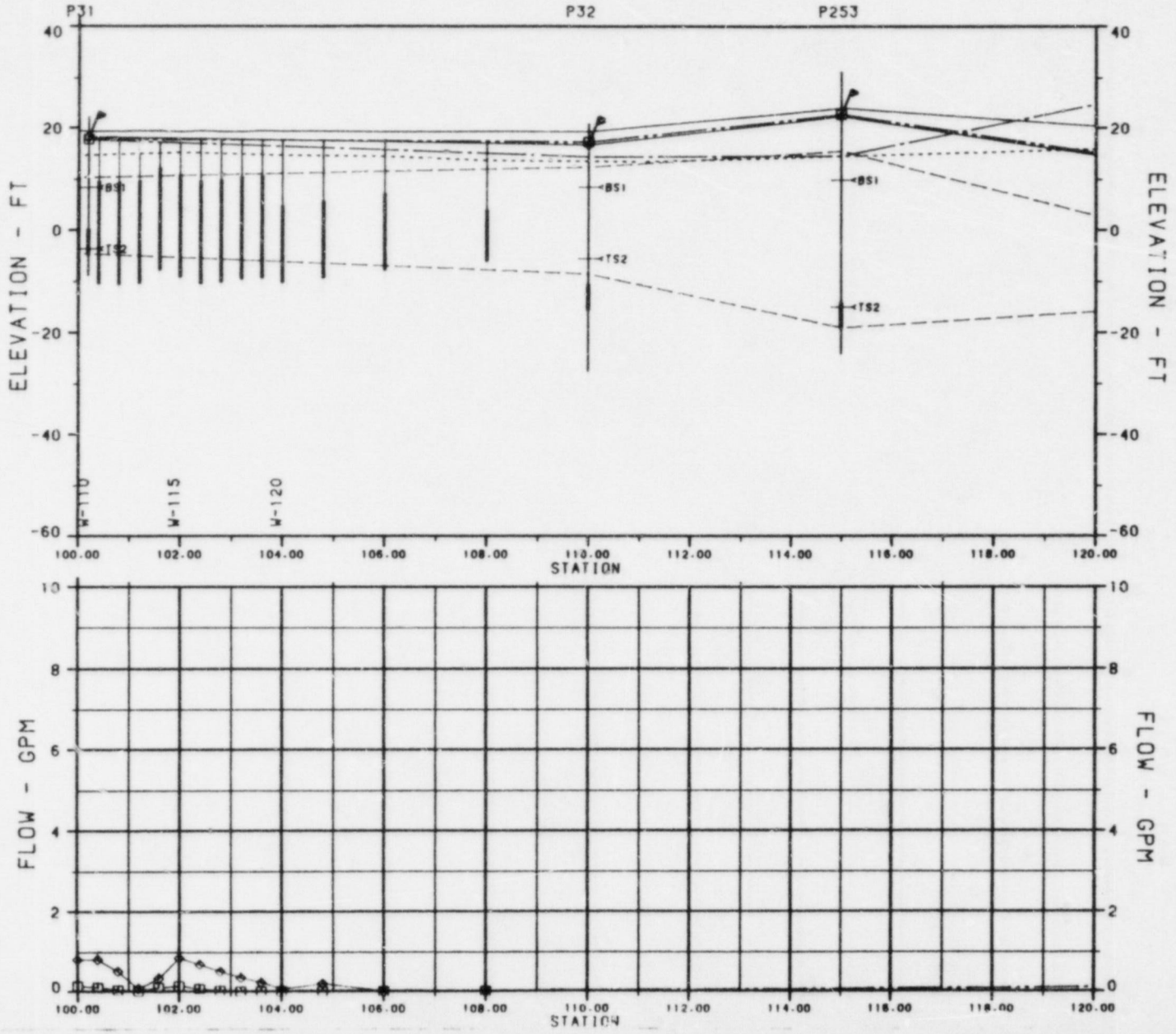
RELIEF WELL
- DISCHARGE ELEV.
- SCREEN
- BOREHOLE BOTTOM

W-1

INSTRUMENT TYPE	DATA PACKET NUMBER	DATE
PIEZOMETER	R099	01 SEP 85
RELIEF WELL	R099	01 SEP 85
PIEZOMETER	R117	01 APR 86
RELIEF WELL	R117	01 APR 86
X	NO RELIEF WELL DATA	

HOUSTON LIGHTING AND POWER COMPANY	
SOUTH TEXAS PROJECT	INSTRUMENTATION
BECHTEL ENERGY CORPORATION	
MAIN COOLING RESERVOIR INSTRUMENTATION	
HARZA ENGINEERING COMPANY	
CHICAGO, IL	14926 B004

EXHIBIT 104



LEGEND:

STRATIGRAPHY

- GROUND LEVEL
- TOP OF SAND (TS)
- BOTTOM OF SAND (BS)
- DITCH INVERT
- FACTOR OF SAFETY=1.5
- WARNING (SEE OUTPUT)

INSTRUMENT SYMBOLS:

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- TOP OF RISER
- SCREEN
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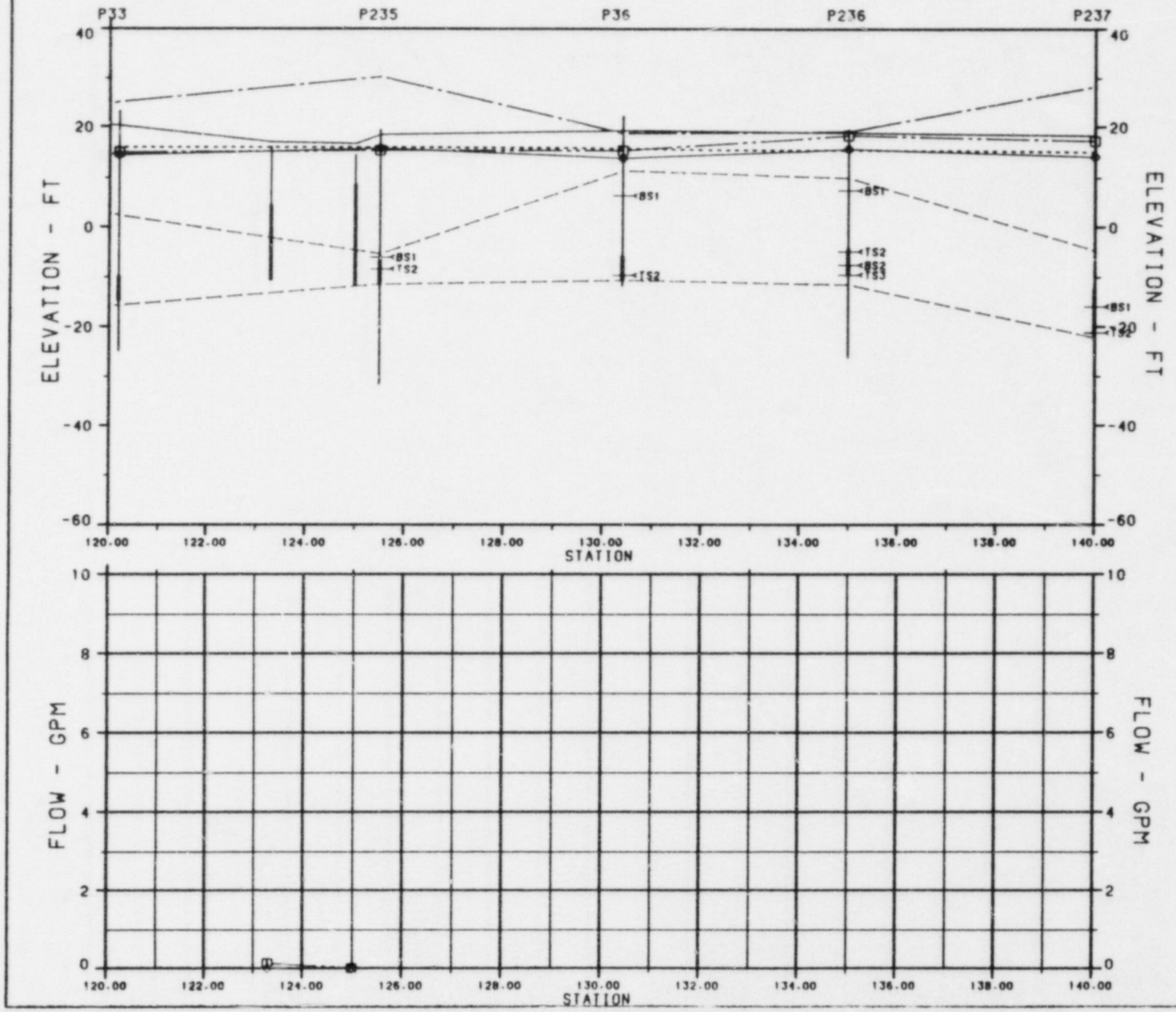
P21

RELIEF WELL
- DISCHARGE ELEV.
- SCREEN
- BOREHOLE BOTTOM

INSTRUMENT TYPE	DATA PACKET NUMBER	DATE
PIEZOMETER	R099	01 SEP 85
RELIEF WELL	R099	01 SEP 85
PIEZOMETER	R117	01 APR 86
RELIEF WELL	R117	01 APR 86
× NO RELIEF WELL DATA		

HOUSTON LIGHTING AND POWER COMPANY
SOUTH TEXAS PROJECT | INSTRUMENTATION
BECHTEL ENERGY CORPORATION MAIN COOLING RESERVOIR INSTRUMENTATION
HARZA ENGINEERING COMPANY
CHICAGO, IL | 14926 8004

EXHIBIT 105



LEGEND:

STRATIGRAPHY

- GROUND LEVEL
- TOP OF SAND (TS)
- BOTTOM OF SAND (BS)
- DITCH INVERT
- FACTOR OF SAFETY=1.5
- WARNING (SEE OUTPUT)

INSTRUMENT SYMBOLS:

PIEZOMETER
- TOP OF RISER
- SCREEN
- BOREHOLE BOTTOM

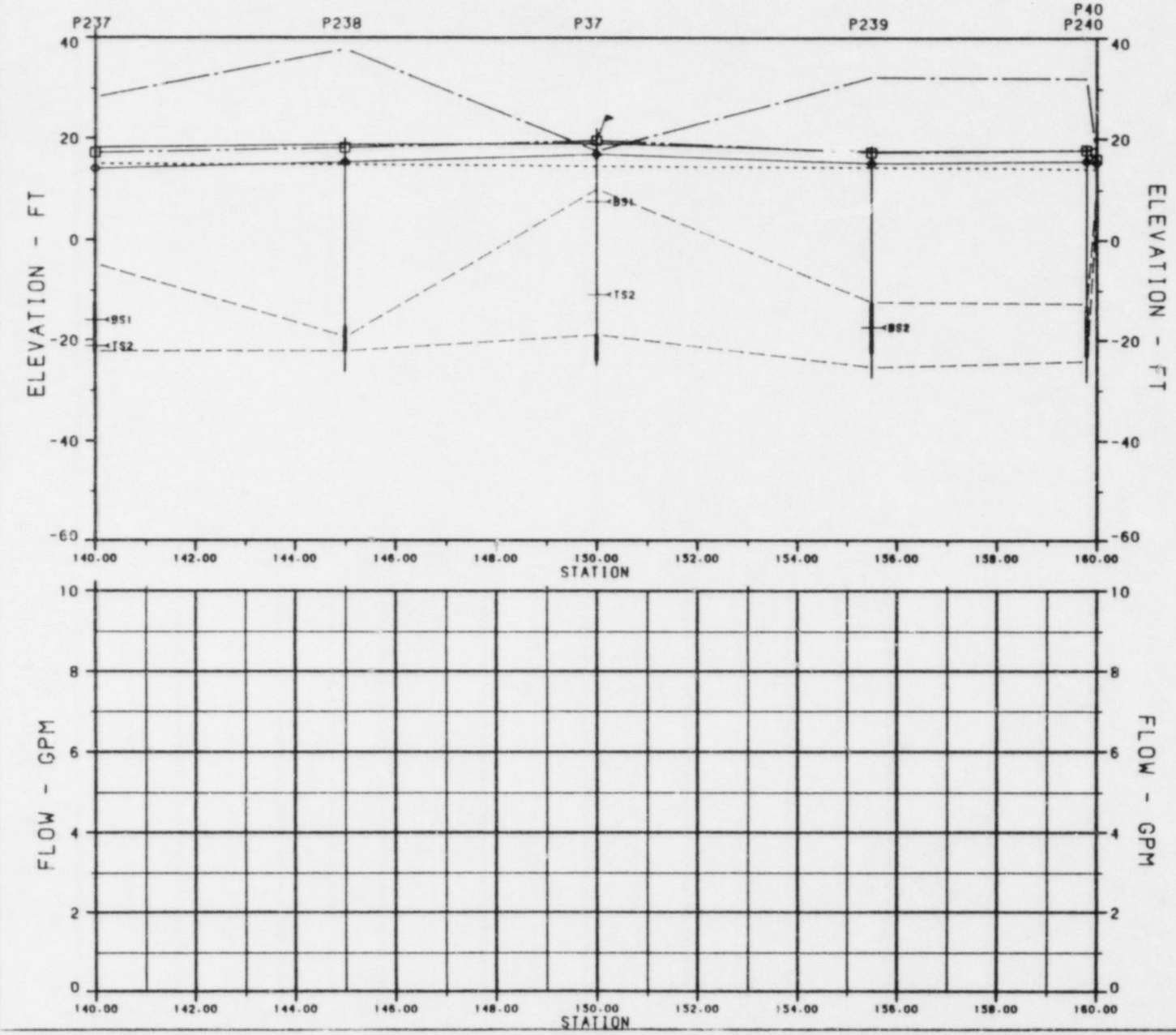
RELIEF WELL
- DISCHARGE ELEV.
- SCREEN
- BOREHOLE BOTTOM

P21

INSTRUMENT TYPE	DATA PACKET NUMBER	DATE
PIEZOMETER	R099	01 SEP 85
RELIEF WELL	R099	01 SEP 85
PIEZOMETER	R117	01 APR 86
RELIEF WELL	R117	01 APR 86
× NO RELIEF WELL DATA		

HOUSTON LIGHTING AND POWER COMPANY
SOUTH TEXAS PROJECT | INSTRUMENTATION
BECHTEL ENERGY CORPORATION
MAIN COOLING RESERVOIR INSTRUMENTATION
HARZA ENGINEERING COMPANY
CHICAGO, IL | 14926 B004

EXHIBIT 106



LEGEND:

STRATIGRAPHY

- GROUND LEVEL
- TOP OF SAND (TS)
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- DITCH INVERT
- FACTOR OF SAFETY=1.5

WARNING (SEE OUTPUT)

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RELIEF WELL
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- SCREEN
- BOREHOLE BOTTOM

P21

INSTRUMENT TYPE	DATA PACKET NUMBER	DATE
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RELIEF WELL	R099	01 SEP 85
PIEZOMETER	R117	01 APR 86
RELIEF WELL	R117	01 APR 86
× NO RELIEF WELL DATA		

HOUSTON LIGHTING AND POWER COMPANY

SOUTH TEXAS PROJECT | INSTRUMENTATION

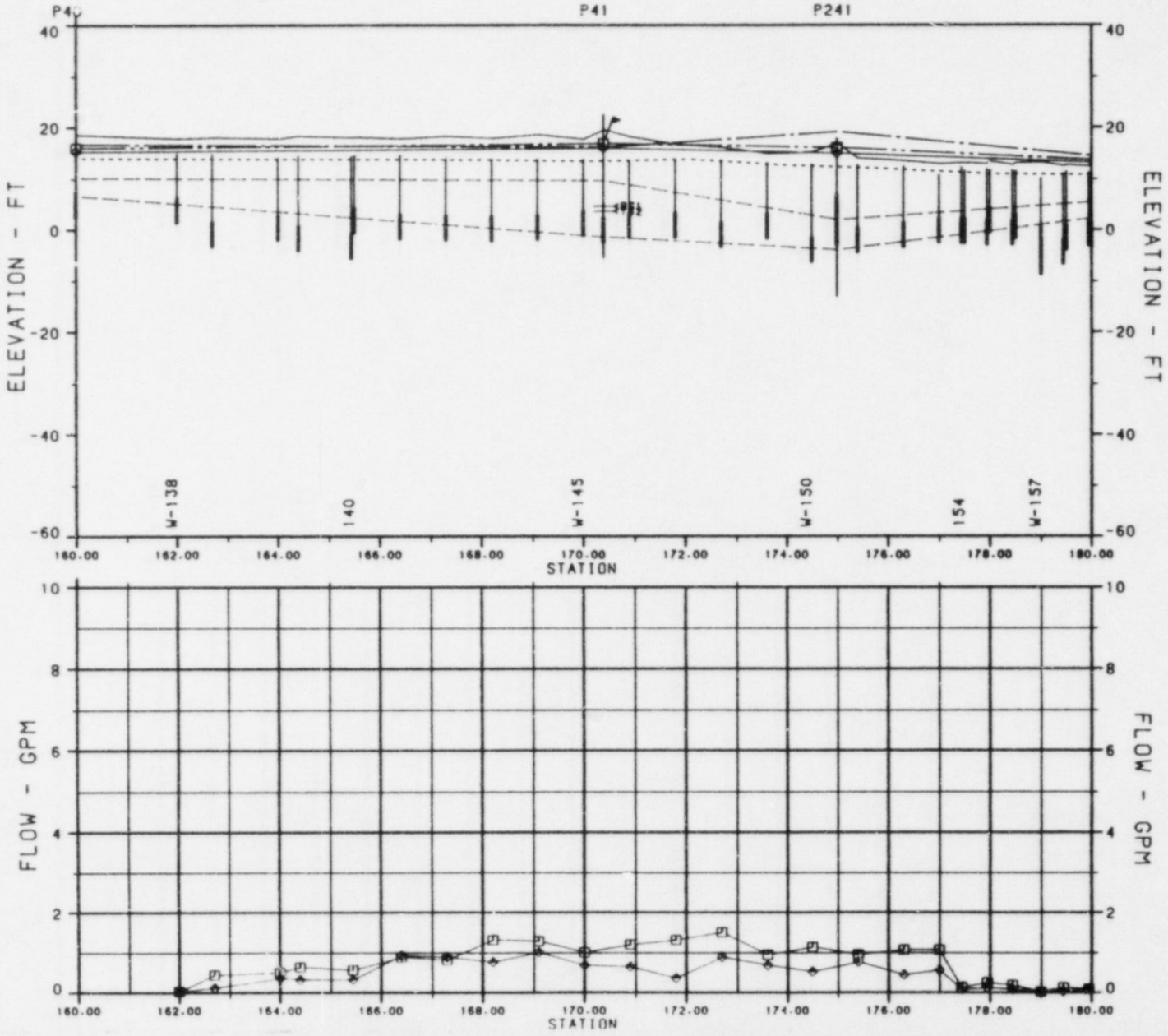
BECHTEL ENERGY CORPORATION

MAIN COOLING RESERVOIR INSTRUMENTATION

HARZA ENGINEERING COMPANY

CHICAGO, IL | 14928 B004

EXHIBIT 107



LEGEND:

STRATIGRAPHY

- GROUND LEVEL
- TOP OF SAND (TS)
- BOTTOM OF SAND (BS)
- DITCH INVERT
- FACTOR OF SAFETY=1.5

WARNING (SEE OUTPUT)

INSTRUMENT SYMBOLS:

PIEZOMETER
- TOP OF RISER
- SCREEN
- BOREHOLE BOTTOM

RELIEF WELL
- DISCHARGE ELEV.
- SCREEN
- BOREHOLE BOTTOM

P21

INSTRUMENT TYPE	DATA PACKET NUMBER	DATE
PIEZOMETER	R099	01 SEP 85
RELIEF WELL	R099	01 SEP 85
PIEZOMETER	R117	01 APR 86
RELIEF WELL	R117	01 APR 86
X NO RELIEF WELL DATA		

HOUSTON LIGHTING AND POWER COMPANY

SOUTH TEXAS PROJECT | INSTRUMENTATION

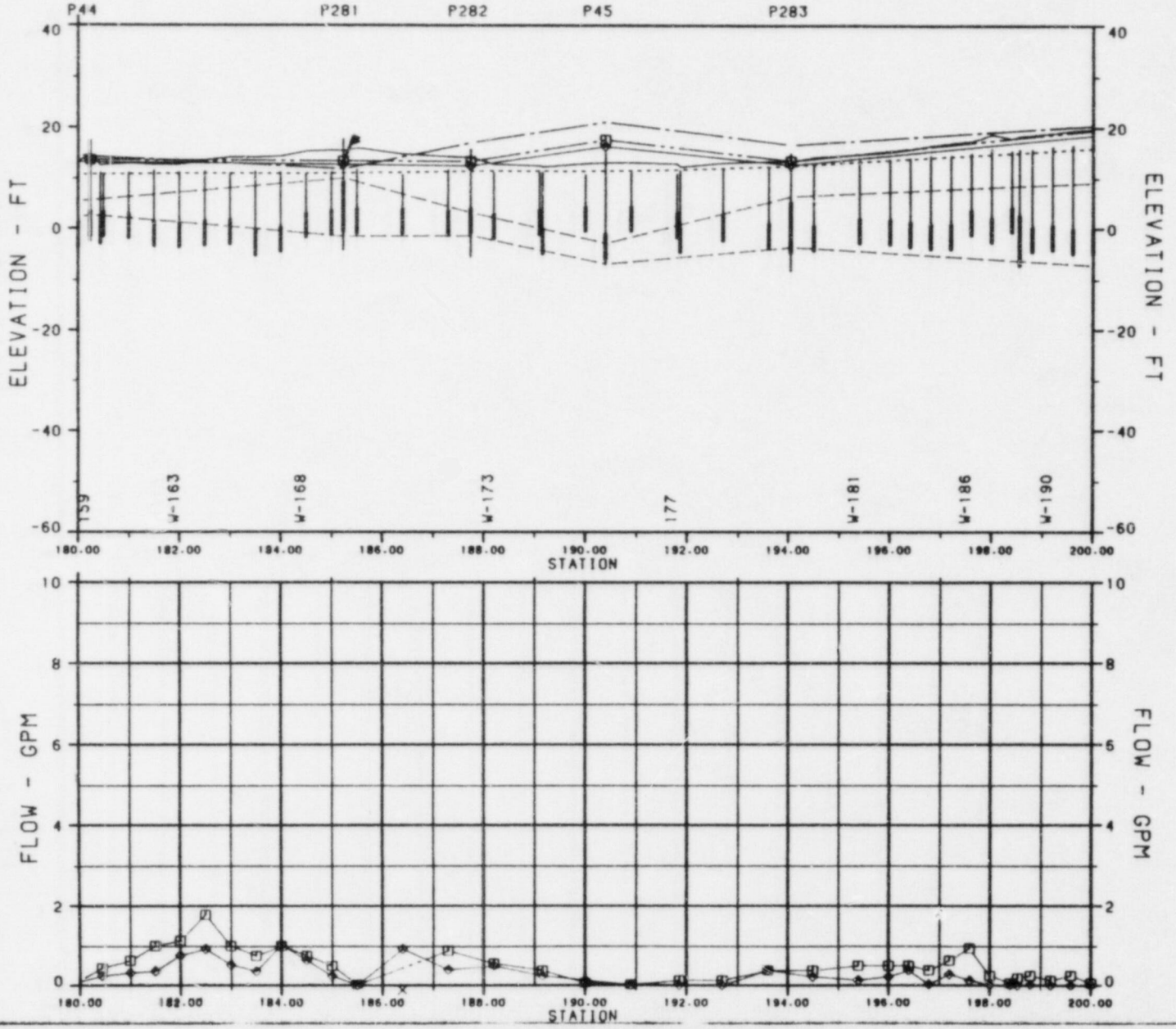
BECHTEL ENERGY CORPORATION

MAIN COOLING RESERVOIR INSTRUMENTATION

HARZA ENGINEERING COMPANY

CHICAGO, IL | 14926 8004

EXHIBIT 108



LEGEND:

STRATIGRAPHY

- GROUND LEVEL
- TOP OF SAND (TS)
- BOTTOM OF SAND (BS)
- DITCH INVERT
- FACTOR OF SAFETY=1.5

WARNING (SEE OUTPUT)

INSTRUMENT SYMBOLS:

PIEZOMETER

- TOP OF RISER
- SCREEN
- BOREHOLE BOTTOM

P21

RELIEF WELL

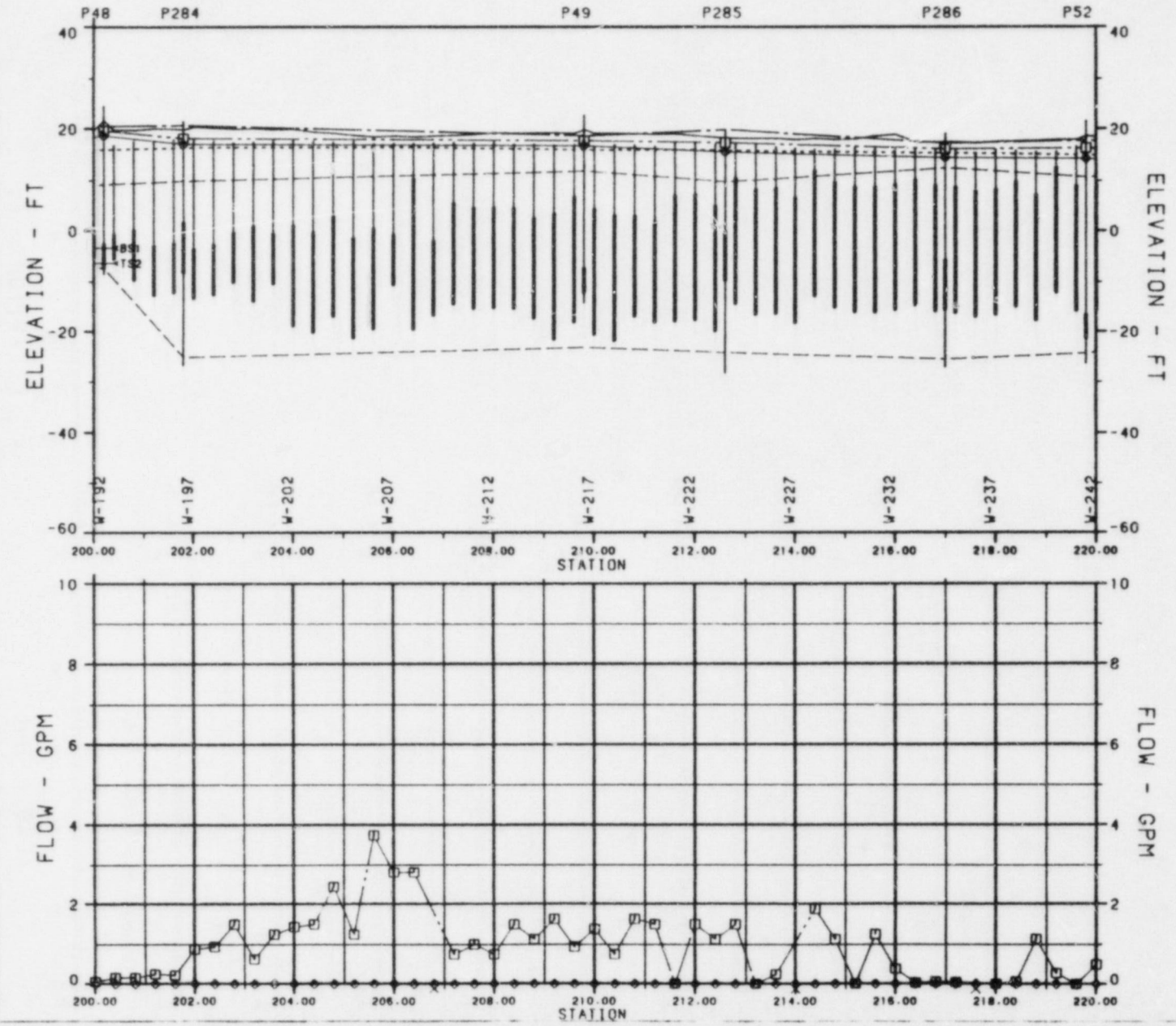
- DISCHARGE ELEV.
- SCREEN
- BOREHOLE BOTTOM

W-1

INSTRUMENT TYPE	DATA PACKET NUMBER	DATE
PIEZOMETER	R099	01 SEP 85
RELIEF WELL	R099	01 SEP 85
PIEZOMETER	R117	01 APR 86
RELIEF WELL	R117	01 APR 86
×	NO RELIEF WELL DATA	

HOUSTON LIGHTING AND POWER COMPANY
SOUTH TEXAS PROJECT | INSTRUMENTATION
BECHTEL ENERGY CORPORATION
MAIN COOLING RESERVOIR
INSTRUMENTATION
HARZA ENGINEERING COMPANY
CHICAGO, IL | 14928 8004

EXHIBIT 109



LEGEND:

STRATIGRAPHY

- GROUND LEVEL
- TOP OF SAND (TS)
- BOTTOM OF SAND (BS)
- DITCH INVERT
- FACTOR OF SAFETY=1.5
- WARNING (SEE OUTPUT)

INSTRUMENT SYMBOLS:

PIEZOMETER
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- SCREEN
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P21

RELIEF WELL
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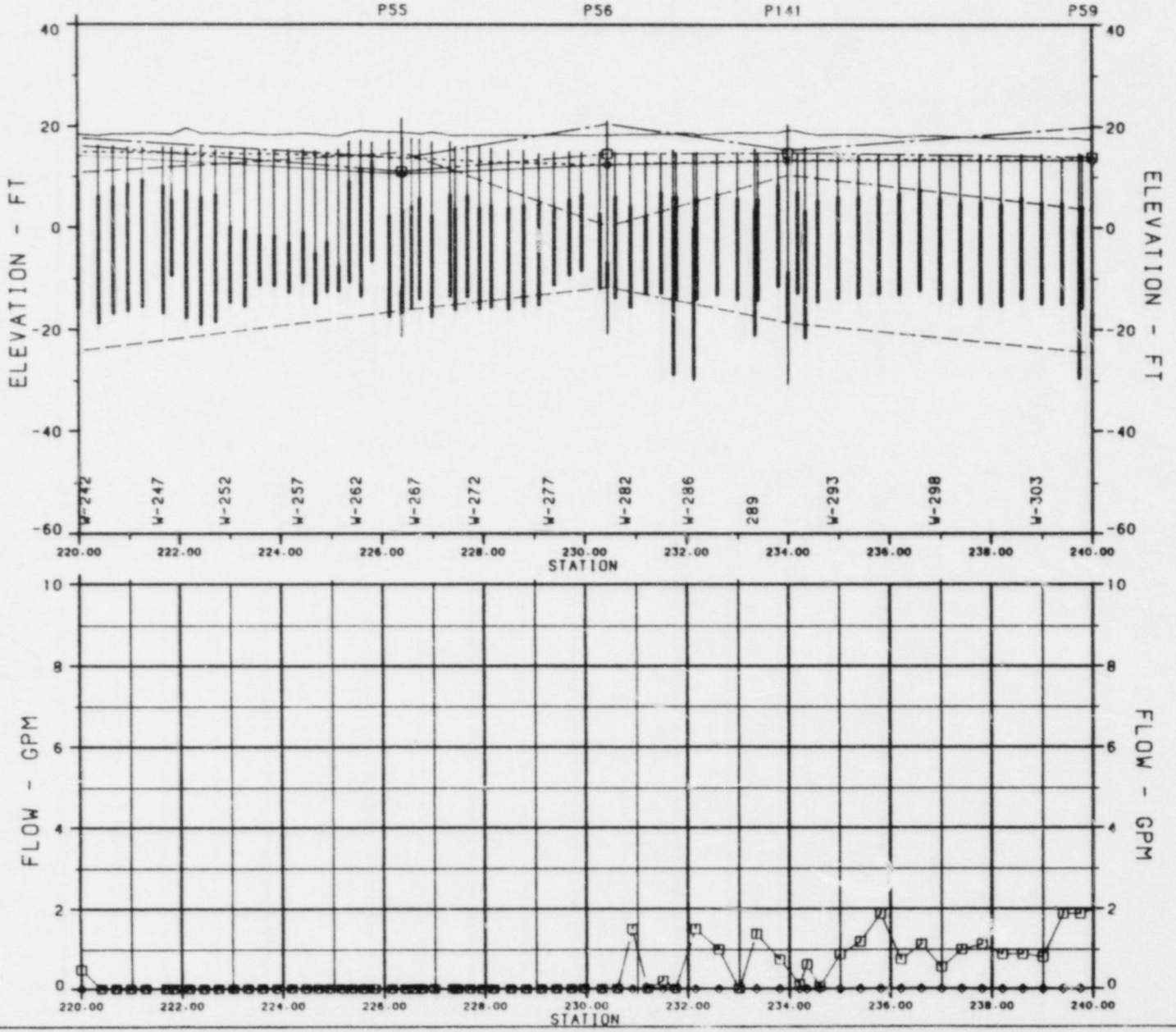
W-1

	INSTRUMENT TYPE	DATA PACKET NUMBER	DATE
	PIEZOMETER	R099	01 SEP 85
	RELIEF WELL	R099	01 SEP 85
	PIEZOMETER	R117	01 APR 86
	RELIEF WELL	R117	01 APR 86
X	NO RELIEF WELL DATA		

HOUSTON LIGHTING AND POWER COMPANY	
SOUTH TEXAS PROJECT	INSTRUMENTATION
BECHTEL ENERGY CORPORATION	
MAIN COOLING RESERVOIR INSTRUMENTATION	
HARZA ENGINEERING COMPANY	
CHICAGO, IL	14926 8004

EXHIBIT 110



LEGEND:

STRATIGRAPHY

- GROUND LEVEL
- TOP OF SAND (TS)
- BOTTOM OF SAND (BS)
- DITCH INVERT
- FACTOR OF SAFETY=1.5
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P21

RELIEF WELL
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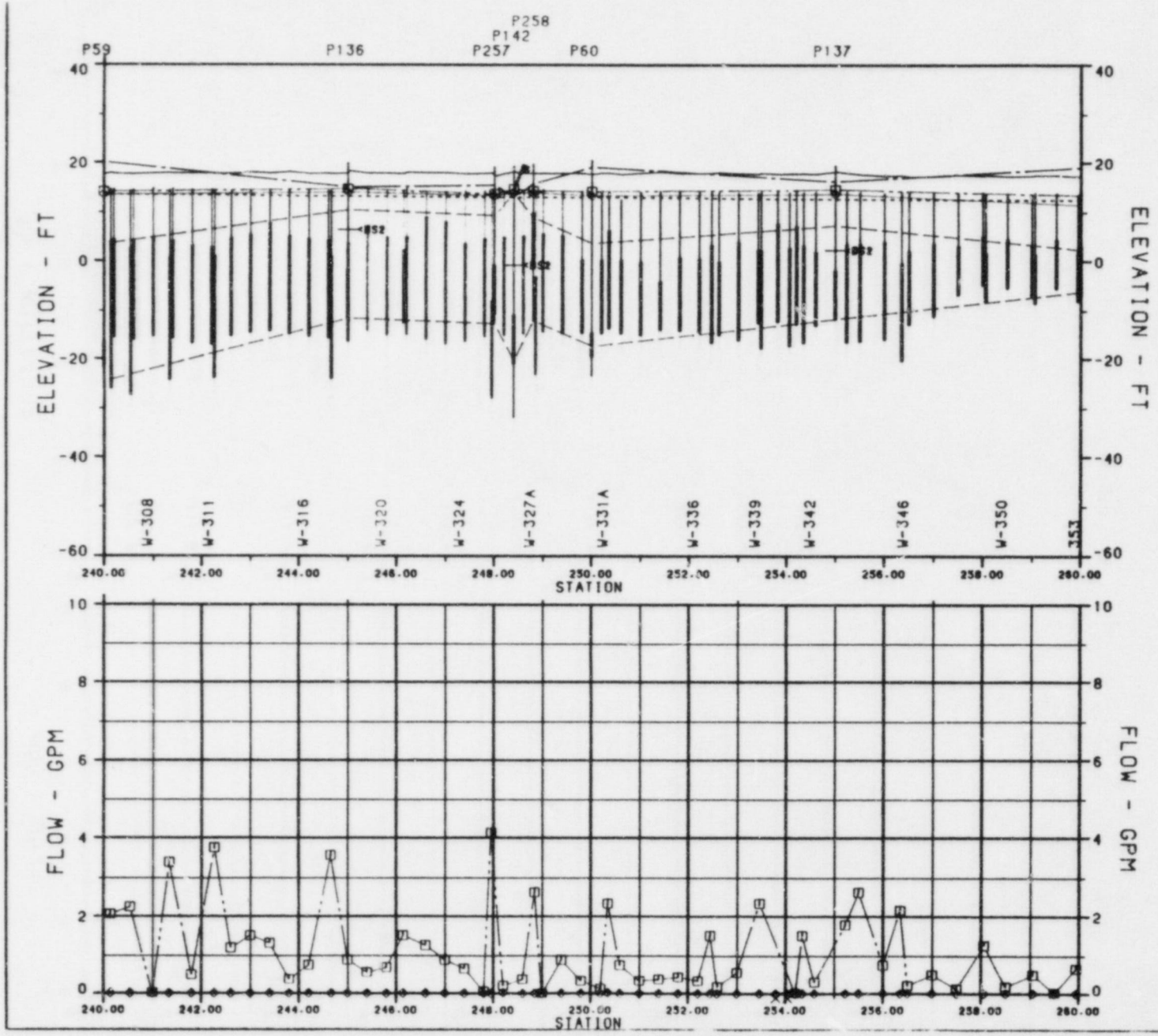
- BOREHOLE BOTTOM

INSTRUMENT TYPE	DATA PACKET NUMBER	DATE
PIEZOMETER	R099	01 SEP 85
RELIEF WELL	R099	01 SEP 85
PIEZOMETER	R117	01 APR 86
RELIEF WELL	R117	01 APR 86
X	NO RELIEF WELL DATA	

HOUSTON LIGHTING AND POWER COMPANY	
SOUTH TEXAS PROJECT	INSTRUMENTATION
BECHTEL ENERGY CORPORATION	
MAIN COOLING RESERVOIR INSTRUMENTATION	
HARZA ENGINEERING COMPANY	
CHICAGO, IL	14926 8004

EXHIBIT 111



LEGEND:

STRATIGRAPHY

- GROUND LEVEL
- TOP OF SAND (TS)
- BOTTOM OF SAND (BS)
- DITCH INVERT
- FACTOR OF SAFETY=1.5
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INSTRUMENT SYMBOLS:

PIEZOMETER
- TOP OF RISER
- SCREEN
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RELIEF WELL
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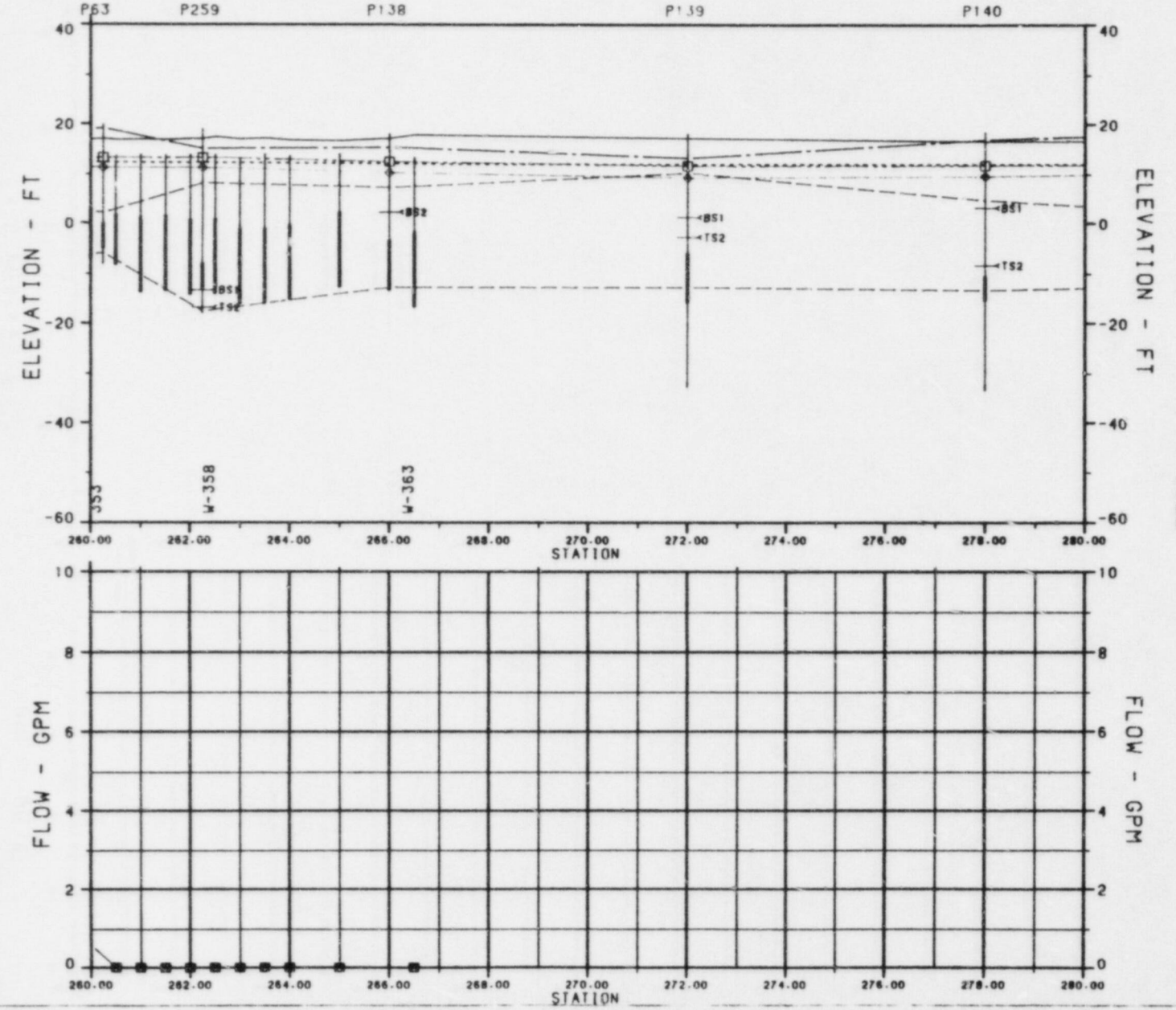
P21

INSTRUMENT TYPE	DATA PACKET NUMBER	DATE
PIEZOMETER	R099	01 SEP 85
RELIEF WELL	R099	01 SEP 85
PIEZOMETER	R117	01 APR 86
RELIEF WELL	R117	01 APR 86
X NO RELIEF WELL DATA		

HOUSTON LIGHTING AND POWER COMPANY
SOUTH TEXAS PROJECT | INSTRUMENTATION
BECHTEL ENERGY CORPORATION
MAIN COOLING RESERVOIR
INSTRUMENTATION
HARZA ENGINEERING COMPANY
CHICAGO, IL | 14926 8004

EXHIBIT 112



LEGEND:

STRATIGRAPHY

- GROUND LEVEL
- TOP OF SAND (TS)
- BOTTOM OF SAND (BS)
- DITCH INVERT
- FACTOR OF SAFETY=1.5
- WARNING (SEE OUTPUT)

INSTRUMENT SYMBOLS:

PIEZOMETER
- TOP OF RISER
- SCREEN
- BOREHOLE BOTTOM

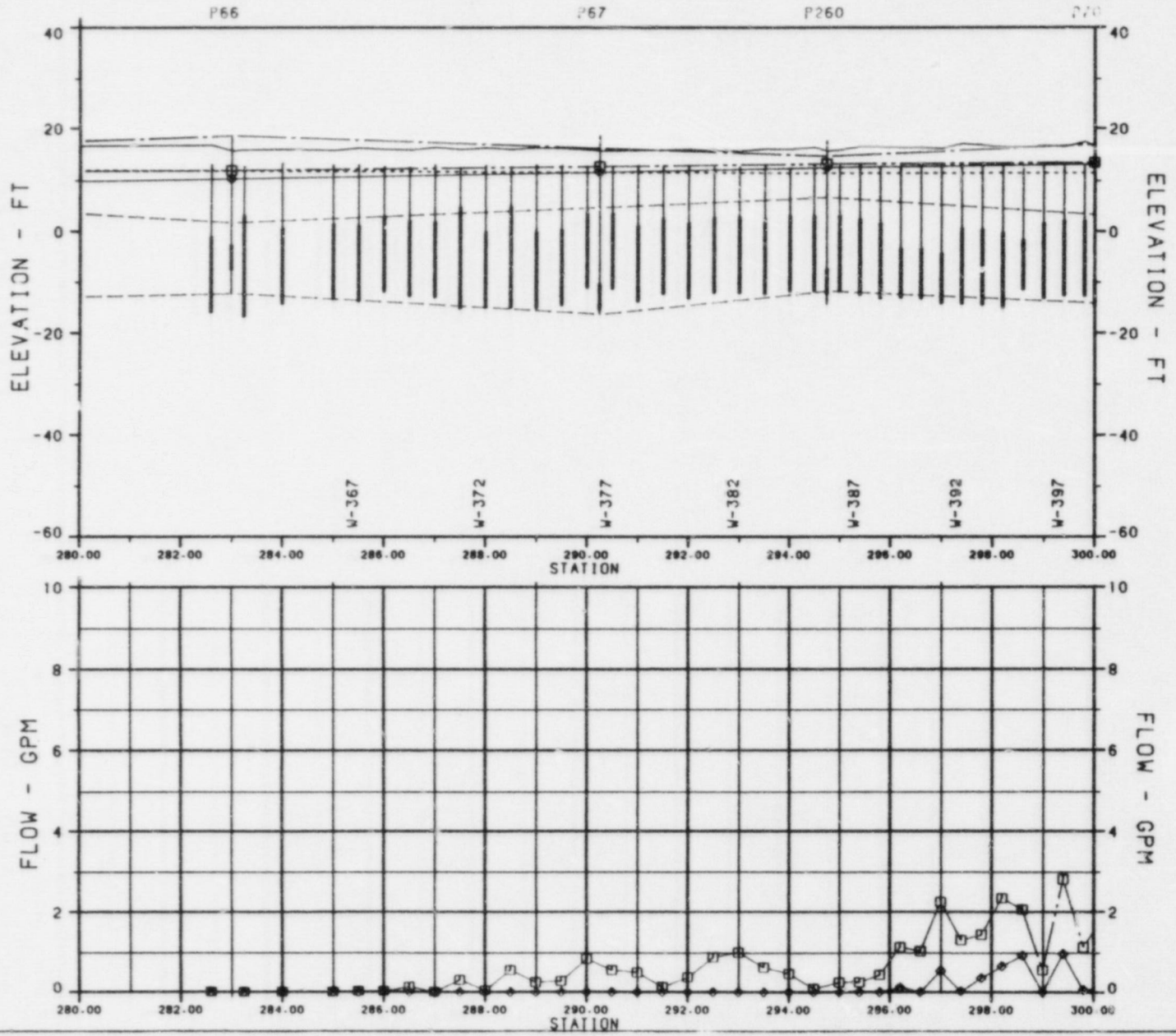
P21

RELIEF WELL
- DISCHARGE ELEV.
- SCREEN
- BOREHOLE BOTTOM

INSTRUMENT TYPE	DATA PACKET NUMBER	DATE
PIEZOMETER	R099	01 SEP 85
RELIEF WELL	R099	01 SEP 85
PIEZOMETER	R117	01 APR 86
RELIEF WELL	R117	01 APR 86
X	NO RELIEF WELL DATA	

HOUSTON LIGHTING AND POWER COMPANY	
SOUTH TEXAS PROJECT	INSTRUMENTATION
BECHTEL ENERGY CORPORATION	
MAIN COOLING RESERVOIR INSTRUMENTATION	
HARZA ENGINEERING COMPANY	
CHICAGO, IL	14926 B004

EXHIBIT 113



LEGEND:

STRATIGRAPHY

- GROUND LEVEL
- TOP OF SAND (TS)
- BOTTOM OF SAND (BS)
- DITCH INVERT
- FACTOR OF SAFETY=1.5
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INSTRUMENT SYMBOLS:

PIEZOMETER
- TOP OF RISER
- SCREEN
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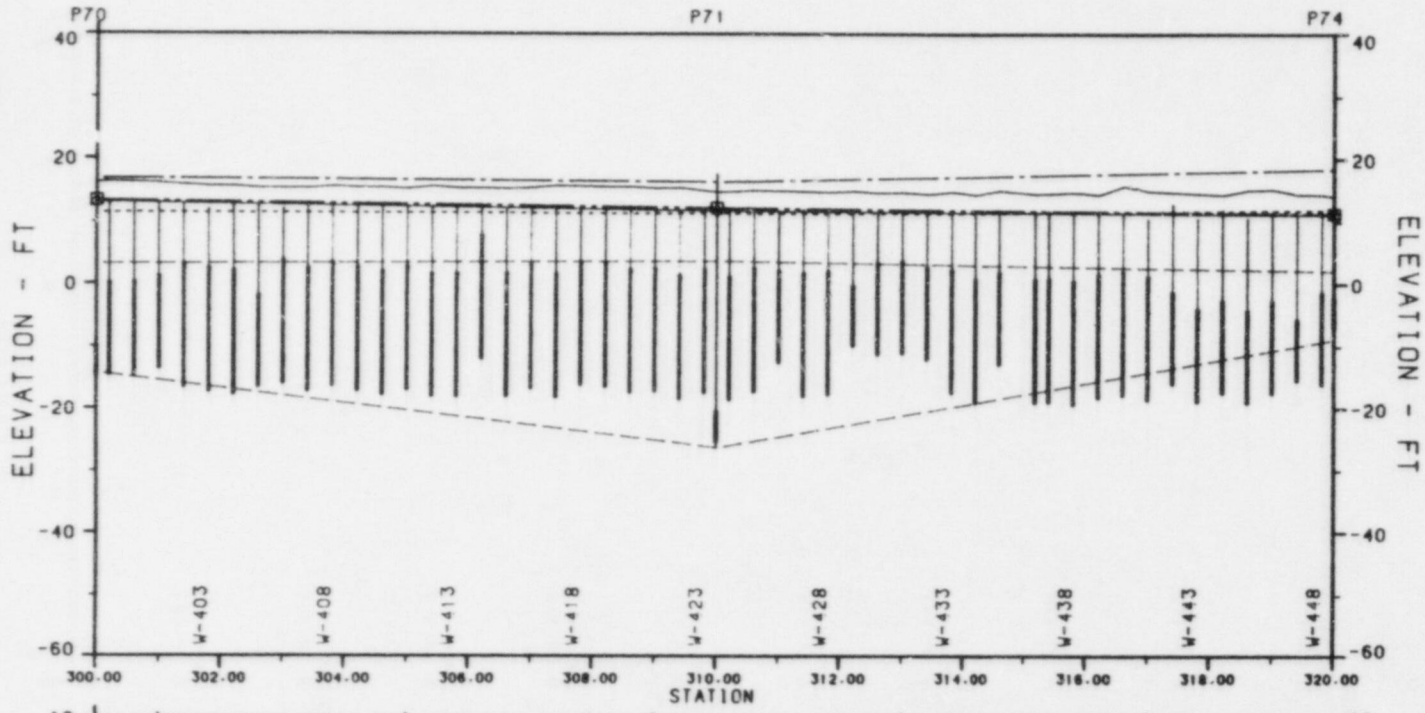
P21

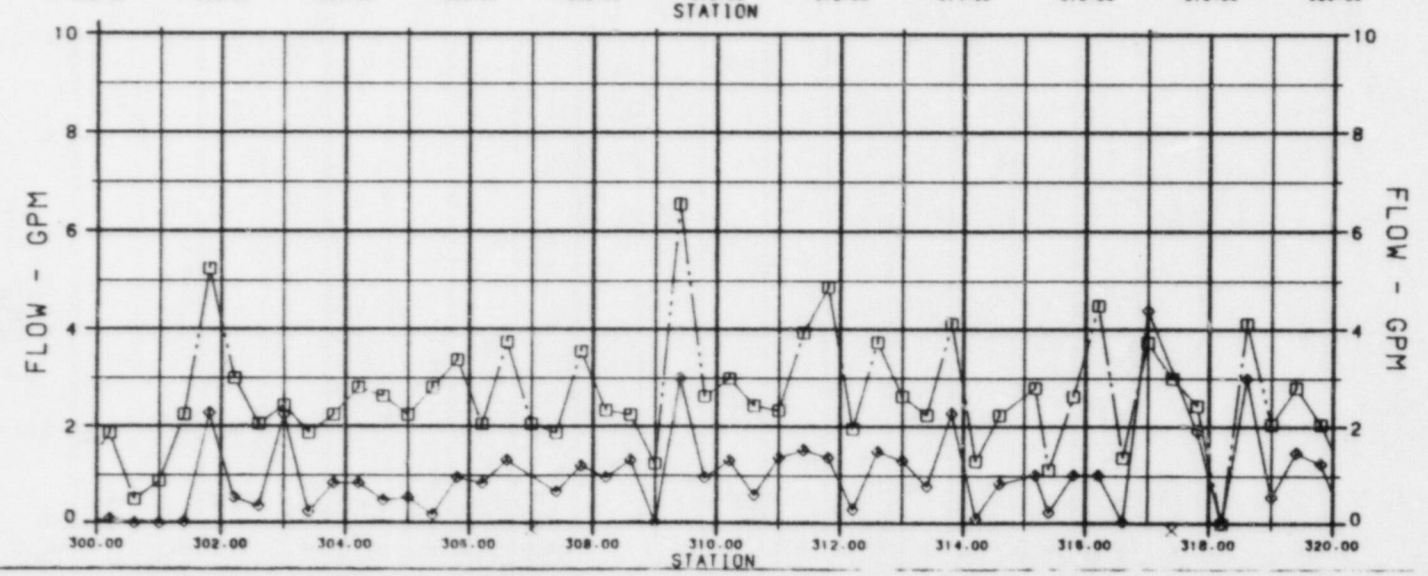
RELIEF WELL
- DISCHARGE ELEV.
- SCREEN
- BOREHOLE BOTTOM

INSTRUMENT TYPE	DATA PACKET NUMBER	DATE
PIEZOMETER	R099	01 SEP 85
RELIEF WELL	R099	01 SEP 85
PIEZOMETER	R117	01 APR 86
RELIEF WELL	R117	01 APR 86
× NO RELIEF WELL DATA		

HOUSTON LIGHTING AND POWER COMPANY	
SOUTH TEXAS PROJECT	INSTRUMENTATION
BECHTEL ENERGY CORPORATION	
MAIN COOLING RESERVOIR INSTRUMENTATION	
HARZA ENGINEERING COMPANY	
CHICAGO, IL	14926 8004

EXHIBIT 114





LEGEND:

STRATIGRAPHY

- GROUND LEVEL
- TOP OF SAND (TS)
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WARNING (SEE OUTPUT)

INSTRUMENT SYMBOLS:

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- SCREEN
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P21

RELIEF WELL
- DISCHARGE ELEV.
- SCREEN
- BOREHOLE BOTTOM

INSTRUMENT TYPE	DATA PACKET NUMBER	DATE
PIEZOMETER	R099	01 SEP 85
RELIEF WELL	R099	01 SEP 85
PIEZOMETER	R117	01 APR 86
RELIEF WELL	R117	01 APR 86
X	NO RELIEF WELL DATA	

HOUSTON LIGHTING AND POWER COMPANY

SOUTH TEXAS PROJECT | INSTRUMENTATION

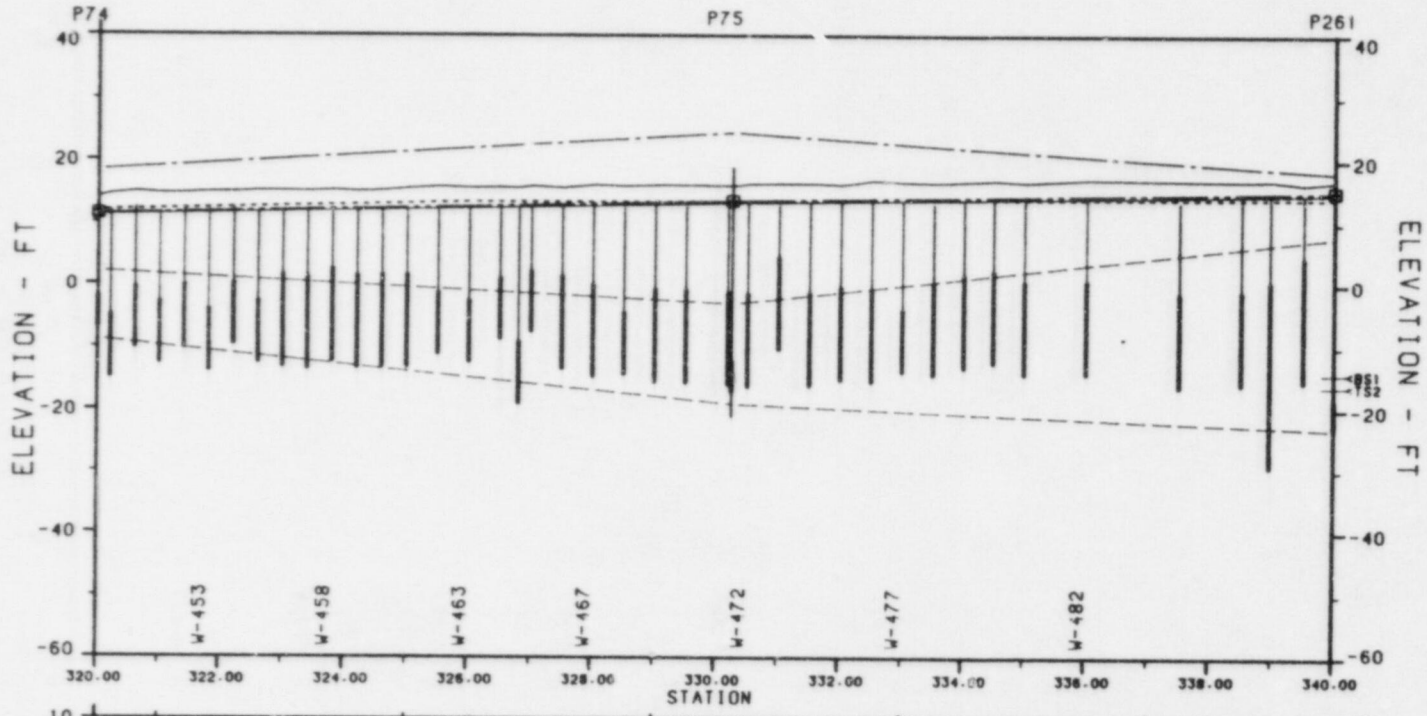
BECHTEL ENERGY CORPORATION

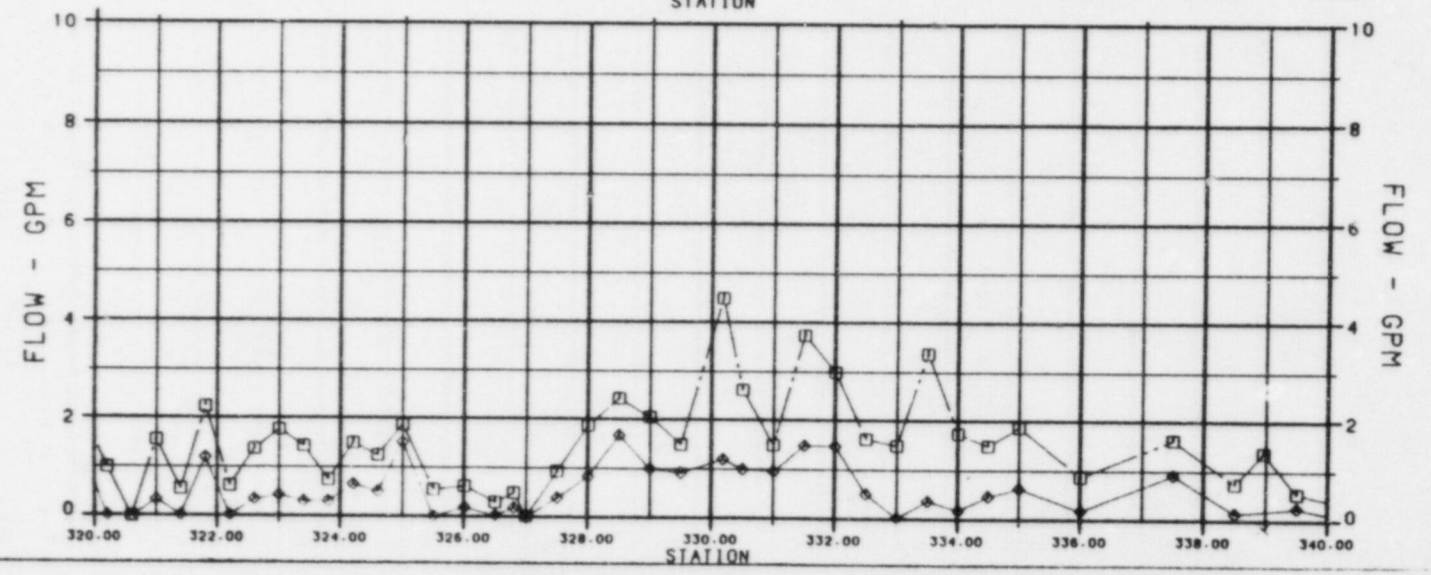
MAIN COOLING RESERVOIR INSTRUMENTATION

HARZA ENGINEERING COMPANY

CHICAGO, IL | 14926 8004

EXHIBIT 115





LEGEND:

STRATIGRAPHY

- GROUND LEVEL
- TOP OF SAND (TS)
- BOTTOM OF SAND (BS)
- DITCH INVERT
- FACTOR OF SAFETY=1.5
- WARNING (SEE OUTPUT)

INSTRUMENT SYMBOLS:

PIEZOMETER
- TOP OF RISER
- SCREEN
- BOREHOLE BOTTOM

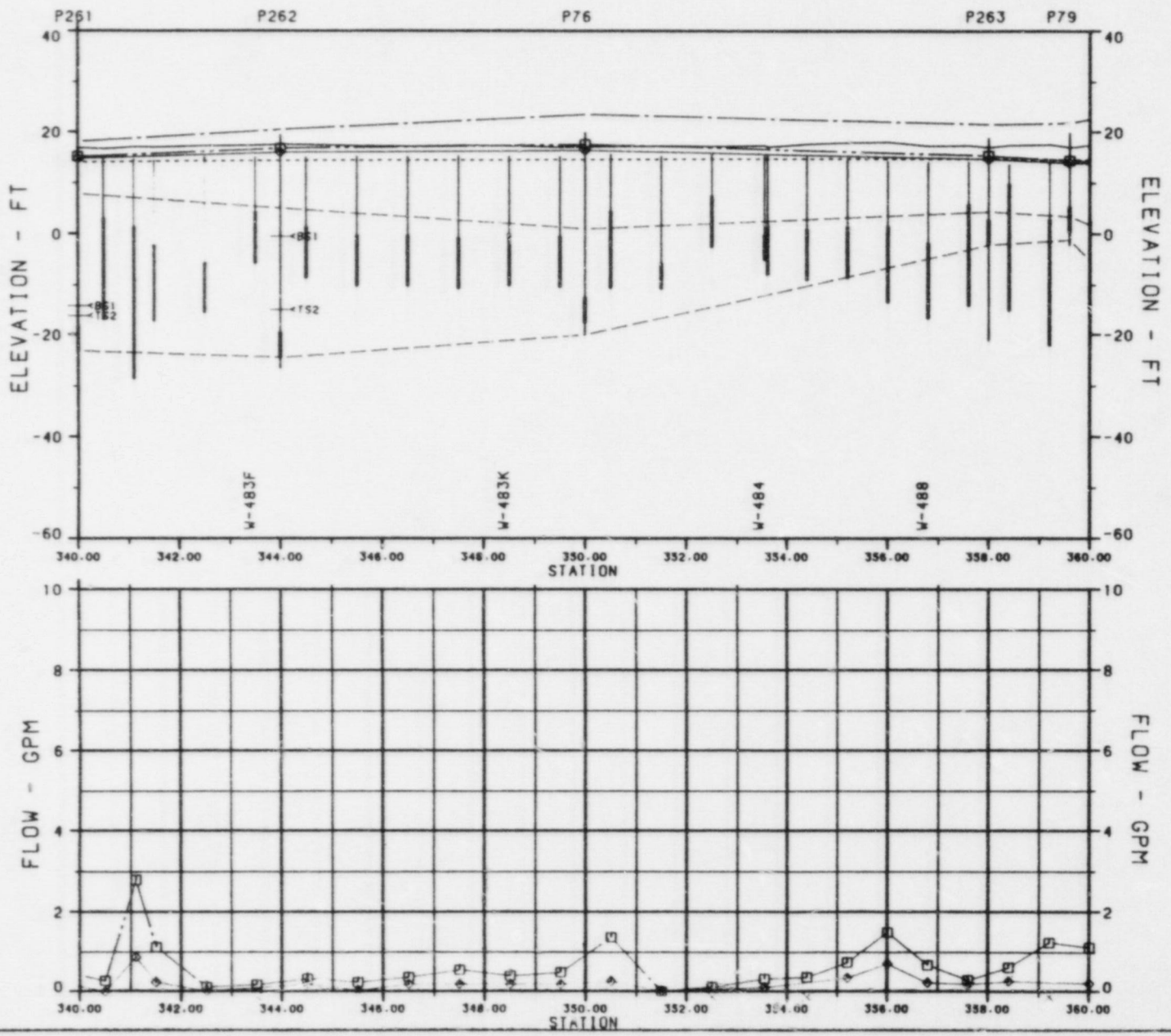
RELIEF WELL
- DISCHARGE ELEV.
- SCREEN
- BOREHOLE BOTTOM

P21

INSTRUMENT TYPE	DATA PACKET NUMBER	DATE
PIEZOMETER	R099	01 SEP 85
RELIEF WELL	R099	01 SEP 85
PIEZOMETER	R117	01 APR 86
RELIEF WELL	R117	01 APR 86
X NO RELIEF WELL DATA		

HOUSTON LIGHTING AND POWER COMPANY
SOUTH TEXAS PROJECT | INSTRUMENTATION
BECHTEL ENERGY CORPORATION
MAIN COOLING RESERVOIR
INSTRUMENTATION
HARZA ENGINEERING COMPANY
CHICAGO, IL | 14926 8004

EXHIBIT 116



LEGEND:

STRATIGRAPHY

- GROUND LEVEL
- TOP OF SAND (TS)
- BOTTOM OF SAND (BS)
- DITCH INVERT
- FACTOR OF SAFETY=1.5

WARNING (SEE OUTPUT)

INSTRUMENT SYMBOLS:

PIEZOMETER
- TOP OF RISER
- SCREEN
- BOREHOLE BOTTOM

P21

RELIEF WELL
- DISCHARGE ELEV.
- SCREEN
- BOREHOLE BOTTOM

INSTRUMENT TYPE	DATA PACKET NUMBER	DATE
PIEZOMETER	R099	01 SEP 85
RELIEF WELL	R099	01 SEP 85
PIEZOMETER	R117	01 APR 86
RELIEF WELL	R117	01 APR 86
X NO RELIEF WELL DATA		

HOUSTON LIGHTING AND POWER COMPANY

SOUTH TEXAS PROJECT | INSTRUMENTATION

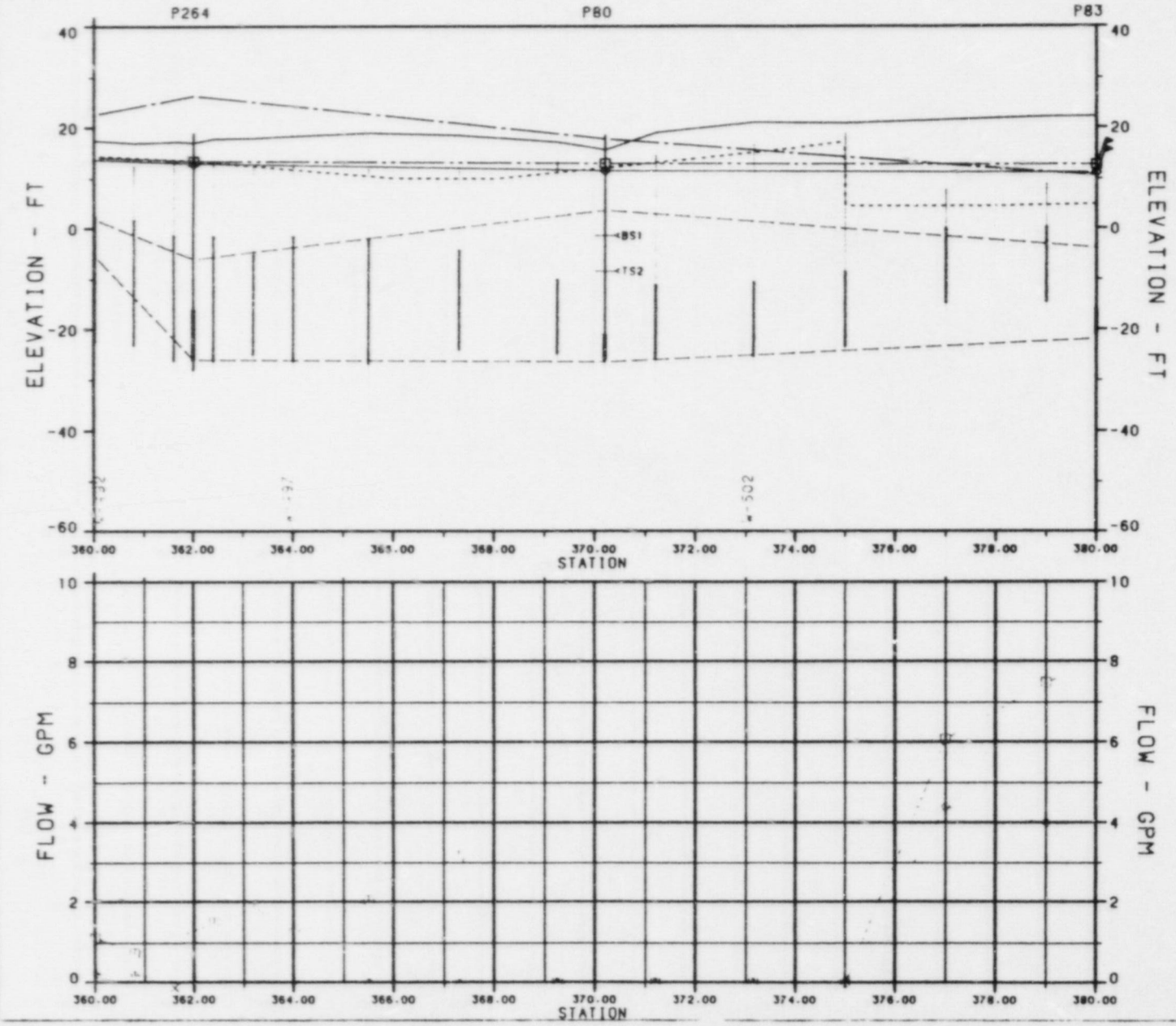
BECHTEL ENERGY CORPORATION

MAIN COOLING RESERVOIR INSTRUMENTATION

MARZA ENGINEERING COMPANY

CHICAGO, IL | 14926 8004

EXHIBIT 117



LEGEND:

STRATIGRAPHY

- GROUND LEVEL
- TOP OF SAND (TS)
- BOTTOM OF SAND (BS)
- DITCH INVERT
- FACTOR OF SAFETY=1.5

WARNING (SEE OUTPUT)

INSTRUMENT SYMBOLS:

PIEZOMETER — TOP OF RISER, SCREEN, BOREHOLE BOTTOM

RELIEF WELL — DISCHARGE PIPE, SCREEN, BOREHOLE BOTTOM

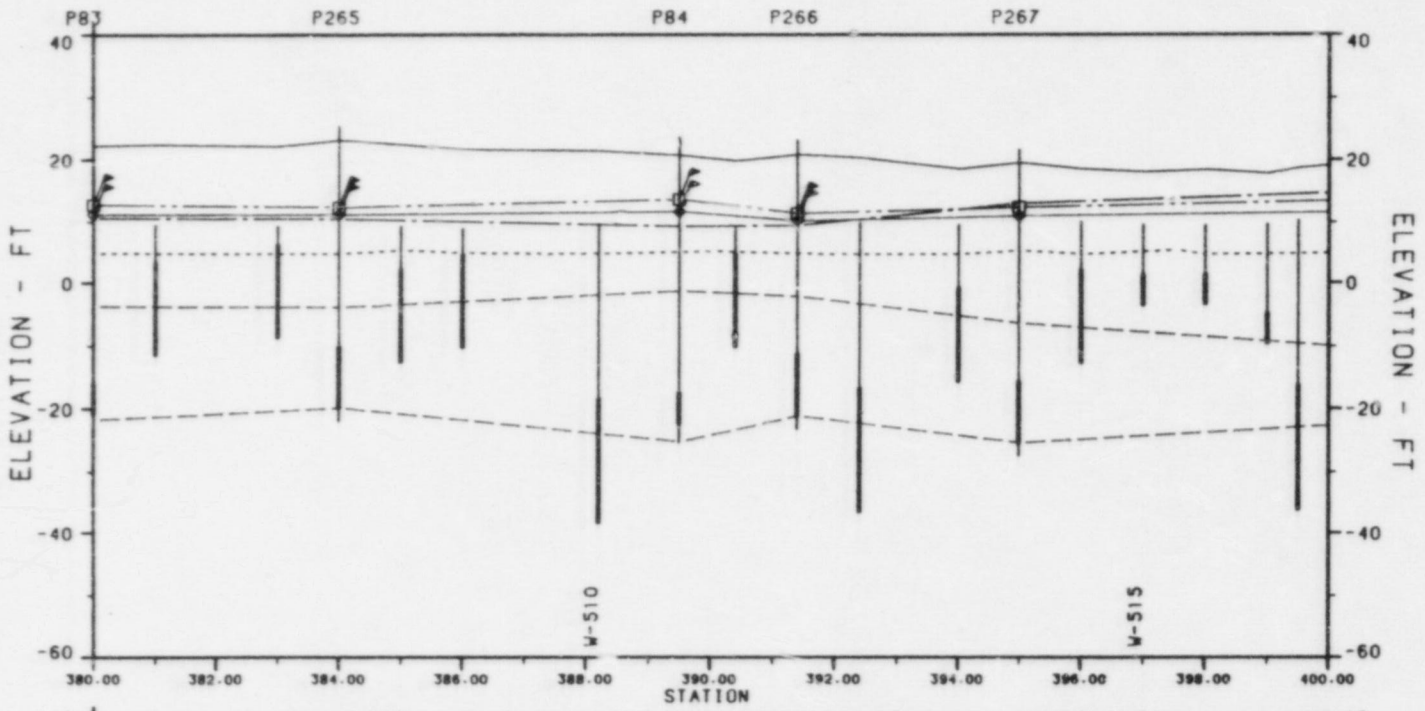
P21

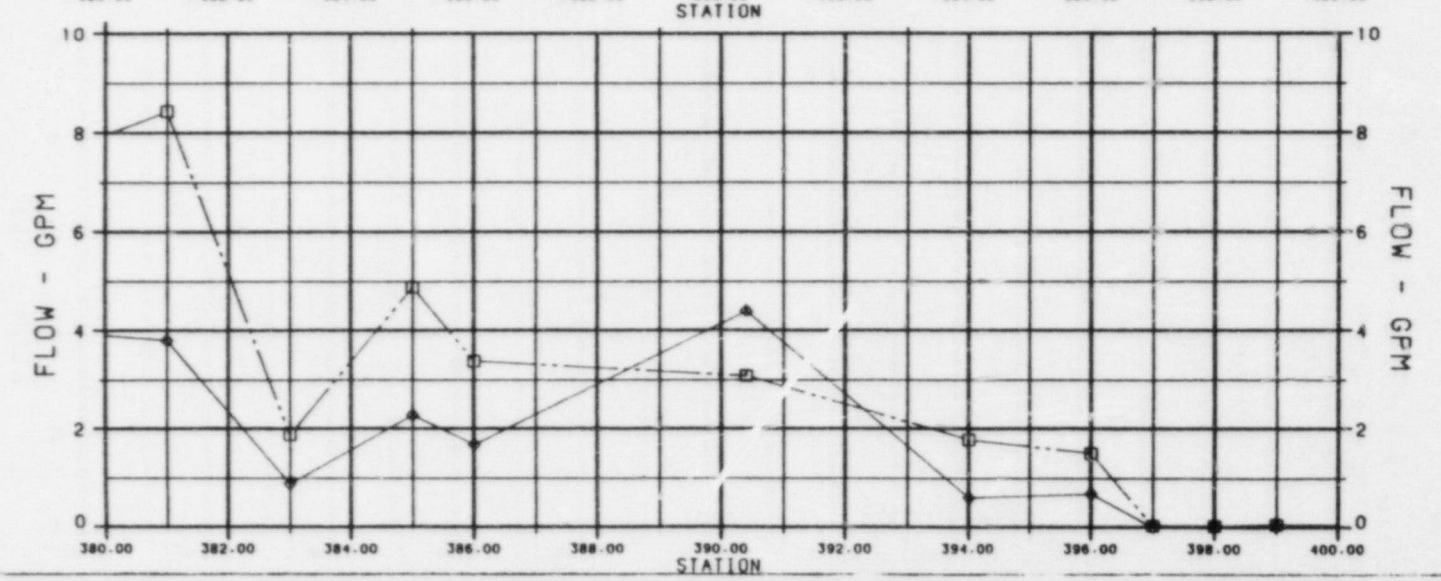
INSTRUMENT TYPE	DATA PACKET NUMBER	DATE
PIEZOMETER	R099	01 SEP 85
RELIEF WELL	R099	01 SEP 85
PIEZOMETER	R117	01 APR 86
RELIEF WELL	R117	01 APR 86

NO RELIEF WELL DATA

HOUSTON LIGHTING AND POWER COMPANY	
SOUTH TEXAS PROJECT	INSTRUMENTATION
BECHTEL ENERGY CORPORATION	
MAIN COOLING RESERVOIR INSTRUMENTATION	
HARZA ENGINEERING COMPANY	
CHICAGO, IL	14926 8004

EXHIBIT 118





LEGEND:

STRATIGRAPHY

- GROUND LEVEL
- TOP OF SAND (TS)
- BOTTOM OF SAND (BS)
- DITCH INVERT
- FACTOR OF SAFETY=1.5

WARNING (SEE OUTPUT)

INSTRUMENT SYMBOLS:

PIEZOMETER
- TOP OF RISER
- SCREEN
- BOREHOLE BOTTOM

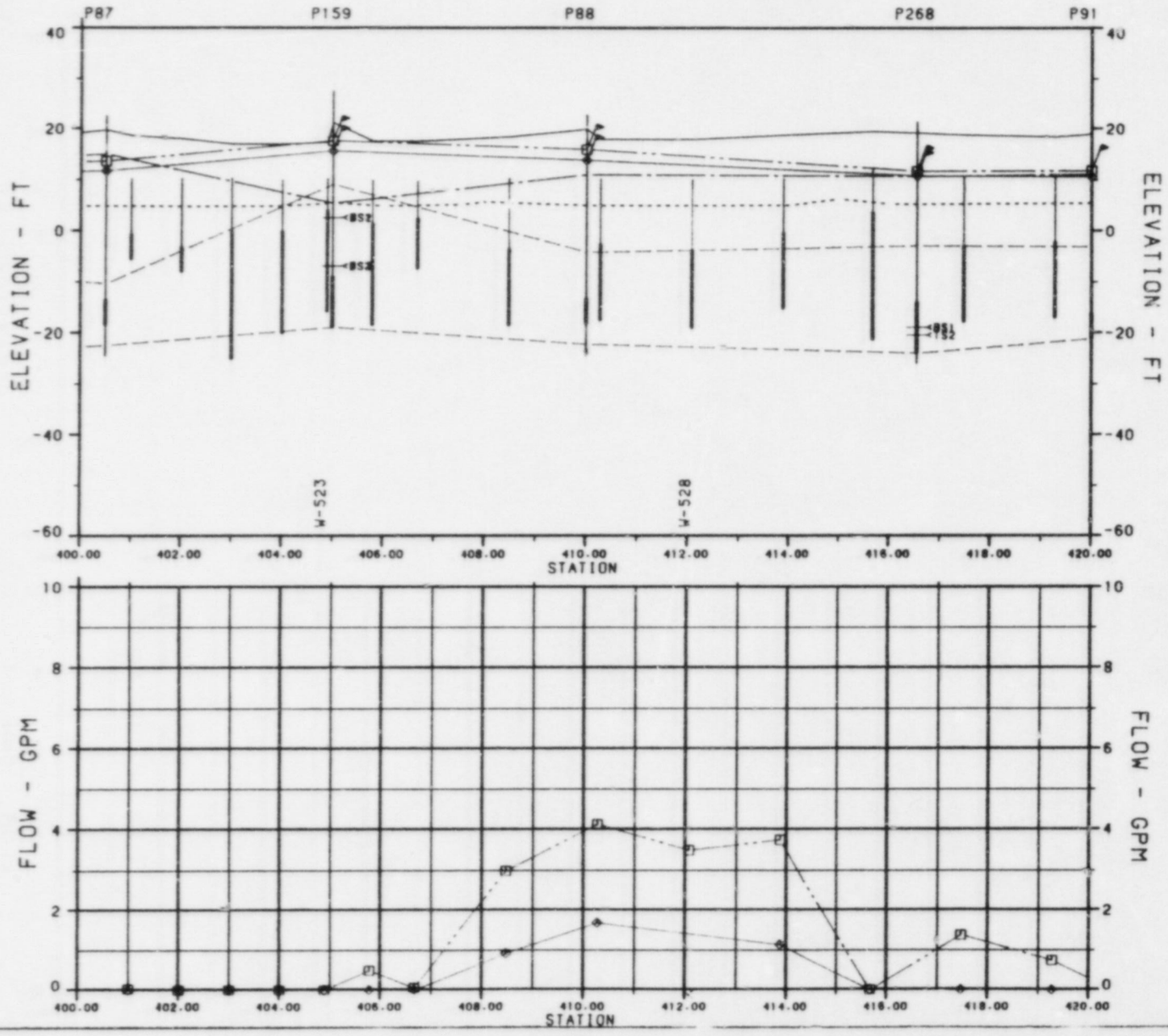
P21

RELIEF WELL
- DISCHARGE ELEV.
- SCREEN
- BOREHOLE BOTTOM

INSTRUMENT TYPE	DATA PACKET NUMBER	DATE
PIEZOMETER	R099	01 SEP 85
RELIEF WELL	R099	01 SEP 85
PIEZOMETER	R117	01 APR 86
RELIEF WELL	R117	01 APR 86
X NO RELIEF WELL DATA		

HOUSTON LIGHTING AND POWER COMPANY	
SOUTH TEXAS PROJECT	INSTRUMENTATION
BECHTEL ENERGY CORPORATION MAIN COOLING RESERVOIR INSTRUMENTATION	
HARZA ENGINEERING COMPANY	
CHICAGO, IL	14926 8004

EXHIBIT 119



LEGEND:

STRATIGRAPHY

- GROUND LEVEL
- TOP OF SAND (TS)
- BOTTOM OF SAND (BS)
- DITCH INVERT
- FACTOR OF SAFETY=1.5
- WARNING (SEE OUTPUT)

INSTRUMENT SYMBOLS:

PIEZOMETER: TOP OF RISER, SCREEN, BOREHOLE BOTTOM

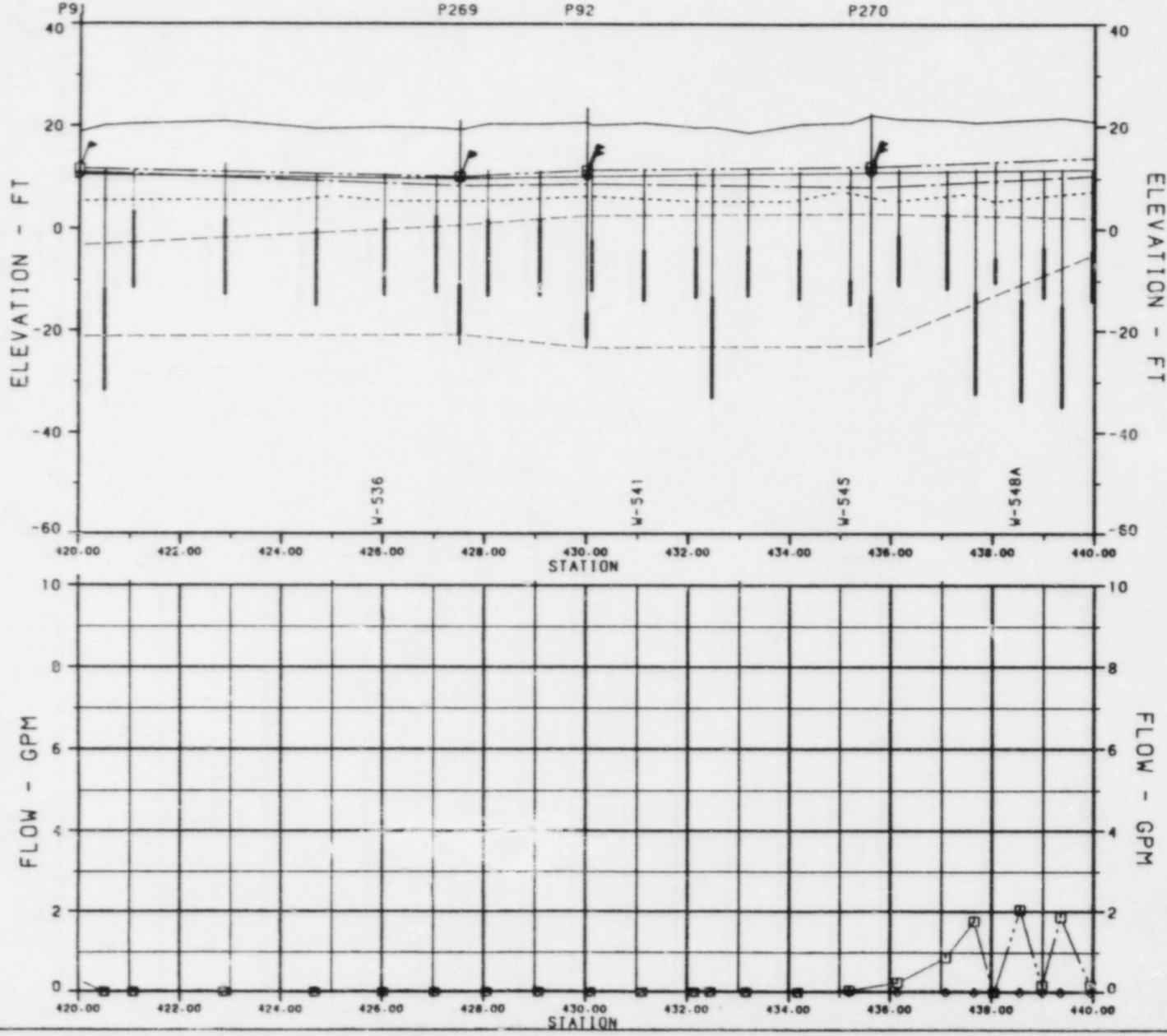
RELIEF WELL: DISCHARGE ELEV., SCREEN, BOREHOLE BOTTOM

P21

INSTRUMENT TYPE	DATA PACKET NUMBER	DATE
PIEZOMETER	R099	01 SEP 85
RELIEF WELL	R099	01 SEP 85
PIEZOMETER	R117	01 APR 86
RELIEF WELL	R117	01 APR 86
X	NO RELIEF WELL DATA	

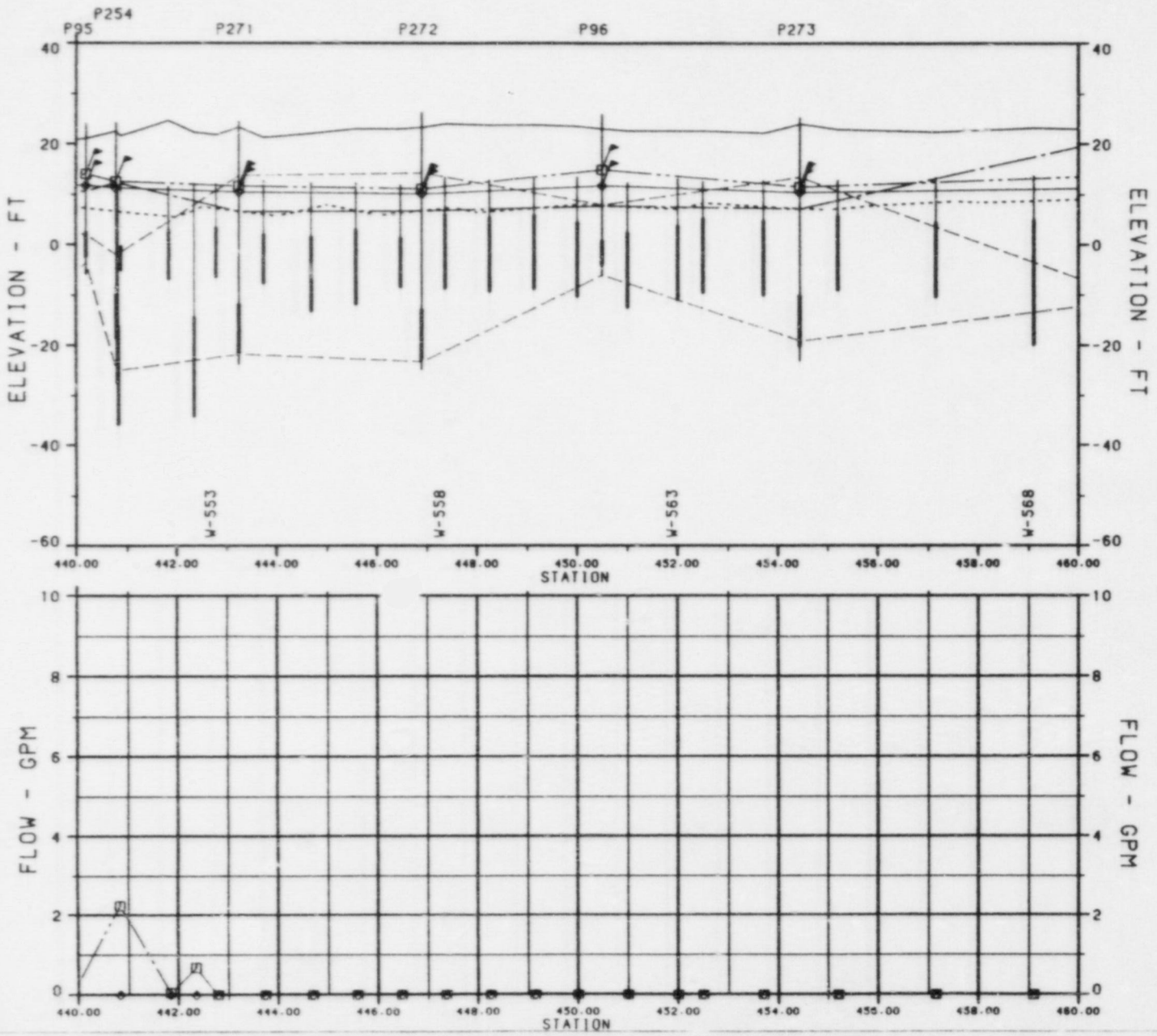
HOUSTON LIGHTING AND POWER COMPANY	
SOUTH TEXAS PROJECT	INSTRUMENTATION
BECHTEL ENERGY CORPORATION	
MAIN COOLING RESERVOIR INSTRUMENTATION	
HARZA ENGINEERING COMPANY	
CHICAGO, IL	14926 B004

EXHIBIT 120



HOUSTON LIGHTING AND POWER COMPANY	
SOUTH TEXAS PROJECT	INSTRUMENTATION
BECHTEL ENERGY CORPORATION	
MAIN COOLING RESERVOIR INSTRUMENTATION	
HARZA ENGINEERING COMPANY	
CHICAGO, IL	14926 B004

EXHIBIT 121



LEGEND:

STRATIGRAPHY

- GROUND LEVEL
- TOP OF SAND (TS)
- BOTTOM OF SAND (BS)
- DITCH INVERT
- FACTOR OF SAFETY=1.5

WARNING (SEE OUTPUT)

INSTRUMENT SYMBOLS:

PIEZOMETER

- TOP OF RISER
- SCREEN
- BOREHOLE BOTTOM

P21

RELIEF WELL

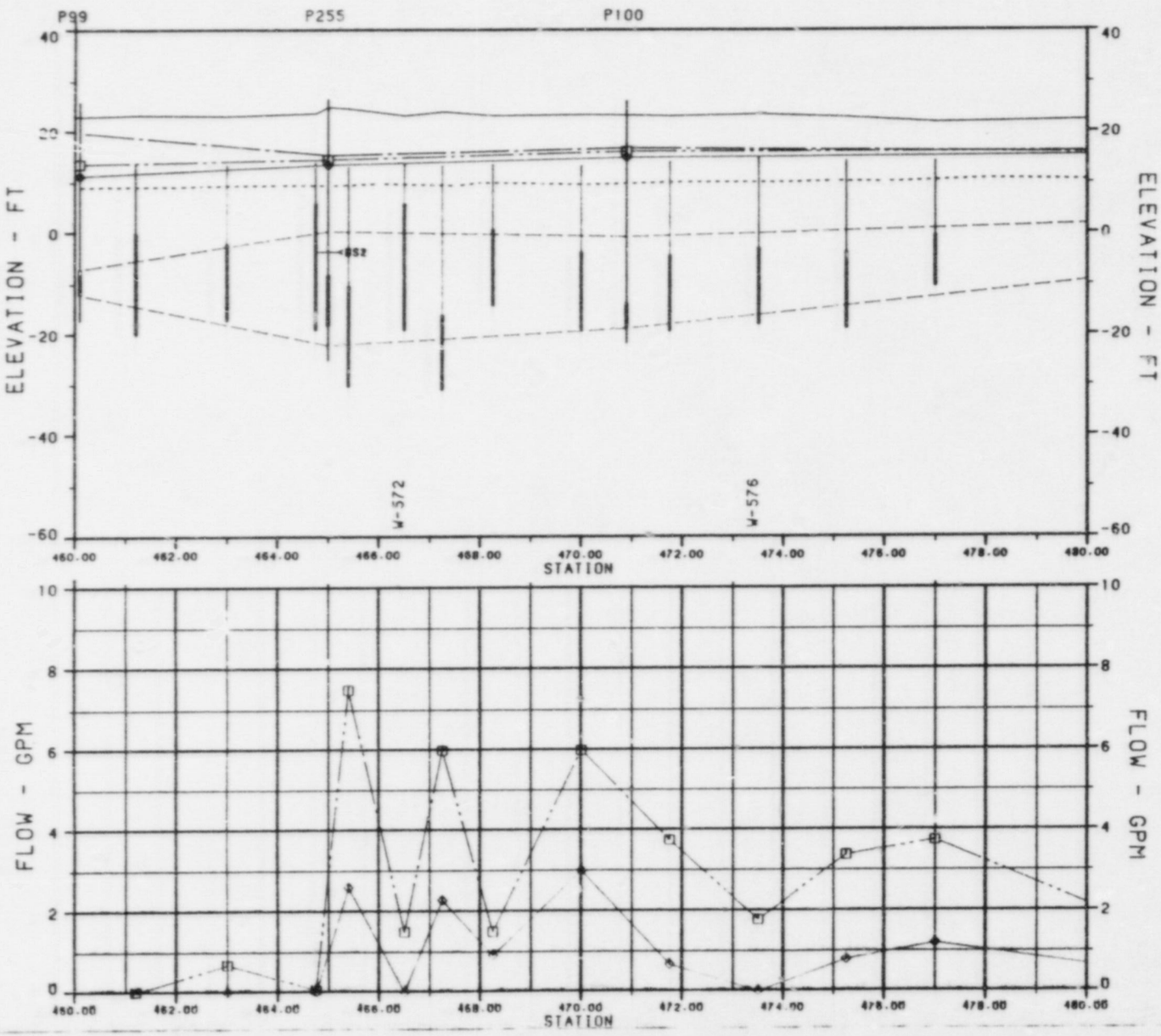
- DISCHARGE ELEV.
- SCREEN
- BOREHOLE BOTTOM

W

INSTRUMENT TYPE	DATA PACKET NUMBER	DATE
PIEZOMETER	R099	01 SEP 85
RELIEF WELL	R099	01 SEP 85
PIEZOMETER	R117	01 APR 86
RELIEF WELL	R117	01 APR 86
X NO RELIEF WELL DATA		

HOUSTON LIGHTING AND POWER COMPANY	
SOUTH TEXAS PROJECT	INSTRUMENTATION
BECHTEL ENERGY CORPORATION	
MAIN COOLING RESERVOIR INSTRUMENTATION	
HARZA ENGINEERING COMPANY	
CHICAGO, IL	14926 8004

EXHIBIT 122



LEGEND:

STRATIGRAPHY

- GROUND LEVEL
- TOP OF SAND (TS)
- BOTTOM OF SAND (BS)
- DITCH INVERT
- FACTOR OF SAFETY=1.5
- WARNING (SEE OUTPUT)

INSTRUMENT SYMBOLS:

PIEZOMETER
- TOP OF RISER
- SCREEN
- BOREHOLE BOTTOM

P21

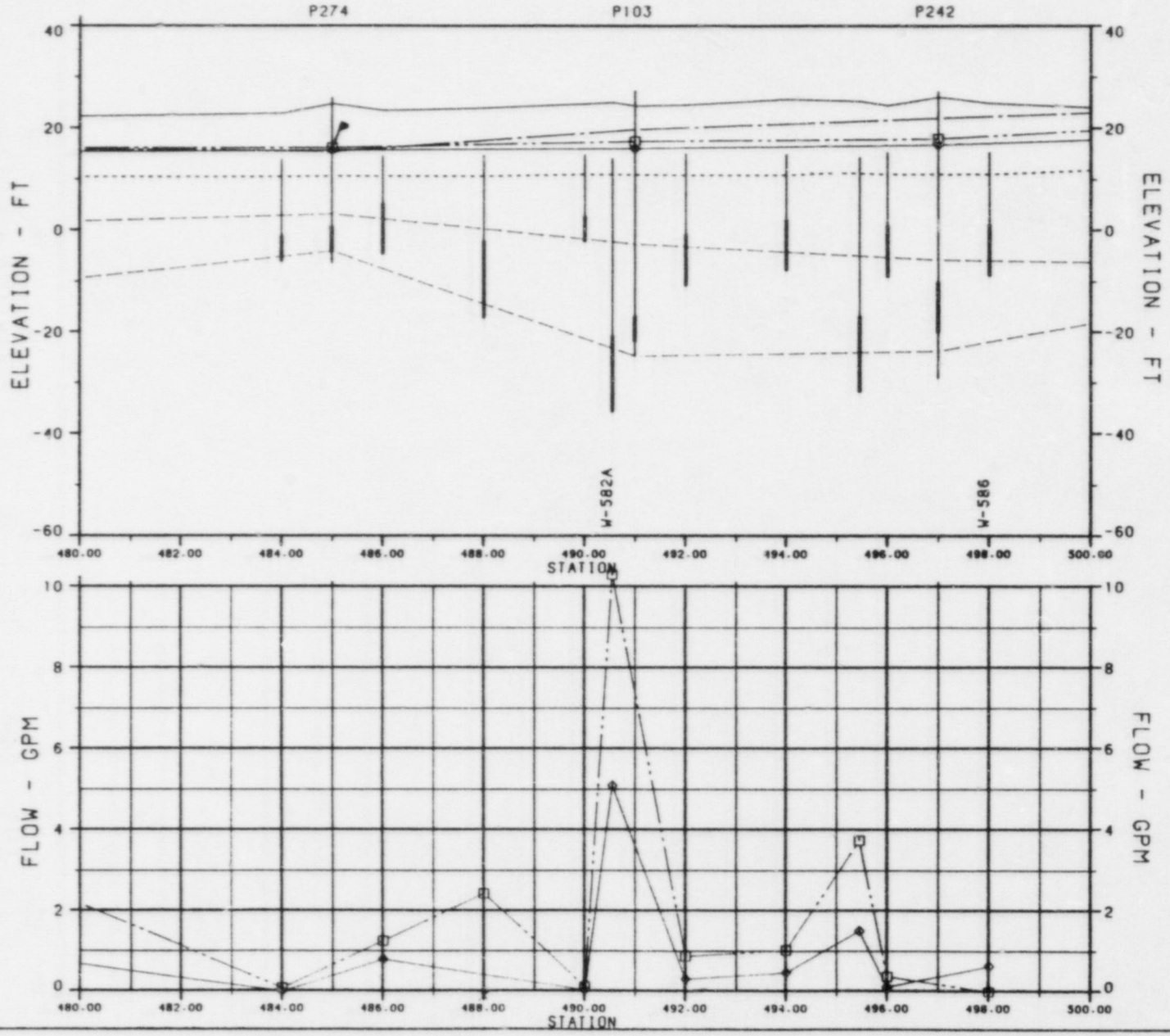
RELIEF WELL
- DISCHARGE ELEV.
- SCREEN
- BOREHOLE BOTTOM

W-1

INSTRUMENT TYPE	DATA PACKET NUMBER	DATE
PIEZOMETER	R099	01 SEP 85
RELIEF WELL	R099	01 SEP 85
PIEZOMETER	R117	01 APR 86
RELIEF WELL	R117	01 APR 86
X	NO RELIEF WELL DATA	

HOUSTON LIGHTING AND POWER COMPANY	
SOUTH TEXAS PROJECT	INSTRUMENTATION
BECHTEL ENERGY CORPORATION	
MAIN COOLING RESERVOIR INSTRUMENTATION	
HARZA ENGINEERING COMPANY	
CHICAGO, IL	14928 B004

EXHIBIT 123



LEGEND:

STRATIGRAPHY

- GROUND LEVEL
- TOP OF SAND (TS)
- BOTTOM OF SAND (BS)
- DITCH INVERT
- FACTOR OF SAFETY=1.5

WARNING (SEE OUTPUT)

INSTRUMENT SYMBOLS:

PIEZOMETER
- TOP OF RISER
- SCREEN
- BOREHOLE BOTTOM

P21

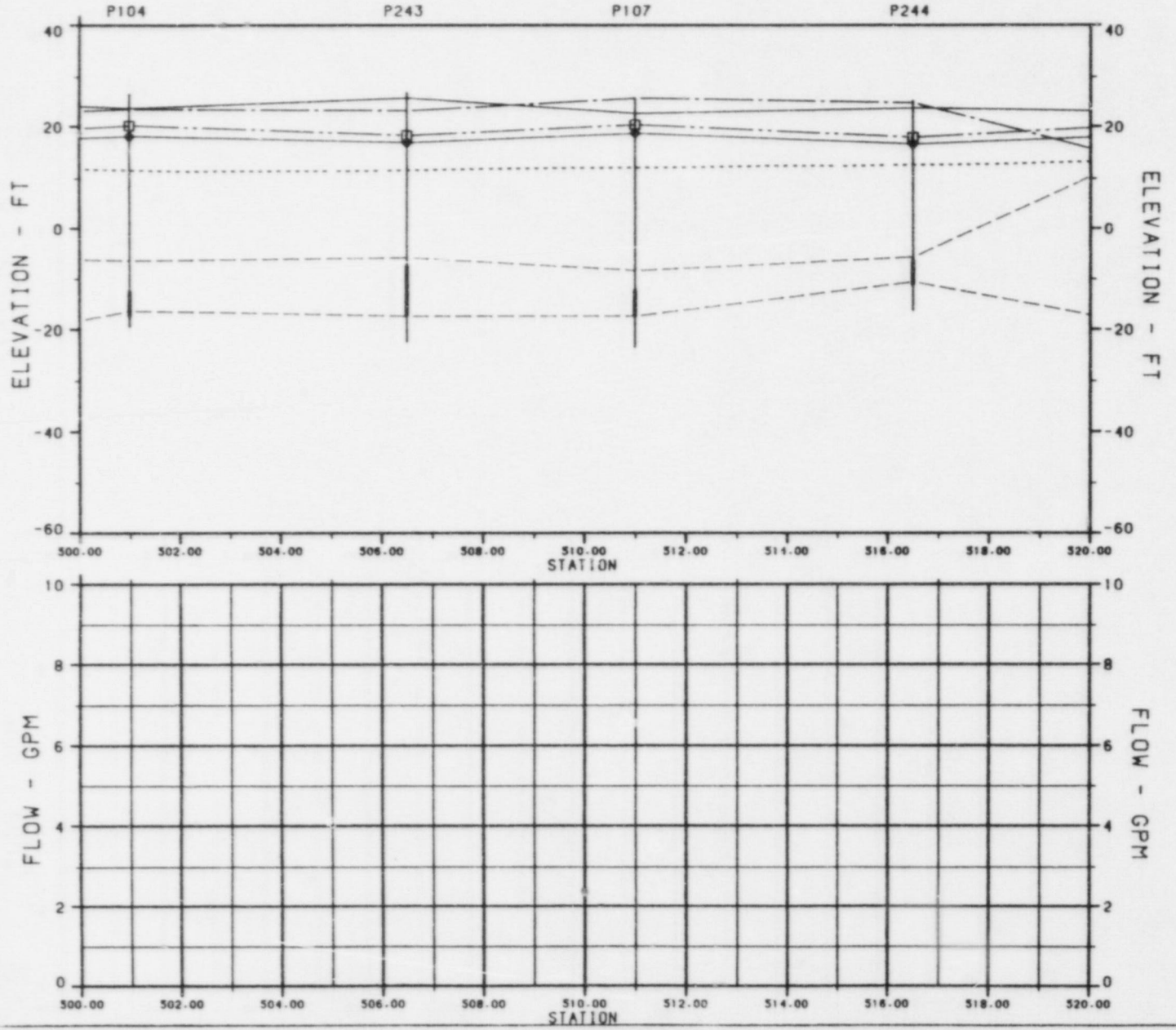
RELIEF WELL
- DISCHARGE ELEV.
- SCREEN
- BOREHOLE BOTTOM

R1

INSTRUMENT TYPE	DATA PACKET NUMBER	DATE
PIEZOMETER	R099	01 SEP 85
RELIEF WELL	R099	01 SEP 85
PIEZOMETER	R117	01 APR 86
RELIEF WELL	R117	01 APR 86
X	NO RELIEF WELL DATA	

HOUSTON LIGHTING AND POWER COMPANY	
SOUTH TEXAS PROJECT	INSTRUMENTATION
BECHTEL ENERGY CORPORATION	
MAIN COOLING RESERVOIR INSTRUMENTATION	
HARZA ENGINEERING COMPANY	
CHICAGO, IL	14926 B004

EXHIBIT 124



LEGEND:

STRATIGRAPHY

- GROUND LEVEL
- TOP OF SAND (TS)
- BOTTOM OF SAND (BS)
- DITCH INVERT
- FACTOR OF SAFETY=1.5
- WARNING (SEE OUTPUT)

INSTRUMENT SYMBOLS:

PIEZOMETER: TOP OF RISER, SCREEN, BOREHOLE BOTTOM

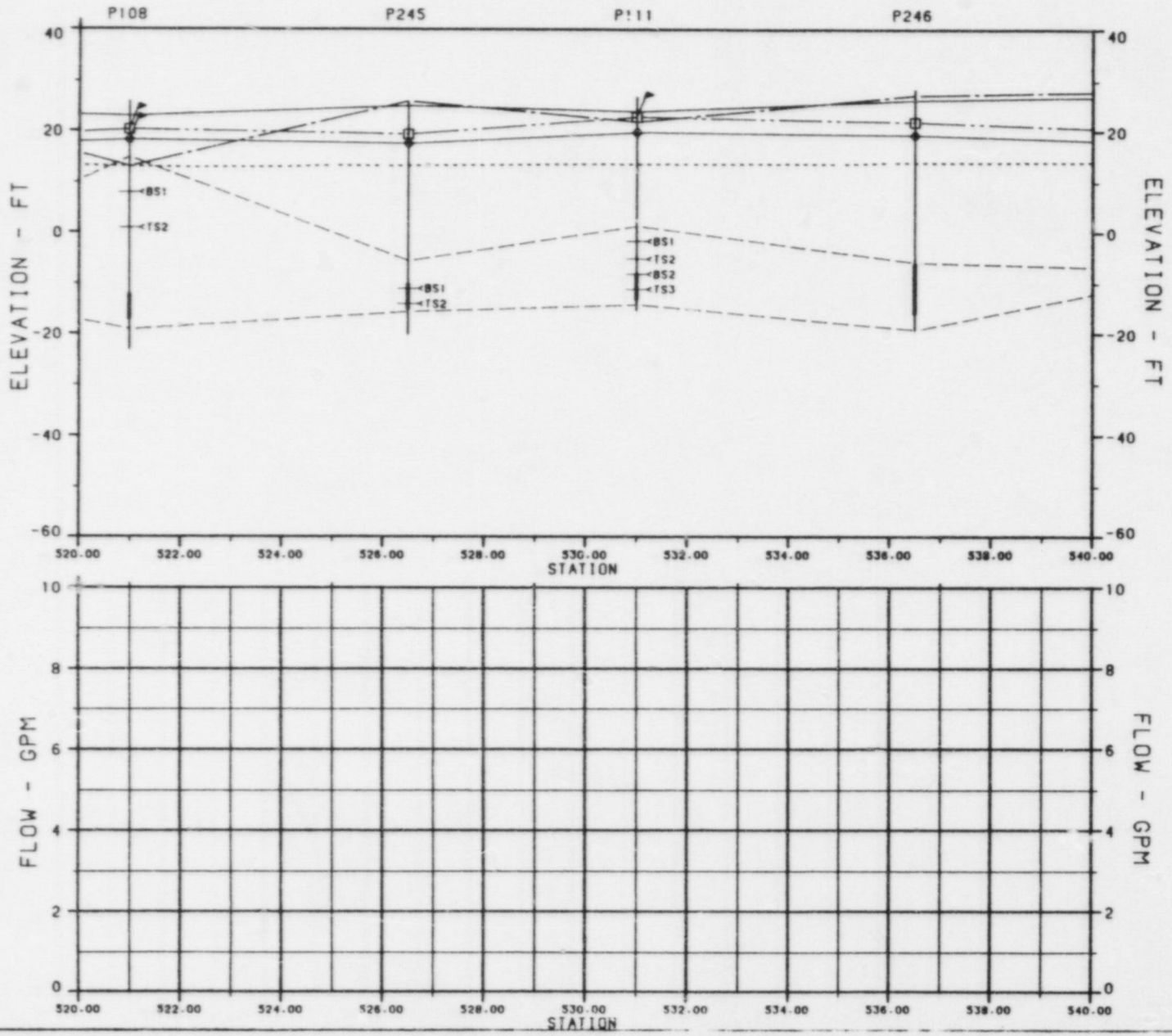
RELIEF WELL: DISCHARGE ELEV., SCREEN, BOREHOLE BOTTOM

P21

INSTRUMENT TYPE	DATA PACKET NUMBER	DATE
PIEZOMETER	R099	01 SEP 85
RELIEF WELL	R099	01 SEP 85
PIEZOMETER	R117	01 APR 86
RELIEF WELL	R117	01 APR 86
X	NO RELIEF WELL DAT.	

HOUSTON LIGHTING AND POWER COMPANY	
SOUTH TEXAS PROJECT	INSTRUMENTATION
BECHTEL ENERGY CORPORATION	
MAIN COOLING RESERVOIR INSTRUMENTATION	
HARZA ENGINEERING COMPANY	
CHICAGO, IL	14926 8004

EXHIBIT 125



LEGEND:

STRATIGRAPHY

- GROUND LEVEL
- TOP OF SAND (TS)
- BOTTOM OF SAND (BS)
- DITCH INVERT
- FACTOR OF SAFETY=1.5
- WARNING (SEE OUTPUT)

INSTRUMENT SYMBOLS:

PIEZOMETER
- TOP OF RISER
- SCREEN
- BOREHOLE BOTTOM

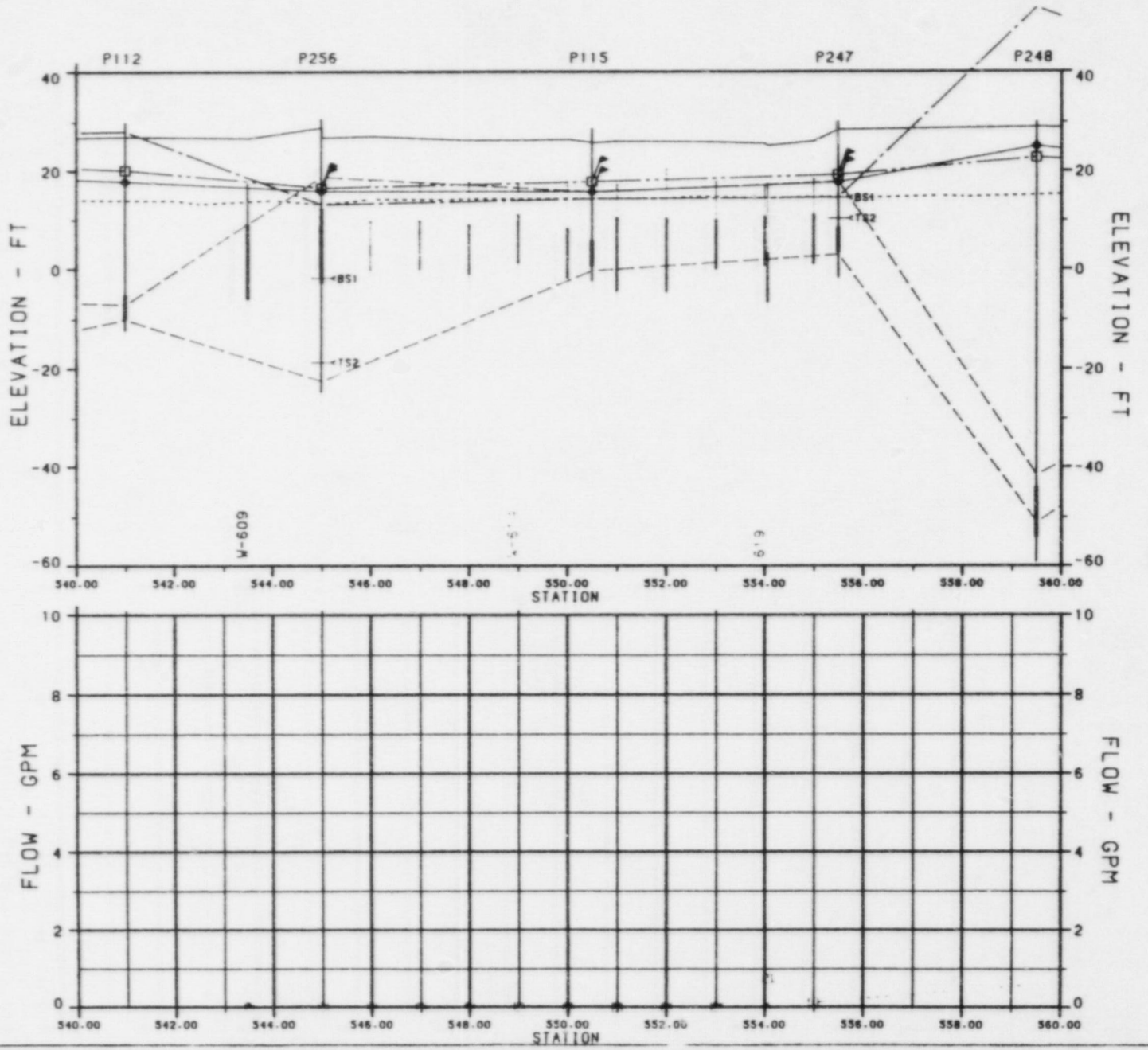
P21

RELIEF WELL
- DISCHARGE ELEV.
- SCREEN
- BOREHOLE BOTTOM

INSTRUMENT TYPE	DATA PACKET NUMBER	DATE
PIEZOMETER	R099	01 SEP 85
RELIEF WELL	R099	01 SEP 85
PIEZOMETER	R117	01 APR 86
RELIEF WELL	R117	01 APR 86
× NO RELIEF WELL DATA		

HOUSTON LIGHTING AND POWER COMPANY	
SOUTH TEXAS PROJECT	INSTRUMENTATION
BECHTEL ENERGY CORPORATION	
MAIN COOLING RESERVOIR INSTRUMENTATION	
HARZA ENGINEERING COMPANY	
CHICAGO, IL	14926 B004

EXHIBIT 126



LEGEND:

STRATIGRAPHY

- GROUND LEVEL
- TOP OF SAND (TS)
- BOTTOM OF SAND (BS)
- DITCH INVERT
- FACTOR OF SAFETY=1.5

WARNING (SEE OUTPUT)

INSTRUMENT SYMBOLS:

PIEZOMETER
- TOP OF RISER
- SCREEN
- BOREHOLE BOTTOM

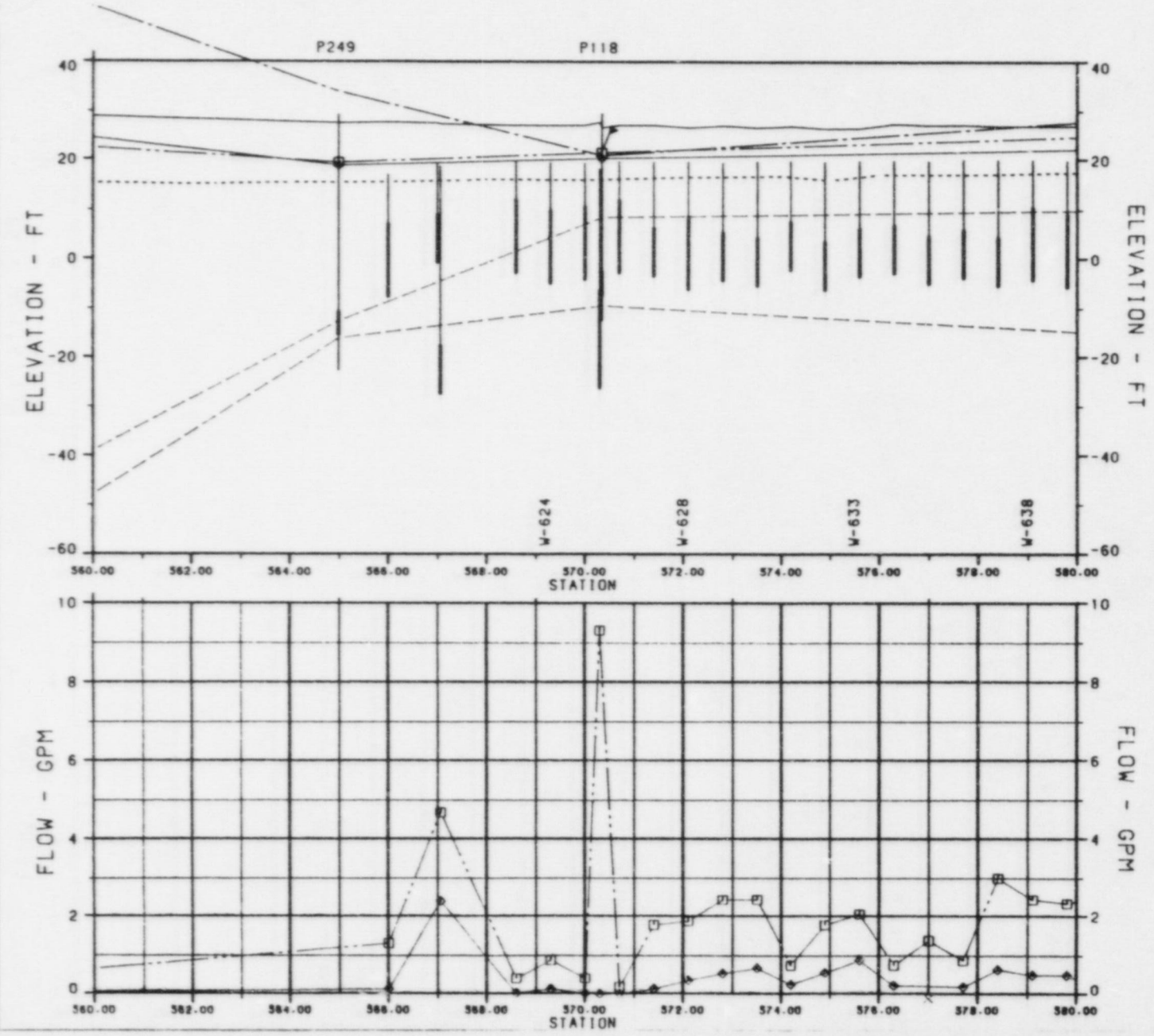
RELIEF WELL
- DISCHARGE ELEV.
- SCREEN
- BOREHOLE BOTTOM

P21

INSTRUMENT TYPE	DATA PACKET NUMBER	DATE
PIEZOMETER	R099	01 SEP 85
RELIEF WELL	R099	01 SEP 85
PIEZOMETER	R117	01 APR 86
RELIEF WELL	R117	01 APR 86
X NO RELIEF WELL DATA		

HOUSTON LIGHTING AND POWER COMPANY	
SOUTH TEXAS PROJECT	INSTRUMENTATION
BECHTEL ENERGY CORPORATION MAIN COOLING RESERVOIR INSTRUMENTATION	
HARZA ENGINEERING COMPANY	
CHICAGO, IL	14926 8004

EXHIBIT 127



LEGEND:

STRATIGRAPHY

- GROUND LEVEL
- TOP OF SAND (TS)
- BOTTOM OF SAND (BS)
- DITCH INVERT
- FACTOR OF SAFETY=1.5
- WARNING (SEE OUTPUT)

INSTRUMENT SYMBOLS:

PIEZOMETER
- TOP OF RISER
- SCREEN
- BOREHOLE BOTTOM

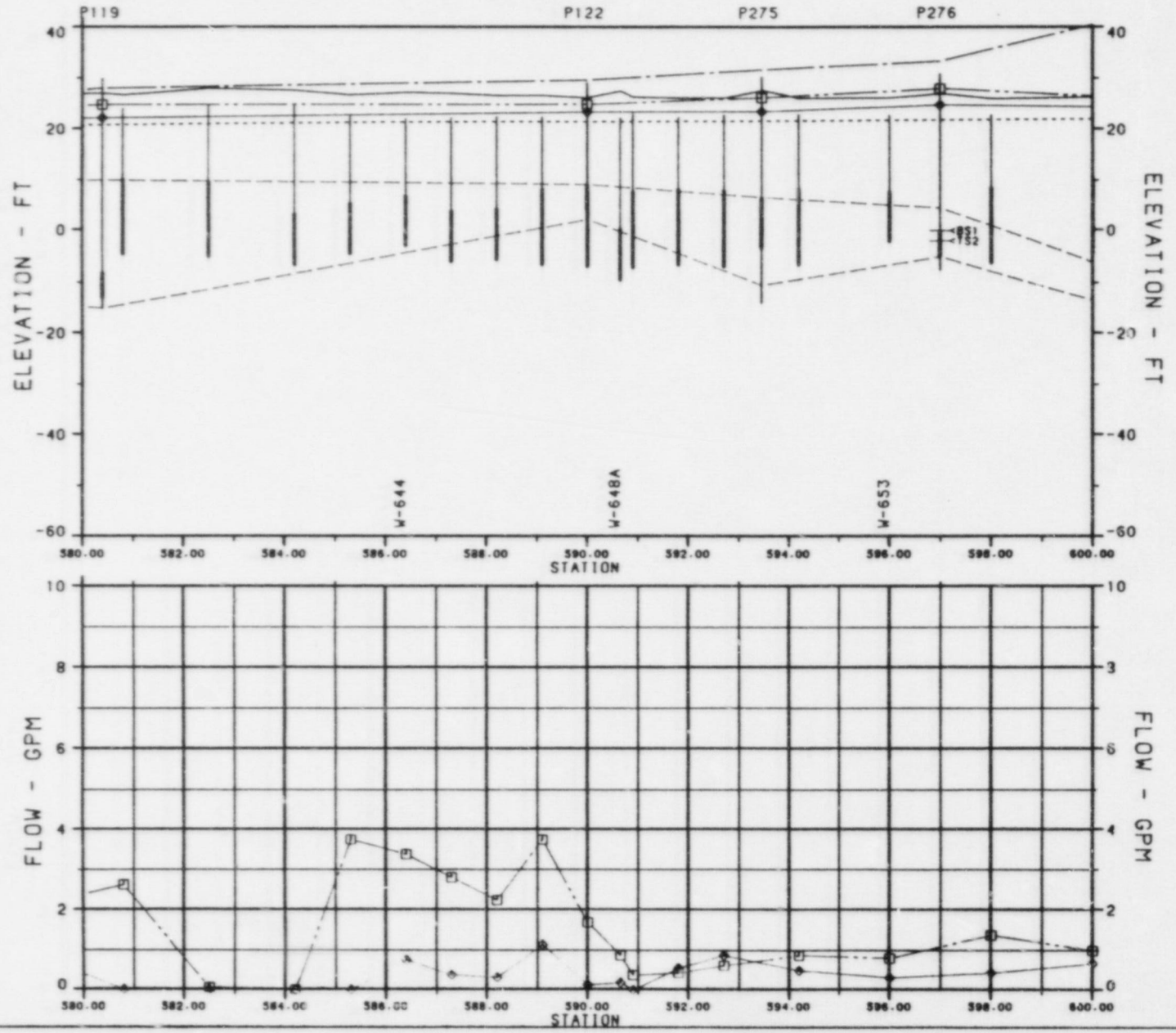
P21

RELIEF WELL
- DISCHARGE ELEV.
- SCREEN
- BOREHOLE BOTTOM

INSTRUMENT TYPE	DATA PACKET NUMBER	DATE
PIEZOMETER	R099	01 SEP 85
RELIEF WELL	R099	01 SEP 85
PIEZOMETER	R117	01 APR 86
RELIEF WELL	R117	01 APR 86
X	NO RELIEF WELL DATA	

HOUSTON LIGHTING AND POWER COMPANY	
SOUTH TEXAS PROJECT	INSTRUMENTATION
BECHTEL ENERGY CORPORATION	
MAIN COOLING RESERVOIR INSTRUMENTATION	
HARZA ENGINEERING COMPANY	
CHICAGO, IL	14926 8004

EXHIBIT 128



LEGEND:

STRATIGRAPHY

- GROUND LEVEL
- TOP OF SAND (TS)
- BOTTOM OF SAND (BS)
- DITCH INVERT
- FACTOR OF SAFETY=1.5
- WARNING (SEE OUTPUT)

INSTRUMENT SYMBOLS:

PIEZOMETER: TOP OF RISER, SCREEN, BOREHOLE BOTTOM

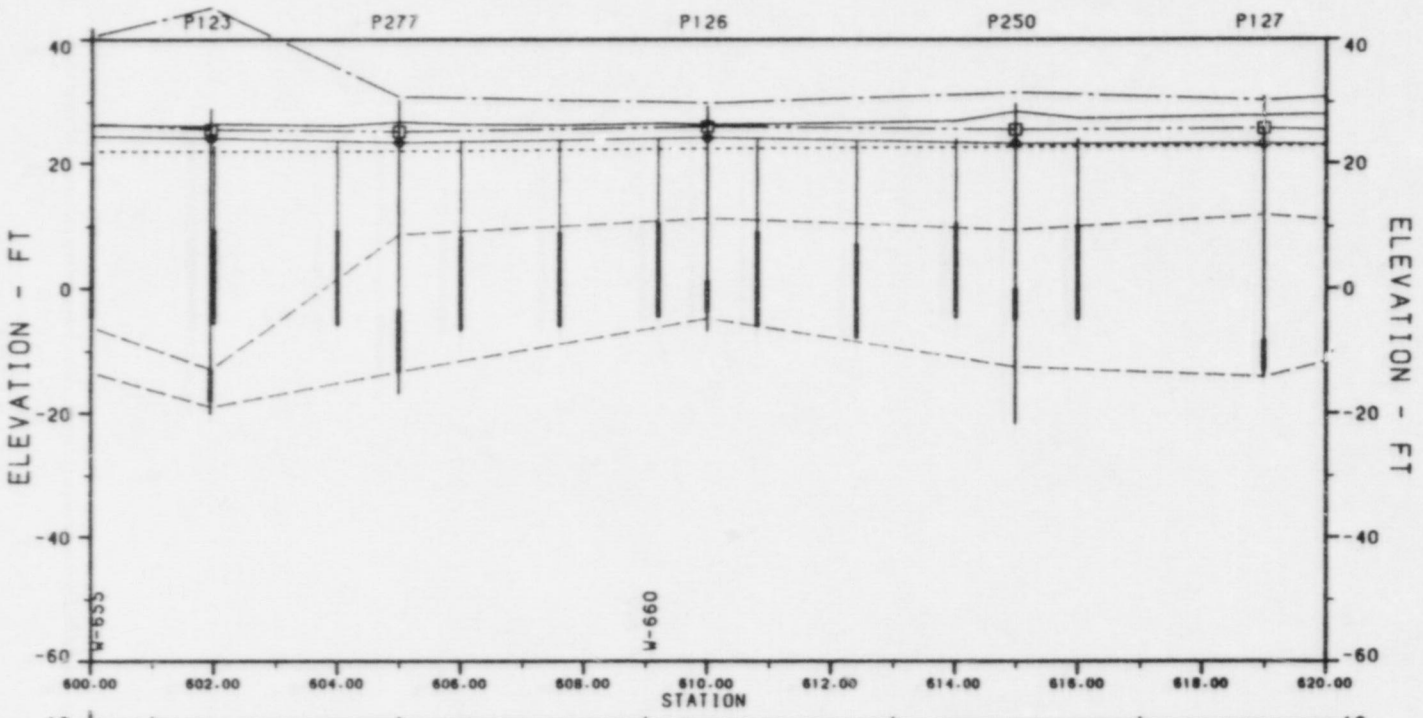
RELIEF WELL: DISCHARGE ELEV., SCREEN, BOREHOLE BOTTOM

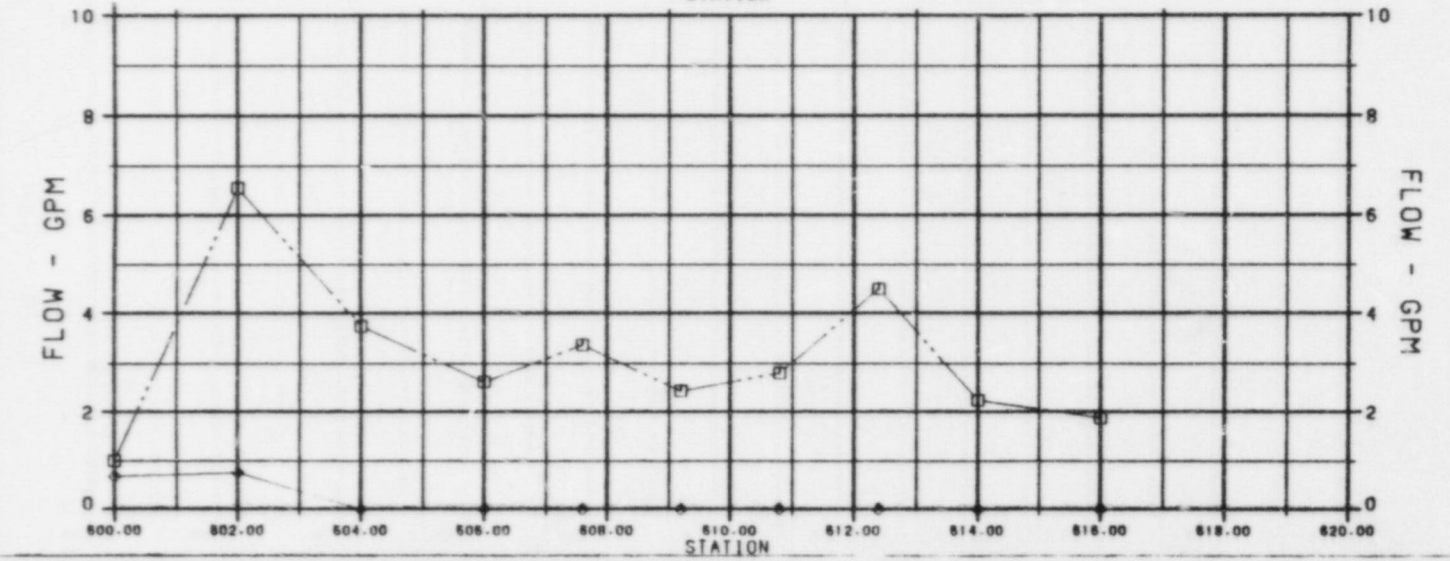
P21

INSTRUMENT TYPE	DATA PACKET NUMBER	DATE
PIEZOMETER	R099	01 SEP 85
RELIEF WELL	R099	01 SEP 85
PIEZOMETER	R117	01 APR 86
RELIEF WELL	R117	01 APR 86
X	NO RELIEF WELL DATA	

HOUSTON LIGHTING AND POWER COMPANY	
SOUTH TEXAS PROJECT	INSTRUMENTATION
BECHTEL ENERGY CORPORATION	
MAIN COOLING RESERVOIR INSTRUMENTATION	
HARZA ENGINEERING COMPANY	
CHICAGO, IL	14926 8004

EXHIBIT 129





LEGEND:

STRATIGRAPHY

- GROUND LEVEL
- TOP OF SAND (TS)
- BOTTOM OF SAND (BS)
- DITCH INVERT
- FACTOR OF SAFETY=1.5

WARNING (SEE OUTPUT)

INSTRUMENT SYMBOLS:

PIEZOMETER

- TOP OF RISER
- SCREEN
- BOREHOLE BOTTOM

P21

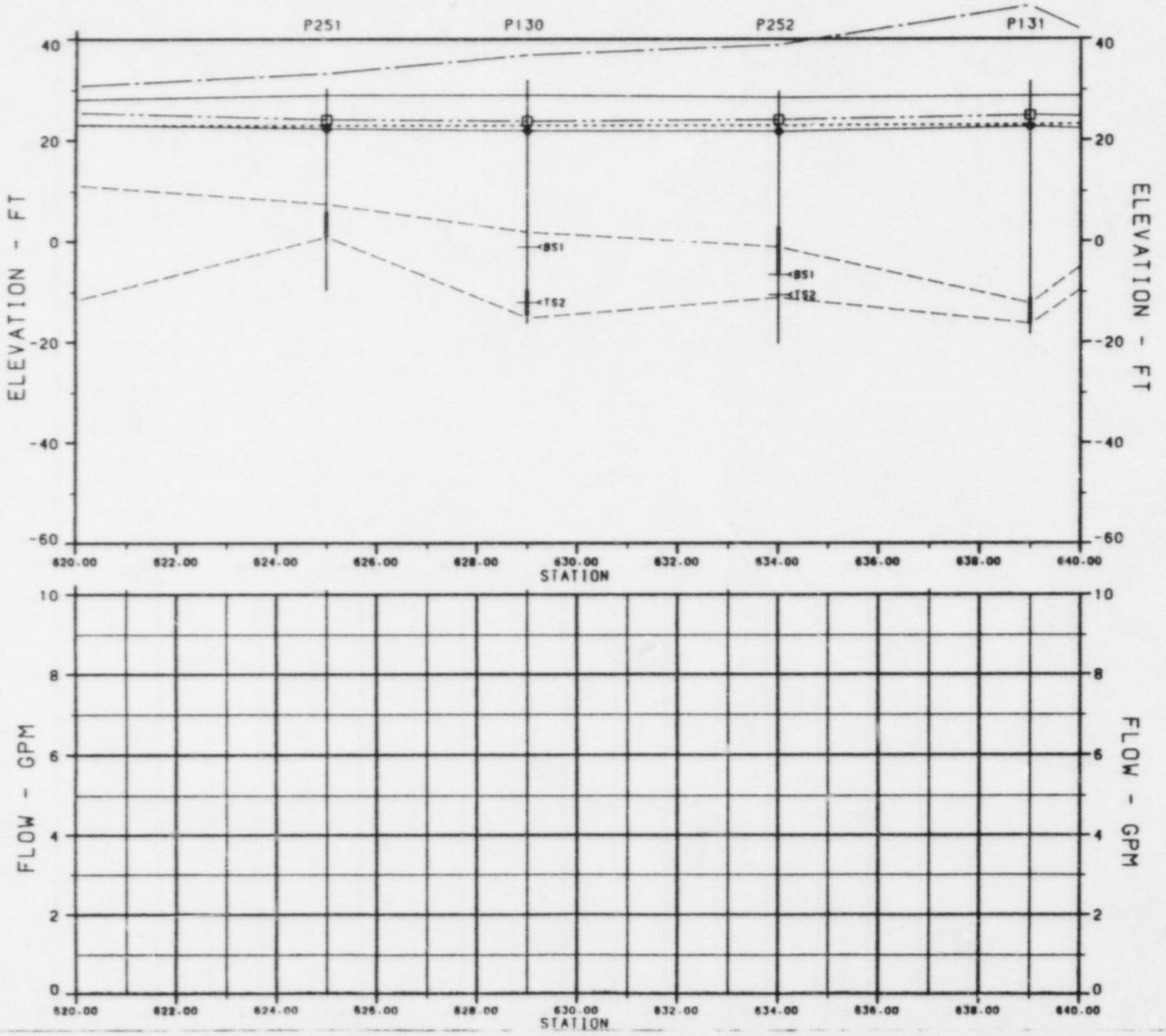
RELIEF WELL

- DISCHARGE ELEV.
- SCREEN
- BOREHOLE BOTTOM

INSTRUMENT TYPE	DATA PACKET NUMBER	DATE
PIEZOMETER	R099	01 SEP 85
RELIEF WELL	R099	01 SEP 85
PIEZOMETER	R117	01 APR 86
RELIEF WELL	R117	01 APR 86
× NO RELIEF WELL DATA		

HOUSTON LIGHTING AND POWER COMPANY	
SOUTH TEXAS PROJECT	INSTRUMENTATION
BECHTEL ENERGY CORPORATION: MAIN COOLING RESERVOIR INSTRUMENTATION	
HARZA ENGINEERING COMPANY	
CHICAGO, IL	14926 B004

EXHIBIT 130



LEGEND:

STRATIGRAPHY

- GROUND LEVEL
- TOP OF SAND (TS)
- BOTTOM OF SAND (BS)
- DITCH INVERT
- FACTOR OF SAFETY=1.5
- WARNING (SEE OUTPUT)

INSTRUMENT SYMBOLS:

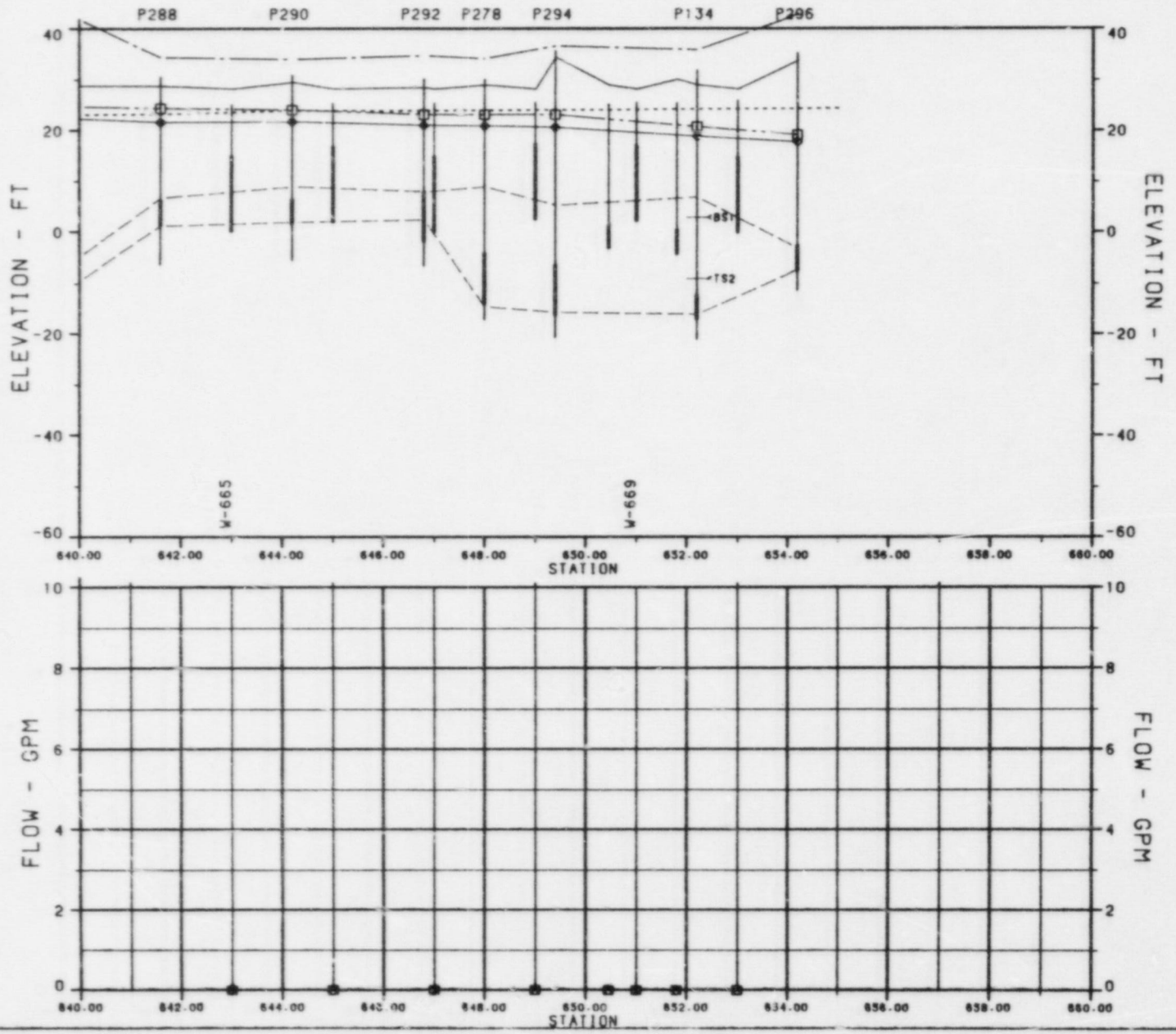
PIEZOMETER: TOP OF RISER, SCREEN, BOREHOLE BOTTOM — P21

RELIEF WELL: DISCHARGE ELEV., SCREEN, BOREHOLE BOTTOM — R1

INSTRUMENT TYPE	DATA PACKET NUMBER	DATE
PIEZOMETER	R099	01 SEP 85
RELIEF WELL	R099	01 SEP 85
PIEZOMETER	R117	01 APR 86
RELIEF WELL	R117	01 APR 86
× NO RELIEF WELL DATA		

HOUSTON LIGHTING AND POWER COMPANY
SOUTH TEXAS PROJECT | INSTRUMENTATION
BECHTEL ENERGY CORPORATION
MAIN COOLING RESERVOIR INSTRUMENTATION
HARZA ENGINEERING COMPANY
CHICAGO, IL | 14926 8004

EXHIBIT 131



LEGEND:

STRATIGRAPHY

- GROUND LEVEL
- TOP OF SAND (TS)
- BOTTOM OF SAND (BS)
- DITCH INVERT
- FACTOR OF SAFETY=1.5
- WARNING (SEE OUTPUT)

INSTRUMENT SYMBOLS:

PIEZOMETER
- TOP OF RISER
- SCREEN
- BOREHOLE BOTTOM

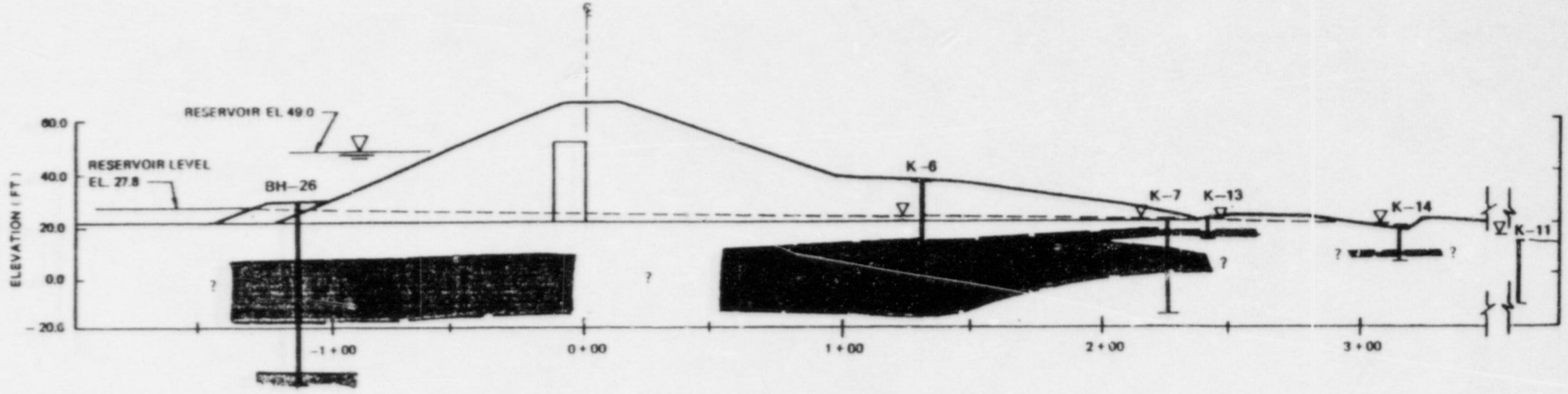
P21

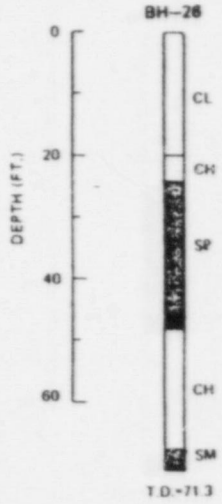
RELIEF WELL
- DISCHARGE ELEV.
- SCREEN
- BOREHOLE BOTTOM

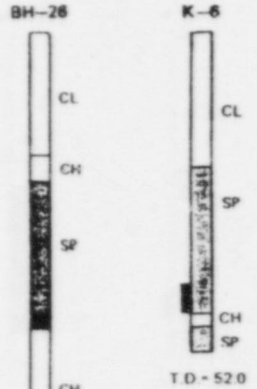
INSTRUMENT TYPE	DATA PACKET NUMBER	DATE
PIEZOMETER	R099	01 SEP 85
RELIEF WELL	R099	01 SEP 85
PIEZOMETER	R117	01 APR 86
RELIEF WELL	R117	01 APR 86
X	NO RELIEF WELL DATA	

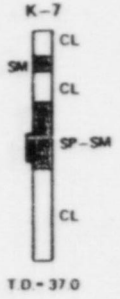
HOUSTON LIGHTING AND POWER COMPANY	
SOUTH TEXAS PROJECT	INSTRUMENTATION
BECHTEL ENERGY CORPORATION	
MAIN COOLING RESERVOIR INSTRUMENTATION	
HARZA ENGINEERING COMPANY	
CHICAGO, IL.	14926 8004

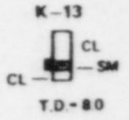
EXHIBIT 132

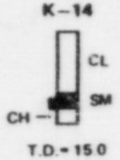


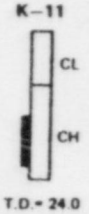




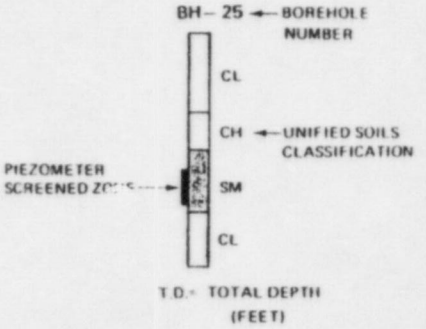








LEGEND:



BECHTEL ENERGY CORPORATION SOUTH TEXAS PROJECT	
KELLY LAKE AREA EMBANKMENT SECTION STATION 102 + 50	
HARZA ENGINEERING CO., CHICAGO PROJECT MANAGER	
DATE DEC. 1985	DWG. NO.