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October 1, 1984

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Byron Generating Station Units 1 and 2
Groundwater Monitoring
NRC Docket Nos. 50-454 and 50-455

Reference (a): March 26, 1984 letter from T. R. Tramm to H. R. Denton.

Dear Mr. Denton:

This is to provide additional information regarding the monitoring of groundwater at Byron Station. NRC review of this information should make unnecessary License Condition 1 as contemplated in the Byron SER.

The information contained in the enclosed report supplements the report of the 1983 well monitoring which was provided in reference (c). Additional support is provided for our conclusion that further groundwater monitoring is unnecessary to address the liquefaction issue discussed in section 2.4.6 of the Byron SER. Color-coded exhibits are provided at the request of the NRC Staff to delineate the structures and paving which have accelerated surface runoff.

Please address furtner questions regarding this matter to this office.

One signed original and fifteen copies of this letter and the enclosure are provided for NRC review. Three copies of the color-coded exhibits are provided.

Very truly yours,

T. R. Tramm

T. R. Tramm
Nuclear Licensing Administrator

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Enclosure: "Byron Station, Groundwater Monitoring License Condition, Commonwealth Edison Company," Sargent & Lundy, September 24, 1984.

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PDR ADOCK 05000454
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B001
1/3 SETS OF DRAWINGS
NOTE: DRAWINGS TO:
1C4 RES FILE
2C45 TO PM

BYRON STATION
GROUNDWATER MONITORING LICENSE CONDITION
COMMONWEALTH EDISON COMPANY

A program of groundwater monitoring was developed and executed to address the licensing condition cited in Section 2.4.6 Byron Safety Evaluation Report (NUREG-0876) on groundwater monitoring for the essential service water pipeline. The program consisted of collecting field data from four observation wells and precipitation data from the U. S. Weather Service. Monitoring of the four observation wells began on April 12, 1982, and continued until December 1983. The four observation wells were dry during the entire monitoring period.

The precipitation data for 1982 indicates that the total rainfall at the Byron site was 29.81 inches or 5.31 inches less than the 1931-1960 mean yearly rainfall. The first six months of 1982 were 5.85 inches less than the mean which the second half was 0.54 inches greater than the mean for the area. The precipitation data for 1983 indicates that the total rainfall was 27.42 inches or 6.83 inches less than the prorated 1931-1960 mean yearly rainfall.

The objective of the monitoring program was to demonstrate that the ground water levels would not rise and saturate the residual soils present above the bedrock. Saturation of soil is of paramount importance in the evaluation of liquefaction potential. The data collected during both 1982 and 1983 indicates the groundwater level in the area of concern is less than elevation 809 feet MSL or greater than 41 feet below the elevation of 850 feet MSL at which contingency plans may be needed. Both the Galena group

dolomite and soil level observation wells remain dry, thereby, providing direct evidence that the phreatic surface is well below the pipeline elevation and that a perched groundwater condition does not exist.

It is the applicants position that the potentiometric map presented on FSAR figure 2.4-24 represents results of an externally recharged bedrock aquifer and, therefore, an anomalously high groundwater level. In addition, given the same piezometric levels which occurred during 1973 and 1974 the same piezometric level, as shown on that FSAR figure, will not be attained. This position is supported by the fact that groundwater levels within the plant site Galena dolomite aquifer were being artificially recharged through the grouting and water pressure testing conducted at the power block area. In addition surface soils were also being recharged from the site sedimentation pond constructed for the collection and temporary retention of water runoff from the grouting operation. In order to illustrate the consequences of the grouting operation and the subsequent alteration of the groundwater levels, two demonstration well locations were selected. These observation wells G1 and G8 were selected to represent bedrock areas potentially unaffected by the influx of surplus grout water. Observation well G1 is located at the north property line while G8 is located at the south property line along the west and east border of the site. The locations are shown on the attached exhibits A & B.

The recorded groundwater elevations for these wells are as follows:

	11/72	1/73	7/74
G-1	747.3ft	747.5ft	751.2ft
G-8	769.0ft	767.3ft	774.5ft.

In each of these observation wells the variation in the measured water surface elevation amounted to a maximum change of 7+feet over the years of 1972 to 1974 while in contrast observation well P39 located at the northeast corner of the grouted foundation rock experienced the following responses:

	2/73	1/73	7/74	4/75
P-39	787.8ft	824.9ft	845.6ft	787.5ft

The comparison of the Galena-Platteville aquifer observation well elevation readings of G1 and G8 with those recorded in P39 clearly demonstrate that a natural rise in groundwater given similar meteorological conditions would not contribute to the saturation of the residual soils along the essential service water pipeline corridor.

The second principal source of groundwater which could potentially cause soil saturation, is from perched water table conditions. The geohydrologic conditions in the area are not conductive to the establishment of perched water table within the soils. Specifically, surface runoff percolation through the near-surface soils and through joints and features in the near surface bedrock would negate such a possibility. Two docketed geologic investigations were conducted recently which describe the conditions of the soil, bedrock, and structural integrity of the bedrock along the pipeline. These reports entitled "Geologic Investigations of Solution Features and

Confirmatory Geotechnical Investigations ESW Pipeline Corridor" support the inability of the soil to support perched water table conditions. Therefore, the only geohydrologic condition that could possibly be postulated to create only a potential case for liquefaction is temporary saturation of the soils that may occur during and shortly after a sustained heavy rain storm. It is the applicants position that liquefaction will not occur due to temporary saturation because:

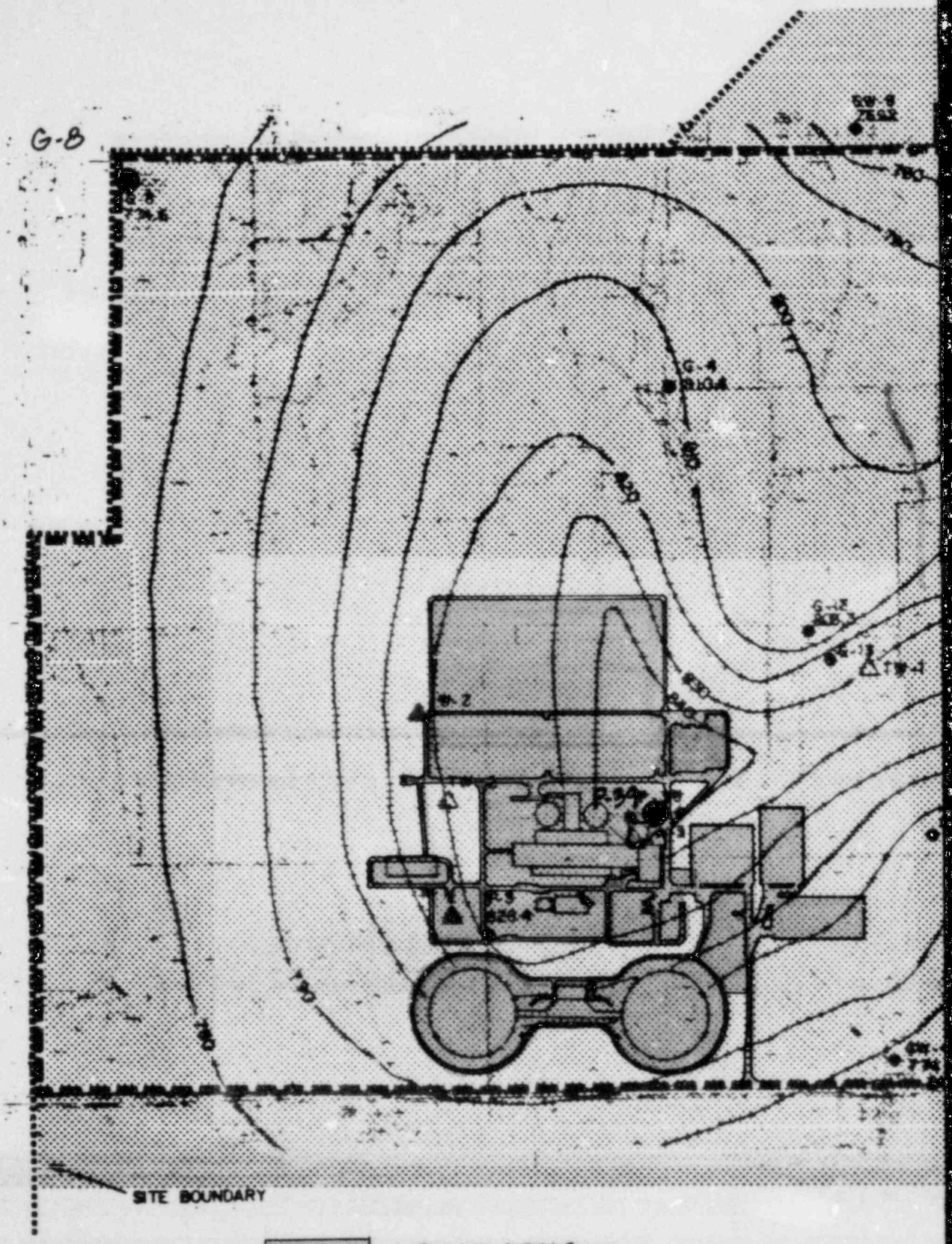
1. Surface runoff is accelerated as a result of building construction, paved areas and extensive perimeter ditching, thereby, reducing infiltration. See attached exhibits A & B,
2. absence of perched water table conditions and/or flow impending layers within the soil profile, and
3. induction of vertical seepage patterns with reduction excess pore pressures to negligible levels (Cedergren 1967 Seepage, Drainage and Flow Nets, J. Wiley & Sons, Inc., NY)

In summary, as a result of the absence of groundwater measurements during the 1982, 1983 monitoring program, which was performed in response to the SER license condition, we believe liquefaction is not a concern along the essential service water pipeline corridor. Two scenarios have been considered for development of saturation necessary for liquefaction to occur (1) through rise of the groundwater within the Galena Platteville aquifer and (2) from the development of perched groundwater conditions.

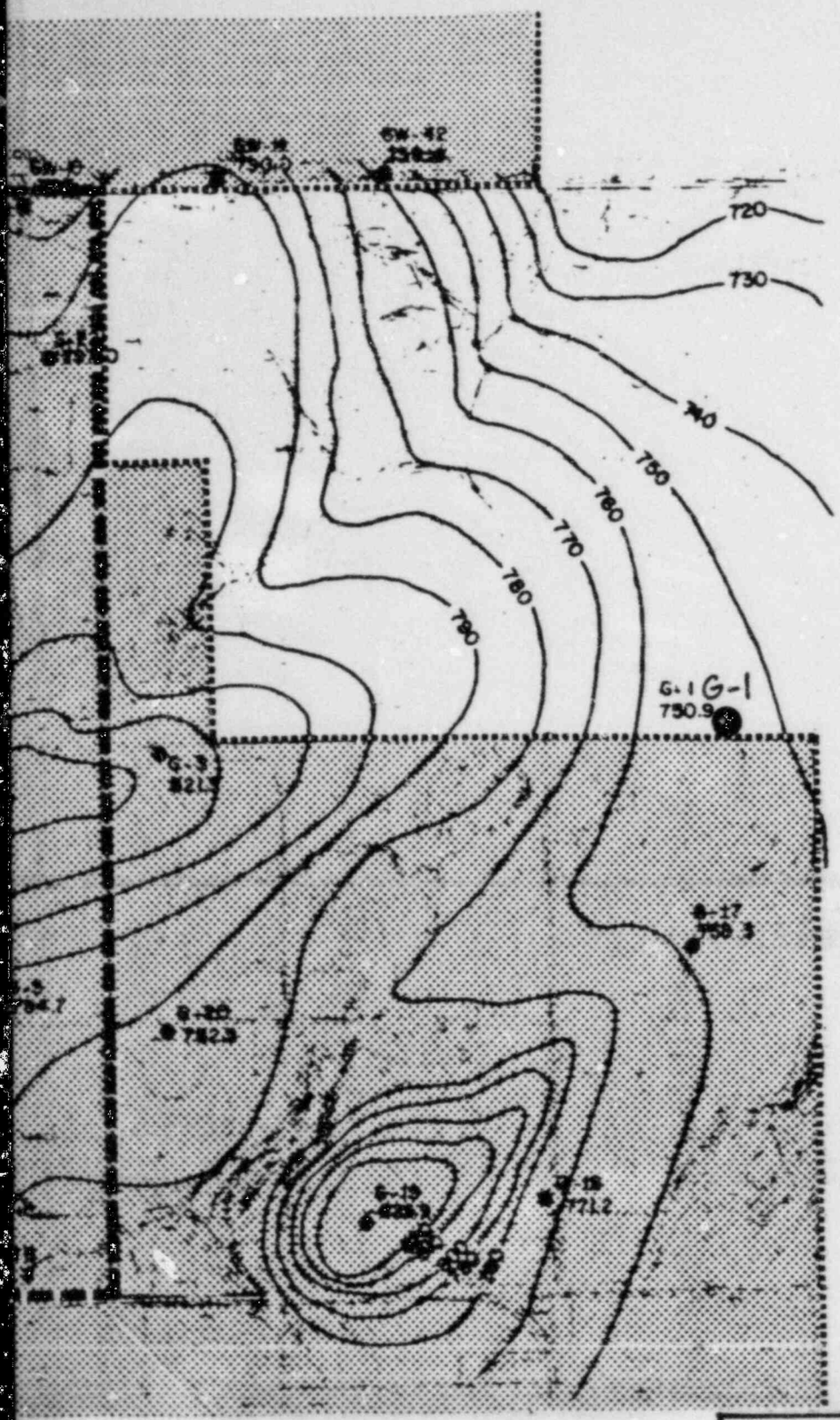
For the rise in water table within bedrock it appears the unique 1974 construction conditions heavily contributed to the artificially

high groundwater levels. This fact can be seen by comparing onsite and offsite observation well readings for the years in question.

The second condition considered was the establishment of temporary perched groundwater elevations which could cause saturation. Two attached exhibits have been prepared which illustrate the modifications to the runoff characteristics of the site as a result of the station construction, paving of roads and parking areas, and the extensive perimeter drainage system not present during the 1974 groundwater map preparation. The combined effect of the site construction significantly reduces surface infiltration, thereby, negating the perched water condition and liquefaction.


G-8
SITE BOUNDARY
PAVED AREAS
POWER PLANT STRUCTURES
WAREHOUSE STRUCTURES

AMENDMENT 39
SEPTEMBER 1982



LEGEND

G-3 ● 822.3	Well designation Piezometer level
▲ W-1	Byron Station water well.
△ TW-1	Temporary construction well
GW-9	Former domestic well

NOTES

1. Map based on water level data measured on July 1, 1976.
2. Map modified from Domes & Moore, Environmental Report — Inv. of Buried Toxic Materials, Unpublished Figure 9
3. GW- series are formerly private water wells.

NORTH

400 0 400
Scale in Feet
Contour Interval = 10 Feet

ATI APERTURE CARD

Also Available On Aperture Card

EXHIBIT A

BYRON STATION
FINAL SAFETY ANALYSIS REPORT

FIGURE 2.1-24

SITE AREA PIEZOMETRIC SURFACE MAP
GALENA-PLATTEVILLE AQUIFER

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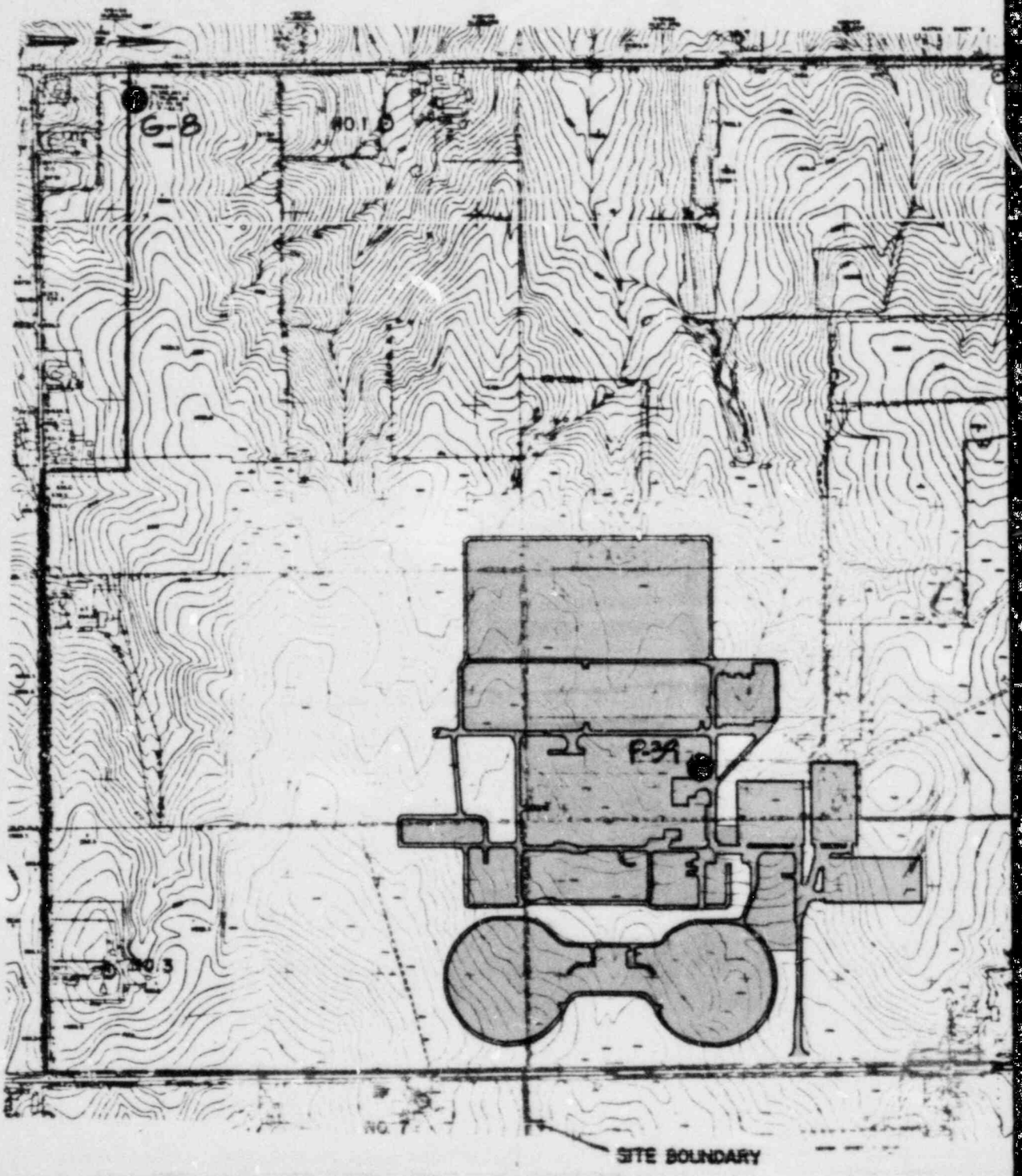
G-8
NO.1
P-3A
NO.3
NO.7
SITE BOUNDARY
PAVED AREAS
POWER PLANT STRUCTURES
WAREHOUSE STRUCTURES

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LEGEND

⊙ Well location and number

NOTES

1. The records of ground water levels are presented on Table 2.4-26.
2. The water quality data from these wells is presented in Table 2.4-27.
3. Well No. 4 was not included in the monitoring program.

400 0 400

Scale in Feet

Contour Interval = 10 Feet

EXHIBIT B

BYRON STATION

FINAL SAFETY ANALYSIS REPORT

FIGURE 2.4-28

WELL LOCATION MAP - WATER QUALITY MONITORING SYSTEM

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APERTURE
CARD

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