UNION ELECTRIC COMPANY
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JOHN K. BRYAN
VICE PRESIDENT

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March 10, 1981

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

Dear Mr. Denton:

ULNRC-423

DOCKET NUMBER 50-483
CALLAWAY PLANT, UNITS 1&2
ENVIRONMENTAL REPORT - OPERATING LICENSE STAGE

Reference: NRC Letter dated Jan. 2, 1981 signed by R. L. Tedesco

The referenced letter requested additional information concerning the Callaway Plant, Unit 1 Environmental Report. Per our letter of January 28, 1981, transmitted herewith are responses to questions in the referenced letter which were not answered in our letter dated February 6, 1981. The remaining outstanding responses will be forwarded to you on March 20, 1981. This information will be formally incorporated into the Callaway Plant Environmental Report in Revision 2. This information is hereby incorporated into the Callaway Application.

Very truly yours,

for John K. Bryan

NGS/kml

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STATE OF MISSOURI)
) S S
CITY OF ST. LOUIS)

Robert J. Schukai, of lawful age, being first duly sworn upon oath says that he is General Manager-Engineering (Nuclear) for Union Electric Company; that he has read the foregoing document and knows the content thereof; that he has executed the same for and on behalf of said company with full power and authority to do so; and that the facts therein stated are true and correct to the best of his knowledge, information and belief.

By _____
Robert J. Schukai
General Manager-Engineering
Nuclear

SUBSCRIBED and sworn to before me this 10th day of March, 1981

Margaret S. Heida

MARGARET S. HEIDA
NOTARY PUBLIC — STATE OF MISSOURI
ST. LOUIS COUNTY
MY COMMISSION EXPIRES JANUARY 2, 1982

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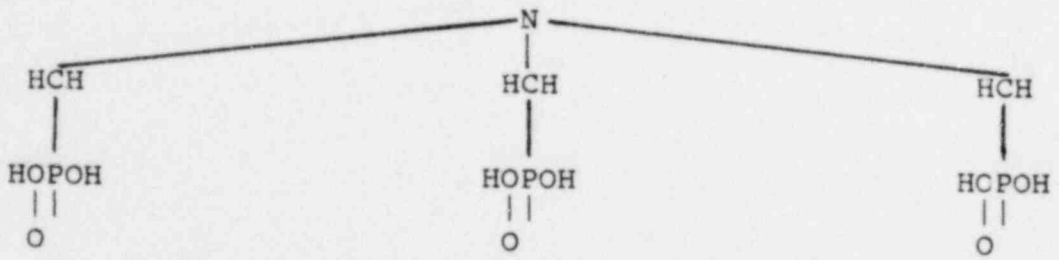
Question 291.9:

Please specify the organic composition of the dispersant (organic phosphonate), the EPA registration number, toxicity data for aquatic organisms (if available), the form in which it will be discharged, the basis for the amount used, the amount discharged, and discuss the possible chemical decomposition in water.

Response:

The dispersant will be Betz 403U; its organic composition is shown below:



Solution of Aminotri
(methylenephosphonic acid)
Molecular Weight: 229

EPA registers only toxic substances such as biocides, and since Betz 403U does not fall into this category, it has not been issued an EPA registration number.

The toxicity data for Betz 403U is as follows:

Daphnia magna	100% survival at 1,000 mg/l
	LC_{50} 1,000 mg/l
Rainbow trout	100% survival at 500 mg/l
	LC_{50} 1,000 mg/l

It is expected that Betz 403U will be discharged in the form it is introduced (i.e., as an organic phosphate). All organic phosphates, however, can revert to orthophosphate in time. Elevated temperatures, acidic pH levels, bacteriological growth, and continuous chlorination to free residuals in excess of 1.0 ppm can accelerate this usually very slow reversion.

An average dosage of 9 ppm of Betz 403U was assumed because it falls midway between the range of treatment dosages actually being achieved with Betz 403U in other recirculating cooling systems (7 - 12 ppm).

The dispersant will average 9 ppm in the cooling tower recirculating water and will therefore be 9 ppm in the cooling tower blowdown.

Question 291.11:

In reference to question 291.10, discuss the effect of adding sulfuric acid on the action of organic phosphonates for scaling control; in particular, the effectiveness of organophosphonates at different pH values. How does the amount of sulfuric acid that would be needed to control scaling without using organophosphonates compare with the amount needed when both are used?

Response:

The following table illustrates the effectiveness of the common phosphonates at two levels of pH and alkalinity. The test solutions were prepared by mixing $CaCl_2$, Na_2CO_3, $NaHCO_3$, deionized water and inhibitor and maintaining the solutions in agitated storage at 25 C for seven days. The average percent inhibition maintained over the seven-day tests show that the phosphonates are effective at varying levels of alkalinity and pH.

	Average Percent Inhibition Over Seven Days	
Inhibitor at 5 ppm (as is)	1,600 ppm $CaCO_3$ pH 8.5	400 ppm $CaCO_3$ pH 10.0
None	0%	0%
AMP*	85%	89%
HEDP**	86%	72%

* Aminotri methylenephosphonic acid
** 1-Hydroxyethylidene; 1, 1-Diphosphonic acid

The above table shows that the ability of AMP to inhibit $CaCO_3$ changes very little between pH 8.5 and 10.0. It can be generally assumed that less phosphonate is needed for calcium carbonate deposit control as the system pH (lower Langelier's Saturation Index (LSI)) is reduced. However, the exact relationship between LSI and phosphonate dosage has not been determined because of the effect of other aspects of system water chemistry.

Betz established an optimum pH control range for the condenser cooling system to protect the Asbestos Concrete Board (ACB) tower fill and to minimize attack on the cooling tower concrete by high sulfate concentrations. The Betz program will optimize the dispersant audition which will provide for lower acid dosages than could be obtained if just acid were used to control scaling. This will also result in lower sulfate concentrations in the cooling tower water.

Question 291.12:

Specify whether the inhibition of scaling by phosphonates will affect the corrosion protection normally afforded by slightly scaling conditions (positive saturation index). Provide a quantitative discussion of the effects that the phosphonates may have on the soluble fractions of heavy metals (such as copper, nickel) cooling system corrosion products and the resultant impact on discharge water quality and receiving water biota.

Response:

Excessive precipitation resulting in scaling is prevented by phosphonates inhibiting the precipitation of calcium carbonate. Precipitation, however, is not entirely inhibited and this controlled amount that does precipitate will provide some protection against corrosion.

The effect of phosphonates on the soluble fractions of copper and nickel is questionable. Data is available in the literature on the inhibition properties of phosphonates when studying zinc phosphate deposition tendencies. However, no data was uncovered in our (Betz) search on copper and nickel.

As shown on the attached Figure 1, by operating in a pH range of 7 to 10, the corrosion rate for copper alloys will be at a minimum and, therefore, the levels of soluble copper in the recirculating water will be at a minimum. Betz outlined in their proposal a monitoring system as part of their normal service program. Copper was one of the parameters listed to be monitored.

Reproduced From: Betz, Process Facts
PFC 307 8006
1980
FIGURE 5- Copper Solubility

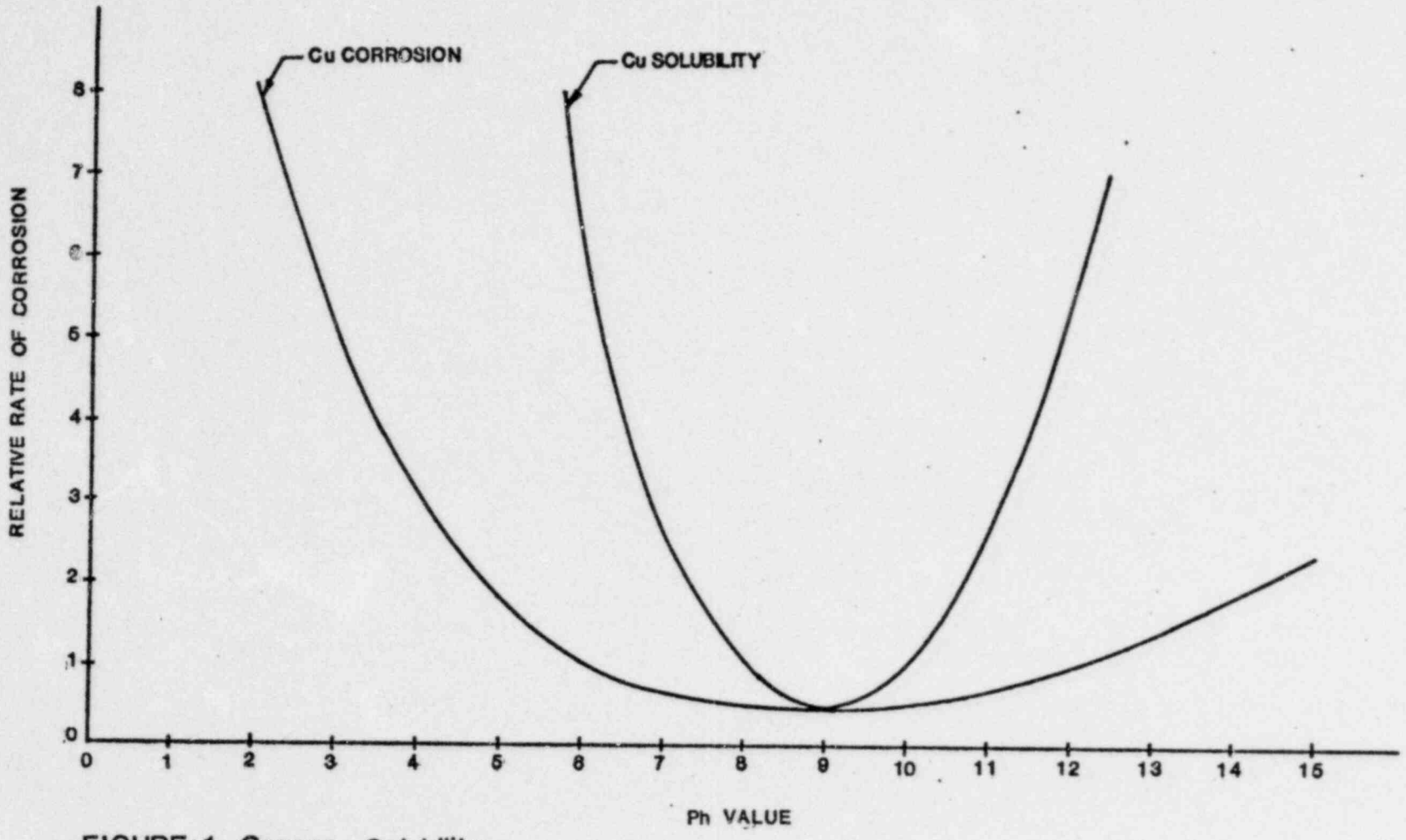


FIGURE 1- Copper Solubility

Question 311.3:

Section 2.1.2.3. Page 2.1-6 (and FSAR Section 2.1.3.3, Page 2.1-10) states that "Lost Canyon Lakes is a recreational vehicle and trailer park development approximately 2.2 miles north of the site. The development has approximately 800 sites currently in use, and its developers hope to sell an additional 500 to 600 sites by September, 1980. No permanent residential structures are allowed within Lost Canyon Lakes."

"Current average summer weekend use of Lost Canyon Lakes is estimated to be around 400 persons with usage on peak holiday weekends approaching 1,000 persons (Utley, 1979)"

Please update this information and include:

1. Projected total number of sites at completion of project.

2. Projected end of project usage on a seasonal, weekday, and weekend basis if significantly different.

Response:

1. The total number of camper sites planned for Lost Canyon Lakes is 1,720. In January 1981 approximately 1,100 of the sites had been sold. Since the 1979 interview, the developer has planned 110 3-acre homesites. However, he indicated in January 1981 that the homesites are not selling.

2. Approximately 600 people use Lost Canyon Lakes on a typical weekend, while usage is about 200 people on an average weekday. Maximum usage on a holiday is about 1,400. From December 15 through February 15 there is very little usage. The developer did not furnish data for projected end of project usage.

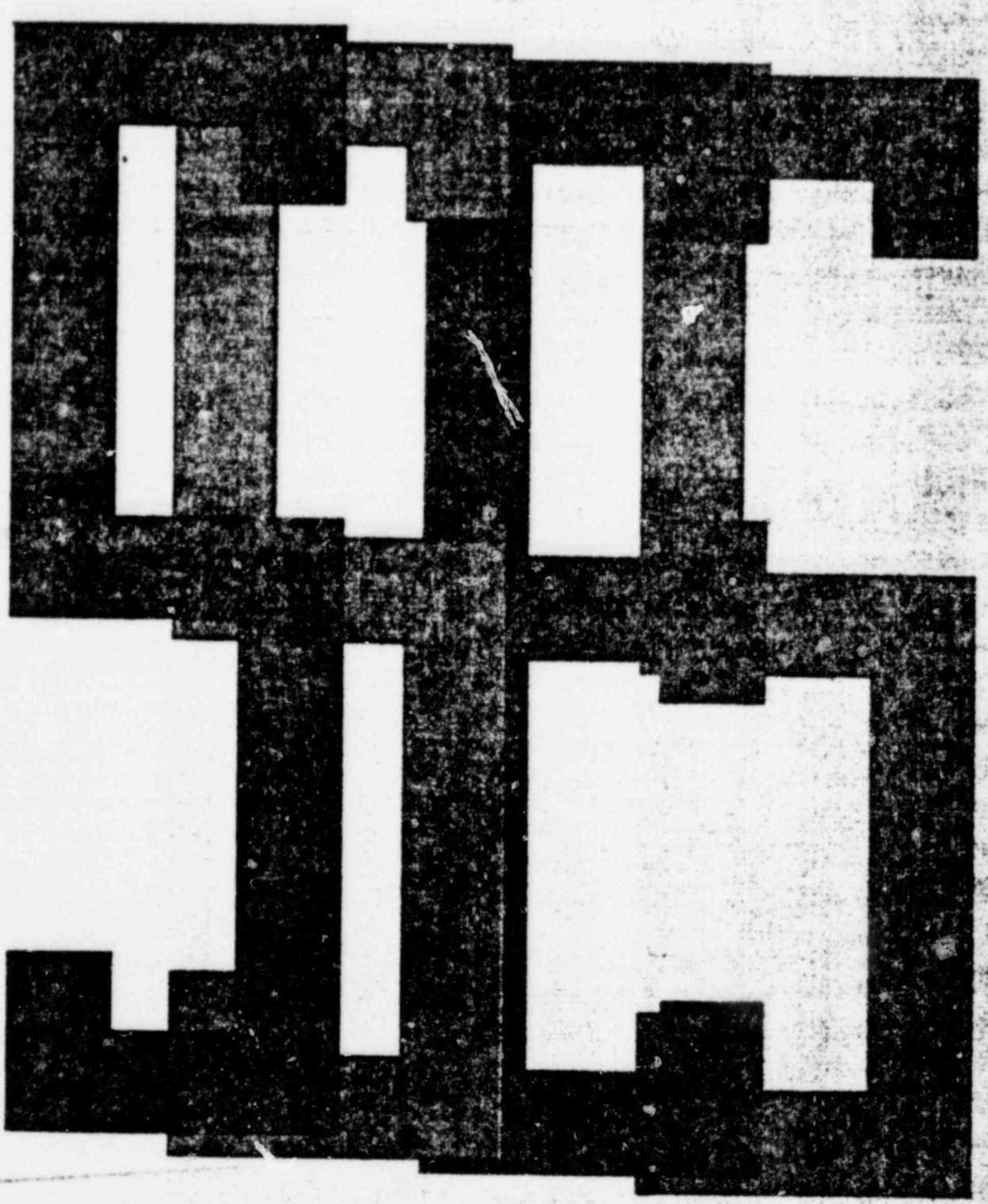
Reference: Lewis, R.L. 1981. Written Communications (January 28).

Question 310.3:

Provide a copy of the Dames & Moore demographic study which is discussed in Section 8.1.2.1.1.

Response:

The most notable observation is "A Monitoring Study of Community Impact by the Susquehanna Steam Electric Station," Pennsylvania Power & Light, Allentown, PA. Mr. Bernard Bujnowski, planner, participated and conducted two surveys (1976 and 1978). Findings in these research efforts substantially support the statement ". . . in-migrating employees are interested in establishing homes in new communities where adequate housing exists and where public school systems are rated high. . ." A copy of each document is attached.



A MONITORING STUDY OF COMMUNITY IMPACT
Susquehanna Steam Electric Station

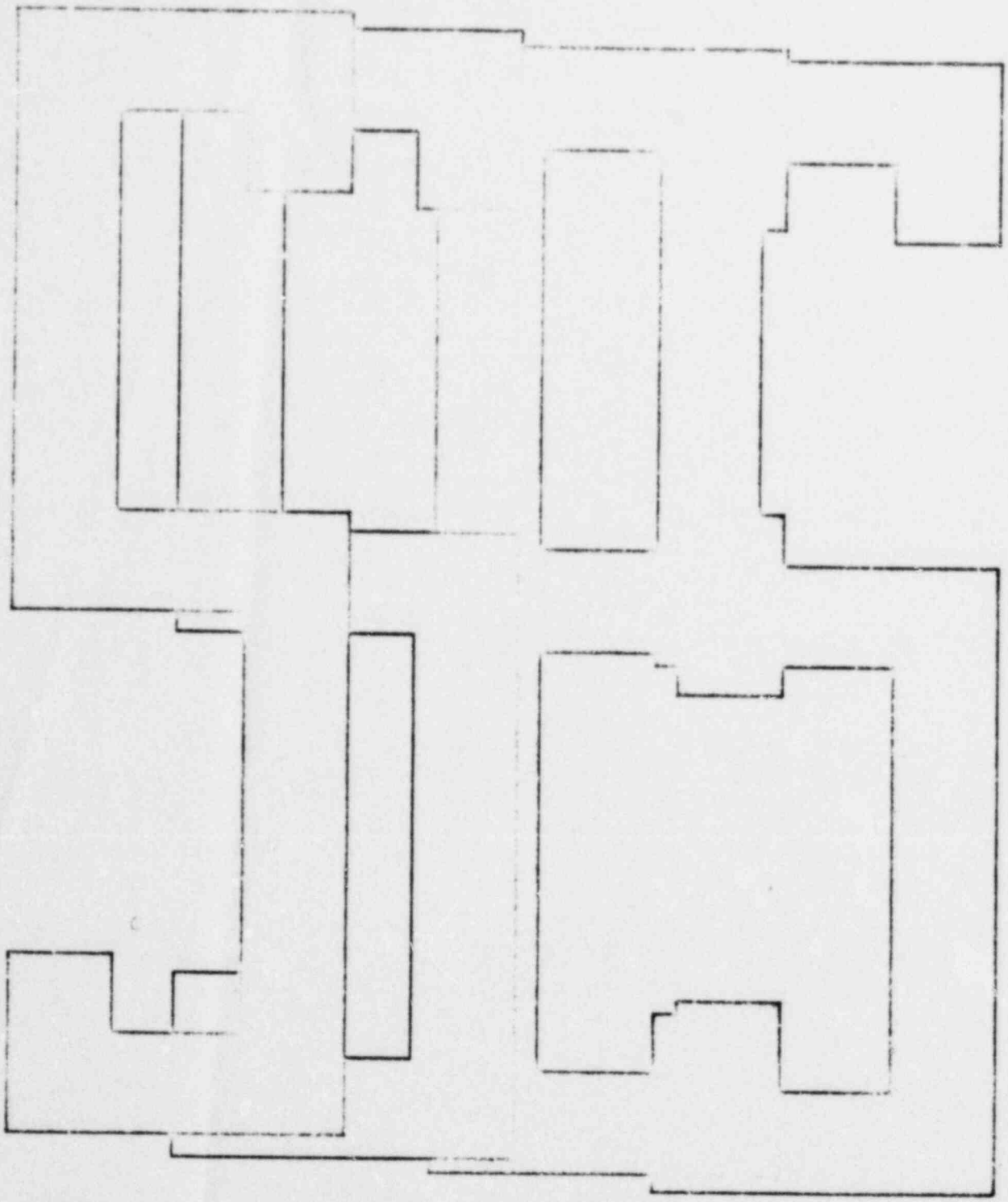
Pennsylvania Power & Light Company
Allentown, Pennsylvania

dype
7910170121

A MONITORING STUDY OF COMMUNITY IMPACTS FOR THE SUSQUEHANNA STEAM ELECTRIC STATION

COMMUNITY AFFAIRS
PENNSYLVANIA POWER & LIGHT COMPANY
ALLENTOWN, PENNSYLVANIA

JUNE, 1976



A MONITORING STUDY OF COMMUNITY IMPACT: AN UPDATE

Susquehanna Steam Electric Station

Pennsylvania Power & Light Company
Allentown, Pennsylvania

December 1978