

Commonwealth Edison Company

ONE FIRST NATIONAL PLAZA ★ CHICAGO, ILLINOIS

Address Reply to:

POST OFFICE BOX 767 ★ CHICAGO, ILLINOIS 60690

May 18, 1972

Mr. Edward J. Bloch, Acting Director
Directorate of Licensing
U.S. Atomic Energy Commission
Washington, D.C. 20545

Subject: Supplement No. V to Zion Nuclear Power
Station Environmental Report - AEC Dkts
50-295 and 50-304

Dear Mr. Bloch:

Commonwealth Edison Company submits Supplement No. V to the Zion Nuclear Power Station Environmental Report. Supplement V is in response to a letter from the AEC dated May 8, 1972 which requested copies of an Industrial Bio-Test report entitled "Preoperational Environmental Monitoring (Thermal) of Lake Michigan Near Zion Station, July 1969-December 1969."

In addition to three signed originals, 300 copies of this supplement are also submitted.

Very truly yours,

Byron Lee, Jr.
Assistant to the President

SUBSCRIBED and SWORN to
before me this 18th day
of May, 1972.

Notary Public

Question B.1.c.3. Actual dimensions of thermal plumes (distribution of excess temperatures in Lake Michigan) under varying meteorological conditions.

Both physical and mathematical models of the discharge plume predict that the size of the mixing zone will not exceed the limits set by the State of Illinois. However, verification of both types of models will be undertaken as soon as the station begins operation. Discussion of the revised state standards for thermal discharges into Lake Michigan and the results of the predictive models can be found in section 5.2.1.4. of the Environmental Report, Supplement II. Results of the predictive models can also be found in Section 2.3.3. of the Environmental Report.

Question B.l.d. Effects of passage through the condenser on Biota.

Answer: Commonwealth Edison has developed a good understanding of species diversity in the Zion area with respect to the three major taxonomic groups of phytoplankton, zooplankton and fish larvae. This information has been gained through two years of preoperational monitoring. A study at the Waukegan Station is evaluating the effects of condenser passage on biota of this area. This study began in March 1971 and will be completed by the middle of 1972.

Once the Zion Station is operational, studies will be conducted to determine if there are changes in primary productivity due to condenser passage. Mortality rates of zooplankton will be calculated, and a model is being developed to evaluate overall changes in secondary productivity as a result of losses due to condenser passage and increased secondary productivity in the discharge area as a result of increased heat.

Studies are being designed to determine if fish larvae are subjected to condenser passage and if mortality is a consequence of the possible passage. Studies at the Waukegan Station tended to indicate that fish larvae were not subjected to condenser passage to any extent. During ten months of monitoring only six larvae were found in drift nets.

Question B.2. What spawning areas in Lake Michigan and tributaries exist within a two-mile radius of Zion Station? Will preoperational and postoperational monitoring be performed in these areas.

Answer: Based on preoperational monitoring accomplished thus far, it appears fairly certain that spawning grounds for lake trout and white fish do not exist in the Zion area. Preoperational studies have shown that adults of these species are absent from the predicted area of discharge during spawning seasons.

Tows with plankton nets have shown that this area does not contain significant amounts of either fish larvae or pelagic fish eggs. Analysis of stomach contents suggests that spawning of some species may take place. The eggs found are those of either smelt or alewives. Extended studies are planned this spring. This study will continue evaluating this area as a possible nursery. Continuation of monitoring will depend upon the results of the present studies.

Question B.3. Briefly describe plans for mitigating severe environmental impacts disclosed by the environmental monitoring system.

Answer: The design of Zion Station is such that all known potential environmental impacts were precluded or otherwise mitigated. Extensive postoperational monitoring programs for radioactivity and aquatic organisms are designed to disclose any changes which might occur as a result of station operation in time to institute appropriate programs to ameliorate any environmental stress. Prior to the appearance of adverse effects, it is impossible to provide plans for mitigating them.

Question C.1. Provide the circulating water pump characteristics and proposed method of operation of the six pumps during normal (summer and winter) and emergency conditions, if different than provided in your answer to question 10.7 (Amendment 16, October, 1971). Describe the flow and the temperature rise through the condenser for these methods of operation.

Answer: The answer to this question necessitates the formulation of detailed operating procedure. Such procedure is in preparation and will be submitted in the near future.

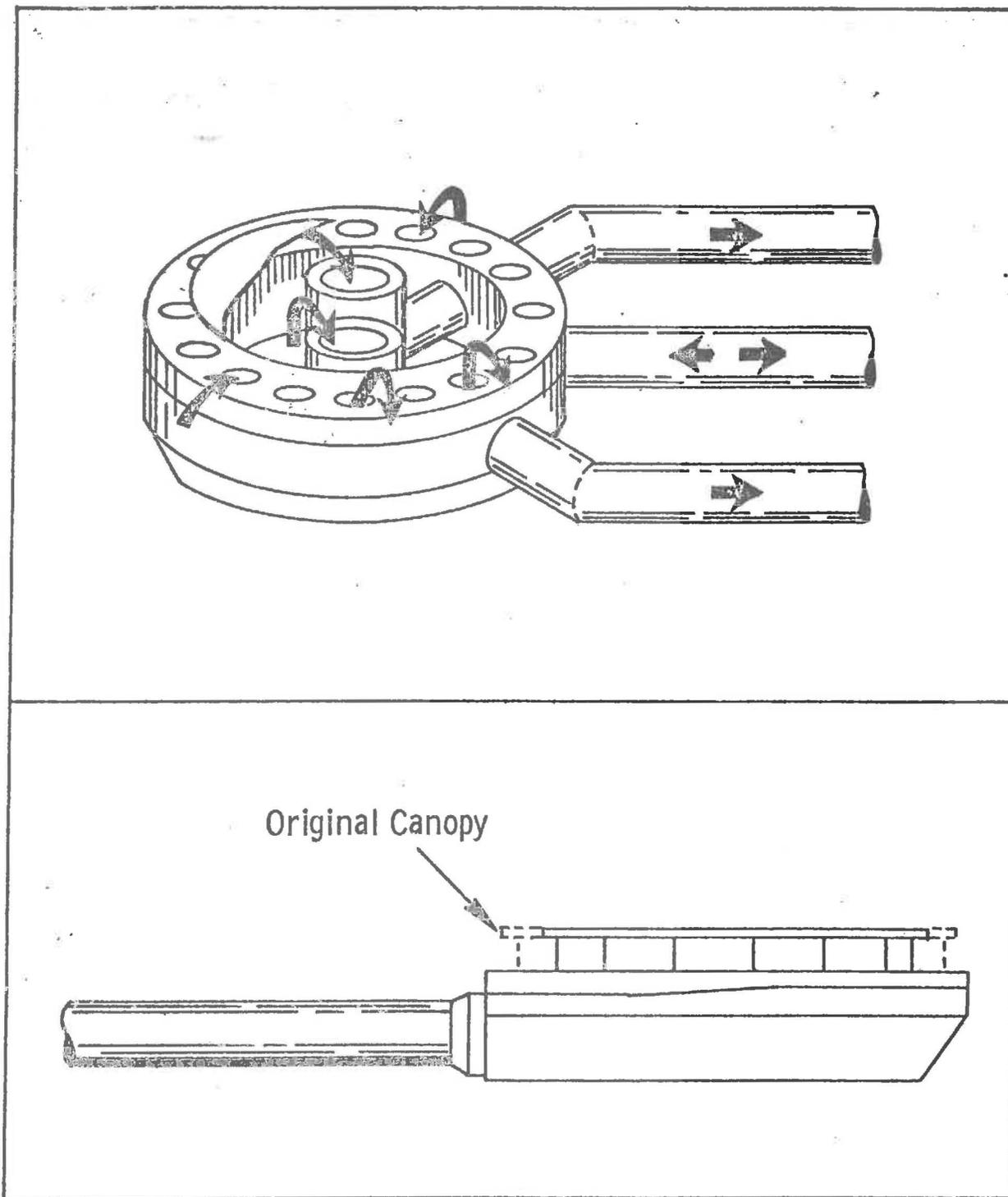
CONDENSER CIRCULATING WATER SYSTEM

QUESTION C-2

Provide a revised sketch (like Figure 33, page 2.3.6-85 of your Environmental Report) of the intake structure, showing the new canopy roof design. Include any changes that have been made to drawing B-837, Intake Structure (answer to question 10.6, Amendment 16).

ANSWER:

Attached is a revised sketch of Figure 33, page 2.3.6-85 of the Environmental Report. The diameter of the intake canopy has been reduced as shown on drawing B-837.



ZION STATION
COOLING WATER-INTAKE STRUCTURE

Figure 33

Question C.3. If fish become trapped in the forebay, will any means be provided to return them to the lake?

Answer: Fish biomass in Lake Michigan is low with the exception of alewives, so only a few fish should be introduced into the forebay. Because of the length of the intake and the high velocity of water involved, any fish introduced into the forebay will probably be in poor physiological condition. If the fish were returned to the lake, poor survival would be expected as the procedures for returning fish would involve an additional stress. Due to this problem, present plans do not call for fish trapped in the forebay to be returned to the lake.

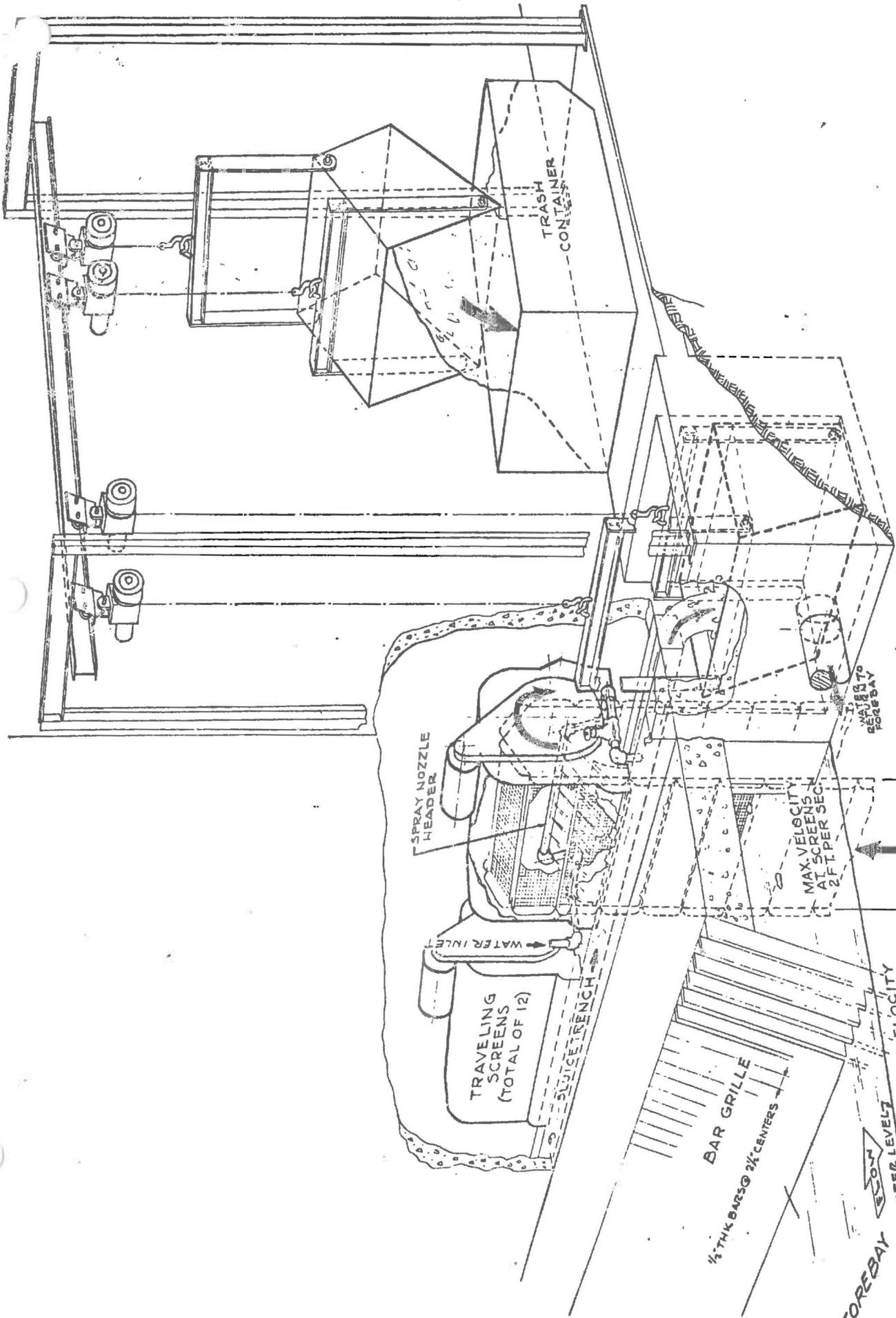
CONDENSER CIRCULATING WATER SYSTEM

QUESTION C-4

Provide dimensions and water velocities for the bar rack and traveling screens. Provide the vertical speed of the traveling screens. Provide a sketch of the traveling screens, including the clearing of debris from the shelves as they move over the top.

ANSWER:

Attached is Fig. C-4.1 of the traveling screens showing the method of debris removal. There are twelve (12) traveling screens, six (6) for each Unit. The velocity of the water through the screens varies from a maximum of 2.0 ft/sec. at low operating water level to 1.4 ft/sec. at high operating water level. The velocity through the bar grill varies from a maximum of 1.2 ft/sec. at low operating water level to .8 ft/sec. at high operating water level. These velocities are for six (6) circulating water pumps operating and four (4) service water pumps operating. The vertical speed of the traveling screen is 10 ft/min. The width of each screen is 10'-0" while the width of each unit is 11'-2". At high operating water level, the depth of the water at the screens is 26'-5" and at low operating water level, the depth of the water at the screens is 19'-0".



CIRCULATING WATER
AT TRAVELING SCREENS
STATION UNIT 1&2
COMMONWEALTH EDISON CO.
CHICAGO, ILLINOIS
DRAWN D. SINNEN 2-14-72 FIG. C-4-1

SPRAY NOZZLE
HEADER

TRAVELING
SCREENS
(TOTAL OF 12)

SLUICE TRENCH

1/2" THK BARS @ 2" CENTERS

FOREBAY

OPERATING WATER LEVEL
ELEV. 579.5'-HIGH
ELEV. 566.0'-LOW

LOW POINT OF FOREBAY
ELEV. 537.0'

MAX. VELOCITY
AT SCREENS
2 FT. PER SEC.

10'-0" SCREEN WIDTH
11'-2" WIDTH OF BAY

WATER TO
FOREBAY

TRASH
CONTAINER

Question C.5. Provide available data on marine life collected and destroyed by the intake structures of operating power stations in the southern portion of Lake Michigan. Can estimates of species collected and destroyed be made for the Zion Station?

Answer: At this time, we are unaware of any data on marine life collected and destroyed by intake structures in the southern portion of Lake Michigan. Commonwealth Edison has initiated a program to begin in April, 1972 that will assess the numbers and species of fish removed at the traveling screens of it's Waukegan generating station. These data will be made available to the AEC.

Estimates of species collected and destroyed will be made for the Zion Station.

Question D.1. Provide a table of the chemicals used in significant quantities at the station. Include an estimate of the required pounds per year of each chemical. Indicate the pounds released per year and the ppm concentrations for each chemical released to the environment. Include chemicals such as chlorine, boric acid, lithium hydroxide, hydrazine, morpholine, sodium hydroxide, sulfuric acid, resins, detergents, etc.

Answer: The chemicals released to Lake Michigan will comply with Illinois standards. See Table D-1.1 which lists the chemicals that are used in the operation of Zion Station.

TABLE D-1.1
ESTIMATED CHEMICAL USAGE ZION UNITS 1 & 2

Name	lb./yr. used	Releases		Comments
		lbs./yr.	PPM Conc.	
Chlorides	None	None	None	See sodium hypochlorite.
Boric Acid	1000	None	None	Losses are buried off site.
Sodium Hypochlorite	8000	8000	.0012	
Lithium Hydroxide	9	None	None	Removed and retained by demineralizer
Hydrazine	30,000	None	None	Breaks down to make hydrogen, nitrogen and ammonia and released to the stack.
Morpholine	5,220	None	None	
Sodium Hydroxide	84,000	None	None	See sodium sulphate.
Sulfuric acid	90,000	None	None	See sodium sulphate.
Sodium Sulphate	None	132,000	.0200	Products of regenerate neutralization.
Resins - CVCS	15,700	None	None	Kept by 105 micron retention screen and filters.
Resins - Demineralizer	82,000	None	None	Resin filters in effluent discharges.
Alum	9,840	9,840	.0015	
Detergents	2,000	1,455	.0002	
Organic Solids	900	None	None	Kept in liquid radwaste

<u>Name</u>	<u>lb./yr. used</u>	<u>Releases</u>		<u>Comments</u>
		<u>lbs./yr.</u>	<u>PPM Conc.</u>	
Phosphates	500	None	None	Removed and retained by the demineralizer.
Boron	1260	1260	.0002	During periods of primary to secondary steam generator leakage, boron will be processed out of the secondary side after being neutralized by treatment with tri-sodium-phosphate. The processing will occur in the steam generator blowdown portion of the liquid radwaste system. As a result, boron and phosphate will be released from the plant during intermittent periods corresponding to such leaks.
Phosphates	3000	3000	.0005	

LIQUID EFFLUENTS AND LIQUID AND GASEOUS RADWASTE

QUESTION D-2

Are anticorrosives to be used? Give brand names if they are proprietary agents, list their major constituents and amounts to be used.

ANSWER:

No anticorrosives will be used in the circulating water system, service water system or radwaste system.

LIQUID EFFLUENTS AND LIQUID AND GASEOUS RADWASTE

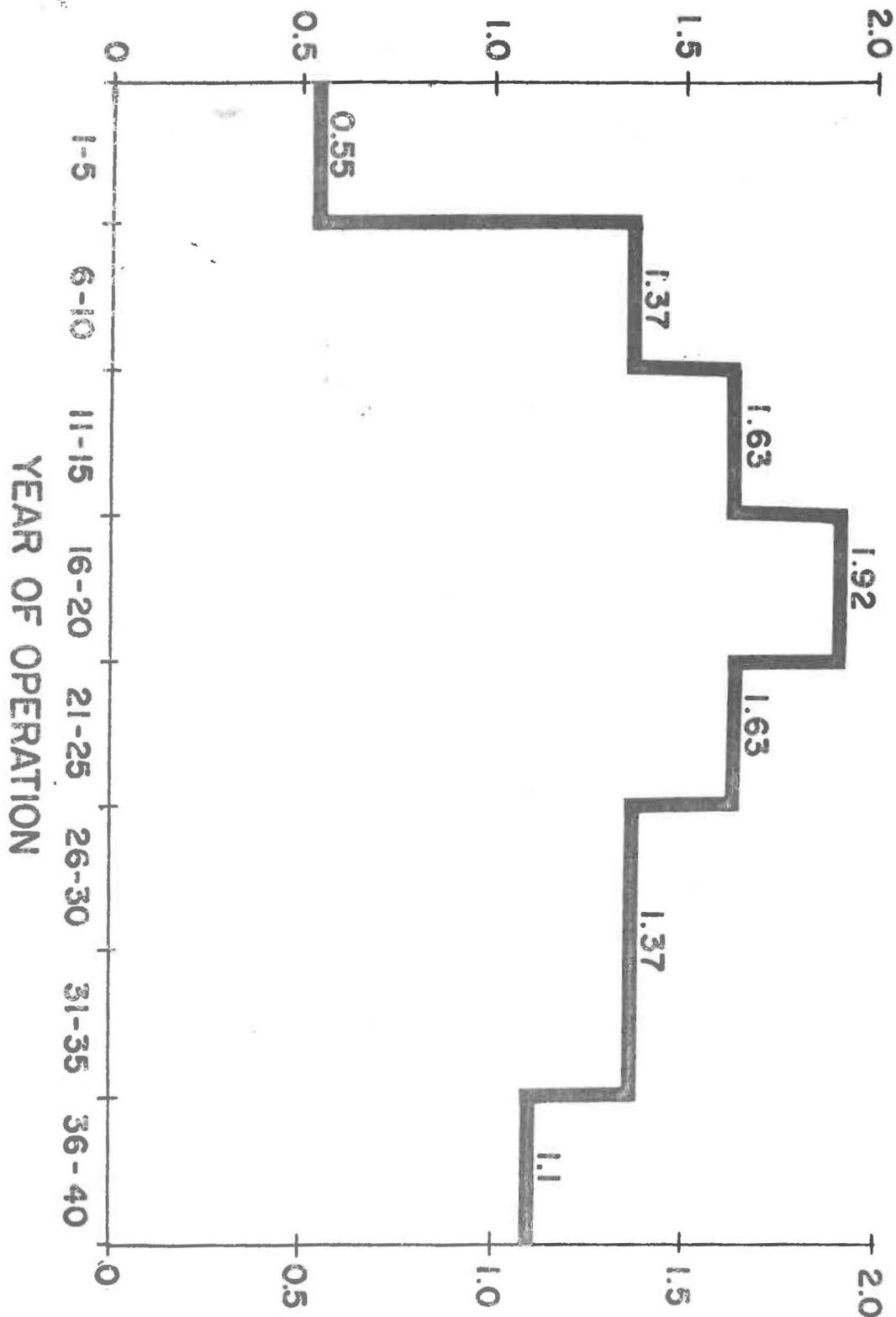
QUESTION D-3

Provide changes (if any) in the anticipated radioactive emissions as described in Supplement I to the Zion Station Environmental Report (November 1971).

ANSWER:

The expected emissions for tritium have been revised to account for the gradual build up of the plant tritium inventory. The attached table (Fig. D-3.1) indicates the daily average microcurie release during any five (5) year operating period of Zion Units 1 & 2. These emissions take into account the recycle of approximately 70% of the tritiated water, normal decay of tritium and the anticipated capacity factors of the units.

MICRO CURES
(DAILY AVG. FOR 5 YR. PERIODS)
IN MILLIONS



TRITIUM RELEASE RATE - ZION UNITS 182

MICRO CURES
(DAILY AVG. FOR 5 YR. PERIODS)
IN MILLIONS

FIGURE 3.1