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Docket No. 50-286

NOV 7 1974

Daniel R. Muller, Assistant Director for Environmental Projects, L  
 THRU: George W. Knighton, Chief, Environmental Projects Branch No. 1, L

STATUS OF THE PREPARATION OF THE FES FOR INDIAN POINT UNIT NO. 3

On October 30 through November 2, 1974, the EPM visited W. Fulkerson, T. Row, and R. Rush at Oak Ridge National Laboratory to discuss the status of the preparation of the lab draft of the FES. The lab draft of the FES has been assembled and completed and is being edited and typed up at ORNL. The lab draft should be ready for review by November 8, 1974.

George Knighton and the EPM will visit ORNL on November 8, 1974, to start the review and bring back copies for review by AEC staff and OGC.

Basic changes in the Summary and Conclusions from the DES to the FES include the following:

1. Change from May 1, 1978 to May 1, 1980 as date for termination of the once-through cooling. Operation with a closed-cycle cooling system would begin on December 1, 1980.
2. Deletion of requirement for Con Edison to submit an environmental report on closed-cycle cooling system which was to be submitted to the AEC on July 1, 1974. We will require that the information presented in the IP-2 environmental report on closed-cycle cooling due on December 1, 1974 should be sufficient for use in selecting a preferred system.

Original signed by  
 M. J. Oestmann

Mary Jane Oestmann, Project Manager  
 Environmental Projects Branch NO. 1  
 Directorate of Licensing

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DATE	11/6/74	11/7/74				

Docket Nos. 50-3  
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Daniel R. Muller, Assistant Director for Environmental Projects, 1  
 THRU: George W. Knighton, Chief, Environmental Projects Branch No. 1

**BRIEFING OF THE AEC MANAGEMENT BY ORNL TEAM REGARDING THE REVIEW OF APPEAL BOARD DECISION ON INDIAN POINT UNIT NO. 2 AND THE PREPARATION OF THE FES FOR UNIT NO. 3**

On July 2, 1974, a meeting was held at Oak Ridge National Laboratory to brief AEC Management as to the status of preparation of the FES for Indian Point Unit No. 3 and to discuss the effect of the Appeal Board Decision (ALAB-188) on the FES for Unit No. 3 and the DES for Unit No. 1. The meeting also served as a review of the major issues of controversy in the Unit No. 2 hearing which were summarized in ALAB-188. Plans to reach a settlement agreement with the parties were also discussed.

It was concluded that the FES on Unit No. 3 should be representative of the current state of knowledge on environmental issues and should be a high quality document with conclusions solidly supported in the text. The FES has to address all the Appeal Board criticisms in the Indian Point Unit No. 2 case and provide a fresh look on ecological issues. The schedule which was proposed by ORNL management to complete the ORNL lab draft of the FES is October 14 rather than August 15. The critical path is the work of W. Van Winkle and A. Ersalan on the development and verification of the young-of-the-year and adult striped bass models.

Details of the discussion are presented in Enclosure 1. The list of attendees is presented in Enclosure 2. Enclosure 3 is the preliminary results of the staff's adult fish model and Enclosure 4 lists the preliminary conditions in the license proposed by ORNL.

Original signed by  
 M. J. Oestmann

Mary Jane Oestmann, Project Manager  
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Enclosures:  
 As stated

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DATE >	10/31/74	10/ /74				

ENCLOSURE 1

DETAILS OF BRIEFING OF AEC MANAGEMENT ON STATUS OF PREPARATION  
OF FES FOR INDIAN POINT UNIT NO. 3  
DOCKET NO. 50-286

I. Review of Appeal Board Decision (ALAB-188)

R. Rush, Team Leader, of the Indian Point Team, discussed the ORNL review of the Appeal Board Decision on the exceptions to the Initial Decision for Indian Point Unit No. 2. The outcome was a delay in the termination of operation of the once-through cooling system from May 1, 1978 to May 1, 1979. The first ORNL reaction to the Decision was that the Appeal Board had missed the points on ecological issues made by the staff in the hearing and also misreviewed the record of the hearing. Van Winkle needed to substantiate the ORNL position taken in the hearing for IP-2. After six weeks' review of the record, however, ORNL finally concluded that a sufficient record did not exist on which the staff had a strong case to defend. It would require a strong argument to refute the evidence in the record but the evidence was not clearly presented in the record. The outcome was to take a "fresh look," as required by the Appeal Board, in the preparation of the FES for Unit No. 3. It was further decided that a good case would have to be developed in the Unit No. 3 hearing. Van Winkle was to work on the FES for Unit No. 3 rather than prepare a strong case to refute the Appeal Board Decision. Thus, the staff would press for a sound record in the Unit No. 3 case and build up the credibility and reliability of the staff's efforts in the Unit No. 3 FES and hearing.

A. Giambusso pointed out the significance of the project and emphasized the importance not only in the Indian Point case but also for the ORNL and Regulatory position taken. The Decision requires the staff to lay to rest open items and to address each criticism objectively.

A. Giambusso mentioned about the pending sale of Unit No. 3 to Power Authority of State of New York (PASNY) and the attempt to reach a settlement agreement for both Units Nos. 2 and 3 cases. In the settlement agreement, the question of (1) the timing for cooling towers and (2) the criteria used as a standard to require cooling towers to mitigate impacts are the two most important points to be agreed upon and negotiated. Con Ed wants the staff to be receptive to new data and to carry out an reevaluation of the requirements and timing for cooling towers. The EPM discussed the schedule for the cooling towers for Unit No. 2 and Unit No. 3. Once-through cooling

would be terminated on May 1, 1979 at Unit No. 2 and on May 1, 1980 at Unit No. 3. The towers would be ready by the following December respectively. The schedule was based on that presented in ALAB-188 and C. Newman's April 9, 1973 testimony on cooling towers.

## II. Status of Work on the Indian Point Unit No. 3 FES

### A. Introduction

Rush reiterated the fact that the FES for Unit No. 3 was being revised because of ALAB-188. The revisions are primarily in the area of aquatic entrainment (young-of-the-year) and adult striped bass models. New results of the models have recently been attained as discussed below.

### B. Aquatic Studies

Van Winkle described that the staff plans to back off the position taken in the Unit No. 2 case regarding the 80% contribution of the Hudson River fishery to the Mid-Atlantic fishery. However, the emphasis will be placed on the position that the Hudson River fishery is the major source for the Western Long Island Sound striped bass. There are inadequate data to support the extent of migration of Hudson striped bass to the New England and Mid-Atlantic waters. No data are available to support the claim of significance of contribution of Hudson River fishery to the New England and the Mid-Atlantic fisheries.

Another position to be modified will be that pertaining to the applicant's research program. Van Winkle would like to extend and modify the present research program. Van Winkle believes the research program can show a difference in results due to the staff's recommendations and intervenor's criticisms. Much of the program is the same as was presented by the applicant two years ago. The research program needs to be more objective in its design and conduct. Sid Siegel at ORNL pointed out that the research program should provide more data but no five-year program could be used to conclude the need or lack of need for cooling towers as the applicant claims. The program at best would only provide a partial resolution of the important ecological questions. It is very difficult to prove the null hypotheses with confidence, regarding the impact of plant operation on striped bass.

The research program does not include a survey of the striped bass population as a function of time. It should include a survey of the young-of-the-year populations by the year. The entrainment models provide reasonable predictions as to the effect of plant operation on young-of-the-year population. With a fraction of the young-of-the-year fish destroyed, the damage on subsequent fish populations will be shown through the adult model which is based on function of age of the species under consideration. Although Van Winkle believes data are needed to verify models, he feels that the models can contribute to a resolution of ecological issues. However, a question arises whether the present research program will produce the data needed for the staff model. It was made abundantly clear in the Unit No. 2 case, that the applicant's research program will not provide the data to verify the staff models. This was based on the fact that very little postoperational data will be obtained within the 1974-75 time period when Unit No. 2 will be in operation and in 1975 when Unit No. 3 is in operation. The data collection of the program ends by the fall of 1975.

A. Giambusso requested that ORNL provide specific items on recommendations to improve the applicant's research program by July 8, 1974. Giambusso wanted to provide a listing of recommendations as part of the settlement agreement meeting to be held on July 9, 1974.

Some of the changes of significance in the FES include work on compensation in young-of-the-year fish, "f" factors and the fish hatchery proposal. Of particular importance is the topic of compensation since the applicant used it in his models. However, if compensation is present, it would most likely occur during the first year and thus this concept could be demonstrated during the first year. It is very difficult to quantitate the extent of compensation. The research program never addresses the measure of extent of compensation. The presence of food, resource limitation, and cannibalism all enter into compensation. A sensitivity study would be needed to evaluate compensation.

Another topic under consideration is fish replacement by artificial propagation and restocking with fingerlings.

Con Ed proposed the fish hatchery concept to partially compensate for the damage of once-through cooling operation. Con Ed has the burden of proof to justify this alternative to fish kills at the intakes.

Van Winkle discussed the "f" factors and explained how Con Ed used "f" factors in its entrainment model. Care must be used in treating the data on "f" factors,  $f_1$  and  $f_2$ , which are related to the intake concentration of eggs, larvae, and juveniles. A value of 100% for  $f_c$  was used in the IP-2 case but this value is being reassessed in view of new research results obtained by C. Coutant. The FES will contain definitions of "f" factors and a critique of the significance of the values. The FES will require a critique of the applicant's entrainment model and the values for the "f" factors used in the model.

Van Winkle also submitted printouts and graphs on results from the adult model. See Enclosure 3 for preliminary results of the adult model. The model will be described in an ORNL technical report.

The significance of temperature and the timing for spawning were also discussed. The distribution of the deposition of eggs is temperature sensitive and also fresh-water-flow sensitive. Van Winkle and A. Ersalan discussed the features of the young-of-the-year model and the adult model. Hydraulics will be factored into the young-of-the-year model which were not emphasized in the IP-2 model. The staff has obtained preliminary results on the new young-of-the-year model using the 1967 hydraulics flow data and egg and larvae distribution. They are compared below:

Reduction of fish to fishery

<u>1967 data</u>	<u>Old</u>	<u>New</u>
100% mortality $f_c$	36%	24%
50% mortality $f_c$	24%	15%

These were based on full flow with all three units in operation.

The major difference between the applicant's and the staff's new young-of-the-year model depends on "f" factors. An avoidance factor of 40% was also used for Juvenile I class of fish in model. A shoal ratio value of 0.5 was also used in the model calculation.

Previous results from the old model were as follows:

- All plants w/o IP = 37% reduction to the fishery.
- All plants w/IP-1, 2 and 3 = 62% reduction to the fishery.
- W/IP-1, 2 and 3 alone = 43% reduction to the fishery.
- W/IP-1, CT at IP-2 and 3 = 15% reduction to the fishery.
- All plants w/IP-1, 2 and 3 with CT = 46% reduction to the fishery.

By installing cooling towers at IP-2 and IP-3, the impact on the fishery is reduced by 28% (43-15) taking into account IP-2 and IP-3 alone; but when taking all the plants on the river into account, the reduction amounts to 16% (62-46).

Impingement of striped bass, white perch and other species is being factored into the adult model. It is estimated that the impingement effects will amount to  $2.6 \times 10^6$  fish for all three plants. Only 5% of impinged fish are striped bass and about 80-90% are white perch. Impingement will have to receive greater emphasis in cost-benefit balancing. In the overall cost-benefit balancing, realistic situations will be considered in accordance with the Appeal Board Decision.

#### C. Thermal Studies

Thermal impact revisions of the FES were summarized by Rush. The team is looking at realistic conditions when the NYS thermal criterial will be exceeded. Recent data from the applicant indicates that the maximum river temperature is 82°F, not 79°F. The effect of Bowline and Roseton on the thermal discharges for Indian Point is also being taken into account.

#### D. Need for Power

M. Carter discussed the changes in the need for power section. Much of the information in the DES is out of date. Energy price on oil has affected the reserve margins. Energy conservation measures have also been put into effect. When PASNY applies for the license to operate Unit No. 3, the need for

power section will need revisions. Carter has prepared a list of questions to send to PASNY once PASNY has made a formal application to the AEC.

#### E. Benefit-Cost Analysis

Carter also explained the different approaches that can be taken to carry out a cost-benefit balance. In the Unit No. 2 case, the ASLB carried out its cost-benefit analysis based on the contribution of the Hudson River striped bass to the Mid-Atlantic fishery. Con Ed's results indicated that during the first year, the impact on the reduction to the fishery will amount to only about 3%; after five years, the impact would be about 5%, after 10 years, 7% and after 30 years, 15%.

The monetary loss of fish will be addressed in the FES. During the past three years, the commercial catch amounted to  $1.6 \times 10^6$  pounds for 1971. At \$0.48/lb, the total catch would amount to \$796,800. Sport fishery was based on assuming 12.5 days/yr for sport fishing and at \$3/d the cost would amount to \$38,233 for the first year and \$89,257 after five years.

The cost for the cooling towers was estimated to be \$488,000,000 over 26 years of operation. This amounts to \$18,000,000/year - the annualized level costs for the towers.

Siegel mentioned a change in the state fishing regulations should help the fishery population by having a closed season during certain times of the year.

ORNL was to investigate how the cost-benefit on fish loss should be handled in the FES. AEC staff would check with the Cost-Benefit Branch to discuss approaches in CBA to be taken.

#### F. Conditions on License

Rush supplied a possible description of conditions on the license. See the enclosed summary in Enclosure 4.

### III. Manpower Requirements, Scheduling and Content of the FES

Substantial changes in the FES have to be carried out to obtain the "fresh look" required by ALAB-188. The entire document must support valid conclusions reached. The conclusions need substantiation in the body of the text. In order to prepare a high quality document, additional technical assistance to treat the data and evaluate the applicant's reports for input into models is needed. The work is given the highest priority.

Fulkerson said that August 15 would be the earliest date that the lab draft of the FES would be ready. This would be the best efforts approach. However, October 14 would be a better date in order to produce a quality job. By this date the results and documentation of the young-of-the-year and adult models would be available.

It was agreed that the FES should be a high quality document in complete response to ALAB-188. Therefore, it must be representative of the current state of knowledge on the important environmental issues in this case, particularly in relation to the best modeling work with respect to the young-of-the-year and adult models. October 14, 1974 was set as the date to obtain the lab draft.

AEC management requested what additional resources could be obtained to get the job done in a shorter time period. ORNL management believed that a more accelerated schedule was not possible. The critical path is the work to be done by W. Van Winkle and A. Ersalsan. They have been working an extensive number of hours. It was felt that to train additional personnel would not be productive at this stage in the game.

A question was raised whether the modeling work should be in a separate document. AEC management believes the FES should be a self-contained document with the technical support presented in the body of the text for the conclusions reached. It was felt that the results of the models with a summary description should be an appendix to the FES. Detailed computer runs should be in a separate document.

The fuel loading data was to be checked by the AEC staff. It was found out that February 1, 1975 is the present date for fuel loading.

ENCLOSURE 2

List of Attendees

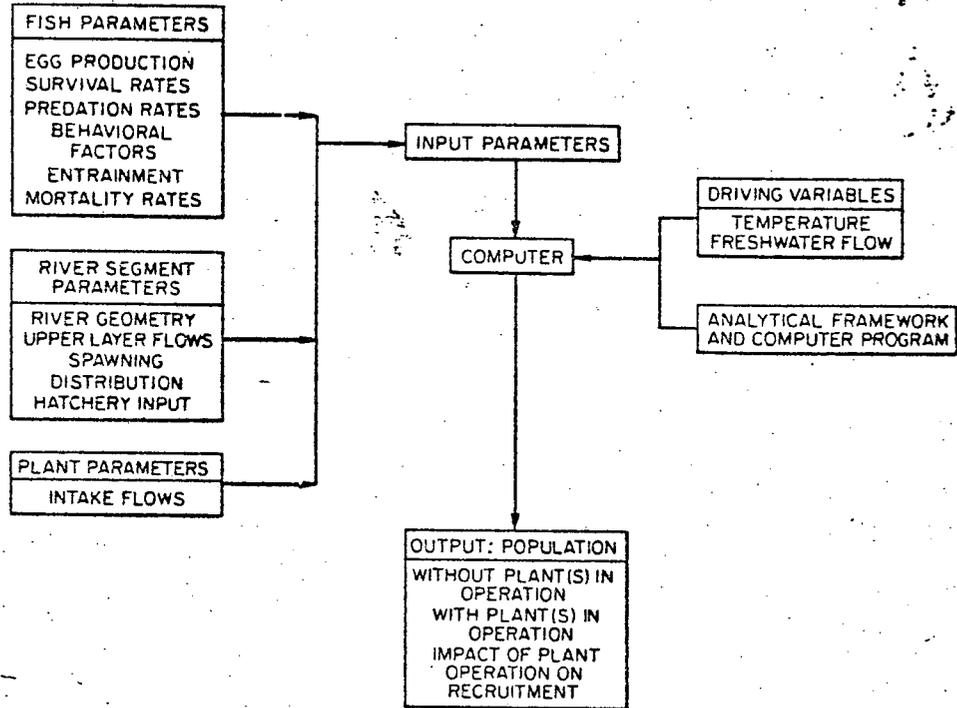
AEC

A. Giambusso  
G. W. Knighton  
M. J. Oestmann

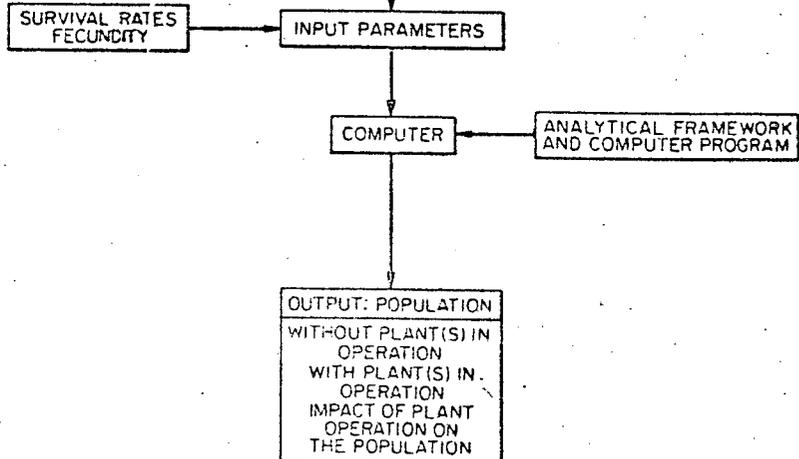
ORNL

W. Fulkerson  
T. Row  
M. Carter  
R. Rush  
S. Christiansen  
W. Van Winkle  
C. Coutant  
A. Ersalan  
M. Rosenthal  
S. Siegel

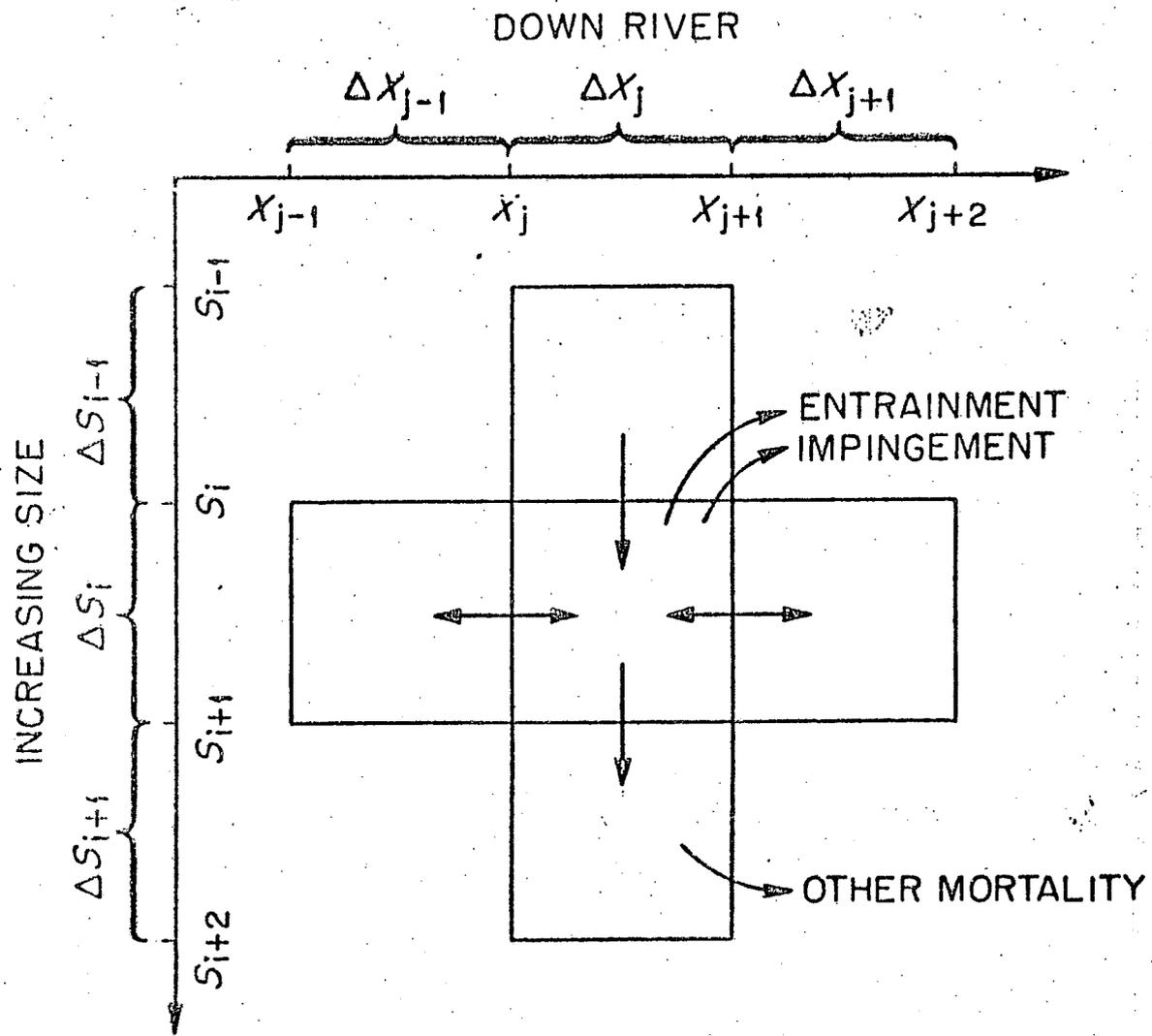
IMPACT OF PLANT OPERATION  
ON NUMBER OF JUVENILES  
SURVIVING THE ENTRAINMENT  
PERIOD



IMPACT OF PLANT OPERATION  
ON THE POPULATION



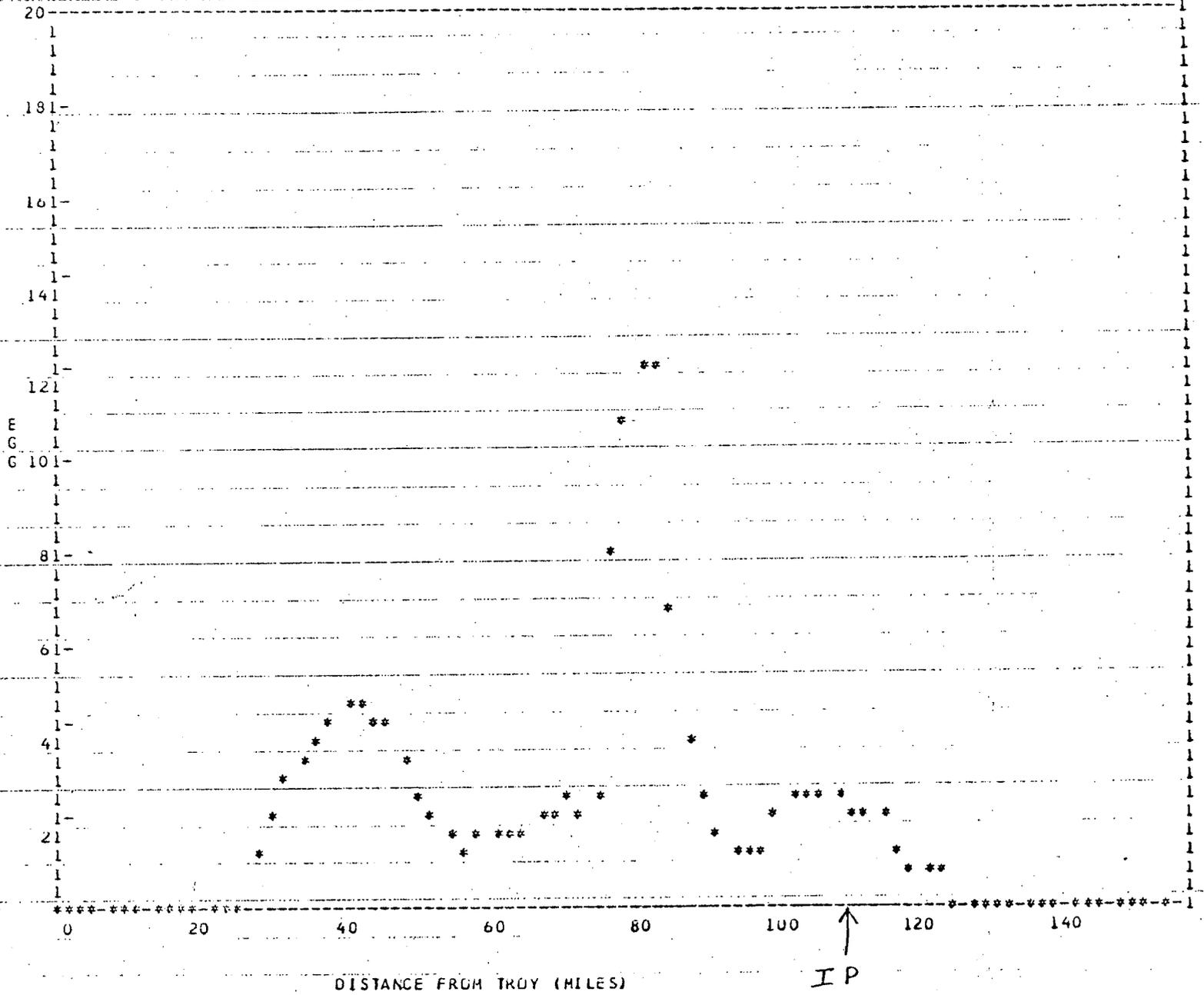
Striped Bass Model.



Y-SCALE FACTOR = 0.1000E 05

TIME = 720.0 HRS

= 30 days



*Handwritten signature*

Y-SCALE FACTOR =

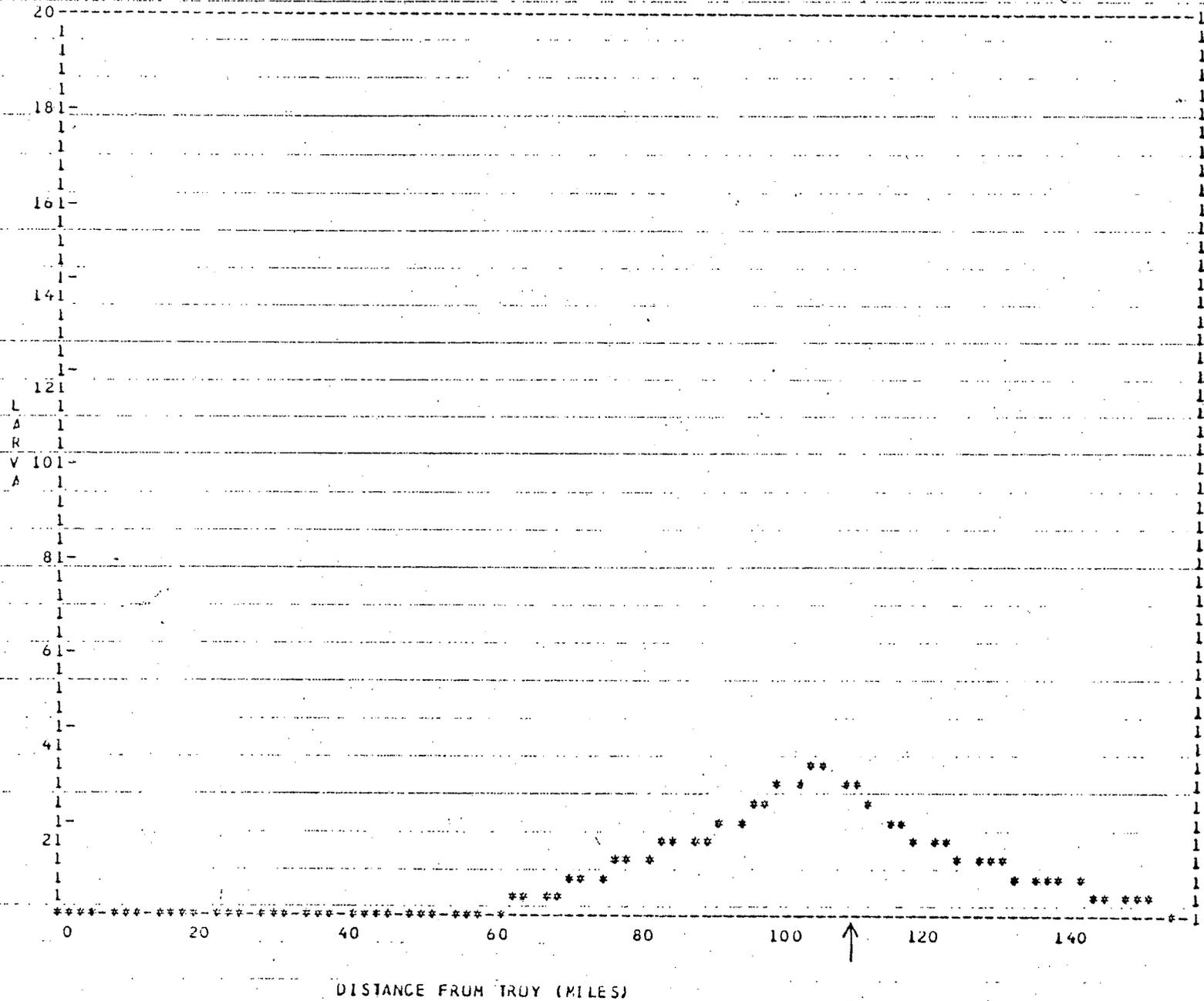
0.1000E 06

TIME =

1680.0

HRS

= 70 days

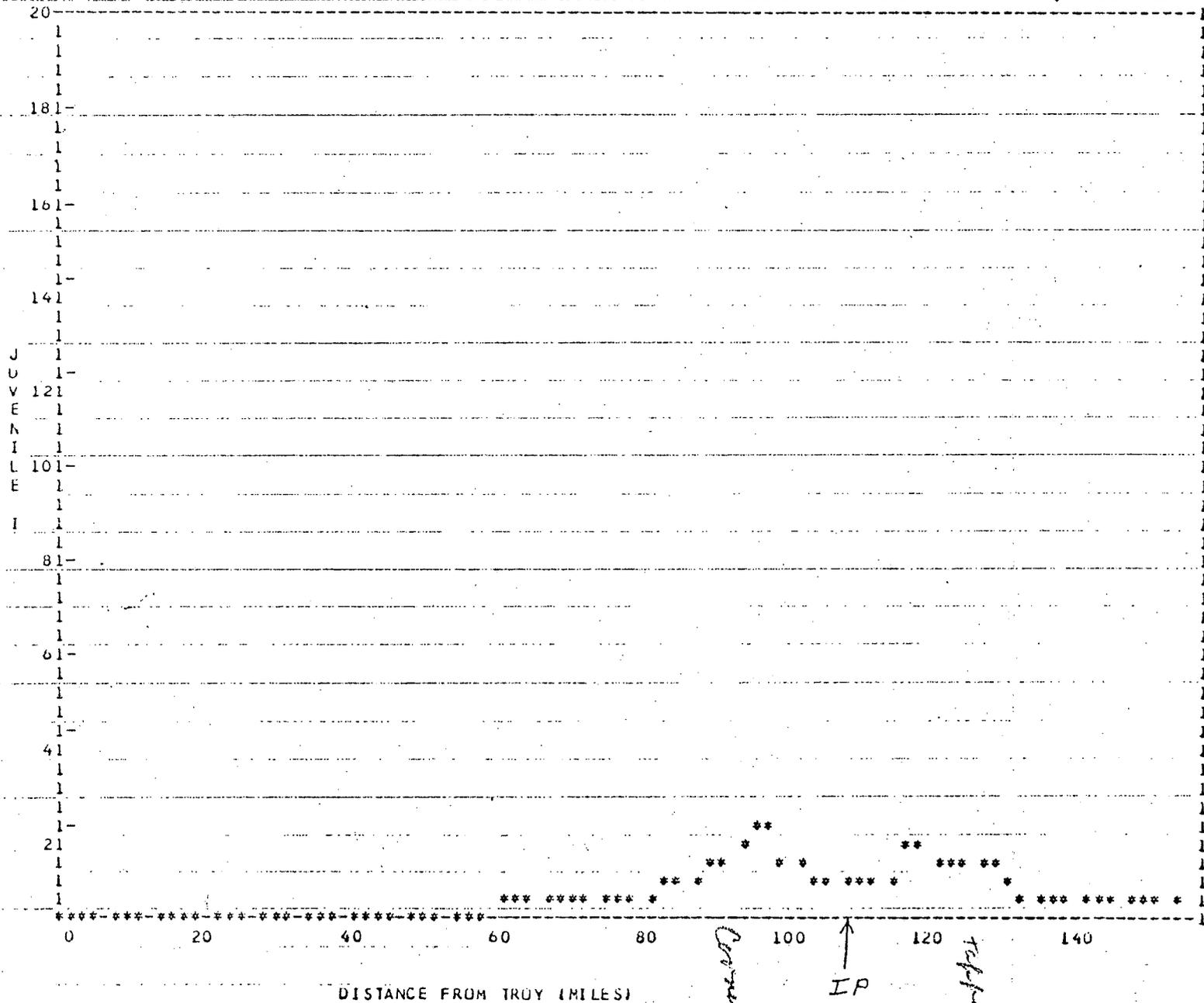


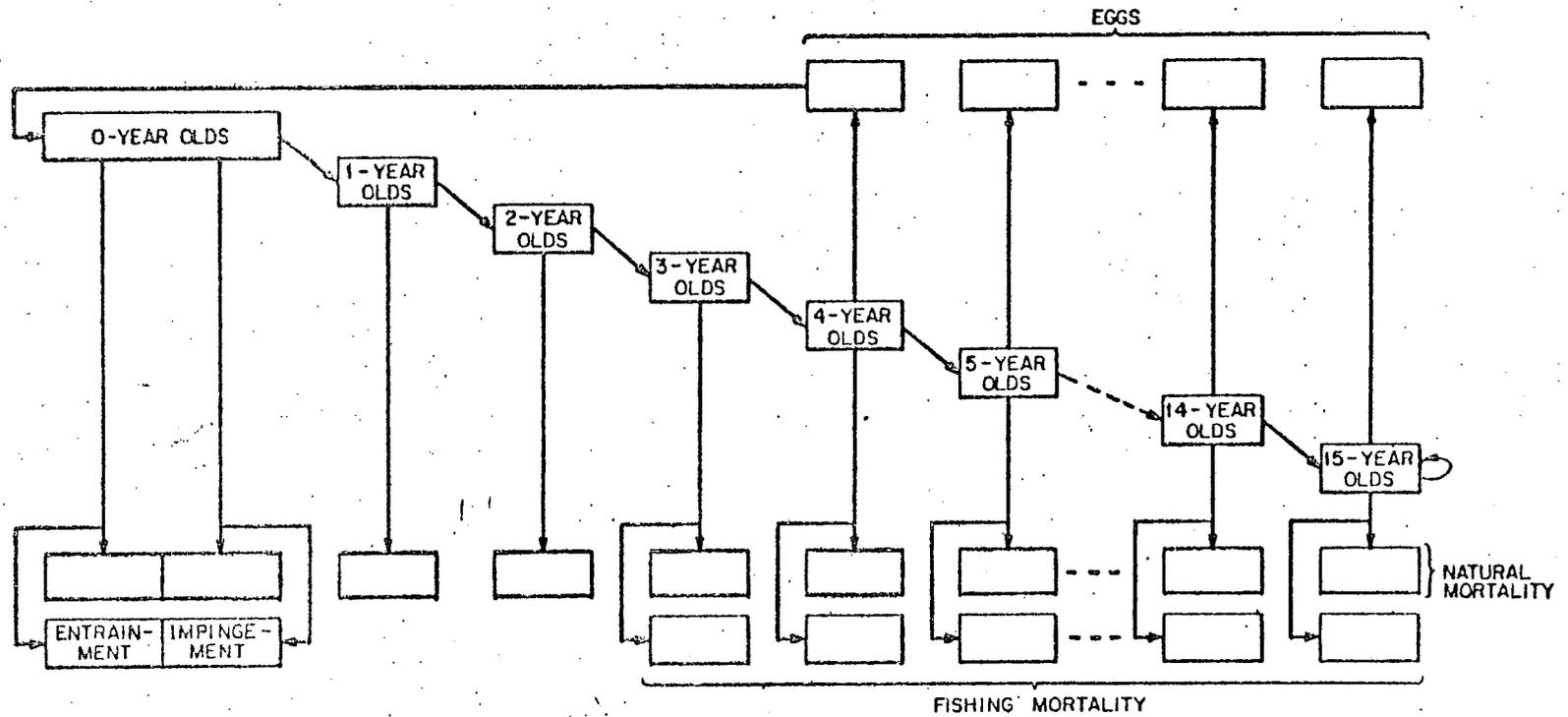
*Alvarez*

Y-SCALE FACTOR = 0.1000E 06

TIME = 1680.0 HRS

= 70 days





Population Model.

Table . Parameter combinations used for the 21 sets of RO and RC runs.\*

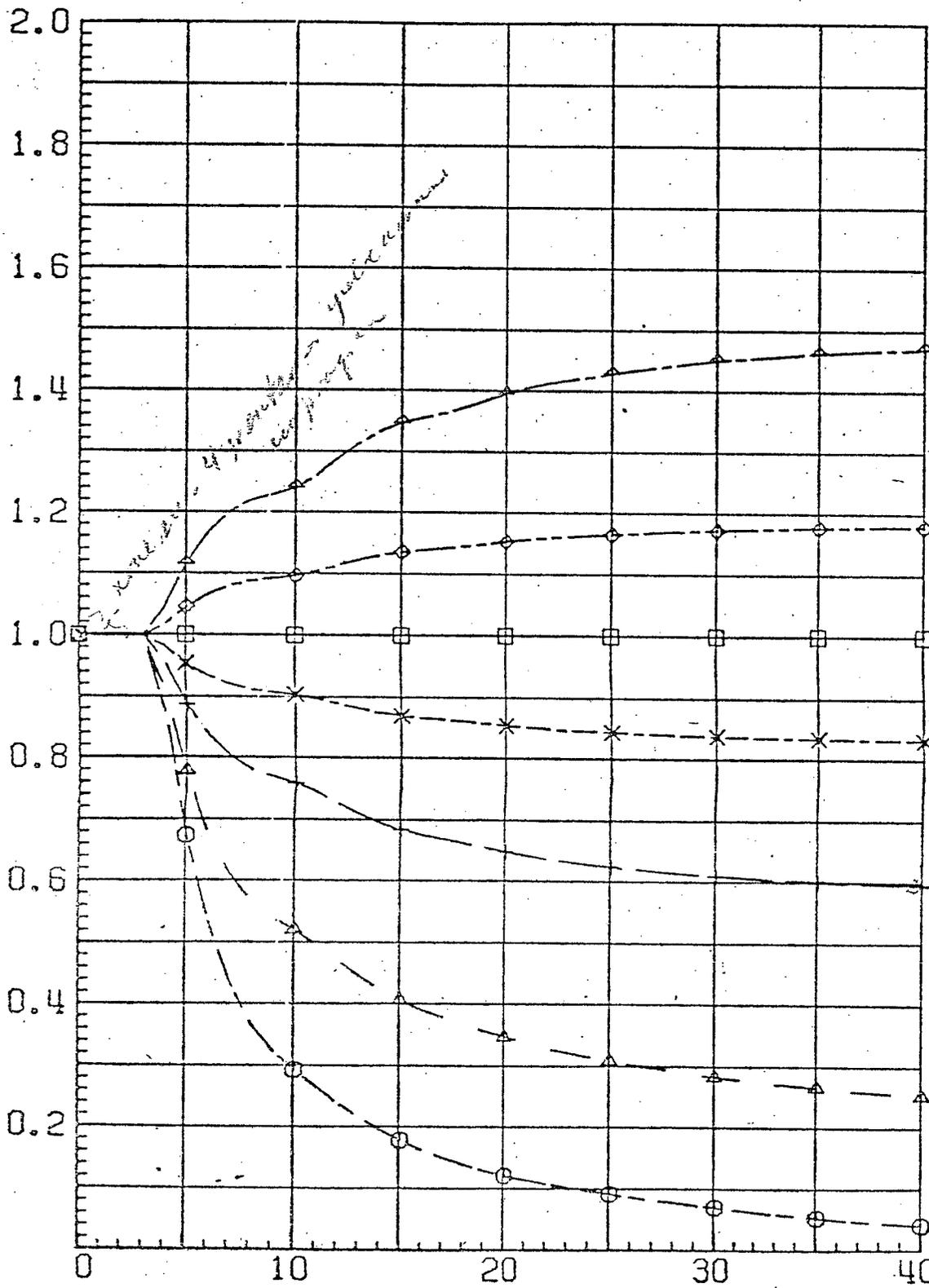
Set	FMT5	FMT6	FMT7	PNS1	PNS2	PNS <sub>i=3,15</sub>	B (mm/yr)	C (mm/yr <sup>2</sup> )	TOTP1 (lbs)	RATIO	PMAX	PMIN	D	LEGAL (mm)
1	0.0	0.67	1.0	0.4	0.6	0.8	115.1	-3.090	1E6	3.0	0.85	0.6	0.6	438
2	0.0	0.0	0.5											
3	0.5	1.0	1.0											
4				0.2	0.4	0.6								
5				0.6	0.8	0.9								
6							106.1	-3.890						
7							124.1	-2.290						
8									1E5					
9									1E7					
10										2.0				
11										5.0				
12											0.75	0.5	0.4	
13											0.75	0.5	0.8	
14											0.75	0.7	0.4	
15											0.75	0.7	0.8	
16											0.95	0.5	0.4	
17											0.95	0.5	0.8	
18											0.95	0.7	0.4	
19											0.95	0.7	0.8	
20														
21														

\* Set 1: Best Estimate values for all parameters. For sets 2-21 the values of one or more of the parameters listed across the top of the table were changed to the Minimum or Maximum values indicated in the body of the table. All other parameters remained at the Best Estimate values.

# SET 1

## RELATIVE YIELD VS. TIME

RELATIVE YIELD



PT  
 □ 0.0  
 ○ -0.75000  
 ▲ -0.50000  
 + -0.25000  
 × -0.10000  
 ◆ 0.10000  
 † 0.25000

Stacking

10

25

50

75

increased amount of PPO-1

TIME YEARS

Summary of RO Runs :

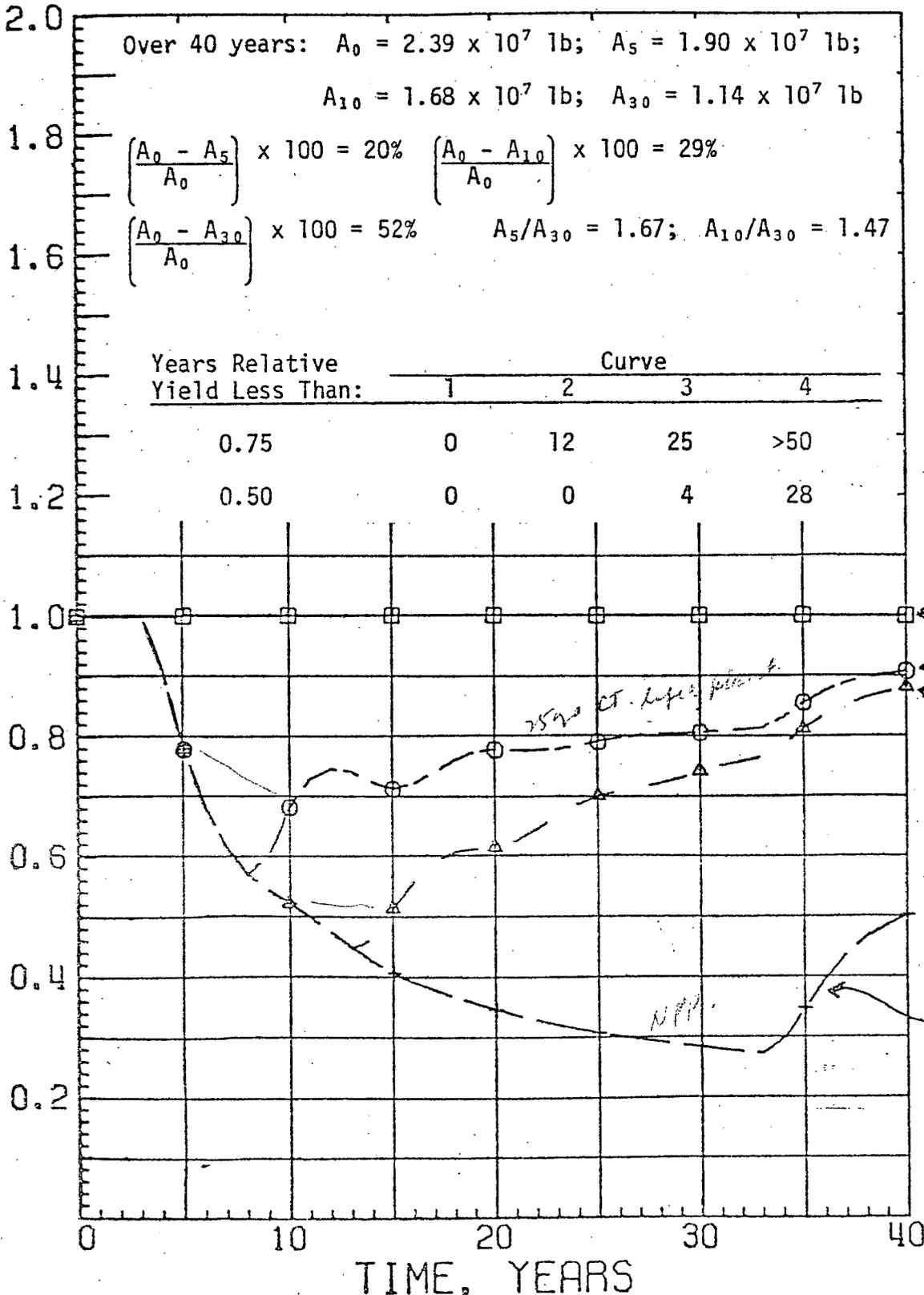
Relative Yield at End of 40 Years

Fractional Change in Survival of Young-of-the-Year, PPO-1.0

Parameter	Set	-0.75	-0.50	-0.25	-0.10	0.0	0.10	0.25
	1	0.04	0.25	0.59	0.83	1.00	1.18	1.47
	2	0.07	0.32	0.65	0.86	1.00	1.14	1.36
FMAT	1	0.04	0.25	0.59	0.83	1.00	1.18	1.47
	3	0.03	0.20	0.54	0.80	1.00	1.22	1.59
	4	0.01	0.13	0.49	0.78	1.00	1.24	1.65
PNS <sub>i</sub>	1	0.04	0.25	0.59	0.83	1.00	1.18	1.47
	5	0.09	0.33	0.65	0.86	1.00	1.15	1.39
	6	0.02	0.16	0.50	0.78	1.00	1.24	1.67
B,C	1	0.04	0.25	0.59	0.83	1.00	1.18	1.47
	7	0.06	0.31	0.64	0.85	1.00	1.15	1.39
	8	0.04	0.25	0.59	0.83	1.00	1.18	1.47
TOTP1	1	0.04	0.25	0.59	0.83	1.00	1.18	1.47
	9	0.04	0.25	0.59	0.83	1.00	1.18	1.47
	10	0.05	0.34	0.66	0.86	1.00	1.14	1.37
RATIO	1	0.04	0.25	0.59	0.83	1.00	1.18	1.47
	11	0.03	0.20	0.54	0.80	1.00	1.21	1.56
	12	0.02	0.17	0.51	0.79	1.00	1.22	1.60
	13	0.05	0.38	0.68	0.87	1.00	1.14	1.39
	14	0.01	0.07	0.34	0.67	1.00	1.43	2.34
	15	0.01	0.09	0.40	0.71	1.00	1.39	2.28
D, PMIN,	1	0.04	0.25	0.59	0.83	1.00	1.18	1.47
PMAX	16	0.04	0.26	0.61	0.84	1.00	1.16	1.39
	17	0.11	0.45	0.74	0.90	1.00	1.10	1.24
	18	0.02	0.16	0.49	0.78	1.00	1.24	1.63
	19	0.04	0.27	0.62	0.85	1.00	1.16	1.41
	20	0.06	0.33	0.66	0.86	1.00	1.14	1.36
LEGAL	1	0.04	0.25	0.59	0.83	1.00	1.18	1.47
	21	0.02	0.18	0.51	0.78	1.00	1.24	1.68

# SET 2

## RELATIVE YIELD VS. TIME



CONDITIONS FOR INDIAN POINT UNITS NOS. 2 AND 3

1. The Indian Point Ecological Studies shall be extended to May 1, 1977 so that data will be obtained during 3 striped bass spawning seasons with Unit No. 2 and/or Unit No. 3 in full commercial operation.
2. There shall be regularly scheduled meetings at 6 month intervals until the Indian Point Ecological Studies are completed to discuss results and progress of the Studies. The meetings shall be organized jointly by the applicant and the AEC staff and the program shall provide adequate time for discussions. All parties shall be invited to these meetings.
3. The final report of the Indian Point Ecological Studies shall be delivered to all parties by May 1, 1978.
4. The AEC staff will make recommendations regarding the need for a closed-cycle cooling system by November 1, 1978.
5. Operation with once-through cooling shall cease on November 1, 1981, unless the AEC has reached a prior decision that a closed-cycle cooling system is not required.