



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
631 PARK AVENUE
KING OF PRUSSIA, PENNSYLVANIA 19406

OCT 22 1981

Docket No. 50-293

MEMORANDUM FOR: L. K. Cohen, Health Physicist, Reactor Radiological Safety Section, RSB:IE

FROM: J. J. Kottan, Radiation Laboratory Specialist, Region I

SUBJECT: Fe-55 AND P-32 IN THE MARINE PATHWAY

Background

In a memo dated April 26, 1978 from B. K. Grimes, Assistant Director for Engineering and Projects, Division of Operating Reactors, NRR to L. B. Higginbotham, Assistant Director, Division of Fuel Facility and Materials Safety, OI&E, a request was made that IE initiate a study for sampling the aquatic environment for Fe-55 and P-32 at the Pilgrim Nuclear Power Station. The request to implement the sampling and analysis program at Pilgrim was transmitted to Region I via Track Item H30165F1. A meeting was held with the Boston Edison Company on July 25, 1979 to discuss the implementation of the program. Sampling started during the Fall season, 1979.

Status

The licensee is continuing to send samples to RESL for analyses. The total sampling period to date has been approximately two years. The expected duration of the program was initially expected to be only one year in length. The licensee would like to discontinue this program as soon as possible.

Recommendations

The data accumulated to date indicate that P-32 and Fe-55 were not present in detectable quantities in any of the fish, lobster or Irish moss samples. A detectable concentration of Fe-55 (508+6pCi/kg) was detected in one mussel sample taken from the plant outfall on January 10, 1980. The licensee submitted an LER for the same sample because the Co-60 (167+25pCi/kg) and Cr-51 (339+14 pCi/kg) concentrations were greater than ten times the control station values. During the period January 1, 1980 through May 5, 1981 the licensee submitted seven LER's for Co-60 in either mussels or Irish moss greater than ten times the control station value. However, Fe-55 was not detected in any of the other samples analyzed by RESL. Attachment A contains the sampling and analysis results, Attachment B lists the total release of Fe-55, Co-60, Zn-65 and Cr-51 for the same time periods as the sampling program, and Attachment C lists the sampling locations.

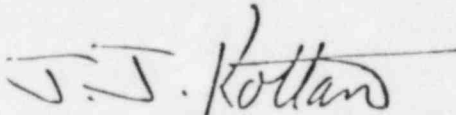
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Based on a review of the attached data I would recommend that the present cooperative sampling and analysis program with Boston Edison Company be discontinued. However, I would also recommend that Fe-55 and P-32 analyses be performed on the marine samples collected as part of the Massachusetts State contract program.



J. J. Kottan, Radiation Laboratory
Specialist

Attachments: As Stated

cc: R. J. Bores

Attachment A

Results of Fe-55, P-32 Sampling and Analysis Program

<u>Sample Type</u>	<u>Location</u>	<u>Date</u>	<u>Fe-55 uCi/kg</u>	<u>P-32 uCi/kg</u>
(striped) Fish (bass)	Control	10-23-79	(5+5) E-6	(0+3) E-6
" (striped) " (bass)	site 11	10-16-79	(1+1) E-5	-
" (--)	site 11	1-8-80	(0+3) E-6	(0+2) E-6
" (--)	site 11	1-23-80	(0+3) E-6	(0+2) E-6
" (--)	Control	1-23-80	(-3+3) E-6	(7+4) E-6
" (--)	site 99	2-4-80	(12+6) E-6	(0+4) E-6
(Atlantic) " (cod)	site 11	2-12-80	(0+6) E-6	(0+4) E-6
(Atlantic) " (herring)	site 11	2-12-80	(6+6) E-6	(0+4) E-6
(Atlantic) " (herring)	site 11	2-12-80	(0+6) E-6	(4+4) E-6
(Atlantic) " (cod)	site 11	3-20-80	(0+1) E-5	(9+17) E-6
(Atlantic) " (herring)	site 11	4-18-80	(1+1) E-5	(6+12) E-6
" (hake)	control	5-10-80	(8+8) E-6	(-6+12) E-6
" (alewife)	control	5-10-80	(0+6) E-6	(0+9) E-6
" (alewife)	control	5-5-80	(0+5) E-6	(-8+8) E-6
" (cunner)	site 11	5-8-80	(0+1) E-5	(-14+14) E-6
" (alewife)	site 11	5-8-80	(0+6) E-6	(-4+8) E-6
" (tautog)	site 11	5-8-80	(0+1) E-5	(16+16) E-6
(winter) " (flounder)	site 11	5-29-80	(0+6) E-6	(6+12) E-6
(winter) " (founder)	site 11	5-29-80	(0+6) E-6	(0+8) E-6
" (alewife)	site 11	6-13-80	(0+6) E-6	(6+12) E-6

<u>Sample Type</u>	<u>Location</u>	<u>Date</u>	<u>Fe-55 uCi/kg</u>	<u>P-32 uCi/kg</u>
Fish (hake)	site 11	7-22-80	(0 _± 6) E-6	(4 _± 9) E-6
"(cunner)	site 11	7-22-80	(6 _± 6) E-6	(0 _± 9) E-6
"(bluefish)	control	7-11-80	(0 _± 6) E-6	(0 _± 9) E-6
(Atlantic)				
"(mackerel)	site 11	7-11-80	(6 _± 6) E-6	(6 _± 12) E-6
(winter)				
"(flounder)	site 1	9-17-80	(12 _± 6) E-6	(6 _± 12) E-6
(yellow tail)				
"(flounder)	site 11	9-17-80	(0 _± 6) E-6	(0 _± 8) E-6
"(tautog)	site 11	10-8-80	(6 _± 6) E-6	(-8 _± 16) E-6
"(pollock)	site 11	10-8-80	(6 _± 6) E-6	(-4 _± 8) E-6
(winter)				
"(flounder)	site 11	10-31-80	(6 _± 6) E-6	(8 _± 16) E-6
(yellow tail)				
"(flounder)	site 11	10-31-80	(0 _± 6) E-6	(4 _± 8) E-6
"(cod)	control	11-14-80	(0 _± 5) E-6	(3 _± 6) E-6
"(cod)	control	11-14-80	(5 _± 5) E-6	(0 _± 6) E-6
(Atlantic)				
"(herring)	control	11-14-80	(6 _± 6) E-6	(0 _± 12) E-6
(striped)				
"(bass)	site 11	10-21-80	(6 _± 6) E-6	(0 _± 16) E-6
(winter)				
"(flounder)	site 11	3-9-81	(5 _± 5) E-6	(0 _± 6) E-6
"(cod)	site 11	3-9-81	(6 _± 6) E-6	(0 _± 12) E-6
(winter)				
"(flounder)	site 11	3-9-81	(4 _± 4) E-6	(5 _± 10) E-6

<u>Sample Type</u>	<u>Location</u>	<u>Date</u>	<u>Fe-55 uCi/kg</u>	<u>P-32 uCi/kg</u>
(winter) Fish(flounder)	control(site 21)	4-3-81	(0 _± 6) E-6	(6 _± 12) E-6
"(cod)	control(site 21)	3-9-81	(0 _± 6) E-6	(0 _± 8) E-6
"(cod)	site 11	3-9-81	(6 _± 6) E-6	(6 _± 12) E-6
(winter) "(flounder)	site 11	4-3-81	(0 _± 6) E-6	(0 _± 12) E-6
(winter) "(flounder)	site 11	4-3-81	(0 _± 6) E-6	(0 _± 12) E-6
"(pollock)	site 11	5-15-81	(6 _± 6) E-6	(-6 _± 12) E-6
"(pollock)	site 11	6/3-4/81	(6 _± 6) E-6	(4 _± 8) E-6
"(mackerel)	site 11	6/3-4/81	(6 _± 6) E-6	(4 _± 8) E-6
(striped) "(bass)	site 11	5-15-81	(0 _± 6) E-6	(0 _± 12) E-6
(striped) "(bass)	site 11	5-15-81	(0 _± 6) E-6	(6 _± 12) E-6
(striped) "(bass)	site 11	6/3-4/81	(6 _± 6) E-6	(4 _± 8) E-6
Irish moss	not given	10-24-79	(3 _± 2) E-5	-
Irish moss	not given	10-29-79	(1 _± 1) E-5	(-6 _± 6) E-7
Irish moss	site 11	1-10-80	(9 _± 3) E-6	(0 _± 2) E-6
Irish moss	site 15	1-22-80	(0 _± 3) E-6	(-2 _± 2) E-6
Irish moss	site 22	1-22-80	(2 _± 1) E-6	(8 _± 8) E-7
Irish moss	site 11	3-6-80	(2 _± 2) E-6	(1 _± 2) E-6
Irish moss	site 22	4-7-80	(2 _± 2) E-6	(0 _± 2) E-6
Irish moss	site 11	5-29-80	(7 _± 7) E-6	(1 _± 2) E-6

<u>Sample Type</u>	<u>Location</u>	<u>Date</u>	<u>Fe-55 uCi/kg</u>	<u>P-32 uCi/kg</u>
Irish moss	site 22	7-15-80	(0 _± 2) E-6	(2 _± 4) E-6
Irish moss	site 11	7-18-80	(0 _± 2) E-6	(0 _± 2) E-6
Irish moss	site 11	10-22-80	(0 _± 4) E-6	(2 _± 4) E-6
Irish moss	site 11	10-27-80	(6 _± 6) E-6	(0 _± 16) E-6
Irish moss	site 22	2-12-81	(0 _± 3) E-6	(0 _± 4) E-6
Irish moss	site 11	2-11-81	(0 _± 3) E-6	(0 _± 4) E-6
Irish moss	site 11	5-27-81	(3 _± 3) E-6	(2 _± 4) E-6
Irish moss	site 22	6-8-81	(6 _± 6) E-6	(4 _± 8) E-6
mussels	not given	10-11-79	(3 _± 3) E-5	-
mussels	not given	10-12-79	(5 _± 3) E-5	-
mussels	site 11	1-10-80	(3 _± 3) E-6	(2 _± 2) E-6
mussels	site 11 ¹⁵	1-11-80	(5.08 _± 0.06) E-4	(2 _± 2) E-6
mussels	site 24	1-24-80	(6 _± 3) E-6	(2 _± 2) E-6
mussels	site 12	1-25-80	(0 _± 3) E-6	(6 _± 2) E-6
mussels	not given	4-8-80	(0 _± 3) E-6	(2 _± 4) E-6
mussels	site 24	6-5-80	(0 _± 7) E-6	(2 _± 4) E-6
mussels	site 11	7-14-80	(6 _± 6) E-6	(0 _± 4) E-6
mussels	site 24	7-17-80	(3 _± 3) E-6	(2 _± 4) E-6
mussels	site 11	10-1-80	(0 _± 6) E-6	(3 _± 6) E-6
mussel shells	site 11	10-1-80	(6 _± 6) E-6	(6 _± 12) E-6
mussels	site 24	10-17-80	(0 _± 4) E-6	(0 _± 5) E-6
mussels	site 24	2-25-81	(6 _± 6) E-6	(4 _± 9) E-6

<u>Sample Type</u>	<u>Location</u>	<u>Date</u>	<u>Fe-55 uCi/kg</u>	<u>P-32 uCi/kg</u>
mussels	site 11	3-12-81	(0+3) E-6	(0+4) E-6
mussels	site 11	5-15-81	(0+3) E-6	(0+2) E-6
mussels	site 24	6-4-81	(0+3) E-6	(0+2) E-6
lobster	not given	9-29-79	(5+3) E-6	-
lobster	not given	9-30-79	(7+7) E-6	-

Attachment B

Total Liquid Releases (in Curies)
From Pilgrim Nuclear Power Station
For the Period January 1979-June 1981

<u>Period</u>	<u>Fe-55</u>	<u>Co-60</u>	<u>Zn-65</u>	<u>Cr-51</u>
1/1/79-3/31/79	0.0518	0.0208	0.000101	0.0000735
4/1/79-6/30/79	0.196	0.0402	0.00048	0.00117
7/1/79-9/30/79	0.0194	0.00723	0.0000164	0.000174
10/1/79-12/31/79	0.0462	0.0166	0.0000785	0.00528
1/1/80-3/31/80	0.212	0.336	0.0022	0.0161
4/1/80-6/30/80	0.187	0.157	0.00101	-
7/1/80-9/30/80	0.0753	0.189	0.00183	0.0247
10/1/80-12/31/79	0.0871	0.0728	0.00056	0.00483
1/1/81-3/31/81	0.313	0.515	0.00306	0.0163
4/1/81-6/30/81	0.0484	0.030	0.0000641	-

NOTE: Co-60 is listed because it is reported in the LER's for mussel samples. Zn-65 and Cr-51 have high relative bioaccumulation factors as listed in Table A-1 of Reg. Guide 1.109.

Attachment C

Sampling Locations

<u>Media</u>	<u>Station Number</u>	<u>Location</u>
Mussels	11	Discharge Canal Outfall
	12	Plymouth Harbor
	13	Duxbury Bay
	15	Manomet Pt.
	24	Marshfield (Control)
Irish Moss	11	Discharge Canal Outfall
	15	Manomet Pt.
	22	Ellisville (Control)
Lobster	11	Vicinity of Discharge Canal
	15/99	Offshore (Control)
	25	Scituate (Control)
Fish	2	Round Hill Pt. (Control)
	11	Vicinity of Discharge Canal
	21	Auto Trawl Station Offshore (Control)
	22	Offshore (Control)
	99	Priest Cove (Control)