NRC FORM 195 (2-76)

U.S. NUCLEAR REGULATORY COMMISSION

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APPENDIX I DISTRIBUTION AFTER ISSUANCE OF A LICENSE

Plant Name:

Duane Arnold

ENCLOSURE

Furnishing the necessary page changes needed to amend the information transmitted in the referenced letter.

ACKNOWLEDGED

DO NOT REMOVE

FOR ACTION/INFORMATION 9/1/76 RJL

	ASSIGNED AD:			ASSIGNED AD:	
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	MELTZ					✓	VERDERY
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NRC FORM 195 (2-76)

IOWA ELECTRIC LIGHT AND POWER COMPANY

General Office

CEDAR RAPIDS, IOWA

August 30, 1976
IE-76-1306

50-331

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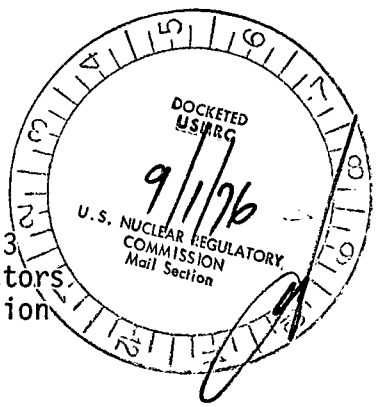
VICE PRESIDENT – ENGINEERING



Mr. George Lear, Chief
Operating Reactors Branch 3
Division of Operating Reactors
Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Lear:

On June 3, 1976 we transmitted to you information as required by Section V.B of Appendix I to 10CFR Part 50. We hereby amend that information with the enclosed page changes.

During a review of the information transmitted on June 3 we discovered the GALE input to the cost-beneficial case had not included the use of the charcoal and HEPA on the drywell gaseous discharge. With these inputs now included the cost-beneficial-case is shown to meet the individual dose requirements via the milk path. The enclosed page changes include results of this corrected input and minor clerical changes.

This amendment to our evaluation does not change the conclusions stated in our June 3, 1976 submittal, i.e. "The presently installed equipment (less the evaporator) meets Appendix I numerical guidelines for keeping levels of radioactivity in effluents to unrestricted areas as low as reasonably achievable and that additional equipment (including the evaporator) is not advantageous when considered in accordance with the cost benefit criteria of Regulatory Guide 1.110."

Three originals and 37 copies of this amendment are transmitted herewith. This submittal consisting of this letter and the attachment hereto, is true and accurate to the best of my knowledge and belief.

Iowa Electric Light and Power Company

By: _____
Lee Liu
Vice President, Engineering

Subscribed and Sworn to Before me
on this 30th day of August, 1976.

_____
Notary Public in and for the State
of Iowa

Jean R. Smith
NOTARY PUBLIC
STATE OF IOWA
Commission Expires
September 30, 1978

LL/KAM/ms
Enc.
cc: K. Meyer
D. Arnold
J. Newman
J. Shea (NRC)
J. Keppler (NRC)
L. Root
File A-107, A-117

Thus in the case of additional augments, the difference will be positive, representing a reduction in release. In the case of the elimination of an augment, the difference will be negative, representing an increase in release. These differences for the alternate cases described in Table 3-1 are shown in Table 3-5.

3.4.4 Inputs for Cost-Beneficial Base

The indicated cost-beneficial equipment for the various waste systems is shown in Paragraph 3.9.2. Since the cost-beneficial case would involve the removal of some equipment pieces which were included in the base case, it is necessary to run the individual doses for the cost-beneficial case to determine whether it meets the requirements of Paragraphs II B & C of Appendix I. The cost-beneficial case is shown schematically on Figure 3-2. The GALE inputs for this cost-beneficial case are shown in Table 3-6 and the resulting gaseous releases are shown in Table 3-7.

3.5 Environmental Inputs

In order to convert the releases described in Section 3.4 into either individual or population doses it is necessary to develop a considerable amount of information which describes the pathways at and near the site by which radioactivity released in gaseous effluents might make its way back to individuals. In this section there are described the parameters which were used in making dose calculations to individuals and to populations. Extensive use has been made of the parameters outlined in Reg Guide 1.109, but these have been supplemented, particularly in the case of population doses, with site specific information. In the calculation of population doses considerable reliance has been placed on the selection of clearly conservative assumptions.

3.5.1 Characteristics of Maximum Individual

In the calculation of doses to individuals maximumly exposed to the gaseous discharges from DAEC the usage factors given in Table A-2 of Reg Guide 1.109 have been assumed. Doses to individuals have been calculated at three points:

a) Residence 1610 meters NNW

b) Residence 2650 meters WNW (real cow)

d) Residence 3000 meters NE (real cow)

3.5.5 Other Pathways

No other pathways which might increase the calculated population doses by as much as 10% were found.

3.6 Individual Doses

Individual doses for the various Cases described in Section 3.4 are discussed in this Section.

3.6.1 With Base Case

The gaseous releases described in Paragraph 3.4.2 were combined with the parameters outlined in Paragraph 3.5.1 and the individual doses were calculated using the methods of Reg Guide 1.109. The results of those calculations are summarized in Table 3-13. It can be seen that the Base Case gaseous releases meet all of the requirements of Paragraphs II B & C of Appendix I.

3.6.2 With Cost-Beneficial Case

The gaseous releases described in Paragraph 3.4.4 were treated in a similar manner and the results are summarized in Table 3-14. It can be seen that the doses which result from this case meet the requirements of Paragraphs II B & C of Appendix I although the infant doses via milk push the limit closely. This implies that all of the non-cost beneficial equipment already included in DAEC could be dispensed with. However, the equipment is already in place and it has been decided to continue using it notwithstanding its non-essentiality. Therefore, to demonstrate compliance with Appendix I the Base Case is used.

3.7 Population Doses

Three major food pathways:

a) fruits & vegetables
b) milk
c) meat

and three population-oriented pathways:

a) noble gas immersion
b) ground plane deposition
c) inhalation

have been evaluated in determining population doses from gaseous discharges. The first three depend on the crop production described in Paragraph 3.5.4, the last three on the populations described in Paragraph 3.5.3. Population doses have been calculated for the Base Case described in Section 3.2 and the changes in population dose for each of the alternatives described in Section 3.3 have also been calculated.

3.7.1 Base Case

The population doses resulting from the gaseous releases from the Base Case described in Section 3.2 and Paragraph 3.4.2 are shown in Table 3-15. It appears from the total shown in that table that the Base Case treatments may have already passed the point of cost-effectiveness. This point will be examined in more detail in section 3.9.

3.7.2 Change in Population Doses for Alternates Considered

Although there appears to be a reasonable chance that the gaseous augments already included in DAEC may have passed the point of cost effectiveness, to prove the point conclusively and to respond fully to the requirements of Paragraph II D of Appendix I requires that a series of augments (or subments) be hypothetically applied to the Base Case and a cost-benefit analysis be performed on these changes. To this end the alternates described in Section 3.3 were developed, the changes in the gaseous releases were determined (see Paragraph 3.4.3), and the changes in population dose resulting therefrom were calculated. The results of these calculations are shown in Table 3-16.

3.8 Cost Changes Associated with Alternates

3.8.1 Methodology

For each of the alternate cases listed in Table 3-1, estimates have been made of the capital and operating costs associated with the described change. The capital costs have been annualized and added to the annual operating costs to arrive at a total annual cost. For additional augments the resulting costs are additional costs to be compared to the savings in environmental cost which result from population dose reductions. For the instances in which an equipment sequence is removed (either actually or hypothetically), the resulting

costs are cost savings to be compared to increases in environmental cost which result from environmental dose increases. In either case the test is whether or not the quotient of

$$\frac{\text{annual cost in dollars}}{\text{annual change in dose in man-rem}}$$

is greater than $1000.

To the greatest extent possible the cost estimates used herein are based on Regulatory Guide 1.110. Only where necessary (and where indicated) have other sources of cost data and other methods of cost estimating been used.

3.8.2 Cost of Alternates

The resulting cost increases (or savings) for the alternate cases listed in Table 3-1 are shown in Table 3-17. A detailed backup for these values is given in Appendix A.

3.9 Cost Benefit Ratios

By combining the costs associated with the various alternates considered (given in Section 3.8) with the changes in population doses (given in Section 3.7) one obtains the cost per man-rem change in dose for each.

3.9.1 Alternate Cases

The Cost-benefit ratios for the alternate cases listed in Table 3-1 are shown in Table 3-18. The values given are based on the population values. It can be seen that there is no additional augment which is justified by cost-benefit and, indeed, there are two augments which have been included in the design which are not cost-beneficial.

3.9.2 Indicated Cost-Beneficial Configuration

Based solely on the criterion of cost-benefit the gaseous radwaste systems for DAEC should be those shown in Table 3-19. As indicated earlier even though this system is cost beneficial, and it does just meet the individual dose requirements, it has been decided to use the Base Case for demonstrating compliance with Appendix I.

3.10 Appendix I Compliance

For the Base Case equipment, discussed in sections 3.2 and 3.9 and shown schematically on Figure 3-1 it has been shown herein that:

Table 3-6

CALE Input Terms for Cost-Beneficial Case--Gases

Card No.	Spaces	Entry	Item	Units
21	73-80	7.147	gland seal steam	10^3 lb/hr
22	73-80	9.64E-03	mass steam in reactor	10^6 lb/hr
23	73-80	0.029	gland seal holdup time	hour
24	73-80	0.5	SJAE holdup	hour
25	43-45	Yes	Drywell vented through charcoal	
	52-54	Yes	Drywell vented through HEPA	
26	43-45	Blank	turbine, no charcoal	
	52-54	Blank	no HEPA	
	68-70	Blank	no clean steam	
27	73-80	1	no HEPA on charcoal on gland seal	
28	73-80	0	charcoal delay on SJAE	
29	43-45	Blank	no charcoal Reactor Bldg	
	52-54	Blank	no HEPA	
30	43-45	Blank	charcoal Radwaste Bldg	
	52-54	Blank	HEPA	
31	80	1	charcoal delay system	
32	73-80	18.5	Kr coef	
33	73-80	330	Xe coef	
34	73-80	2	No. of cond shells	
35	73-80	68	mass of charcoal	10^3 lb

TABLE 3-7

GASEOUS RELEASES -- COST-BENEFICIAL CASE
(CURIES/YEAR)

ISOTOPE	RELEASE FROM STACK	RELEASE FROM PLANT VENT	TOTAL
H----3	1.05E+01	1.05E+01	2.10E+01
C---14	9.50E+00	0.	9.50E+00
AR--41	0.	2.50E+01	2.50E+01
CR--51	0.	2.23E-02	2.23E-02
MN--54	0.	3.36E-02	3.36E-02
FE--59	0.	1.59E-02	1.59E-02
CO--58	0.	5.71E-03	5.71E-03
CO--60	0.	1.02E-01	1.02E-01
ZN--65	0.	3.72E-03	3.72E-03
KR-83M	6.70E+01	0.	6.70E+01
KR-85M	2.94E+03	7.40E+01	3.02E+03
KR--85	1.40E+02	0.	1.40E+02
KR--87	1.62E+02	1.36E+02	2.98E+02
KR--88	2.25E+03	2.36E+02	2.49E+03
KR--89	6.40E+02	0.	6.40E+02
SR--89	0.	6.54E-03	6.54E-03
SR--90	0.	3.25E-04	3.25E-04
ZR--95	0.	5.54E-04	5.54E-04
SB-124	0.	5.52E-04	5.52E-04
XE131M	5.20E+01	0.	5.20E+01
XE133M	4.80E+01	0.	4.80E+01
XE-133	1.44E+04	3.92E+02	1.48E+04
XE135M	1.80E+01	7.42E+02	7.60E+02
XE-135	5.10E+02	7.43E+02	1.25E+03
XE-137	7.80E+02	0.	7.80E+02
XE-138	5.90E+02	1.41E+03	2.00E+03
I--131	5.20E-02	4.27E-01	4.79E-01
I--133	8.80E-02	1.69E+00	1.78E+00
CS-134	3.00E-06	8.84E-03	8.84E-03
CS-136	2.00E-06	8.03E-04	8.05E-04
CS-137	1.00E-05	1.52E-02	1.52E-02
BA-140	1.10E-05	1.15E-02	1.15E-02
CE-141	0.	3.30E-03	3.30E-03

TABLE 3-14

MAXIMUM INDIVIDUAL DOSES FROM EXPOSURE TO GASEOUS RELEASES (MREM)

COST-BENEFICIAL CASE -- RESIDENCE 1609 METERS NNW

PATHWAY/AGE GROUP	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
ADULTS								
NOBLE GAS IMMERSION (GAMMA)	1.91E+00	1.91E+00	1.91E+00	1.91E+00	1.91E+00	1.91E+00	2.22E+00	1.91E+00
NOBLE GAS IMMERSION (BETA)	0.	0.	0.	0.	0.	0.	1.32E+00	0.
GROUND PLANE DEPOSITION	1.35E+00	1.35E+00	1.35E+00	1.35E+00	1.35E+00	1.35E+00	1.57E+00	1.35E+00
INHALATION	1.43E-02	6.93E-02	1.13E+00	1.73E-02	8.10E-02	8.16E-03	0.	1.18E-
STORED FRUITS AND VEGETABLES	4.02E-01	1.70E-01	2.24E-01	7.04E-02	3.86E-02	1.09E+00	0.	1.70E-01
FRESH FRUITS AND VEGETABLES	7.48E-02	3.54E-02	4.24E+00	3.21E-02	4.91E-03	1.50E-01	0.	2.94E-02
TOTAL ADULTS	3.75E+00	3.53E+00	8.85E+00	3.35E+00	3.38E+00	4.51E+00	5.11E+00	3.47E+00
TEENAGERS								
NOBLE GAS IMMERSION (GAMMA)	1.91E+00	1.91E+00	1.91E+00	1.91E+00	1.91E+00	1.91E+00	2.22E+00	1.91E+00
NOBLE GAS IMMERSION (BETA)	0.	0.	0.	0.	0.	0.	1.32E+00	0.
GROUND PLANE DEPOSITION	1.35E+00	1.35E+00	1.35E+00	1.35E+00	1.35E+00	1.35E+00	1.57E+00	1.35E+00
INHALATION	7.85E-03	4.97E-02	9.72E-01	1.21E-02	7.85E-02	5.17E-03	0.	8.09E-03
STORED FRUITS AND VEGETABLES	5.34E-01	2.65E-01	3.18E-01	9.53E-02	4.40E-01	1.36E+00	0.	2.07E-01
FRESH FRUITS AND VEGETABLES	5.93E-02	3.02E-02	3.27E+00	2.10E-02	2.95E-02	1.00E-01	0.	2.13E-02
TOTAL TEENAGERS	3.86E+00	3.60E+00	7.82E+00	3.38E+00	3.81E+00	4.73E+00	5.11E+00	3.50E+00
CHILDREN								
NOBLE GAS IMMERSION (GAMMA)	1.91E+00	1.91E+00	1.91E+00	1.91E+00	1.91E+00	1.91E+00	2.22E+00	1.91E+00
NOBLE GAS IMMERSION (BETA)	0.	0.	0.	0.	0.	0.	1.32E+00	0.
GROUND PLANE DEPOSITION	1.35E+00	1.35E+00	1.35E+00	1.35E+00	1.35E+00	1.35E+00	1.57E+00	1.35E+00
INHALATION	8.66E-03	3.05E-02	1.35E+00	6.40E-03	7.09E-02	3.38E-03	0.	6.53E-
STORED FRUITS AND VEGETABLES	1.09E+00	4.61E-01	6.48E-01	7.04E-02	1.28E-01	1.26E+00	0.	2.99E-
FRESH FRUITS AND VEGETABLES	9.79E-02	3.92E-02	4.92E+00	1.30E-02	6.52E-03	6.89E-02	0.	2.71E-02
TOTAL CHILDREN	4.46E+00	3.79E+00	1.02E+01	3.35E+00	3.47E+00	4.59E+00	5.11E+00	3.59E+00
INFANTS								
NOBLE GAS IMMERSION (GAMMA)	1.91E+00	1.91E+00	1.91E+00	1.91E+00	1.91E+00	1.91E+00	2.22E+00	1.91E+00
NOBLE GAS IMMERSION (BETA)	0.	0.	0.	0.	0.	0.	1.32E+00	0.
GROUND PLANE DEPOSITION	1.35E+00	1.35E+00	1.35E+00	1.35E+00	1.35E+00	1.35E+00	1.57E+00	1.35E+00
INHALATION	1.14E-02	2.87E-02	2.32E+00	4.50E-03	1.05E-01	2.92E-03	0.	6.76E-03
TOTAL INFANTS	3.27E+00	3.29E+00	5.56E+00	3.26E+00	3.36E+00	3.26E+00	5.11E+00	3.27E+00

Doses above are based upon semi-infinite plume model for gamma dose. Use of finite plume model for the stack release point increases the noble gas immersion gamma and total doses for each organ by 0.24 mrem/year.

TABLE 3-14

MAXIMUM INDIVIDUAL DOSES FROM EXPOSURE TO GASEOUS RELEASES (MREM)

COST-BENEFICIAL CASE -- RESIDENCE 2650 METERS WNW

PATHWAY/AGE GROUP	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
ADULTS								
NOBLE GAS IMMERSION (GAMMA)	4.32E-01	4.32E-01	4.32E-01	4.32E-01	4.32E-01	4.32E-01	5.02E-01	4.32E-01
NOBLE GAS IMMERSION (BETA)	0.	0.	0.	0.	0.	0.	2.96E-01	0.
GROUND PLANE DEPOSITION	4.26E-01	4.26E-01	4.26E-01	4.26E-01	4.26E-01	4.26E-01	4.97E-01	4.26E-01
INHALATION	3.66E-03	1.54E-02	2.27E-01	4.23E-03	1.60E-02	1.72E-03	0.	3.30E-03
STORED FRUITS AND VEGETABLES	1.00E-01	3.81E-02	4.96E-02	1.75E-02	1.09E-02	2.29E-01	0.	3.62E-02
FRESH FRUITS AND VEGETABLES	1.80E-02	7.71E-03	8.87E-01	7.04E-03	1.38E-03	3.14E-02	0.	6.47E-03
MEAT (CONTAMINATED FORAGE)	7.52E-03	3.45E-03	5.37E-02	2.03E-03	1.40E-03	8.55E-03	0.	3.09E-03
MEAT (CONTAMINATED FEED)	6.50E-03	2.03E-03	1.25E-03	1.47E-03	1.31E-03	3.99E-03	0.	1.96E-03
COWS MILK (CONTAMIN FORAGE)	1.80E-02	1.69E-02	1.50E+00	1.32E-02	2.52E-03	5.09E-03	0.	1.20E-02
COWS MILK (CONTAMIN FEED)	9.91E-03	6.30E-03	1.63E-03	3.12E-03	1.91E-03	2.26E-03	0.	4.97E-03
TOTAL ADULTS	1.02E+00	9.48E-01	3.56E+00	9.07E-01	8.93E-01	1.14E+00	1.29E+00	9.28E-01
TEENAGERS								
NOBLE GAS IMMERSION (GAMMA)	4.32E-01	4.32E-01	4.32E-01	4.32E-01	4.32E-01	4.32E-01	5.02E-01	4.32E-01
NOBLE GAS IMMERSION (BETA)	0.	0.	0.	0.	0.	0.	2.96E-01	0.
GROUND PLANE DEPOSITION	4.26E-01	4.26E-01	4.26E-01	4.26E-01	4.26E-01	4.26E-01	4.97E-01	4.26E-01
INHALATION	1.95E-03	1.10E-02	1.96E-01	2.96E-03	1.55E-02	1.10E-03	0.	2.20E-03
STORED FRUITS AND VEGETABLES	1.20E-01	5.96E-02	7.12E-02	2.12E-02	9.56E-02	2.87E-01	0.	4.77E-02
FRESH FRUITS AND VEGETABLES	1.33E-02	6.59E-03	6.83E-01	4.62E-03	6.42E-03	2.12E-02	0.	4.75E-03
MEAT (CONTAMINATED FORAGE)	2.11E-03	2.57E-03	3.71E-02	1.20E-03	1.16E-03	4.71E-03	0.	2.07E-03
MEAT (CONTAMINATED FEED)	1.32E-03	1.55E-03	9.67E-04	8.68E-04	1.03E-03	2.33E-03	0.	1.40E-03
COWS MILK (CONTAMIN FORAGE)	2.22E-02	2.85E-02	2.26E+00	1.71E-02	4.55E-03	6.77E-03	0.	1.48E-02
COWS MILK (CONTAMIN FEED)	8.00E-03	1.06E-02	2.69E-03	4.02E-03	3.34E-03	3.33E-03	0.	5.84E-03
TOTAL TEENAGERS	1.03E+00	9.78E-01	4.11E+00	9.10E-01	9.86E-01	1.18E+00	1.29E+00	9.37E-01

Doses above are based upon semi-infinite plume model for gamma dose. Use of the finite plume model for the stack release point increases the noble gas immersion gamma and total doses for each organ by 0.08 mrem/year.

TABLE 3-14

MAXIMUM INDIVIDUAL DOSES FROM EXPOSURE TO GASEOUS RELEASES (MREM)

COST-BENEFICIAL CASE -- RESIDENCE 2650 METERS WNW

PATHWAY/AGE GROUP	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
CHILDREN								
NOBLE GAS IMMERSION (GAMMA)	4.32E-01	4.32E-01	4.32E-01	4.32E-01	4.32E-01	4.32E-01	5.02E-01	4.32E-01
NOBLE GAS IMMERSION (BETA)	0.	0.	0.	0.	0.	0.	2.96E-01	0.
GROUND PLANE DEPOSITION	4.26E-01	4.26E-01	4.26E-01	4.26E-01	4.26E-01	4.26E-01	4.97E-01	4.26E-01
INHALATION	2.00E-03	6.74E-03	2.72E-01	1.56E-03	1.40E-02	7.66E-04	0.	1.73E-03
STORED FRUITS AND VEGETABLES	2.40E-01	1.07E-01	1.46E-01	1.75E-02	3.82E-02	2.72E-01	0.	7.37E-02
FRESH FRUITS AND VEGETABLES	2.21E-02	8.72E-03	1.03E+00	2.86E-03	1.93E-03	1.49E-02	0.	6.24E-03
MEAT (CONTAMINATED FORAGE)	3.68E-02	3.62E-03	5.62E-02	7.57E-04	1.98E-03	3.93E-03	0.	3.04E-03
MEAT (CONTAMINATED FEED)	2.39E-03	2.50E-03	1.81E-03	5.48E-04	1.87E-03	2.56E-03	0.	2.26E-03
COWS MILK (CONTAMIN FORAGE)	5.19E-02	4.93E-02	4.49E+00	1.41E-02	8.99E-03	9.22E-03	0.	2.24E-02
COWS MILK (CONTAMIN FEED)	1.86E-02	1.92E-02	6.40E-03	3.32E-03	7.20E-03	6.45E-03	0.	8.52E-03
TOTAL CHILDREN	1.21E+00	1.06E+00	6.86E+00	8.99E-01	9.32E-01	1.17E+00	1.29E+00	9.76E-01
INFANTS								
NOBLE GAS IMMERSION (GAMMA)	4.32E-01	4.32E-01	4.32E-01	4.32E-01	4.32E-01	4.32E-01	5.02E-01	4.32E-01
NOBLE GAS IMMERSION (BETA)	0.	0.	0.	0.	0.	0.	2.96E-01	0.
GROUND PLANE DEPOSITION	4.26E-01	4.26E-01	4.26E-01	4.26E-01	4.26E-01	4.26E-01	4.97E-01	4.26E-01
INHALATION	2.34E-03	6.26E-03	4.66E-01	1.10E-03	2.07E-02	7.21E-04	0.	1.72E-03
COWS MILK (CONTAMIN FORAGE)	1.08E-01	1.14E-01	1.08E+01	1.41E-02	1.99E-02	1.56E-02	0.	3.80E-02
COWS MILK (CONTAMIN FEED)	3.84E-02	4.31E-02	1.37E-02	3.32E-03	1.57E-02	1.28E-02	0.	1.49E-02
TOTAL INFANTS	1.01E+00	1.02E+00	1.21E+01	8.77E-01	9.14E-01	8.87E-01	1.29E+00	9.13E-01

Doses above are based upon semi-infinite plume model for gamma dose. Use of the finite plume model for the stack release point increases the noble gas immersion gamma and total doses for each organ by 0.08 mrem/year.

TABLE 3-14

MAXIMUM INDIVIDUAL DOSES FROM EXPOSURE TO GASEOUS RELEASES (MREM)

COST-BENEFICIAL CASE -- RESIDENCE 3000 METERS NE

PATHWAY/AGE GROUP	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
ADULTS								
NOBLE GAS IMMERSION (GAMMA)	2.26E-01	2.26E-01	2.26E-01	2.26E-01	2.26E-01	2.26E-01	2.62E-01	2.26E-01
NOBLE GAS IMMERSION (BETA)	0.	0.	0.	0.	0.	0.	1.54E-01	0.
GROUND PLANE DEPOSITION	2.19E-01	2.19E-01	2.19E-01	2.19E-01	2.19E-01	2.19E-01	2.56E-01	2.19E-01
INHALATION	1.92E-03	7.91E-03	1.14E-01	2.17E-03	8.15E-03	8.78E-04	0.	1.73E-03
STORED FRUITS AND VEGETABLES	9.62E-02	3.45E-02	4.65E-02	1.53E-02	9.09E-03	2.14E-01	0.	3.49E-02
FRESH FRUITS AND VEGETABLES	1.82E-02	7.17E-03	8.55E-01	6.59E-03	1.15E-03	2.96E-02	0.	6.02E-03
MEAT (CONTAMINATED FORAGE)	6.36E-03	3.07E-03	5.17E-02	1.74E-03	1.22E-03	7.85E-03	0.	2.73E-03
MEAT (CONTAMINATED FEED)	5.33E-03	1.73E-03	1.00E-03	1.21E-03	1.06E-03	3.57E-03	0.	1.69E-03
COWS MILK (CONTAMIN FORAGE)	1.66E-02	1.58E-02	1.44E+00	1.24E-02	2.17E-03	4.68E-03	0.	1.11E-02
COWS MILK (CONTAMIN FEED)	3.50E-03	3.71E-03	1.34E-03	2.72E-03	1.59E-03	1.93E-03	0.	4.47E-03
TOTAL ADULTS	5.98E-01	5.21E-01	2.95E+00	4.87E-01	4.69E-01	7.08E-01	6.72E-01	5.03E-01
TEENAGERS								
NOBLE GAS IMMERSION (GAMMA)	2.26E-01	2.26E-01	2.26E-01	2.26E-01	2.26E-01	2.26E-01	2.62E-01	2.26E-01
NOBLE GAS IMMERSION (BETA)	0.	0.	0.	0.	0.	0.	1.54E-01	0.
GROUND PLANE DEPOSITION	2.19E-01	2.19E-01	2.19E-01	2.19E-01	2.19E-01	2.19E-01	2.56E-01	2.19E-01
INHALATION	1.01E-03	5.67E-03	9.85E-02	1.52E-03	7.88E-03	5.67E-04	0.	1.20E-03
STORED FRUITS AND VEGETABLES	1.23E-01	5.42E-02	6.67E-02	1.85E-02	8.77E-02	2.68E-01	0.	4.33E-02
FRESH FRUITS AND VEGETABLES	1.43E-02	6.13E-03	6.59E-01	4.32E-03	5.89E-03	1.99E-02	0.	4.42E-03
MEAT (CONTAMINATED FORAGE)	1.94E-03	2.28E-03	3.56E-02	1.03E-03	9.58E-04	4.29E-03	0.	1.82E-03
MEAT (CONTAMINATED FEED)	1.13E-03	1.32E-03	7.79E-04	7.15E-04	8.37E-04	2.06E-03	0.	1.18E-03
COWS MILK (CONTAMIN FORAGE)	2.15E-02	2.66E-02	2.18E+00	1.60E-02	3.95E-03	6.15E-03	0.	1.37E-02
COWS MILK (CONTAMIN FEED)	7.32E-03	9.58E-03	2.21E-03	3.52E-03	2.82E-03	2.81E-03	0.	5.15E-03
TOTAL TEENAGERS	6.15E-01	5.51E-01	3.49E+00	4.91E-01	5.05E-01	7.49E-01	6.72E-01	5.16E-01

TABLE 3-14

MAXIMUM INDIVIDUAL DOSES FROM EXPOSURE TO GASEOUS RELEASES (MREM)

COST-BENEFICIAL CASE -- RESIDENCE 3000 METERS NE

PATHWAY/AGE GROUP	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	SKIN	TOTAL BODY
CHILDREN								
NOBLE GAS IMMERSION (GAMMA)	2.26E-01	2.26E-01	2.26E-01	2.26E-01	2.26E-01	2.26E-01	2.62E-01	2.26E-01
NOBLE GAS IMMERSION (BETA)	0.	0.	0.	0.	0.	0.	1.54E-01	0.
GROUND PLANE DEPOSITION	2.19E-01	2.19E-01	2.19E-01	2.19E-01	2.19E-01	2.19E-01	2.56E-01	2.19E-01
INHALATION	1.03E-03	3.47E-03	1.37E-01	8.04E-04	7.14E-03	4.11E-04	0.	9.10E-04
STORED FRUITS AND VEGETABLES	2.60E-01	9.61E-02	1.36E-01	1.53E-02	3.17E-02	2.52E-01	0.	6.59E-02
FRESH FRUITS AND VEGETABLES	2.41E-02	8.05E-03	9.90E-01	2.68E-03	1.60E-03	1.39E-02	0.	5.81E-03
MEAT (CONTAMINATED FORAGE)	3.37E-03	3.16E-03	5.41E-02	6.50E-04	1.62E-03	3.45E-03	0.	2.62E-03
MEAT (CONTAMINATED FEED)	2.03E-03	2.11E-03	1.46E-03	4.51E-04	1.52E-03	2.17E-03	0.	1.90E-03
COWS MILK (CONTAMIN FORAGE)	5.03E-02	4.58E-02	4.33E+00	1.32E-02	7.66E-03	7.99E-03	0.	2.05E-02
COWS MILK (CONTAMIN FEED)	1.69E-02	1.72E-02	5.25E-03	2.90E-03	5.99E-03	5.29E-03	0.	7.23E-03
TOTAL CHILDREN	8.03E-01	6.21E-01	6.10E+00	4.81E-01	5.02E-01	7.30E-01	6.72E-01	5.50E-01
INFANTS								
NOBLE GAS IMMERSION (GAMMA)	2.26E-01	2.26E-01	2.26E-01	2.26E-01	2.26E-01	2.26E-01	2.62E-01	2.26E-
NOBLE GAS IMMERSION (BETA)	0.	0.	0.	0.	0.	0.	1.54E-01	0.
GROUND PLANE DEPOSITION	2.19E-01	2.19E-01	2.19E-01	2.19E-01	2.19E-01	2.19E-01	2.56E-01	2.19E-01
INHALATION	1.31E-03	3.21E-03	2.35E-01	5.66E-04	1.05E-02	3.82E-04	0.	8.98E-04
COWS MILK (CONTAMIN FORAGE)	1.04E-01	1.06E-01	1.05E+01	1.32E-02	1.71E-02	1.32E-02	0.	3.47E-02
COWS MILK (CONTAMIN FEED)	3.50E-02	3.88E-02	1.13E+02	2.90E-03	1.31E-02	1.04E-02	0.	1.24E-02
TOTAL INFANTS	5.85E-01	5.93E-01	1.12E+01	4.62E-01	4.86E-01	4.69E-01	6.72E-01	4.93E-01

Table 3-19

Indicated Cost-Beneficial Treatment

System	Indicated Treatment
SJAE	Operate as at present with at least two fewer beds
Gland Seal	Present Design
Drywell	Present Design
Turbine Bldg	Discard without treatment-Present Design
Auxiliary (Reactor) Bldg	Discard without treatment-Present Design
Radwaste Bldg	Remove HEPA and discard w/o treatment