UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
DAIRYLAND POWER COOPERATIVE	)	Docket No. 50-409
	)	(FTOL PROCEEDING)
	)	
(La Crosse Boiling Water Reactor)	)	

AFFIDAVIT OF ROBERT P. GECKLER

Robert P. Geckler, being duly sworn, deposes and says:

My name is Robert P. Geckler. I am employed by the Nuclear Regulatory Commission and assigned to the Environmental Engineering Branch of the Division of Engineering. At the time of the preparation of the Final Environmental Statement (FES) concerning the operation of the La Crosse Boiling Water Reactor (LACBWR), I was the environmental project manager for the La Crosse plant. The Final Environmental Statement for LACBWR was prepared under my supervision.

The purpose of this affidavit is to respond to questions concerning the LACBWR FES submitted on May 21, 1980 to the Applicant and Staff by the Atomic Safety and Licensing Board. This affidavit was prepared by me or under my supervision. My professional qualifications are attached to this statement. (Attachment 2)

Board Question 1

With respect to Contention 2A, regarding off-gas emissions, there appear to be some discrepancies in the radiological release figures provided in the FES. The Staff's evaluation of releases of radioactive material in gaseous effluents is based on the period 1978-79, whereas the Applicant's higher estimates for noble gases, I-131 and particulates are based on actual releases during early 1977. On the other hand, EPA estimates that releases of I-131 may be considerably higher (FES, p. A-10). The Board desires a reconciliation of these estimates and, in any event, a listing of actual annual releases of gaseous effluents (particularly I-131) throughout the life of the plant. The Board also wishes an explanation of why the years used by the Staff (1978-79) as a basis for estimates are more appropriate than those used by the Applicant or EPA, which apparently reflect higher release values. Please describe in detail any mechanical or operational changes in the facility which may justify using the years chosen by the Staff.

In making its calculation of estimated radiological releases, the Staff apparently used the parameters appearing in Table 3.6-1, including a plant capacity factor of .71. The .71 factor was based on 9 years past operation at 0.5 and 21 years projected operation at a factor of 0.8. In projecting for the future, why should not only the future projected factor (0.8) be used? (In any event, is 0.8 a realistic projection?)

Response

The Staff used 1978-79 releases as a basis for their off-gas estimate since these years reflected operation with the off-gas system modifications. The Applicant's estimate was submitted in February of 1978 and does not reflect these modifications. The EPA comment (FES p. A-10) does not make an estimate of releases, but points out that the Staff's radioactive estimates (in the DES) are high compared to the Applicant's actual reported releases, and that the Staff should factor in operational experience in their estimates. As indicated in the FES Section 3.6, paragraph 4, the Staff has used operating information to develop the release estimates.

To accommodate the Board's request for annual release reports, the semi-annual effluent release reports submitted by DPC for the La Crosse plant for 1973-1979 are attached. These are the only reports available. (Attachment 1)

The years 1978-79 are a more appropriate basis for estimating releases for the future since the plant's off-gas system was improved in 1977. Referencing FES Figure 3.6-2, the off-gas system modifications can be considered a combination of mechanical and operational changes. The absolute filter (HEPA) and charcoal filter on the discharge of the waste gas storage tanks were not originally present and were added. The normal discharge path for the main condenser off-gas was modified to include flow through the recombiner, the two waste gas storage tanks, and the new HEPA/charcoal filter. Previously these items were intended to be used as an option and were normally bypassed. Furthermore the two waste gas storage tanks were lined up to be used in series rather than parallel operation. The overall result is longer decay time in the waste gas storage tanks and additional filtration, thereby reducing the gaseous effluent releases.

The methodology used by the Staff to develop the 0.71 plant capacity factor was a means of factoring in past operating experience to provide a more realistic estimate. The 0.8 plant capacity factor is an assumed plant capacity for newer plants, considered to be a 30 year average, which in the Staff's opinion is capable of being attained once major maintenance problems and extended refueling outages are overcome.

Board Question 2

With respect to Contention 2B, regarding occupational exposure of workers, the FES includes a number of figures which appear to call for further explanation. For instance, it lists 156 man-rems/year as the average LACBWR occupational exposure for the years 1970-1978 (§ 5.5.2, p. 5-12). In contrast, it lists 600 man-rems/year/reactor unit as general past exposure experience (without defining which reactors and which years are included) (Id.). At the spent fuel pool hearing, however, the Staff testified that the annual worker exposures of LACBWR ranged from about 110 to 240 man-rems (Shea, direct testimony, p. 4, fol. Tr. 893). Moreover, the Staff's Environmental Impact Appraisal prepared in conjunction with the spent fuel pool expansion proceeding suggested that occupational exposures with the additional spent fuel might be 1% higher than earlier annual man-rem exposures (EIA, § 8.1.2).

The Board wishes to be provided with a listing of the annual man-rem occupational exposures at LACBWR throughout its operation and an explanation for any years during which exposures were significantly above the predicted average of 156 man-rems. The Board also wishes to be provided with an analysis of man-rem exposures at reactors of varying sizes and an explanation as to how the predicted occupational exposure of 156 man-rems may be considered ALARA in view of the relatively small size of LACBWR and the relatively lower number of employees at LACBWR compared to larger reactors. In addition, the Board wishes to be advised why average occupational exposures at Big Rock Point, Nine Mile Point, and Oyster Creek have apparently been lower than at LACBWR and whether measures used at those plants might possibly be adopted at LACBWR.

Response

The average man-rem/year on p. 5-12 of the FES was obtained from the annual reports contained in NUREG-0594 (1979) as indicated by footnote 4 referencing this document on page 5-32. NUREG-0594 (1979) contains a listing of the annual man-rem occupational exposures at LACBWR.

As indicated by the recent correction issued concerning Chapter 5 of the FES, the 600 man-rem/year/reactor should be changed to 200 for the LACBWR plant. However, explanation of the 600 figure is provided in FES § 5.5.2, p. 5-12 wherein it is stated that:

> "Therefore, past exposure experience from operating nuclear power stations has been used to provide a widely applicable estimate to be used for all light water reactor power plants of the type for La Crosse." (i.e., all boiling water reactors).

The annual worker exposures at LACBWR reported to the Commission by DPC have ranged from a low of approximately 110(111) in 1976 to a high of approximately 240(234) in 1975 (NUREG-0594). These occupational exposures correspond with the figures cited in Mr. Shea's testimony, referenced by the Board.

The 1% increase conservatively estimated by the Staff in the EIA § 8.1.2 concerning the spent fuel pool modification does not affect or contradict the LACBWR occupational exposures reported or predicted in the FES since the added 1% anticipated would amount to only 1-2 man-rems. This was previously explained by the Affidavit of Dr. Donohew (p. 7), attached to the Staff's motion for summary disposition on record in the spent fuel pool proceeding.

Many factors affect the variations in annual man-rem doses from plant to plant and from year to year. Among these, in general order of descending importance, are:

(1) <u>Fission and Corrosion Products</u>

Fission products can enter primary coolant through leaks in fuel cladding; corrosion products can enter the primary coolant and be activated by core neutrons. Either can then be dispersed within various systems, causing elevated radiation dose rates. These radiation levels vary substantially from plant to plant, and cannot be predicted in advance.

(2) Special Maintenance or Equipment Replacement

When equipment, piping, or components fail, and need to be repaired or replaced, workers may be exposed to very high dose rates which cannot be estimated in advance. Also, it is not possible to predict how many or which components will fail in any given year.

(3) Plant Age

In a typical plant, man-rem doses tend to increase over a period of several years, as the level of buildup of fission and/or corrosion products increases, and to level off. However, actual doses, from year to year, go up or down, depending principally on (2) above.

(4) Plant Size

There is some indication that larger plants tend to experience high man-rem doses. However, this variation does not reflect a clear, linear relationship. Experience at large plants for example may vary in a given year from less than 100 man-rems (comparable to or less than some smaller plants) to several thousand man-rems.

Thus, in comparing different plants in terms of man-rems per year, it is necessary to be aware of a multiplication of factors. The principal determining factors affecting man-rem doses during a given year are the dose rates in the plant from fission and corrosion products, and the unpredictable activities necessary to maintain, repair, and replace components or equipment.

The Staff has not determined that any particular dose value would be ALARA at LACBWR. No particular annual man-rem dose number can, of itself, be ALARA. Whether or not radiation doses associated with any particular activity are ALARA depends upon conditions at the time, and whether reasonable actions are taken to reduce doses.

As to the Board's inquiry about exposure at the four plants listed, the Staff has no specific information on hand to explain the difference in occupational exposures between the four other plants and LACBWR. But, as explained above, the size of the plant does not determine the exposure rates, nor is plant size significant in this regard. The determining factors in occupational exposures are, as previously indicated, the particular maintenance requirements and operating characteristics of each plant. For this reason, procedures in effect at other plants might not be at all relevant to the LACBWR occupational exposures.

Board Question 3

> With regard to Contention 8, concerning environmental radiological monitoring, the FES suggests that the monitoring which is being provided is that required by Regulatory Guide 1.21 (see FES § 6.4). The latest revision of that Guide apparently is dated June 1974. However, the Board is aware that the Department of Health, Education and Welfare, Public Health Service, commented critically on

the operational off-site radiological monitoring program (FES, p. A-4) and that the Staff declined to respond to those comments (FES, § 11.6, p. 11-8). The Board is also aware that new and additional guidelines for environmental radiological monitoring have recently been developed and provided to both licensees and operating license applicants. See Branch Technical Position (BTP), Revision 1 (November 1979) of Radiological Assessment Branch, provided to licensees by letter from W. P. Gammill, dated November 27, 1979, and to operating license applicants by letter from Steven A. Varga, dated December 21, 1979. (This BTP apparently updates Regulatory Guide 4.8, which was referred to in the DES but has been deleted from the FES.)

The Board wishes to be provided with a complete description of the environmental radiological monitoring program and apprised as to whether, and if so in what manner, DPC will comply with the requirements of the foregoing BTP, Revision 1, the Board should be provided with explanations as to why particular provisions of the BTP, Revision 1, are not to be followed.

Response

Regulatory Guide 1.21: "Measuring, Evaluating and Reporting Radioactivity in Solid Waste in Releases of Radioactive Materials in Liquid and Gaseous Effluents From Light-Water-Cooled Nuclear Power Plants" is concerned with effluent monitoring rather than radiological environmental monitoring, as explained in the FES § 6.4, p. 6-2. The comment on the DES by the Department of Health, Education and Welfare (FES, p. A-4) is concerned with the lack of information in the DES about the radiological environmental monitoring done by DPC rather than a criticism of the program.

The comment of HEW in the first paragraph (FES, p. A-4) concerning off-site doses is answered in FES § 11.5.10. Since the radiological environmental monitoring programs of applicants have no impact on the environment, detailed descriptions of the programs are not included in environmental statements, and for this reason, no response to the HEW comment was provided.

The Board has been provided with a complete description of the environmental radiological monitoring program at LACBWR and a comparison with BTP 4.8, Revision 1, in Dr. Branagan's Affidavit submitted in support of the Staff's motion for summary disposition served June 6, 1980.

Board Question 4

> With reference to the impacts on aquatic biota, the Board wishes to be provided with a summary listing of the LACBWR environmental studies to date, including the time that the studies were carried out and their content. Explain the discrepancy between the range in annual commercial fish catches described in § 2.7 of the FES (p. 2-14), and the data provided in Table 2.7-2. Is the large decline in fish catch in Pond 9 since 1974 significant, and how does this square with statements made in the second pa agraph of § 10.1.2? Before construction and operation of LACBWR, were living speciments of the Higgins' pearly eye mussel found in Thief Slough or other areas nearby?

Response

The Staff does not possess a list of LACBWR environmental studies, but I have been advised that the Applicant is compiling this list for the Board.

The numbers of commercial fish catches contained in FES § 2.7, p. 2-14 are in error. The correct data is contained in Table 2.7-2.

The Wisconsin Department of Natural Resources was contacted to inquire about the decline in the Pond 9 fish catch since 1974. WDNR considers the decline to be a natural fluctuation with no definite trend as yet. Some of the factors influencing fishing effort (and, hence, yield) have to do with economics, drought years (1976, 1977), and what fishes make up the catches (e.g. catfish are variable in quantity when compared with drumhead and carp, which are reasonably stable). Also, fishing may be better in some areas for a period than in others, for various reasons. Thus, there is no single factor to which the reduction can be attributed and no reason is known why such a reduction in Pond 8 did not occur. Since LACBWR takes about 2.5% of the total flow of the river during the ten year (one week) low flow, and much less on the average, it is not reasonable to attribute the fish catch reduction to the nuclear plant. For the reasons explained, I do not believe the decline in fish catch from Pond 9 to be significant. FES § 10.1.2 is an accurate statement of the Staff's evaluation. As to the Higgins' pearly eye mussel, the Staff is not aware of any records or studies revealing the existence of this species in Thief Slough or nearby areas prior to construction of LACBWR. It should be remembered that LACBWR was constructed and began operation prior to enactment of the National Environmental Policy Act and the Endangered Species Act.

Board Question 5

> In its comments on the DES, the Environmental Protection Agency indicated that, although LACBWR's cooling system in general is in conformance with the requirements of EPA regulations, the combined discharges of LACBWR and the neighboring Genoa-3 coal-fired facility result in chlorine levels exceeding those recommended by the Wisconsin Department of Natural Resources (FES, p. A-6). Apparently, LACBWR itself does not chlorinate (Id., pp. 5-20, A-7), so that the entire chlorine discharge emanates from Genoa-3. If this be so, the Board wishes to be apprised as to whether there is any action which could be taken with respect to LACBWR which could reduce the levels of chlorine emitted from the combined, common discharge. How could EPA's recommendation that "chlorination procedures be evaluated" be carried out? Is a proceeding involving an operating license for LACBWR the proper forum in which to undertake such an inquiry?

Response

As stated in the FES, § 6.1.1, the Wisconsin Department of Natural Resources has issued a discharge permit for LACBWR (Permit No. Wi0003239), which requires chlorine monitoring. Also, it is pointed out in FES § 11.5 (p. 11-7) that chlorination of Genoa-3 is controlled by the Wisconsin Department of Natural Resources and is a matter outside the Commission's jurisdiction.

Board Question 6

> In responding to an EPA comment concerning the use of any materials containing PCBs, the Staff indicated that the Applicant had stated that materials containing PCBs are not presently used on the site and there are no plans to use any such materials in the future (FES, § 11.5.12, p. 11-8). The Board wishes to be advised whether, if the Applicant's plans in this regard should change, the matter would be one regarded by the Applicant and/or Staff as falling within the purview of the first paragraph of the proposed license condition appearing in paragraph numbered 7 on p. ii of the FES.

Response

Since use, handling, and disposal of PCB is regulated by the Environmental Protection Agency, notice to NRC of the intent to use components containing PCB would not be required.

Board Question 7

> The Applicant has recently indicated that it plans to phase out operations of LACBWR in 1990. If various calculations in the FES were changed to reflect 10 more years of operation (instead of 20), what changes (if any) would result? (Among other things, changes in the amounts of radioactive effluents and in the need-for-power estimates might appear to be warranted, as well as resultant modifications to the cost-benefit balance.)

Response

No changes in the FES would be necessary to reflect an end to operation of LACBWR in 1990. The Staff method of calculating radioactive effluents would be the same and the results would not change to any appreciable degree. Since the Staff projected a need for the LACBWR plant over the 1980-1990 period in FES Section 8.2.6, the need for power conclusion would not change. Additionally, the Staff points out on p. 8-8 of the FES that a 520 MWe plant is proposed by DPC for the 1987-88 time period so that the FES need-for-power estimates account for a replacement of LACBWR power within ten years. Since the FES demonstrates that the annual environmental costs of continued operation of LACBWR are minimal and that the power produced by LACBWR is a benefit to the DPC service area, the cost-benefit balance would not change and the conclusion reached in FES § 10.4.2 would remain unchanged.

I have read the foregoing affidavit and swear that it is true and accurate to the best of my knowledge and belief.

Robert P. Geckler

Subscribed and sworn to before
me this 16th day of June 1980

Elizabeth Ann Tipton
Notary Public

My Commission Expires: July 1, 1982

II. AIRBORNE RELEASES (1973)

	Units	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1. Total noble gases	Curies	11,424.2	12,813.2	20,395.4	0	0	76.0	1,704.0	7,759.9	14,371.0	20,857.4	1,664.1	124.7	81,190
2. Total halogens	Curies	<0.028	≤0.024	≤0.017	<0.056	≤0.005	≤0.002	≤0.002	≤0.012	≤0.040	≤0.018	≤0.023	≤0.006	≤0.235
3. Total particulate gross radioactivity (β, γ)		18.3	21.8	32.7	<0.1	<0.1	0.1	2.6	10.1	12.9	25.1	2.0	0.2	<126.0
4. Total tritium	Curies	18.5	5.7	5.2	4.0	3.2	1.9	0.3	4.5	3.3	2.4	0.6	1.0	50.6
5. Total particulate gross alpha radioactivity	Curies	$<1.6\times10^{-7}$	$<2.1\times10^{-7}$	$<1.5\times10^{-7}$	$<1.5\times10^{-7}$	$<3.1\times10^{-7}$	$<3.0\times10^{-7}$	$<2.6\times10^{-7}$	$<1.6\times10^{-7}$	$<2.3\times10^{-7}$	1.4×10^{-7}	$<4.4\times10^{-8}$	$<9.5\times10^{-8}$	$<2.2\times10^{-6}$
6. Maximum noble gas release rate	μCi/sec	7,430	10,910	12,720	0	0	750	2,050	7,300	12,150	10,140	9,626	556	12,720
7. Percent of applicable limit for:														
a. noble gases	%	38	47	68	0	0	<1	6	26	53	70	6	<1	<26
b. halogens (^{131}I)	%	14	15	9	41	2	<1	<1	5	18	9	16	3	<11
c. particulates*	%	1	1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
8. Isotope released:	Curies													
Particulates														
Cs-137		<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<0.0012
Ba-La-140		<.0001	<.0001	.0003	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<0.0014
Sr-90		.0002	.0002	.0002	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<0.0015
Ce-144		<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<0.0012
Sr-89		.0023	.0023	.0023	<.0001	<.0001	<.0001	.0033	.0033	.0033	.0009	.0009	.0009	<0.0193
Halogens														
I-131		0.0188	0.0188	0.0124	0.0540	0.0027	0.0004	0.0003	0.0068	0.0253	0.0125	0.0211	0.0036	0.1767
I-133		0.0079	0.0046	<0.0039	<0.0012	<0.0010	<0.0010	<0.0010	0.0046	0.0139	0.0047	<0.0010	<0.0010	<0.0459
I-135		<0.0012	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0120
Gases														
Kr-85		0	14.6	23.3	0	0	0.1	0	0	0	0	0	0	35.0
Kr-85m		324.7	758.5	1207.4	0	0	4.5	6.8	308.5	571.0	829.0	66.1	0.4	4056.9
Kr-88		1357.2	3073.2	4894.9	0	0	18.2	109.9	651.1	1205.4	1750.0	139.6	6.6	13,208.1
Kr-87		1105.9	1236.5	1968.2	0	0	7.3	144.5	787.9	1458.5	2117.5	168.9	9.6	9234.9
Kr-83m		846.5	1342.8	2137.4	0	0	7.9	24.7	241.6	447.3	649.4	51.8	1.9	5731.2
Xe-133		1396.0	1359.5	2163.9	0	0	8.0	754.0	1975.1	3656.4	5308.3	423.5	80.5	17,125.2
Xe-135m		2577.3	2057.8	3275.5	0	0	12.2	201.1	1811.2	3352.9	4867.7	368.4	19.1	18,563.2
Xe-135		3159.9	2411.4	3838.4	0	0	14.3	81.6	1470.1	2721.4	3951.0	315.2	6.7	17,970.0
Xe-137		647.8	426.7	679.2	0	0	2.5	377.1	522.9	968.0	1405.4	112.1	0	5141.7
Others as appropriate (specify) Xe^{133m}		0	107.6	171.3	0	0	0.6	1.4	0	0	0	0	0	280.9
Reactor Power, Average MWT		155	138	153	0	0	5	75	147	113	129	10	12	78

*Based on particulates with > 8 day half-lives, and not on total particulates as shown in Column 3.
Environmental Samples for Period - Water 56, Air 172, Silt 13, TLD 80, Milk 47, Fish 25.

II. AIRBORNE RELEASES (1974)

	Units	Jan.	Feb.	Mar.	Apr.	May	June
1. Total noble gases	Curies	1845.56	1960.22	3443.31	4663.24	1431.20	4351.36
2. Total halogens	Curies	0.0017	<0.0016	<0.0027	<0.0025	<0.0031	<0.0047
3. Total particulate gross radioactivity (β,γ)		2.40	3.34	5.17	6.07	1.43	4.79
4. Total tritium	Curies	0.90	1.25	1.53	1.65	0.90	2.17
5. Total particulate gross alpha radioactivity	Curies	$<7.0\times10^{-8}$	$<7.5\times10^{-8}$	$<5.4\times10^{-8}$	$<8.4\times10^{-8}$	$<8.2\times10^{-8}$	$<8.1\times10^{-8}$
6. Maximum noble gas release rate	µCi/sec	1110	1260	2213	2309	3088	3252
7. Percent of applicable limit for:							
a. noble gases	%	6	8	12	17	5	16
b. halogens (^{131}I)	%	0.1	0.2	0.9	0.9	1.3	1.8
c. particulates*	%	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
8. Isotope released:	Curies						
Particulates							
Cs-137		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Ba-La-140		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Sr-90		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cs-134		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Sr-89		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Halogens		0.0004	0.0004	0.0004	0.0004	0.0004	0.0004
I-131		0.0001	0.0002	0.0012	0.0012	0.0018	0.0024
I-133		0.0006	0.0004	0.0005	0.0003	0.0003	0.0013
I-135		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Gases							
Xe-133m							
Xe-133		0	0	0	8.86	2.72	8.27
Kr-88		5.73	6.08	10.67	132.44	40.65	123.58
Kr-87		97.02	102.91	180.77	351.14	107.77	327.66
Kr-85m		142.85	151.53	266.17	503.16	154.43	469.51
Xe-138		27.35	29.01	50.96	140.36	43.08	130.98
Xe-135m		1191.19	1263.56	2219.56	1435.81	440.67	1339.78
Xe-135		282.37	299.52	526.14	910.73	279.51	849.82
Xe-137		99.05	105.07	184.56	672.91	206.52	627.90
Others as appropriate (specify)		0	0	0	503.16	154.43	469.51
Reactor Power, Average MWT		146	156	155	153	39	133

*Based on >8 day half-life particulates. Not on total particulates as shown in Column 3.

ATTACHMENT 1

II. AIRBORNE RELEASES (1974)

	Units	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1. Total noble gases	Curies	6887.86	6613.67	649.05	3482.89	6062.29	7757.98	49149
2. Total halogens	Curies	≤0.0061	≤0.0102	≤0.0070	≤0.0068	≤0.0096	≤0.0073	≤0.0633
3. Total particulate gross radioactivity (β, γ)		8.97	7.95	0.78	4.53	7.89	11.65	64.97
4. Total tritium	Curies	2.46	2.34	1.05	0.85	1.7	1.46	18.26
5. Total particulate gross alpha radioactivity	Curies	$<1.15 \times 10^{-7}$	$<2.43 \times 10^{-7}$	$<1.08 \times 10^{-7}$	1.12×10^{-7}	$<3.6 \times 10^{-8}$	9.48×10^{-8}	$<1.05 \times 10^{-6}$
6. Maximum noble gas release rate	μCi/sec	3235	3750	3305	3011	3675	3492	3750
7. Percent of applicable limit for:								
a. noble gases	%	24	22	2.2	11.7	21	26	14.24
b. halogens (^{131}I)	%	2.5	4.6	3.6	1.98	3.57	2.94	2.03
c. particulates*	%	0.52	0.53	0.53	0.25	0.24	0.24	≤0.29
8. Isotope released:	Curies							
Particulates								
Ca-137		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	≤0.0012
Ba-La-140		<0.0001	<0.0001	<0.0001	0.0001	0.0001	0.0001	≤0.0012
Sr-90		0.0002	0.0002	0.0002	<0.0001	<0.0001	<0.0001	≤0.0015
Cs-134		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	≤0.0012
Sr-89		<0.0001	<0.0001	<0.0001	0.0007	0.0006	0.0007	≤0.0047
Halogens								
I-131		0.0034	0.0063	0.0047	0.0027	0.0047	0.0040	0.0327
I-133		0.0017	0.0029	0.0013	0.0031	0.0039	0.0023	0.0186
I-135		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.012
Gases								
Xe-133m		13.09	94.58	9.28	49.81	86.69	13.19	286.49
Xe-133		195.62	264.55	26.01	139.33	242.29	377.16	1564.11
Kr-88		518.66	602.51	59.12	317.29	552.27	540.72	3757.84
Kr-87		743.20	705.68	69.25	371.62	646.85	617.52	4841.77
Kr-85m		207.32	214.28	21.03	112.85	196.42	282.39	1456.03
Xe-138		2120.77	1891.51	185.61	996.10	1733.81	3411.13	18229.00
Xe-135m		1345.20	1261.23	123.76	664.19	1156.08	1225.74	8924.29
Xe-135		993.92	1053.56	103.39	554.82	965.72	987.57	6554.99
Xe-137		743.20	518.51	50.88	273.06	475.28	77.58	3265.61
Others as appropriate (specify)	Kr-89						211.79	211.79
	Kr-85						4.65	4.65
	Xe-131m						7.76	7.76
Reactor Power, Average MWT		160	137	16	90	148	162	125

*Based on >8 day half-life particulates. Not on total particulates as shown in Column 3.

ATTACHMENT 1

II. AIRBORNE RELEASES (1975)

	Units	Jan.	Feb.	Mar.	Apr.	May	June
1. Total noble gases	Curies	7751.02	6580.35	8136.96	5378.5	337.63	0
2. Total halogens	Curies	0.011	0.016	0.0133	0.011	0.0469	0.0098
3. Total particulate gross radioactivity (β,γ))		11.64	8.57	12.80	7.00	0.44	<0.1
4. Total tritium	Curies	3.3	1.62	2.67	1.16	0.77	0.63
5. Total particulate gross alpha radioactivity	Curies	$<1.52 \times 10^{-7}$	$<9.37 \times 10^{-8}$	2.09×10^{-7}	$<1.1 \times 10^{-7}$	$<1.52 \times 10^{-7}$	8.4×10^{-7}
6. Maximum noble gas release rate	μCi/sec	5491	4906	5658	5141	4293	0
7. Percent of applicable limit for:							
a. noble gases	%	26.4	24.8	27.7	18.1	1.1	0
b. halogens (^{131}I)	%	4.69	8.67	5.2	6.27	28.77	6.5
c. particulates*	%	0.45	0.45	0.49	0.23	0.23	0.23
8. Isotope released:	Curies						
Particulates							
Cs-137		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Ba-La-140		<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Sr-90		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cs-134		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Sr-89		0.0008	0.0007	0.0008	0.0004	0.0005	0.0004
Halogens							
I-131		0.0064	0.0107	0.0071	0.0083	0.0393	0.0086
I-133		0.0036	0.0043	0.0052	0.0017	0.0066	<0.0002
I-135		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Gases							
Xe-133m		17.83	15.13	18.75	34.42	2.16	0
Xe-133		273.61	232.29	287.24	316.26	19.85	0
Kr-88		539.47	457.99	566.35	460.94	28.93	0
Kr-87		684.42	581.04	718.51	557.21	34.98	0
Kr-85m		246.48	209.26	258.76	208.15	13.07	0
Xe-138		3203.50	2719.66	3363.10	1758.77	110.41	0
Xe-135m		1077.39	914.67	1131.10	772.89	48.52	0
Xe-135		1021.58	867.29	1072.50	885.84	55.61	0
Xe-137		475.14	403.38	498.81	250.10	15.70	0
Others as appropriate (specify)	Kr-89	205.40	174.38	215.64	112.95	7.09	0
	Kr-85				13.45	0.84	0
	Xe-131m						
Reactor Power, Average MWT		150	141	144	123	41	0

*Based on 8 day half-life particulates. Not on total particulates as shown in Column 3.

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ATTACHMENT 1

II. AIRBORNE RELEASES (1975)

	Units	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1. Total noble gases	Curies	0	1739.99	5010.24	7090.68	6808.45	8298.73	57132.55
2. Total halogens	Curies	<0.003	0.0052	0.0039	0.0034	0.0036	0.0054	0.1325
3. Total particulate gross radioactivity (β,γ)		<0.1	4.01	6.52	8.52	9.53	9.97	[illegible]
4. Total tritium	Curies	0.02	0.68	0.90	1.40	1.71	1.86	[illegible]
5. Total particulate gross alpha radioactivity	Curies	$<9 \times 10^{-8}$	1.2×10^{-7}	2.13×10^{-6}	2.98×10^{-7}	5.13×10^{-6}	6.96×10^{-7}	1×10^{-5}
6. Maximum noble gas release rate	μCi/sec	0	2032	3532	3420	3451	5671	5671
7. Percent of applicable limit for:								
a. noble gases	%	0	6.4	19.0	22.8	22.6	26.7	[illegible]
b. halogens (^{131}I)	%	<0.15	0.22	0.38	0.93	0.94	1.81	5.32
c. particulates*	%	0.22	0.29	0.22	0.49	0.49	0.51	0.36
8. Isotope released:	Curies							
Particulates								
Cs-137		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	≤0.0012
Ba-La-140		<0.0001	0.0006	0.0001	0.0001	0.0001	0.0002	≤0.0018
Sr-90		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0012
Cs-134		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0012
Sr-89		0.0007	0.0007	0.0007	0.0019	0.0017	0.0013	[illegible]
Halogens								
I-131		<0.001	0.0003	0.0005	0.0013	0.0013	0.0025	[illegible]
I-133		<0.001	0.0039	0.0024	0.0011	0.0013	0.0019	[illegible]
I-135		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.012
Gases								
Xe-133m		0	[illegible]	14.03	51.76	47.70	60.58	[illegible]
Xe-133		0	[illegible]	32.57	255.66	242.47	[illegible]	[illegible]
Kr-88		0	41.24	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Kr-87		0	101.09	291.09	523.26	[illegible]	[illegible]	[illegible]
Kr-85m		0	16.51	47.69	164.50	157.96	192.53	[illegible]
Xe-138		0	724.53	2086.26	2405.87	2310.11	2815.76	[illegible]
Xe-135m		0	221.67	639.30	1122.45	1077.78	1313.59	[illegible]
Xe-135		0	58.64	168.85	[illegible]	455.49	[illegible]	[illegible]
Xe-137		0	398.98	1148.85	991.20	951.82	2160.15	[illegible]
Others as appropriate (specify)	Kr-89	0	147.03	423.37	451.68	433.70	528.53	[illegible]
	Kr-85	0	0	0	0	0	0	[illegible]
	Xe-131m		11.83	34.07	220.03	219.91	269.05	[illegible]
Reactor Power, Average MWT		0	62	152	158	158	127	[illegible]

*Based on >8 day half-life particulates. Not on total particulates as shown in Column 3.

ATTACHMENT 1

II. AIRBORNE RELEASES (1976)

Table II -A

⟼ Shut Down

	Units	Jan.	Feb.	Mar.	Apr.	May	June
1. Total noble gases	Curies	10,205.94	6945.35	0	0	0	0
2. Total halogens	Curies	0.0072	0.0085	0.0031	<0.0012	<0.0014	<0.0012
3. Total particulate gross radioactivity (β, γ)		13.28	7.65	<0.1	<0.1	<0.1	<0.1
4. Total tritium	Curies	3.404	1.694	0.042	0.081	0.081	0.150
5. Total particulate gross alpha radioactivity	Curies	6.96×10^{-7}	1.6×10^{-7}	$<1.7 \times 10^{-7}$	$<1.0 \times 10^{-7}$	2.50×10^{-7}	9.8×10^{-7}
6. Maximum noble gas release rate	µCi/sec	5896	5481	0	0	0	0
7. Percent of applicable limit for:							
a. noble gases	%	32.9	25.3	0	0	0	0
b. halogens (^{131}I)	%	2.44	3.76	1.41	0.08	<0.07	<0.08
c. particulates*	%	0.61	0.58	<0.53	<0.02	<0.02	<0.02
8. Isotope released:	Curies						
Particulates							
Cs-137		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Ba-La-140		0.0003	0.0002	<0.0001	<0.0001	<0.0001	<0.0001
Sr-90		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cs-134		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Sr-89		0.0019	0.0017	0.0019	<0.0001	<0.0001	<0.0001
Halogens							
I-131		0.0033	0.0048	0.0019	0.0001	<0.0001	<0.0001
I-133		0.0029	0.0027	0.0002	0.0001	<0.0003	<0.0001
I-135		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Gases							
Xe-133m		74.50	15.28	0	0	0	0
Xe-133		513.36	578.55	0	0	0	0
Kr-88		442.94	520.90	0	0	0	0
Kr-87		760.34	636.89	0	0	0	0
Kr-85m		236.78	243.09	0	0	0	0
Xe-138		3462.88	2053.74	0	0	0	0
Xe-135m		1615.60	1209.19	0	0	0	0
Xe-135		682.78	914.70	0	0	0	0
Xe-137		1426.79	534.10	0	0	0	0
Others as appropriate (specify)	Kr-89	650.12	232.67	0	0	0	0
	Xe-131m	329.65	4.86	0	0	0	0
	Xe-129m	0	0.69	0	0	0	0
Reactor Power, Average MWT		156	146	0	0	0	0

*Based on >8 day half-life particulates. Not on total particulates as shown in Column 3.

ATTACHMENT 1

II. AIRBORNE RELEASES (1976)

Table II-B

	Units	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1. Total noble gases	Curies	0	15806.14	24967.51	22732.61	14329.24	28691.17	123678
2. Total halogens	Curies	<0.0020	0.0052	0.0384	0.0074	0.0184	0.0070	0.1010
3. Total particulate gross radioactivity (β,γ)	Curies	<0.1	8.86	13.49	16.83	10.76	23.83	95.20
4. Total tritium	Curies	0.016	1[illegible].578	2.367	0.930	0.864	1.370	12.577
5. Total particulate gross alpha radioactivity	Curies	$<1.2 \times 10^{-7}$	$<7.26 \times 10^{-8}$	2.83×10^{-7}	$<1.61 \times 10^{-7}$	$<9.1 \times 10^{-8}$	9.35×10^{-8}	3.18×10^{-6}
6. Maximum noble gas release rate	µCi/sec	0	16650	12808	10817	11424	13718	16650
7. Percent of applicable limit for:								
a. noble gases	%		56.1	90.2	81.5	51.8	103.9	36.8
b. halogens (^{131}I)	%	<0.15	0.81	10.83	2.56	11.84	1.98	3.0
c. particulates*	%	<0.53	0.54	0.60	0.49	<0.45	0.48	C.41
8. Isotope released:	Curies							
Particulates								
Cs-137		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0012
Ba-La-140		<0.0001	0.0001	0.0005	0.0005	0.0001	<0.0001	<0.0023
Sr-90		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0012
Cs-134		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0012
Sr-89		0.0021	0.0021	0.0020	0.0017	0.0016	0.0017	0.0170
Halogens								
I-131		<0.0001	0.00[illegible]	0.0143	0.0035	0.0157	0.0027	0.0477
I-133		<0.0009	0.0031	0.0231	0.0029	0.0017	0.0033	0.0413
I-135		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.012
Gases								
Kr-85		0	20.55	42.44	61.38	37.26	71.73	233.36
Xe-133m		0	11.06	49.94	34.10	10.03	20.08	214.99
Xe-133		0	605.38	1183.46	829.74	604.69	760.32	5075.50
Kr-88		0	335.09	584.24	543.31	349.63	651.29	3427.40
Kr-87		0	1392.52	2321.98	2245.98	1458.72	2780.17	11596.60
Kr-85m		0	205.48	354.54	322.80	209.21	355.77	1927.67
Xe-138		0	7054.28	10933.27	10500.19	6471.08	14549.29	55024.73
Xe-135m		0	2513.18	3957.35	3696.32	2401.58	3772.89	19166.11
Xe-135		0	983.14	1657.84	1523.08	1003.05	1600.97	8365.56
Xe-137		0	2073.77	2786.37	2155.05	1295.36	3219.15	13490.59
Others as appropriate (specify)	Kr-89	0	575.34	796.46	609.23	398.35	886.56	4148.73
	Xe-131m	0	28.45	287.13	190.95	83.11	8.61	932.76
	Xe-129m	0	0	0	0	0	0	0.69
Reactor Power, Average MWT		0	104	138	146	95	140	77

*Based on >8 day half-life particulates. Not on total particulates as shown in Column 3.

ATTACHMENT 1

Table II-A

II. AIRBORNE RELEASES (1977)

	Units	Jan.	Feb.	Mar.	Apr.	May	June
1. Total noble gases	Curies	28,426.54	5[illegible]98.19	5128.18	2373.6[illegible]	661.305	0
2. Total halogens	Curies	0.0147	0.1097	0.0322	0.0150	0.0635	0.0091
3. Total particulate gross radioactivity (β,γ)	Curies	28.46	6.73	14.09	3.38	0.62	<0.001
4. Total tritium	Curies	3.1[illegible]	2.56	0.83	0.66	0.41	0.37
5. Total particulate gross alpha radioactivity	Curies	$<1.19\times10^{-7}$	2.93×10^{-7}	$<1.133\times10^{-7}$	$<1.327\times10^{-7}$	1.335×10^{-7}	$<1.185\times10^{-7}$
6. Maximum noble gas release rate	μCi/sec	15165	12571	13776	1699	837	0
7. Percent of applicable limit for:							
a. noble	%	97.3	8.20	4.99	1.69	0.40	0
b. halogens (^{131}I)	%	5.29	75.54	1.06	1.87	32.14	5.23
c. particulates*	%	0.601	0.669	0.701	0.074	0.081	0.032
8. Isotope released:	Curies						
Particulates							
Cs-137		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Ba-La-140		0.0005	<0.0003	0.0003	<0.0004	<0.0004	<0.0001
Sr-90		0.0001	0.0001	0.0001	<0.0001	<0.0001	<0.00[illegible]
Cs-134		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Sr-89		0.0011	0.0010	0.0011	0.0003	0.0003	0.0003
Halogens							
I-131		0.0072	0.0932	0.0014	0.0025	0.0439	<0.0069
I-133		0.0065	0.0098	<0.0022	0.0051	<0.0178	<0.0002
I-135		<0.001	<0.0067	0.0286	<0.0074	<0.0018	<0.0021
Gases							
Xe-133m		25.58	13.30	19.58	17.80	5.03	0
Kr-85		39.80	10.39	17.09	6.43	1.85	0
Xe-133		1222.34	528.21	760.58	808.98	266.44	0
Kr-88		1702.75	438.38	487.98	173.49	36.50	0
Kr-87		2461.74	512.74	466.36	98.70	14.61	0
Kr-85m		568.53	173.02	211.52	96.25	23.67	0
Xe-138		12567.37	1996.78	1087.18	68.57	3.17	0
Xe-135m		3766.52	596.79	302.08	18.44	0.53	0
Xe-135		3306.01	1205.84	1615.92	1057.71	305.32	0
Xe-137		2004.07	297.18	77.21	6.05	0.93	0
Others as appropriate (specify)	Kr-89	699.29	112.06	57.43	8.19	1.19	0
	Xe-131m	31.27	9.50	12.76	10.87	1.85	0
	Xe-129m	0	0	1.51	2.28	0.40	0
Reactor Power, Average MWT		148.49	88.26	107.07	98.80	31.24	0.00

*Based on >8 day half-life particulates. Not total particulates as shown in Line 3.

ATTACHMENT 1

Table II-B

II. AIRBORNE RELEASES (1977)

	Units	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1. Total noble gases	Curies	0	0	0	0	0	0	42487.84
2. Total halogens	Curies	0.0015	<0.0009	<0.0007	<0.0007	<0.0007	<0.0003	<0.2490
3. Total particulate gross radioactivity (β,γ)	Curies	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<53.29
4. Total tritium	Curies	0.305	0.151	0.033	0.119	0.077	0.067	8.742
5. Total particulate gross alpha radioactivity	Curies	2.46×10^{-7}	8.73×10^{-7}	$<6.88 \times 10^{-8}$	3.88×10^{-7}	$<3.36 \times 10^{-7}$	7.03×10^{-8}	$<2.892 \times 10^{-6}$
6. Maximum noble gas release rate	µCi/sec	0	0	0	0	0	0	15165
7. Percent of applicable limit for:								
a. noble	%	0	0	0	0	0	0	9.38
b. halogens (^{131}I)	%	0.17	<0.01	<0.01	<0.01	<0.01	<0.01	10.11
c. particulates*	%	0.033	<0.018	<0.022	<0.007	<0.012	<0.008	0.188
8. Isotope released:	Curies							
Particulates								
Cs-137		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0012
Ba-La-140		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0026
Sr-90		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0012
Cs-134		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0012
Sr-89		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0047
Halogens								
I-131		<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.1558
I-133		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0422
I-135		<0.0012	<0.0008	<0.0006	<0.0006	<0.0006	<0.0002	<0.0516
Gases								
Xe-133m		0	0	0	0	0	0	81.29
Kr-85		0	0	0	0	0	0	75.56
Xe-133		0	0	0	0	0	0	3586.55
Kr-88		0	0	0	0	0	0	2839.10
Kr-87		0	0	0	0	0	0	3554.15
Kr-85m		0	0	0	0	0	0	1072.99
Xe-138		0	0	0	0	0	0	15723.07
Xe-135m		0	0	0	0	0	0	4684.36
Xe-135		0	0	0	0	0	0	7490.80
Xe-137		0	0	0	0	0	0	2385.44
Others as appropriate (specify)	Kr-89	0	0	0	0	0	0	878.16
	Xe-131m	0	0	0	0	0	0	66.25
	Xe-129m	0	0	0	0	0	0	4.19
Reactor Power, Average MWT		0.00	0.00	0.00	0.00	0.00	0.00	39.49

*Based on >8 day half-life particulates. Not total particulates as shown in Line 3.

ATTACHMENT 1

Table II-A

II. AIRBORNE RELEASES (1978)

Item	Units	Jan.	Feb.	Mar.	Apr.	May	June
1. Total Noble gases	Curies	0	0	1.03×10^{1}	1.14×10^{1}	3.47×10^{2}	6.61×10^{2}
2. Total halogens	Curies	3.18×10^{-6}	0	4.19×10^{-3}	7.39×10^{-3}	3.61×10^{-3}	$1.60\times10^{-}$[illegible]
3. Total particulate gross radioactivity (β,γ) with > 8 day half-life	Curies	1.21×10^{-5}	3.05×10^{-6}	4.49×10^{-4}	2.39×10^{-4}	4.45×10^{-4}	$3.78\times10^{-}$[illegible]
4. Total tritium	Curies	5.04×10^{-2}	1.20×10^{-1}	1.83×10^{-1}	5.07×10^{-1}	4.83×10^{-1}	5.71×10^{-1}
5. Total particulate gross alpha radioactivity	Curies	2.41×10^{-7}	7.39×10^{-8}	6.61×10^{-7}	1.25×10^{-7}	2.82×10^{-7}	2.16×10^{-7}
6. Maximum noble gas release rate	µCi/sec	0	0	5.59×10^{3}	1.21×10^{4}	7.13×10^{3}	1.07×10^{4}
7. Percent of applicable limit for:							
a. noble gases	%	0	0	5.55×10^{0}	3.22×10^{0}	1.02×10^{0}	1.09×10^{0}
b. I-131	%	4.9×10^{-1}	0	1.55×10^{-1}	1.77×10^{0}	2.05×10^{0}	7.27×10^{-1}
c. particulates > 8 day half-life	%	4.3×10^{-1}	3.6×10^{-3}	1.07×10^{-1}	2.68×10^{-2}	1.01×10^{-1}	9.87×10^{-2}
d. Tritium	%	5.7×10^{-1}	1.51×10^{0}	1.28×10^{0}	2.96×10^{0}	2.73×10^{0}	3.33×10^{0}
8. Average Release Rates							
a. noble gases	µCi/sec	0	0	3.84×10^{2}	4.39×10^{2}	1.30×10^{2}	2.55×10^{2}
b. I-131	µCi/sec	1.18×10^{-6}	0	6.30×10^{-5}	9.04×10^{-4}	1.05×10^{-3}	3.7[illegible]$\times10^{-4}$
c. > 8 day half-life particulates	µCi/sec	4.52×10^{-6}	1.26×10^{-6}	1.67×10^{-4}	9.23×10^{-4}	1.66×10^{-4}	1.46×10^{-4}
d. Tritium	µCi/sec	1.88×10^{-2}	4.97×10^{-2}	6.84×10^{-2}	1.96×10^{-1}	1.80×10^{-1}	2.02×10^{-1}
9. Allowable Total Releases							
a. gases	Curies	1.29×10^{4}	1.17×10^{4}	1.86×10^{4}	3.53×10^{4}	3.41×10^{4}	6.04×10^{4}
b. I-131	Curies	6.43×10^{-2}	5.81×10^{-2}	1.09×10^{-1}	1.32×10^{-1}	1.37×10^{-1}	1.32×10^{-1}
c. Particulates	Curies	4.50×10^{0}	5.42×10^{0}	2.38×10^{1}	2.87×10^{1}	2.97×10^{1}	2.08×10^{1}
d. Tritium	Curies	8.85×10^{0}	7.99×10^{0}	1.43×10^{1}	1.71×10^{1}	1.77×10^{1}	1.71×10^{1}
10. Actual Releases	Curies						
a. Gases							
Kr-85		0	0	7.19×10^{0}	2.31×10^{1}	5.47×10^{0}	7.50×10^{-2}
Xe-133		0	0	3.32×10^{1}	1.28×10^{2}	2.43×10^{1}	1.15×10^{1}
Kr-88		0	0	6.27×10^{1}	1.08×10^{2}	4.20×10^{1}	6.47×10^{1}
Kr-87		0	0	8.20×10^{1}	7.15×10^{1}	2.57×10^{1}	2.45×10^{1}
Kr-85m		0	0	2.35×10^{1}	5.67×10^{1}	2.63×10^{1}	5.27×10^{1}
Xe-138		0	0	4.52×10^{0}	8.60×10^{1}	6.97×10^{1}	2.99×10^{1}
Xe-135m		0	0	8.67×10^{1}	1.87×10^{1}	1.37×10^{1}	9.76×10^{0}
Xe-135		0	0	1.95×10^{2}	6.08×10^{1}	1.41×10^{1}	3.53×10^{1}
Xe-133m		0	0	7.37×10^{0}	2.57×10^{1}	2.10×10^{0}	4.05×10^{0}
Xe-131m		0	0	8.17×10^{-1}	1.95×10^{0}	4.91×10^{-1}	1.83×10^{-2}
Xe-129m		0	0	1.15×10^{-1}	5.26×10^{-1}	1.38×10^{-1}	1.69×10^{-2}
Kr-89		0	0	1.84×10^{1}	1.95×10^{0}	2.40×10^{0}	2.22×10^{0}
Xe-137		0	0	6.04×10^{1}	6.94×10^{0}	8.80×10^{0}	4.77×10^{0}

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II. AIRBORNE RELEASES (Con'd) 1978

Table II-B

10. Actual Releases	Units Curies	Jan.	Feb.	Mar.	Apr.	May	June
b. Halogens							
I-131		3.18×10^{-6}	0	1.69×10^{-4}	2.34×10^{-3}	2.81×10^{-3}	9.61×10^{-4}
I-133		0	0	1.88×10^{-3}	2.69×10^{-3}	4.29×10^{-4}	5.04×10^{-4}
I-135		0	0	2.14×10^{-3}	2.36×10^{-3}	3.71×10^{-4}	1.31×10^{-4}
c. Particulates							
Co-57				1.80×10^{-6}	1.39×10^{-6}	4.44×10^{-7}	4.28×10^{-7}
Ce-144		1.98×10^{-6}		9.92×10^{-5}	9.85×10^{-6}	2.56×10^{-6}	3.83×10^{-5}
Ce-141							
Ba+La-140		3.19×10^{-6}		7.32×10^{-5}	1.38×10^{-4}	5.93×10^{-5}	1.63×10^{-4}
Cs-134				8.60×10^{-6}	4.95×10^{-5}	2.14×10^{-6}	1.30×10^{-7}
Cs-137		7.20×10^{-7}		1.09×10^{-5}	7.79×10^{-6}	1.05×10^{-5}	5.05×10^{-6}
Cr-51							
Mn-54		8.00×10^{-7}		1.27×10^{-5}	9.13×10^{-7}	5.99×10^{-6}	1.54×10^{-6}
Fe-59							
Co-58				4.78×10^{-5}	8.48×10^{-6}	1.94×10^{-5}	2.50×10^{-5}
Co-60		3.23×10^{-6}	1.34×10^{-6}	9.13×10^{-5}	9.39×10^{-6}	2.98×10^{-5}	1.82×10^{-5}
Zn-65							
Zr-95		1.47×10^{-6}		1.94×10^{-5}	1.64×10^{-6}	3.86×10^{-6}	2.52×10^{-6}
Nb-95		7.10×10^{-7}	5.95×10^{-7}	2.43×10^{-5}	4.31×10^{-6}	4.66×10^{-6}	1.28×10^{-6}
Cs-136			6.61×10^{-7}	8.22×10^{-6}	2.42×10^{-5}	3.39×10^{-6}	
Cd-109							
Nd-147							
Cm-241				2.47×10^{-6}			
Sr-89				4.87×10^{-5}	2.80×10^{-5}	2.76×10^{-4}	1.08×10^{-4}
Sr-90			4.58×10^{-7}			3.76×10^{-6}	1.50×10^{-5}

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Table II-C

II. AIRBORNE RELEASES (1978)

	Units	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1. Total Noble gases	Curies	8.22×10^{2}	1.04×10^{3}	1.35×10^{3}	5.76×10^{2}	6.79×10^{2}	8.56×10^{2}	8.45×10^{3}
2. Total halogens	Curies	4.00×10^{-3}	1.11×10^{-2}	1.91×10^{-3}	6.67×10^{-3}	1.15×10^{-3}	1.53×10^{-4}	4.18×10^{-2}
3. Total particulate gross radioactivity (β,γ) with > 8 day half-life	Curies	3.90×10^{-4}	4.61×10^{-4}	2.87×10^{-4}	2.56×10^{-4}	1.34×10^{-4}	1.60×10^{-4}	3.21×10^{-3}
4. Total tritium	Curies	1.88×10^{0}	5.59×10^{-1}	7.45×10^{-1}	1.95×10^{0}	2.03×10^{0}	4.11×10^{-1}	7.66×10^{0}
5. Total particulate gross alpha radioactivity	Curies	4.05×10^{-8}	5.62×10^{-7}	4.77×10^{-7}	6.66×10^{-7}	3.78×10^{-7}	9.54×10^{-8}	4.18×10^{-6}
6. Maximum noble gas release rate	µCi/sec	7.62×10^{3}	6.57×10^{3}	7.47×10^{3}	4.75×10^{3}	7.51×10^{3}	5.02×10^{3}	1.21×10^{4}
7. Percent of applicable limit for:								
a. Noble gases	%	1.03×10^{0}	1.38×10^{0}	1.52×10^{0}	9.40×10^{-1}	1.52×10^{0}	8.99×10^{-1}	1.51×10^{0} *
b. I-131	%	2.51×10^{0}	4.42×10^{0}	1.08×10^{0}	5.13×10^{0}	9.51×10^{-1}	5.71×10^{-2}	1.57×10^{0} *
c. Particulates > 8 day half-life	%	3.39×10^{-2}	6.66×10^{-2}	4.56×10^{-2}	5.99×10^{-2}	2.70×10^{-2}	2.58×10^{-2}	5.00×10^{-2} *
d. Tritium	%	1.06×10^{1}	3.16×10^{0}	4.36×10^{0}	1.23×10^{1}	1.74×10^{0}	2.37×10^{0}	3.91×10^{0} *
8. Average Release Rates								
a. Noble gases	µCi/sec	3.07×10^{2}	3.87×10^{2}	5.22×10^{2}	2.15×10^{2}	2.62×10^{2}	3.01×10 [illegible]	2.67×10^{2} *
b. I-131	µCi/sec	1.28×10^{-3}	2.25×10^{-3}	5.38×10^{-4}	2.34×10^{-3}	4.15×10^{-4}	2.91×10^{-5}	7.70×10^{-4} *
c. > 8 day half-life particulates	µCi/sec	1.46×10^{-4}	1.67×10^{-4}	1.12×10^{-4}	9.55×10^{-5}	5.17×10^{-5}	6.10×10^{-5}	1.01×10^{-4} *
d. Tritium	µCi/sec	7.02×10^{-1}	2.09×10^{-1}	2.88×10^{-1}	7.27×10^{-1}	7.82×10^{-2}	1.57×10^{-1}	2.40×10^{-1} *
9. Allowable Total Releases								
a. Gases	Curies	7.98×10^{4}	7.50×10^{4}	8.93×10^{4}	6.13×10^{4}	4.46×10^{4}	8.97×10^{4}	6.13×10^{5}
b. I-131	Curies	1.36×10^{-1}	1.41×10^{-1}	1.31×10^{-1}	1.22×10^{-1}	1.13×10^{-1}	1.34×10^{-1}	1.41×10^{0}
c. Particulates	Curies	1.75×10^{1}	1.51×10^{1}	1.50×10^{1}	4.51×10^{1}	1.40×10^{1}	4.55×10^{1}	5.27×10^{2}
d. Tritium	Curies	1.77×10^{1}	1.77×10^{1}	1.71×10^{1}	1.58×10^{1}	1.16×10^{1}	1.73×10^{1}	1.80×10^{2}
10. Actual Releases	Curies							
a. Gases								
Kr-85			5.88×10^{-1}	1.84×10^{-1}			4.73×10^{-2}	3.67×10^{1}
Xe-133		2.06×10^{2}	2.59×10^{2}	4.91×10^{2}	2.22×10^{2}	1.11×10^{2}	1.89×10^{2}	1.78×10^{3}
Kr-88		4.56×10^{1}	6.17×10^{1}	6.43×10^{1}	3.00×10^{1}	4.16×10^{1}	5.14×10^{1}	5.72×10^{2}
Kr-87		1.13×10^{1}	2.47×10^{1}	2.00×10^{1}	8.49×10^{0}	3.63×10^{1}	3.95×10^{1}	3.44×10^{2}
Kr-85m		4.20×10^{1}	5.18×10^{1}	6.00×10^{1}	2.43×10^{1}	1.97×10^{1}	2.66×10^{1}	3.84×10^{2}
Xe-138		1.72×10^{1}	3.77×10^{1}	2.56×10^{1}	9.24×10^{0}	2.16×10^{2}	6.88×10^{1}	1.01×10^{3}
Xe-135m		4.96×10^{0}	1.44×10^{1}	7.14×10^{0}	1.77×10^{0}	3.84×10^{1}	1.87×10^{1}	2.14×10^{2}
Xe-135		4.83×10^{2}	5.70×10^{2}	6.67×10^{2}	2.71×10^{2}	1.87×10^{2}	3.98×10^{2}	3.87×10^{3}
Xe-133m		8.05×10^{0}	9.05×10^{0}	1.24×10^{1}	7.90×10^{0}	4.95×10^{0}	7.65×10^{0}	8.92×10^{1}
Xe-131m			1.11×10^{0}	2.05×10^{0}	1.42×10^{0}	7.81×10^{-1}	6.46×10^{-1}	9.28×10^{0}
Xe-129m		2.32×10^{-1}					1.18×10^{-2}	8.10×10^{-1}
Kr-89		8.20×10^{-1}	1.70×10^{0}	7.85×10^{-1}	1.41×10^{-1}	6.70×10^{0}		3.51×10^{1}
Xe-137		3.24×10^{0}	4.23×10^{0}	3.85×10^{0}	9.75×10^{-1}	2.02×10^{1}	5.65×10^{0}	1.19×10^{2}

* Yearly Average, not total.

Table II-D

II. AIRBORNE RELEASES (Con'd) (1978)

10. Actual Releases	Units Curies	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
b. Halogens								
I-131		$3.42x10^{-3}$	$6.22x10^{-3}$	$1.38x10^{-3}$	$6.27x10^{-3}$	$1.07x10^{-3}$	$7.64x10^{-5}$	2.472x10[illegible]
I-133		$4.81x10^{-4}$	$3.60x10^{-3}$	$4.43x10^{-4}$	$3.38x10^{-4}$	$6.15x10^{-5}$	$4.08x10^{-5}$	1.047x10[illegible]
I-135		$9.90x10^{-5}$	$1.26x10^{-3}$	$8.37x10^{-5}$	$6.57x10^{-5}$	$5.87x10^{-6}$	$5.34x10^{-6}$	6.522x10[illegible]
I-132			$1.83x10^{-5}$		$7.0x10^{-7}$			1.90x10[illegible]
I-134						$6.11x10^{-6}$	[illegible].01$x10^{-5}$	3.62x10[illegible]
c. Particulates								
Co-57		$6.60x10^{-7}$	$1.04x10^{-6}$		$5.20x10^{-7}$	$3.83x10^{-7}$	$2.00x10^{-7}$	6.365x10[illegible]
Ce-144		$3.47x10^{-5}$	$2.64x10^{-5}$	$2.11x10^{-5}$	$9.49x10^{-6}$	$2.66x10^{-6}$	$3.53x10^{-6}$	2.49[illegible]x10[illegible]
Ce-141			$1.25x10^{-6}$		$8.0x10^{-8}$	$3.18x10^{-7}$	$1.60x10^{-7}$	1.808x10[illegible]
Ba+La-140		$1.58x10^{-4}$	$2.07x10^{-4}$	$1.71x10^{-4}$	$1.24x10^{-4}$	$3.38x10^{-5}$	$7.49x10^{-6}$	1.205x10[illegible]
Cs-134					$1.45x10^{-7}$	$2.51x10^{-7}$	$1.81x10^{-7}$	1.803x10[illegible]
Cs-137		$3.05x10^{-6}$	$2.19x10^{-6}$	$2.44x10^{-6}$	$8.33x10^{-6}$	$4.07x10^{-5}$	$2.93x10^{-6}$	5.797x10[illegible]
Cr-51			$2.69x10^{-5}$			$2.71x10^{-6}$		2.961x10[illegible]
Mn-54		$2.67x10^{-6}$	$2.35x10^{-6}$	$5.30x10^{-7}$		$9.22x10^{-7}$		2.842x10[illegible]
Fe-59						$3.39x10^{-7}$	$6.12x10^{-7}$	9.51x10[illegible]
Co-58		$4.88x10^{-6}$	$1.48x10^{-5}$	$7.57x10^{-6}$	$7.36x10^{-7}$	$1.83x10^{-5}$	$2.95x10^{-7}$	1.473x10[illegible]
Co-60		$1.90x10^{-5}$	$2.08x10^{-5}$	$2.12x10^{-5}$	$1.06x10^{-5}$	$9.12x10^{-6}$	$7.20x10^{-6}$	2.415x10[illegible]
Zn-65						$1.06x10^{-6}$	$5.94x10^{-7}$	1.654x10[illegible]
Zr-95					$6.57x10^{-6}$	1.76x10[illegible]	$3.30x10^{-7}$	3.75[illegible]x10[illegible]
Nb-95			$4.51x10^{-6}$	$5.20x10^{-7}$	$7.21x10^{-7}$	$1.78x10^{-6}$	$3.15x10^{-7}$	4.379x10[illegible]
Ru+Rh-106							$4.00x10^{-7}$	4.60x10[illegible]
Ru-103		$5.30x10^{-7}$		$4.90x10^{-7}$	$5.1x10^{-8}$	$1.33x10^{-6}$		2.40[illegible]x10[illegible]
Cs-136					$6.96x10^{-7}$	$7.40x10^{-7}$		3.791x10[illegible]
Cd-109						$1.73x10^{-6}$	8.04x10[illegible]	9.77x10[illegible]
Nd-147			$4.17x10^{-6}$		$1.82x10^{-7}$	$2.90x10^{-7}$	$1.35x10^{-6}$	5.992x10[illegible]
Cm-241		$2.50x10^{-7}$	$9.53x10^{-7}$	$2.00x10^{-7}$	$2.75x10^{-7}$	$1.12x10^{-6}$	$1.71x10^{-6}$	6.978x10[illegible]
Sr-89		$1.57x10^{-4}$	$1.48x10^{-4}$	$5.71x10^{-5}$	$6.38x10^{-5}$	$4.78x10^{-5}$	$5.45x10^{-5}$	9.889x10[illegible]
Sr-90		$9.4x10^{-6}$	$1.12x10^{-6}$	$4.84x10^{-6}$	$2.97x10^{-5}$	$3.20x10^{-6}$	$1.05x10^{-6}$	6.853x10[illegible]
Nb-94						$2.80x10^{-7}$		2.80x10[illegible]

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Table II-A   Year 1979

II. AIRBORNE RELEASES	Units	Jan.	Feb.	Mar.	Apr.	May	June
1. Total noble gases	Curies	6.98×10^{2}	5.51×10^{3}	8.05×10^{2}	-	2.28×10^{2}	3.76×10^{2}
2. Total halogens	Curies	2.41×10^{-4}	9.16×10^{-5}	2.90×10^{-4}	1.67×10^{-4}	3.70×10^{-4}	2.07×10^{-3}
3. Total particulate gross radioactivity (β,γ) with < 8 day half-life	Curies	1.97×10^{-4}	1.74×10^{-4}	1.07×10^{-4}	9.54×10^{-5}	1.19×10^{-4}	2.37×10^{-4}
4. Total tritium	Curies	4.30×10^{-1}	2.86×10^{-1}	1.95×10^{-1}	4.07×10^{-2}	4.73×10^{-2}	2.12×10^{-1}
5. Total particulate gross alpha radioactivity	Curies	1.30×10^{-7}	1.54×10^{-7}	8.54×10^{-7}	3.73×10^{-6}	1.25×10^{-6}	5.59×10^{-7}
6. Maximum noble gas release rate	μCi/sec	4852	3867	3714	-	2378	5672
7. Percent of applicable limit for:							
a. noble gases	%	1.08	13.10	1.22	-	0.85	0.73
b. I-131	%	1.62×10^{-1}	4.40×10^{-2}	1.77×10^{-1}	7.63×10^{-2}	3.68×10^{-2}	8.43×10^{-1}
c. particulates < 8 day half-life	%	4.85×10^{-2}	4.17×10^{-2}	9.87×10^{-2}	1.50×10^{-2}	2.41×10^{-2}	5.41×10^{-2}
d. Tritium	%	2.86×10^{-4}	1.74×10^{-4}	1.07×10^{-4}	2.32×10^{-5}	2.61×10^{-5}	1.20×10^{-4}
8. Average Release Rates							
a. noble gases	μCi/sec	260.62	2.28×10^{3}	300.41	-	85.05	145.09
b. I-131	μCi/sec	6.72×10^{-5}	2.24×10^{-5}	9.02×10^{-5}	3.89×10^{-5}	1.87×10^{-5}	4.30×10^{-4}
c. < 8 day half-life particulates	μCi/sec	7.04×10^{-5}	7.31×10^{-5}	4.67×10^{-5}	3.09×10^{-5}	4.66×10^{-5}	9.89×10^{-5}
d. Tritium	μCi/sec	1.61×10^{-1}	1.18×10^{-1}	7.29×10^{-2}	1.57×10^{-2}	1.77×10^{-2}	8.19×10^{-2}
9. Allowable Total Releases							
a. gases	Curies	6.46×10^{4}	4.22×10^{4}	6.62×10^{4}	2.72×10^{4}	2.67×10^{4}	5.13×10^{4}
b. I-131	Curies	1.16×10^{-1}	1.22×10^{-1}	1.17×10^{-1}	1.58×10^{-1}	1.30×10^{-1}	1.22×10^{-1}
c. particulates	Curies	1.36×10^{2}	1.37×10^{2}	1.36×10^{2}	2.05×10^{2}	1.62×10^{2}	1.50×10^{2}
d. Tritium	Curies	1.50×10^{5}	1.65×10^{5}	1.82×10^{5}	1.76×10^{5}	1.82×10^{5}	1.76×10^{5}
10. Actual Releases							
a. Gases							
Kr-85	Curies	1.77×10^{-1}	3.93×10^{0}	1.13×10^{-1}	-	-	-
Kr-85m	Curies	1.57×10^{1}	6.57×10^{1}	1.66×10^{1}	-	3.24×10^{0}	7.35×10^{0}
Kr-87	Curies	5.81×10^{1}	8.57×10^{2}	1.89×10^{1}	-	3.20×10^{1}	2.52×10^{1}
Kr-88	Curies	3.90×10^{1}	4.49×10^{2}	2.70×10^{1}	-	1.11×10^{1}	1.63×10^{1}
Kr-89	Curies	-	-	-	-	-	1.93×10^{0}
Xe-129m	Curies	4.43×10^{-2}	-	2.38×10^{-1}	-	3.01×10^{-2}	6.02×10^{-2}
Xe-131m	Curies	2.23×10^{-1}	1.04×10^{0}	5.23×10^{-1}	-	6.67×10^{-2}	2.44×10^{-1}
Xe-133m	Curies	2.58×10^{0}	6.07×10^{0}	4.33×10^{1}	-	6.65×10^{-2}	1.39×10^{0}
Xe-133	Curies	7.46×10^{1}	1.12×10^{2}	2.84×10^{2}	-	9.22×10^{-1}	1.55×10^{1}
Xe-135	Curies	1.82×10^{2}	6.35×10^{2}	3.89×10^{2}	-	2.40×10^{1}	1.39×10^{2}
Xe-135m	Curies	6.42×10^{1}	7.52×10^{2}	5.45×10^{0}	-	2.80×10^{1}	1.93×10^{1}
Xe-137	Curies	2.12×10^{1}	-	1.53×10^{0}	-	1.12×10^{1}	1.14×10^{1}
Xe-138	Curies	2.40×10^{2}	2.63×10^{3}	1.80×10^{1}	-	1.17×10^{2}	7.81×10^{1}

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Table II-B

II. AIRBORNE RELEASES (Pg 2)

Year (1979)

10. Actual Releases

	Units	Jan.	Feb.	Mar.	Apr.	May	June
b. Halogens							
I-131	Curies	$1.88x10^{-4}$	$5.35x10^{-5}$	$2.07x10^{-4}$	$1.20x10^{-4}$	$4.79x10^{-5}$	$1.03x10^{-3}$
I-132	Curies	-	$9.47x10^{-7}$	$5.73x10^{-7}$	-	$1.20x10^{-5}$	$9.82x10^{-6}$
I-133	Curies	$4.98x10^{-5}$	$1.89x10^{-5}$	$5.33x10^{-5}$	$4.32x10^{-5}$	$1.84x10^{-4}$	$8.65x10^{-4}$
I-134	Curies	-	$2.57x10^{-6}$	$1.23x10^{-5}$	-	-	$4.37x10^{-6}$
I-135	Curies	$3.22x10^{-6}$	$1.92x10^{-5}$	$1.67x10^{-5}$	$2.72x10^{-6}$	$1.26x10^{-4}$	$1.65x10^{-4}$
c. Particulates							
Cr-51	Curies	$5.72x10^{-6}$	$3.24x10^{-6}$	$4.23x10^{-6}$	$4.76x10^{-6}$	$1.11x10^{-5}$	$8.51x10^{-6}$
Mn-54	Curies	$2.36x10^{-7}$	-	-	$2.12x10^{-6}$	$2.95x10^{-6}$	$2.77x10^{-6}$
Fe-59	Curies	-	$1.13x10^{-6}$	-	$1.58x10^{-6}$	$7.96x10^{-7}$	$8.70x10^{-7}$
Co-57	Curies	$1.73x10^{-7}$	$3.37x10^{-7}$	$2.62x10^{-7}$	$3.68x10^{-7}$	$3.71x10^{-7}$	$1.80x10^{-6}$
Co-58	Curies	$4.56x10^{-6}$	-	$9.02x10^{-7}$	$9.25x10^{-6}$	$7.10x10^{-6}$	$7.70x10^{-6}$
Co-60	Curies	$1.06x10^{-5}$	$6.49x10^{-6}$	$8.89x10^{-6}$	$2.09x10^{-5}$	$1.72x10^{-5}$	$3.77x10^{-5}$
Zn-65	Curies	$3.59x10^{-6}$	-	$3.67x10^{-7}$	$1.03x10^{-6}$	$1.86x10^{-7}$	$8.43x10^{-7}$
Se-75	Curies	-	-	-	$2.36x10^{-6}$	$1.70x10^{-6}$	$2.07x10^{-6}$
Sr-89	Curies	$1.12x10^{-4}$	$9.37x10^{-5}$	$6.10x10^{-7}$	$9.11x10^{-7}$	$1.86x10^{-5}$	$2.44x10^{-6}$
Sr-90	Curies	$1.58x10^{-6}$	2.1[illegible]$x10^{-6}$	$3.10x10^{-5}$	$1.05x10^{-6}$	$1.82x10^{-6}$	$5.36x10^{-5}$
Zr-95	Curies	$1.01x10^{-6}$	$8.56x10^{-7}$	$2.49x10^{-6}$	$1.48x10^{-6}$	$2.16x10^{-6}$	-
Nb-94	Curies	-	$4.30x10^{-7}$	-	$6.40x10^{-8}$	$1.17x10^{-6}$	$1.02x10^{-6}$
Nb-95	Curies	$1.83x10^{-6}$	$2.90x10^{-7}$	$1.34x10^{-7}$	$2.97x10^{-6}$	$4.35x10^{-6}$	$3.01x10^{-6}$
Ru-103	Curies	$7.00x10^{-8}$	$9.41x10^{-7}$	$3.79x10^{-7}$	$1.69x10^{-6}$	$1.15x10^{-6}$	$1.00x10^{-6}$
Ru+Rh-106	Curies	$2.45x10^{-6}$	$3.13x10^{-6}$	$1.99x10^{-6}$	$2.36x10^{-6}$	$1.84x10^{-6}$	$2.10x10^{-5}$
Cd-109	Curies	$3.63x10^{-6}$	$1.34x10^{-5}$	$1.40x10^{-5}$	$1.46x10^{-5}$	$1.64x10^{-5}$	$2.03x10^{-5}$
Sb-125	Curies	-	-	-	$1.36x10^{-6}$	$1.33x10^{-6}$	$5.26x10^{-6}$
Cs-134	Curies	$6.55x10^{-7}$	$3.06x10^{-6}$	$1.76x10^{-6}$	$1.99x10^{-6}$	$3.44x10^{-7}$	$1.42x10^{-6}$
Cs-136	Curies	-	-	-	$7.03x10^{-7}$	-	-
Cs-137	Curies	$5.04x10^{-6}$	$5.79x10^{-6}$	$1.31x10^{-5}$	$3.47x10^{-6}$	$4.40x10^{-6}$	$1.11x10^{-5}$
Ba-133	Curies	$1.39x10^{-6}$	-	$2.67x10^{-7}$	$6.27x10^{-7}$	$1.64x10^{-7}$	$1.58x10^{-6}$
Ba+La-140	Curies	$3.86x10^{-5}$	$3.51x10^{-5}$	$2.09x10^{-5}$	$9.94x10^{-6}$	$7.18x10^{-6}$	$4.08x10^{-5}$
Ce-141	Curies	$4.82x10^{-7}$	$2.90x10^{-7}$	$1.69x10^{-6}$	$1.77x10^{-6}$	$1.30x10^{-6}$	$2.74x10^{-6}$
Ce-144	Curies	$1.87x10^{-6}$	$1.77x10^{-6}$	$2.58x10^{-6}$	$2.94x10^{-6}$	$1.26x10^{-5}$	$6.86x10^{-6}$
Nd-147	Curies	$9.88x10^{-7}$	$1.26x10^{-6}$	$1.23x10^{-6}$	$1.95x10^{-6}$	$2.09x10^{-6}$	$2.98x10^{-6}$
Cm-241	Curies	$8.00x10^{-7}$	$8.41x10^{-7}$	$2.62x10^{-7}$	$5.37x10^{-6}$	$1.03x10^{-6}$	$3.55x10^{-6}$

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TABLE II-C Year 1979

II. AIRBORNE RELEASES	Units	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1. Total noble gases	Curies	4.00×10^{2}	2.69×10^{2}	3.00×10^{2}	4.66×10^{2}	6.29×10^{2}	6.84×10^{2}	1.037×10^{4}
2. Total halogens	Curies	7.73×10^{-3}	4.62×10^{-3}	1.80×10^{-3}	2.40×10^{-3}	1.44×10^{-3}	8.79×10^{-4}	2.210×10^{-2}
3. Total particulate gross radioactivity (β, γ) with >8 day half-life	Curies	3.87×10^{-4}	4.39×10^{-4}	3.35×10^{-4}	4.42×10^{-4}	3.24×10^{-4}	3.18×10^{-4}	3.174×10^{-3}
4. Total tritium	Curies	4.72×10^{-1}	8.11×10^{-1}	4.12×10^{-1}	3.06×10^{-1}	5.88×10^{-1}	8.43×10^{-1}	4.596×10^{0}
5. Total particulate gross alpha radioactivity	Curies	3.23×10^{-6}	2.68×10^{-6}	4.08×10^{-6}	1.20×10^{-6}	1.01×10^{-6}	2.05×10^{-6}	2.093×10^{-5}
6. Maximum noble gas release rate	μCi/sec	5484	3236	3167	4168	5050	5009	5672
7. Percent of application limit for:								
a. noble gases	%	0.67	0.42	0.56	0.90	1.24	1.10	1.823
b. I-131	%	1.48×10^{0}	3.16×10^{-1}	3.86×10^{-1}	4.71×10^{-1}	1.48×10^{-1}	1.05×10^{-1}	3.538×10^{-1}
c. particulates >8 day half-life	%	2.73×10^{-2}	2.97×10^{-2}	2.51×10^{-2}	4.17×10^{-2}	1.?9x10^-2 [illegible]	1.65×10^{-2}	4.890×10^{-2}
d. tritium	%	2.59×10^{-4}	4.45×10^{-4}	2.34×10^{-4}	1.68×10^{-4}	3.34×10^{-4}	4.63×10^{-4}	2.199×10^{-4}
8. Average Release Rates								
a. noble gases	μCi/sec	149.46	100.31	115.74	173.81	242.7	255.4	171.38
b. I-131	μCi/sec	1.82×10^{-4}	4.71×10^{-4}	4.68×10^{-4}	5.69×10^{-4}	2.33×10^{-4}	1.26×10^{-4}	3.629×10^{-4}
c. >8 day half-life particulates	μCi/sec	1.57x10^- [illegible]	1.51x10^- [illegible]	1.41x10^- [illegible]	1.86x10^- [illegible]	1.05x10^- [illegible]	1.30x10^- [illegible]	1.031x10^- [illegible]
d. tritium	μCi/sec	1.76×10^{-1}	3.03×10^{-1}	1.59×10^{-1}	1.14×10^{-1}	1.91×10^{-1}	3.15×10^{-1}	1.438×10^{-1}
9. Allowable Total Releases								
a. gases	Curies	5.93×10^{4}	6.42×10^{4}	5.36×10^{4}	5.16×10^{4}	5.09×10^{4}	6.20×10^{4}	6.198×10^{5}
b. I-131	Curies	3.02×10^{-1}	4.35×10^{-1}	2.88×10^{-1}	2.87×10^{-1}	4.85×10^{-1}	2.97×10^{-1}	2.904×10^{0}
c. particulates	Curies	3.98×10^{2}	5.75×10^{2}	3.74×10^{2}	3.79×10^{2}	2.58×10^{2}	3.65×10^{2}	3.275×10^{3}
d. tritium	Curies	1.82×10^{5}	1.82×10^{5}	1.76×10^{5}	1.82×10^{5}	1.76×10^{5}	1.82×10^{5}	2.111x10 [illegible]
10. Actual Releases								
a. gases								
Kr-85	Curies	-	1.16×10^{-1}	4.58×10^{-1}	2.92×10^{0}	2.00×10^{0}	-	9.714×10^{0}
Kr-85m	Curies	9.03×10^{0}	6.88×10^{0}	8.24×10^{0}	1.38×10^{1}	1.86×10^{1}	1.90×10^{1}	1.841×10^{2}
Kr-87	Curies	3.56×10^{1}	5.86×10^{0}	1.11×10^{1}	2.21×10^{1}	2.80×10^{1}	2.77×10^{1}	1.121×10^{2}
Kr-88	Curies	1.83×10^{1}	1.52×10^{1}	1.38×10^{1}	2.46×10^{1}	3.25×10^{1}	3.36×10^{1}	6.804×10^{2}
Kr-89	Curies	8.63×10^{0}	5.78×10^{-1}	3.48×10^{-1}	-	-	1.74×10^{0}	1.323×10^{1}
Xe-129m	Curies	1.56×10^{-2}	4.86×10^{-2}	3.86×10^{-2}	9.28×10^{-2}	8.57×10^{-2}	4.63×10^{-2}	7.002×10^{-1}
Xe-131m	Curies	7.51×10^{-1}	1.38×10^{0}	1.74×10^{0}	2.06×10^{0}	8.56×10^{-1}	5.62×10^{-1}	9.446×10^{0}
Xe-133m	Curies	3.50×10^{0}	3.85×10^{0}	4.22×10^{0}	4.52×10^{0}	4.55×10^{0}	6.54×10^{0}	8.059×10^{1}
Xe-133	Curies	1.44×10^{1}	2.23×10^{1}	2.61×10^{1}	5.00×10^{1}	5.34×10^{1}	6.96×10^{1}	7.228×10^{2}
Xe-135	Curies	2.06×10^{2}	2.04×10^{2}	2.17×10^{2}	3.24×10^{2}	4.49×10^{2}	4.81×10^{2}	3.250×10^{3}
Xe-135m	Curies	4.75×10^{0}	1.62×10^{0}	3.29×10^{0}	4.26×10^{0}	8.09×10^{0}	9.70×10^{0}	9.007×10^{1}
Xe-137	Curies	2.02×10^{1}	1.48×10^{0}	2.29×10^{0}	2.10×10^{0}	4.12×10^{0}	4.90×10^{0}	8.040×10^{1}
Xe-138	Curies	7.71×10^{1}	5.23×10^{0}	1.17×10^{1}	1.44×10^{1}	2.82×10^{1}	3.01×10^{1}	3.250×10^{2}

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TABLE II-D Year 1979

II. AIRBORNE RELEASES

10. Actual Releases (Cont.)

	Units	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
b. halogens								
I-131	Curies	4.48×10^{-3}	1.37×10^{-3}	1.11×10^{-3}	1.35×10^{-3}	7.19×10^{-4}	3.10×10^{-4}	1.38×10^{-2}
I-132	Curies	2.86×10^{-5}	1.23×10^{-4}	5.11×10^{-6}	5.70×10^{-6}	1.08×10^{-4}	7.49×10^{-6}	1.83×10^{-4}
I-133	Curies	2.44×10^{-3}	2.05×10^{-3}	4.51×10^{-4}	9.12×10^{-4}	4.25×10^{-4}	1.38×10^{-4}	7.63×10^{-3}
I-134	Curies	2.98×10^{-4}	5.85×10^{-5}	-	8.57×10^{-5}	-	3.40×10^{-4}	8.01×10^{-4}
I-135	Curies	4.77×10^{-4}	1.01×10^{-3}	2.29×10^{-4}	4.49×10^{-5}	1.85×10^{-4}	8.30×10^{-5}	2.36×10^{-3}
c. particulates								
Cr-51	Curies	1.64×10^{-5}	1.18×10^{-5}	8.65×10^{-6}	6.58×10^{-5}	1.81×10^{-5}	1.43×10^{-5}	1.73×10^{-4}
Mn-54	Curies	2.59×10^{-7}	2.43×10^{-6}	7.79×10^{-7}	3.01×10^{-6}	1.48×10^{-6}	4.23×10^{-6}	2.03×10^{-5}
Fe-59	Curies	1.77×10^{-6}	9.83×10^{-7}	2.44×10^{-6}	8.60×10^{-7}	2.65×10^{-6}	2.74×10^{-6}	1.58×10^{-5}
Co-57	Curies	5.51×10^{-7}	3.48×10^{-7}	8.25×10^{-7}	1.45×10^{-6}	1.56×10^{-6}	4.13×10^{-7}	8.46×10^{-6}
Co-58	Curies	5.17×10^{-6}	4.20×10^{-6}	7.35×10^{-6}	4.66×10^{-6}	1.79×10^{-5}	2.69×10^{-6}	7.15×10^{-5}
Co-60	Curies	3.37×10^{-5}	4.16×10^{-5}	2.44×10^{-5}	3.17×10^{-5}	3.71×10^{-5}	3.78×10^{-5}	3.08×10^{-4}
Zn-65	Curies	2.53×10^{-6}	4.98×10^{-6}	4.00×10^{-6}	8.66×10^{-6}	1.66×10^{-5}	-	4.28×10^{-5}
Se-75	Curies	1.93×10^{-6}	-	7.31×10^{-6}	1.98×10^{-5}	-	1.07×10^{-5}	4.59×10^{-5}
Sr-89	Curies	9.20×10^{-5}	1.70×10^{-5}	1.08×10^{-4}	2.29×10^{-5}	5.15×10^{-5}	3.77×10^{-5}	5.57×10^{-4}
Sr-90	Curies	-	1.36×10^{-5}	-	8.78×10^{-6}	3.07×10^{-6}	7.34×10^{-6}	1.24×10^{-4}
Y-91	Curies	-	-	-	-	-	1.06×10^{-6}	1.06×10^{-6}
Zr-95	Curies	3.00×10^{-6}	3.22×10^{-6}	1.32×10^{-6}	1.73×10^{-6}	8.63×10^{-6}	1.02×10^{-6}	2.69×10^{-5}
Nb-94	Curies	1.27×10^{-6}	1.03×10^{-6}	1.50×10^{-6}	-	-	7.20×10^{-7}	7.20×10^{-6}
Nb-95	Curies	1.56×10^{-6}	3.25×10^{-6}	1.46×10^{-6}	1.20×10^{-6}	3.22×10^{-6}	1.59×10^{-6}	2.49×10^{-5}
Ru-103	Curies	5.97×10^{-6}	5.61×10^{-7}	4.78×10^{-6}	3.01×10^{-6}	3.20×10^{-6}	1.91×10^{-6}	2.47×10^{-5}
Ru+Rh-106	Curies	3.15×10^{-5}	5.25×10^{-5}	9.33×10^{-6}	8.98×10^{-5}	1.55×10^{-5}	1.78×10^{-5}	2.49×10^{-4}
Cd-109	Curies	4.39×10^{-5}	7.81×10^{-5}	1.57×10^{-5}	2.83×10^{-5}	5.09×10^{-5}	1.33×10^{-5}	3.13×10^{-4}
Sb-122	Curies	-	2.05×10^{-5}	2.12×10^{-6}	2.37×10^{-5}	-	-	2.79×10^{-5}
Sb-125	Curies	-	1.02×10^{-6}	-	1.51×10^{-6}	2.40×10^{-6}	8.30×10^{-7}	1.37×10^{-5}
Cs-134	Curies	-	5.32×10^{-6}	3.35×10^{-6}	1.14×10^{-6}	3.20×10^{-7}	1.12×10^{-6}	2.05×10^{-5}
Cs-136	Curies	4.68×10^{-6}	1.60×10^{-6}	1.44×10^{-6}	1.66×10^{-6}	3.68×10^{-7}	-	1.04×10^{-5}
Cs-137	Curies	1.26×10^{-5}	1.06×10^{-5}	1.28×10^{-5}	1.22×10^{-5}	1.15×10^{-5}	1.33×10^{-5}	1.16×10^{-4}
Ba-133	Curies	1.34×10^{-6}	2.22×10^{-6}	5.13×10^{-7}	4.86×10^{-6}	7.89×10^{-7}	2.64×10^{-6}	1.64×10^{-5}
Ba+La-140	Curies	1.11×10^{-4}	1.47×10^{-4}	1.05×10^{-4}	8.88×10^{-5}	6.38×10^{-5}	1.21×10^{-4}	7.89×10^{-4}
Ce-139	Curies	-	-	-	-	-	2.14×10^{-7}	2.14×10^{-7}
Ce-141	Curies	1.60×10^{-6}	2.48×10^{-6}	1.70×10^{-6}	1.75×10^{-6}	1.48×10^{-6}	8.02×10^{-7}	1.81×10^{-5}
Ce-144	Curies	7.00×10^{-6}	1.86×10^{-5}	6.87×10^{-6}	8.77×10^{-6}	6.88×10^{-6}	1.74×10^{-5}	9.41×10^{-5}
Nd-147	Curies	3.15×10^{-6}	8.79×10^{-6}	1.76×10^{-6}	4.06×10^{-6}	2.65×10^{-6}	1.27×10^{-6}	3.22×10^{-5}
Am-241	Curies	-	-	-	-	-	2.41×10^{-7}	2.41×10^{-7}
Cm-241	Curies	4.18×10^{-6}	3.98×10^{-6}	1.60×10^{-6}	1.75×10^{-6}	2.44×10^{-6}	2.62×10^{-6}	2.84×10^{-5}
Cm-243	Curies	-	-	-	-	-	5.62×10^{-7}	5.62×10^{-7}

ATTACHMENT 1

PROFESSIONAL QUALIFICATIONS

ROBERT P. GECKLER

U. S. NUCLEAR REGULATORY COMMISSION

I am a Senior Environmental Project Manager for the U. S. Nuclear Regulatory Commission(NRC), having joined the staff in 1972. As an Environmental Project Manager(EPM) I am responsible for the management of the review of an applicant's environmental reports and the preparation of NRC Environmental Statements which meet the requirements of 10 CFR, part 51 and the National Environmental Policy Act of 1969 in connection with applications for construction permits, operating licenses and amendments for nuclear power plants. I also act as the main point of contact between the NRC and the applicant in matters relating to environmental affairs.

I have held assignments in various capacities as the EPM on the LACBWR, Bailly Nuclear Station, Calvert Cliffs, Hatch, Indian Point, Seabrook Nuclear Station, Farley, South Dade, Brunswick, Pebble Springs and Palisades. In addition, I have held a number of special assignments, including such areas as generic problems of alternative siting, cost-benefit analysis, monitoring requirements, workshops on biological significance and committee membership on a committee between EPA and the NRC, evaluation of research proposals and review of internal staff documents.

Prior to joining the NRC, I spent approximately five years as a Senior Research Associate in the Biomathematics Program, Statistics Department, at North Carolina State University, Raleigh, N. C. As a faculty member and associate member of the graduate faculty, I taught courses in resource management and biology at the advanced undergraduate and graduate level, assisted in organizing and giving a course in systems ecology, participated in graduate student guidance, program administration and research in prey-predation in an aquatic system(snails and marsh flies). I was also a member of the Nutrition Institute and the Air Pollution faculty. Outside consulting activities included general toxicology and toxicology of atmospheric pollutants.

Before joining NCSU, I was employed by Aerojet-General Corporation in California and Ohio for eleven years, three of which were with the company's nuclear division. While with the nuclear division, I had several assignments including those of Project Engineer for manufacture and assembly, including critical assembly, of nuclear training reactors and Administrative Reactor Supervisor. I held an AEC Reactor Operator License for Aerojet-General reactors.

In 1960, I transferred within the company to assist in establishing a life sciences activity. I participated in all phases of life sciences programs and was responsible for the biological research within the Corporation.

Programs included establishing and operating an inhalation toxicology laboratory at Wright-Patterson Air Force Base, Ohio. I was Project Engineer during the early phases of design and fabrication and later Assistant Laboratory Director. Other programs included systems studies of waste management processes, the relationships between solid wastes and disease, needs in solid waste research, water purification and microbial problems in desalination, river purification, recreational water criteria, various problems associated with manned space flight and life support systems(including the manned Mars Mission), research and development leading to the fabrication of a photosynthetic gas exchanger and study of man in confinement. Special assignments were accepted as a life science specialist within the corporation. My final position with the company was Assistant Manager, Life Sciences Division and Manager of the Advanced Biological Applications Department.

Before my employment with Aerojet, I spent one year in military operations research and more than four years with the AEC, Oak Ridge Operations Office, Isotopes Division and Division of Research and Medicine as a Physiologist and Biologist.

From 1949-51, I was a faculty member in the Biology Department at Vanderbilt University, Nashville, Tennessee, where I taught general biology, genetics, and cytology and did research in protozoan genetics.

I received my B. S. in Chemistry and Ph.D. in zoology from Indiana University in 1944 and 1949, respectively. I was granted an M. S. in Biological Chemistry from the University of Michigan in 1946.

I am responsible for approximately a dozen environmental statements for the NRC. In addition, I am author of co-author of more than thirty unclassified scientific papers, and co-holder of a patent on the use of concentrated carbon dioxide for growing algae and have been listed inAmerican Men of Science since 1954. I am or have been a member of Sigma Xi, Phi Lambda Upsilon, the American Society of Naturalists, the American Society of Zoologists and numerous other scientific societies. I held a NIH predoctoral fellowship for two years(1947-49).