latory ... ile Cy.

CHANGE OF ADDRESS

Please note that the new address for HANSON and ELIZABETH BLATZ is:

50-247

100 Bleecker Street
Apt 30 B
New York, N.Y., 10012

The telephone number is:

(212) 254-7143

The office telephone for Hanson Blatz is (212) 566-7750.

HANSON and ELIZABETH BLATZ

XA

A18

RAD-1.5M

7083

C-2-33

B-85 C 219

THE CITY OF NEW YORK

OFFICE OF RADIATION CONTROL

386 FOURTH AVENUE
NEW YORK 16, N. Y.

TEL. LEXINGTON 2-9060

August18, 1959

U. S. Atomic Energy Commission
Washington 25, D. C.

Gentlemen:

Your press release of August 11, reporting the proposed issuance of a disposal license to the Military Sea Transportation Service of the Navy, gives no information about the identities and quantities of the waste radio-isotopes which would be dumped at sea. To be able to estimate the possible health hazard connected with the waste disposal operations it seems necessary to have an inventory of the materials which are dumped.

A proposal has been made for the Metropolitan Regional Council to request a hearing in order to bring out this information. (The Council is an organization of representatives of cities in New York, New Jersey and Connecticut.) Perhaps you can supply the needed information without a formal hearing. In case this cannot be done before the 15 day time limit expires will you please consider this letter a request for an extension of time.

Very truly yours,

Hanson Blatz

Hanson Blatz
Director

CC: Mr. Oliver Townsend, Director
New York State Office of Atomic Development

DOCKETED
USAEC
AUG 28 1959
Division of
Licensing & Regulation
Docket Officer

8012030501

All

B-82

COPY

August 28, 1959

Mr. Hanson Blatz
Director
Office of Radiation Control
The City of New York
386 Fourth Avenue
New York 16, N. Y.

Dear Mr. Blatz:

Enclosed is the information on the proposed license to Military Sea Transportation Service to dispose of radioactive waste in the Atlantic and Pacific Oceans in 1000 fathoms of water which Mr. Lester Rogers of this division discussed with you by telephone on August 26th.

As Mr. Rogers indicated to you, the license requires that the Commission be notified at least 20 days prior to any disposal operation as to the date of disposal, the total amount of radioactivity to be disposed of and the most hazardous radioisotope in each container. This information will be available to any interested person upon request to the Commission.

I hope that this is the information that you desire. Please feel free to contact us if you have further questions on this matter.

Sincerely yours,

H. L. Price, Director
Division of Licensing
and Regulation

Enclosures:
As indicated

DOCKETED
USAEC
AUG 28 1959
Division of
Licensing & Regulation
Docket Officer

8012030472

THE CITY OF NEW YORK
DEPARTMENT OF HEALTH
OFFICE OF RADIATION CONTROL

DR-

July 15, 1966

Mr. Harold Price, Director
Division of Regulation
U.S. Atomic Energy Commission
Washington, D.C.

50-247
(formal)

Dear Mr. Price:

Because of the proximity of Buchanan, N.Y. to New York City and particularly since it is very close to both the Croton Water Supply System and the new Chelsea Hudson River pumping station, there has been considerable interest here in the proposal by the Consolidated Edison Company to construct a large power reactor at Indian Point. The Mayor's Technical Advisory Committee has recommended to Mayor Lindsay that an independent technical review by qualified experts be carried out for the City of New York. Such a review would be limited in scope with the principal purpose being to identify any possible safety aspects that may have been overlooked in the Commission's review.

The Mayor agreed that such an independent review would be desirable and authorized this Office to proceed with the necessary arrangements. A small group of Belgian scientists with appropriate qualifications has agreed to conduct the type of review desired by our Advisory Committee. The Consolidated Edison Company has been most cooperative in supplying the necessary documents.

It is our understanding that a public hearing is generally conducted in connection with any reactor construction permit application and that one month's notice is usually given before the hearing is held. It is expected that such a hearing might be scheduled for the near future, although we have not seen a notice to that effect.

My reason in writing is that we have received word from our consultants that they will not be able to finish their review until about the first of September. In case it is the intention of the A.E.C. to schedule a hearing before that date, it is presumed that questions might still be raised subsequently to the hearing and receive consideration by the A.E.C. It is not expected that the City would request that the application for the construction permit be denied, but further investigation of certain aspects may be requested.

If this procedure might present a problem, it would be helpful to New York City if the hearing not be held until after receipt of the report from our consultants. I believe that we could obtain a closer estimate of that date within a few weeks.

DR

Your consideration of this matter would be appreciated.

Sincerely yours,

Hanson Blatz
Director

HB:jj

THE CITY OF NEW YORK
DEPARTMENT OF HEALTH
OFFICE OF RADIATION CONTROL

DR -

125 WORTH STREET
NEW YORK, N.Y. 10007

July 15, 1966

TEL. 566-7750

50-247
(Suppl)

Mr. Harold Price, Director
Division of Regulation
U.S. Atomic Energy Commission
Washington, D.C.

Dear Mr. Price:

Because of the proximity of Buchanan, N.Y. to New York City and particularly since it is very close to both the Croton Water Supply System and the new Chelsea Hudson River pumping station, there has been considerable interest here in the proposal by the Consolidated Edison Company to construct a large power reactor at Indian Point. The Mayor's Technical Advisory Committee has recommended to Mayor Lindsay that an independent technical review by qualified experts be carried out for the City of New York. Such a review would be limited in scope with the principal purpose being to identify any possible safety aspects that may have been overlooked in the Commission's review.

The Mayor agreed that such an independent review would be desirable and authorized this Office to proceed with the necessary arrangements. A small group of Belgian scientists with appropriate qualifications has agreed to conduct the type of review desired by our Advisory Committee. The Consolidated Edison Company has been most cooperative in supplying the necessary documents.

It is our understanding that a public hearing is generally conducted in connection with any reactor construction permit application and that one month's notice is usually given before the hearing is held. It is expected that such a hearing might be scheduled for the near future, although we have not seen a notice to that effect.

My reason in writing is that we have received word from our consultants that they will not be able to finish their review until about the first of September. In case it is the intention of the A.E.C. to schedule a hearing before that date, it is presumed that questions might still be raised subsequently to the hearing and receive consideration by the A.E.C. It is not expected that the City would request that the application for the construction permit be denied, but further investigation of certain aspects may be requested.

If this procedure might present a problem, it would be helpful to New York City if the hearing not be held until after receipt of the report from our consultants. I believe that we could obtain a closer estimate of that date within a few weeks.

DR -

AH

Your consideration of this matter would be appreciated.

Sincerely yours,

Hanson Blatz
Director

HB:jj

[illegible]	CONTROL NUMBER [illegible]	ACTION COMPLETION DEADLINE
[illegible]	DATE OF DOCUMENT [illegible]	FILE LOCATION
	ACTION PROCESSING DATES: Acknowledged [illegible] Interim Report [illegible] Final [illegible]	INFORMATIONAL COPY DISTRIBUTION [illegible]

DESCRIPTION: [illegible] ☐ Copy ☐ [illegible]

[illegible] Co.'s proposed [illegible] at Indian Point [illegible] hearing [illegible] survey which will not be completed until [illegible] September.

Do Not Remove!

REMARKS: [illegible] Past [illegible]

REFERRED TO	DATE	PREPARE FOR SIGNATURE OF:
[illegible]	[illegible]	CHAIRMAN
[illegible]		DIRECTOR OF REGULATION
[illegible]		(Specify)

50-247

1 [illegible]
1 [illegible]
1 PDR

DETACH THIS COPY

DIRECTOR OF REGULATION
COMMUNICATIONS CONTROL

THE CITY OF NEW YORK
DEPARTMENT OF HEALTH
OFFICE OF RADIATION CONTROL

325 BROADWAY
NEW YORK, N.Y. 10007

TEL. 566-7750

July 20, 1966

50-247
(suppl)

Mr. Harold Price, Director
Division of Licensing
U.S. Atomic Energy Commission
Washington, D.C. 20201

Dear Mr. Price:

I have learned indirectly that my letter of July 15, 1966, addressed to you may have been considered a formal request for a delay in the public hearing referred to.

This was certainly not intended, since we know neither the scheduled date of the hearing nor the date when our review will be completed. It was an exploratory letter to learn whether it would be desirable to coordinate the two dates and if so to learn of the feasibility of doing so.

Sincerely yours,

Hanson Blatz

Hanson Blatz
Director

HB:jj
cc: Dr. Harald H. Rossi
Dr. James B. Kelley
Mr. Oliver Townsend

AB

[illegible]	[illegible]	[illegible]
[illegible]	DATE OF DOCUMENT [illegible]	FIL. [illegible]
[illegible]	ACTION PROCESSING DATES Acknowledged Interim Report Final	INFORMATIONAL COPY DISTRIBUTION [illegible]

[illegible] ☐ Copy ☐ Other

REMARKS

[illegible] law of July 15 [illegible] which was not [illegible] the [illegible] proposal [illegible] delay in [illegible] public hearing.

FORWARDED TO	DATE	PREPARE FOR SIGNATURE OF:
[illegible]	[illegible]	CHAIRMAN
[illegible]		DIRECTOR OF REGULATION
[illegible]		(Specify)
[illegible]		

1 - formal
1 - Dist. R.
18

DETACH THIS COPY

DIRECTOR OF REGULATION
COMMUNICATIONS CONTROL

JUL 25 1966

Docket No. 50-247

Mr. John T. Conway
Executive Director
Joint Committee on Atomic Energy
Congress of the United States

Dear Mr. Conway:

Enclosed for the information of the Joint Committee are two letters recently received from Mr. Hanson Blatz, Director, The City of New York Department of Health, Office of Radiation Control. These letters refer to the proposed nuclear power plant of the Consolidated Edison Company of New York, Indian Point-2.

Sincerely yours,

Original Signed by C. K. Beck

Harold L. Price
Director of Regulation

Enclosures
Ltrs fm HBlatz dtd 7/15/66 & 7/20/66

A/6

Distribution:
Harold L. Price
REG Central File
REG Reading
E. G. Case - RL Room (DRL)
Pub. Doc. Room

50-247

Mr. Hanson Blatz, Director
Department of Health
Office of Radiation Control
323 Broadway
New York, New York 10007

Dear Mr. Blatz:

Thank you for your letters of July 15 and July 20, 1966, concerning the application of the Consolidated Edison Company to construct the Indian Point II reactor.

The public hearing on the application has been scheduled for August 31, 1966. I understand that Mr. Howard Shapar of our General Counsel's Office has discussed this date with you and that you find it to be quite satisfactory.

If you have further questions in this matter, I suggest you contact Mr. Edson G. Case, Assistant Director, Division of Reactor Licensing, who will be the regulatory staff's chief witness in the proceeding.

Sincerely yours,

Harold L. Price
Director of Regulation

cc: Mr. Oliver Townsend
New York State Atomic & Space
Development Authority
230 Park Avenue
New York, New York 10007

8111180200 660808
PDR ADOCK 05000247
0 PDR

OGC	REG
HKShapar:mp	Harold L. Price
8-8-66	8- -66

AH

ᴺᴰ·¹ (Rev. 12 64)

THE CITY OF NEW YORK
DEPARTMENT OF HEALTH
OFFICE OF RADIATION CONTROL

125 BROADWAY
NEW YORK, N.Y. 10007

TEL. 566- 7750

November 24, 1967

Mr. Harold Price, Director
Division of Licensing & Regulation
U.S. Atomic Energy Commission
Washington, D.C.

Dear Mr. Price:

Enclosed is a copy of "Comments on the Preliminary Safety Analysis Report of the Indian Point Nuclear Generating Unit No. 3" prepared by consultants retained by the City of New York. This project has been conducted with both the cooperation of the New York City Mayor's Council on Science & Technology, Dr. John R. Dunning, Chairman, and the New York State Office of Atomic and Space Development, Mr. Oliver Townsend, Director.

We should appreciate it if you would obtain a response from the Consolidated Edison Company to the questions raised by our consultants. For your information, we have informally supplied representatives of the Consolidated Edison Company with a copy of the report to allow them as much time as possible for study.

Very truly yours,

Hanson Blatz

Hanson Blatz
Director

HB/hp

Enclosure

cc: Dr. John R. Dunning, Chairman
Mayor's Council on Science & Technology

cc: Mr. Oliver Townsend, Director
N.Y.S. Office of Atomic and Space Development

Rec'd Off. Dir. of Reg.
Date 11/30/67
Time 11:20
Both ✓

P.S. The imprint on the cover does not mean that it may not be placed in the public record ...

A/9

C.E.N.

NOT FOR PUBLICATION
EITHER IN FULL OR IN
PART WITHOUT PERMISSION

COMMENTS ON THE PRELIMINARY SAFETY ANALYSIS REPORT OF INDIAN POINT NUCLEAR GENERATING UNIT No.3

Work performed for the Office of Radiation Control of the City of New York

by

R. BOULENGER[x], H. DOPCHIE[+], R. DOYEN[*], J. GOENS[°] and G. PENELLE[x]

x On leave of absence from CEN to "Contrôle Radioprotection" - Brussels
+ Société de Traction et d'Electricité, Brussels
* Centre et Sud, Brussels - Centrale Nucléaire des Ardennes, Chooz
° CEN

October 1967

TABLE OF CONTENTS

FOREWORD

(i) The present document gives our comments on the safety of the proposed power power station as requested by Dr H. BLATZ, Director of the Office of Radiation Control of the City of New York, in his letter of June 14, 1967 to Mr. J. COENS

(ii) The documents examined are the following :

- Preliminary Safety Analysis Report (P.S.A.R.)
  - Volume I - Description of Site and Environment
  - Volume II - Parts A and B - Plant Design Description and Safety Analysis.

(iii) In the course of this analysis, the seventy General Design Criteria as presently set forth, have been given attention.

It may be said, in general and within the scope of the present analysis, that most of the general design criteria seem to have been given full thought by the designer.

The purpose of the present analysis is not to demonstrat. .hat the 70 criteria are fully met but to draw the attention on specific topics concurring to public health and safety.

(iv) We feel that the plant as described can be built and operated without adverse consequences for the safety of the public but we think that the following points are of special importance from the safety point of view and should be borne in mind by the designer and the operator :

a) Containment integrity and tightness are essential for public safety and should be maintained and adequately tested (comment 5.4).

b) Secondary coolant accidental release in the containment building following a loss of coolant accident is not considered as credible. However, in view of the consequences of such an event, protection of feed water and vapor lines against missile impact should be ascertained (comment 5.4).

c) The adequacy of the cooling capacity of the fans and spray after a loss of coolant accident should be investigated (comment 5.3).

./.

d) An analysis of the consequence of a delay in the safety injection intermittic should be performed (comment 2.5.2). A method to reduce this delay to a minimum is proposed under comment 6.

e) The possible consequences ofelectrical fires must be analysed and adequatel limited (comment 10.1).

f) No loss of power may entail false indications from vital instrumentation (comment 10.2).

g) Careful analysis of the monitoring and alarm level of the gaseous waste disposal should be performed (comments 2.4.2, 2.4.3 and 2.4.4)

h) The problem of formation and decay of methyliodide should be further investigated (comment 8.3).

i) Boron continuous monitoring in the primary coolant is to be advised (comment 9.1.4).

2. DESIGN CHANGES AS COMPARED TO INDIAN POINT UNIT No 2

In general, the design of the Indian Point Unit No 3 is very similar, and in many respects identical to the design of Indian Point Unit No 2.

However some major changes have been incorporated; these are listed in PSAR table 2.1 and commented in the present report for as much as they affect nuclear safety. These changes are :

1. an increase in nuclear power level from 2758 MWt to 3025 MWt as commented in § 4 ;
2. the suppression of charcoal filters in the main internal ventilation system, as commented in § 7.3.1 ;
3. the reduced heat removal capacity of the internal ventilation and of the containment spray system, as commented in § 5.2 ;
4. the reduced thickness of the concrete shell of the containment building, as commented in § 5.1 ;
5. the higher accepted fuel burn-up of 33,000 MW days/metric ton of uranium (PSAR table 3.1) as compared to 27,000 MW days/metric ton for I.P.2 ; this increase would be justified if the core design limitations appearing in PSAR - page 3.74 are adequately met.

2. WASTE DISPOSAL AND EFFLUENT RELEASE

2.1 SOLID WASTE DISPOSAL

Solid waste preparation and storage do not seem to endanger the public. Final disposal is to be achieved off-site (PSAR page 11.2).

2.2 LIQUID WASTE DISPOSAL UNDER NORMAL CONDITIONS

Liquid waste disposal into the Hudson river can be adequately monitored and the yearly average level of contamination in the condenser discharge canal will be maintained below the maximum permissible concentration for drinking water (PSAR page 11.3).

However, in order to justify that statement, the applicant should explain how he intends to monitor the release of the various isotopes, including tritium, quoted in PSAR, page 11.3.

2.3 ACCIDENTAL RELEASE OF LIQUID EFFLUENTS

Accidental release of liquid effluents is improbable ; spillage and leakage in buildings would flow by gravity to drain and sump tanks. Piping external to buildings will run below grade in concrete trenches (PSAR page 12.19).

Even if the maximum allowable activity included in the primary coolant was discharged into the Hudson river, the peak concentration at the Chelsea reservoir would remain below the maximum permissible concentration (PSAR page 12.20).

2.4 GASEOUS WASTE DISPOSAL UNDER NORMAL CONDITIONS

2.4.1 All gaseous effluents of potential radioactivity, with the exception of the containment vent and purge, are treated in the gaseous waste processing system. The release of effluents from the waste gas tanks is continuously monitored before discharge to the plant vent and, if an unexpected increase in radioactivity is sensed, a discharge valve will be closed automatically (PSAR 11.5).

..../.

2.4.2 However, other discharges to the plant vent are possible, which are not monitored by the detector mentioned above. These are :

- the vent and purge gases of the containment building ; these are monitored before venting and purging (PSAR pages 11.14 and 11.15) ;
- the condenser air removal gases, which are monitored and diverted to the containment building in the event of high activity (PSAR page 11.16) ;
- the gases released by the relief valves in case of high pressure in tanks containing potentially high activity level wastes (PSAR page 11.9) ; these gases would attain the plant vent unmonitored ;
- in the plant vent a last gas monitoring system is installed, consisting of four G.M. tubes. High activity alarm is provided (PSAR page 11.16).

A first remark should be made about the use of G.M. counters as provided for in the "Containment Gas Effluent-Radio Gas Monitors", "Plant Vent Gas Detector", "Condenser Air Removal Gas Monitor" (PSAR pages 11.15 and 11.16) and the "Area Radiation Monitoring System" PSAR page 11.19). These counters have an important dead-time so that special circuits have to be used allowing and the determination of the number of pulses for low counting rates, and the measure of the average current for high counting rates in order to avoid that high activities or doses could entail false measurements.

Further special attention should be devoted to Iodine detection and one may wonder if the "Containment Air Particulate Monitors" quoted in § 11.2.21.a (PSAR pages 11.14 and 11.15) are provided with a special filtering paper (impregnated with a silver salt or loaded with active charcoal) in order to fix the gaseous iodine or if the iodine contamination is computed using a theoretical ratio between that gas and the solid fission products contamination.
One has, as a matter of fact, to take into account that an ordinary filtering paper retains only that iodine already adsorbed on dust particles, but is not efficient as far as the gaseous form of iodine is concerned.

Finally, in view of the variety of gas compositions which could be exhausted through the plant vent, a careful analysis should be made of the alarm level. Pessimistic assumptions on gas composition, including substantial amounts of iodine-131, should be postulated. Two alarm levels are suggested :

./..

- the first should be located slightly above normal reading, so as to warn of unexpected increase of the activity released ;
- the second should be located at a carefully determinated level and should impose a well planified action.

2.4.3 The effluents are issued from the plant vent located above the containment building. For the purpose of calculating the atmospheric dilution factor, the effluents are assumed to be released near ground level and diluted in the wake of the containment building.
Although a smaller dilution factor is possible, if the gases are assumed to be released at a height such that they are not trapped in the wake of the containment building, the dilution factor retained ($1.63\ 10^{-3}$ ci/cu.m/ci/sec - PSAR page 11.5) is considered sufficiently prudent when used as a yearly averaged dilution factor.

2.4.4 The effect of dry and rain-out deposition on the pollution of surface water reservoirs and of meadows should be evaluated for continuous releases, in order to establish the alarm level mentioned in § 2.4.3 above

2.4.5 It is suggested that gaseous waste disposal from Indian Point Units No 1, 2 and 3 be coordinated in a way to minimize public exposure to these effluents. It should further be ascertained that the storage capacity is adequate to meet the present recommendation.

2.4.6 Taking into account the special character of the site (valley) where three nuclear power plants will be in operation, it might be advisable to experiment with some traced gaseous releases in order to ascertain the adopted dilution factor.

2.5 ACCIDENTAL RELEASE OF RADIOACTIVE GASES

2.5.1 [illegible] detrimental release of radioactive gases occurs in the event of loss of coolant accident consecutive to a complete severance of a water coolant pipe.
The following components contribute to the protection of the public :
- The containment building designed and tested to be tight to leakage rate of less than 0,1 % of its volume per day at the

./.

design accident pressure of 47 psig without the help of the "engineered safeguards" listed below. Recent experience indicates that such a low leakage rate is not easy to achieve and maintain. Special attention should be devoted to periodical testing whose scope and planning should be carefully defined. According to the PSAR, the containment would resist the accident design pressure and temperature, together with the design earthquake or design wind, with a sufficient safety margin (PSAR page 5.9) :

- continuously pressurized double containment at all liner seams and penetrations ;
- seal water on the containment isolation valves ;
- safety injection of borated water in the core at high, medium and low pressures ;
- containment cooling by ventilation through roughing and absolute filters ;
- containment spray containing sodium thiosulphate for halogen removal.

Missile protection of vital components will be provided. The periodical testing of the "engineered safeguards" is described (PSAR Chapter 6).

2.5.2 These "engineered safeguards" when energized by the grid are redundant. Minimum safeguards can be energized by two out of three Diesels.

Power supply by one of those two means is essential in case of the loss of coolant accident. Indeed, if the simultaneous occurrence of the following events should take place :

- major rupture in the primary coolant piping,
- persistant power unavailability from the grid,
- persistant failure of all the three diesels,

the core would undoubtedly melt ; core melting through the reactor vessel and through the concrete containment building base mat is to be anticipated. The consequential release of fission products could be catastrophic ; ways to prevent such an occurrence are alluded to under point 6.

If, due to a delayed power supply, the safety injection is delayed, water pouring on the hot core and subsequent chemical reactions might provoke a sharp pressure transient exceeding the resistance capability of the containment building. It is recommended that an analysis of the consequences of a delay in the safety injection intervention be made.

2.5.3 If the "engineered safeguards" powered by two diesel generators operate as anticipated, the resulting doses from direct radiation and fission product inhalation remain at an acceptable level. Even some malfunction of the "engineered safeguards" can be tolerated (PSAR page 12.59). The effect of rain out on the pollution of water reservoirs has been found tolerable. It is our normal procedure to investigate the doses to a child's thyroid due both to iodine inhalation and pasture-cow-milk process and to compare them to the British Medical Research Council recommendations as quoted in ICRP recommendations, publication 6, page 15.

2.5.4 No emergency planning is described to cope with the out of plant site consequences of a major accident.

2.5.5 Further comments on the containment building are provided in § 5 ; on diesel generators, in § 6 ; on engineered safeguards in § 7 and on acciden analysis in § 8.

. PERSONNEL PROTECTION

3.1 In view of possible fuel can failure, the ventilation of the spent fuel storage pit (PSAR page 12-18) should be carefully designed, as difficulties are usually encountered in the location of the ventilation ducts. Air and water monitoring should be considered (PSAR fig. 9-4).

3.2 The radiation dose of 2 mr/hour at the surface of the refueling canal during refueling (PSAR p. 11-13), could possibly have been computed for conditions where no contamination is present in the refueling water. If this is the case, and in view of the very large amount of radioactivity which is accepted in the primary water during reactor operation (of the order of 200 ci/m3 of fiss[illegible] products for 1 % clad failure), what could be the maximum exposure to w[illegible]kers in the course of refueling, after the primary water has been cleaned ? What is the duration of this cleaning operation ?

3.3 It would be recommended, for further maintenance planning purposes to periodically measure the dose rate in cubicles of the auxiliary nuclear

./.

building, whereto personnel should access when repair is necessary to radioactive heat-exchangers, pumps, valves, pipes, etc. (PSAR p. 11-12).

3.4 In accidental conditions, it is admitted that the personnel "planned" whole body exposure be limited to 25 rem (PSAR p. 2-37 and 2-54). In Belgium, we would restrict this dose to 12 rem ; the ICRP publication 9, § 66, limits this dose to 10 rem. In the same circumstances a thyroid dose of 300 rem is tolerated (PSAR p. 2-3). According to the Euratom recommandations, this dose should be restricted to 15 rem, and in the ICRP publication 9, § 66 to 60 rem.

3.5 PSAR p. 5-31 states that containment is completely closed during operation. This implies that purging is not tolerated. However personnel access is permitted. What provisions or steps are foreseen to cope with personnel protection against internal contamination ?

4. INCREASED POWER RATING

4.1 The increase in power level from 2758 MWt for Indian Point Unit No 2 to 3025 MWt for Indian Point No 3 results mainly from adopting a reduction of the nuclear hot channel (or "enthalpy rise") factor from 1.75 to 1.58.

A smaller reduction appears in the axial nuclear power distribution factor from 1.78 to 1.72 (PSAR p. 3-5).

Further changes such as an increase in inlet water temperature (PSAR p. 2-23) is justified by the calculation procedure described in PSAR p. 3-41 to p. 3-58. Other changes result from better theoretical investigation.

4.2 The reduction in the nuclear factors is justified by theoretical analysis and experiments (PSAR p. 3-22 to p. 3-24). These factors will be verified by experi[illegible] [illegible] distribution analysis performed on the first core (PSAR p.3-5 and [illegible] subsequent intervals (PSAR p. 3-26).

4.3 However, these factors do not take into account the local power peaking due to Xenon transients after control clusters' movements (as indicated by PSAR p. 3-29 and p. 3-26).

./.

The measurements of these factors by the in-core instrumentation will not show this transient effect (PSAR p. 3-26).
Hence the rate of withdrawal of the control clusters might have to be limited in some circumstances, and the rate of power increase might have to be limited accordingly. This could be implied by PSAR p. 2-8 ; however, PSAR does not describe the way by which this rate of rod withdrawal could be limited to cope with this long-term transient effect. In some earlier designs a small on-line computer would prohibit rod whithdrawal when a transient power peaking is possible ; this automatic feature is not included in the present design (PSAR p. 7-4).

In view of the reduction of the nuclear factors a careful investigation should be made of this transient power peaking.

4.4 Xenon induced spatial instabilities are possible ; they can be detected by the nuclear instrumentation and corrected by proper control strategy (PSAR p. 3-12). However, before such instabilities can be corrected an increase in nuclear factors will appear, and this fact should be taken into account in the choice of the design value of these nuclear factors.

4.5 In order to obtain the total hot channel factor, the nuclear hot channel factor is multiplied by the "engineering" hot channel sub-factors. One of these is the "flow mixing" hot channel sub-factor. This sub-factor has been determined to be 0,92 (PSAR p. 3-49) in the case of the SENA fuel element (PSAR p. 3-59, Ref 15). This sub-factor should be an inverse fonction of the power density radial peaking factor in the fuel element. Since power peaking is larger in a SENA element than in a I.P.3 fuel element, we would suggest to examine if this sub-factor has not been chosen too small, leading to an overestimation of the power capability of the I.P.3 plant.

5. REACTOR CONTAINMENT

5.1 The thickness of the concrete containment building has been reduced by about one foot as compared to Indian Point No 2. (PSAR p. 2-19). No explanation has been given by applicant for this reduction. Is this caused by the

./.

reduction of the radioactivity released into the containment due to the fact that th. present analysis of the loss of coolant accident excludes core melt down, thanks to the presence of the safety injection accumulators ? It is noted that the I.P. 2 containment was stated to resist the impact of most present day aircrafts, while such a statement does not appear in the I.P.3 report.

5.2 According to the applicant (PSAR p. 5-9), the containment building is more than capable of sustaining the pressure and temperature load resulting from the loss of coolant accident as described in PSAR § 12.3.
It should be fruitful to inve te the conditions in which a higher load to the containment is possible, such as :

- delayed action of the safety injection and heat removal pumps;
- delayed action and failure of the ventilation cooling and/ or the spray pump.

5.3 To insure integrity of the containment following a loss-of-coolant accident with no active quenching system (safety injection), the following must be put in operation (PSAR p. 2-51):

at I.P.2	at I.P.3
3 fan units + 1 spray pump	3 fan units + 1 spray pump
or 4 fan units	or 5 fan units
or 1 spray pump	or 2 spray pumps

The units powered by 2 diesels are (PSAR p. 2-20) :

at I.P.2	at I.P.3
4 fan units	3 fan units
1 spray pump	1 spray pump.

The fan cool r units of I.P.3 are probably identical to the units of I.P.2 (PSAR 2-19). The difference in number of fan units needed to limit the con nment pressure is not explained ; it may be due to a difference in assumptions, whereby at I.P.2 non safety injection was assumed, while at I.P.3 the safety injection water could have been assumed to spill in the reactor cavity hence prevent the core from melting through the containment

./.

base mat. Nevertheless, it should be noted that one of the five fan units must be assumed out of order, and that the operation of the last two fan units implies switching of the units on the operating two diesel generators.

The capacity of the spray pump seems to have been decreased from I.P.2 to I.P.3 Indeed, the heat removal capacity of one I.P.2 spray pump is equivalent to four fan units, while at I.P.3 one spray pump is equivalent to 2,5 fan units (PSAR p. 2-51).

It is suggested to investigate the necessity of increasing the cooling capacity of the fans and spray.

5.4 If secondary coolant water would be released in the containment building following a loss of coolant accident, the consequences of the accident would be drastically increased :

- the peak pressure would be much higher ;
- the secondary system would provide gas leakage path through valve seals, packings, etc. designed for standard industrial watertightness and not provided by seal water injection (PSAR table 6.7) ;
- a reactivity accident could be initiated in the damaged core when the sump water is used for safety injection.

The design is such that rupture of the secondary system as a consequence of a loss of coolant accident is not considered credible (PSAR p. 12-29).

However it is said in PSAR p. 2-38 that "the steam generator secondary shell will provide additional protection from missiles originating in the reactor compartment". One may then ask the question : how would the shell sustain the missile impact and protect feed water and vapor lines ?

5.5. Periodical Leakage Tests

Containment integrity and tightness are essential for public safety and health.

The preoperational integrated leak and resistance test at the accident pressure should be performed with all the penetrations in their final status.

Integrated leak tests at reduced pressure should be periodically run to ascertain the tightness of the containment.

./.

Tests of individual components (air locks, penetrations, valves) should also be performed on a periodical basis.

It is recommended that the requirements, schedule and actions to be taken be clearly defined.

6. DIESEL GENERATORS

As stated in § 2.5.2 diesel generator availability is essential. From what can be inferred from PSAR p. 2-40 and p. 8-6, the diesel generators are normally at standstill. When needed, any engine has to be cranked with an independant power supply, brought up to speed and the proper field has to be put on the generator. Has any consideration been given during design to the concept of having the generators permanently switched on the live busbar, run at no load as a synchronous motor, a flywheel, a clutch and a reliable starting device allowing a quick and safe start-up of the engine in case of loss of normal supply to the bus ? What reasons have led to choose the present design ?

7. ENGINEERED SAFEGUARDS

7.1 SAFETY INJECTION

7.1.1 Much concern has already been raised with the possibility of pressure vessel or primary piping rupture due to rapid cooling by the safety injection. The accumulators in particular would introduce a large amount of cold water within a small time interval (2300 to 3000 ft^3 PSAR p. 6-13).

Although the safety injection pump produce a small flow, they could [illegible] a high pressure while cooling down the vessel and pipes, in case of small pipe break.

Thermal sleeves are suggested on the safety injection inlet into the primary coolant pipes (PSAR fig. 4.2).

7.1.2 It is conceivable that the recirculation pumps (or residual heat

limit the containment pressure.

Considering :

- that the service water system pressure at locations inside the containment is below the design loss-of-coolant accident containment pressure (47 psig) (PSAR p. 9-36) ;
- that numerous precautions have been designed to prevent direct contacts between radioactive materials and the outside world ;
- that an auxiliary coolant system is available for cooling various potentially radioactive equipments and fluids and is specially designed to introduce a double barrier between the equipments and the river water ;

and still being aware

- that a continuous check of piping and components integrity of the containment water cooling system is inherently achieved through normal operation of some of the five units (PSAR p. 6-44) ;
- that provision exists for monitoring and isolating a faulty water line (PSAR fig. 9-7) :

it is asked why the auxiliary cooling system is not used for the containment ventilation cooling.

By asking the question, it is realized that such an arrangement would lead to oversize the auxiliary cooling heat sink capability and to higher containment heat sink tempratures.

7.2.2 Emphasis is put on the fact that service cooling water pressure is below the loss-of-coolant-accident containment pressure (PSAR p. 9-36). Is there any special reason leading to such a status, which at first thought seems to be contrary to safety conditions in case of accident ?

7.2.3 If some imperative of justifical reasons impose the use of service water for containment air cooling, what will be the sensitivity of river water radioactive monitoring at the outlet of the coolers, the possibility of isolating a faulty cooling circuit by remote valve operation and manual seal water injection (there is none according to PSAR fig. 9-7), the time and man power necessitated for corrective action, at a time when plant conditions call for attention and action in many other fields ?

7.2.4 If pertinent reasons impose the use of service water to cool the containment air heat exchangers, water sampling and monitoring at the outlet of the five coolers should be subject to careful design and operation.

The present status of the design (PSAR fig. 9-7) shows separate sampling lines -each of them with an isolating valve - discharging into a common header which leads to a single line of radiation monitoring equipment.

Such a lay-out does not appear to be entirely foolproof when one considers that the sample lines of any four coolers might be subject to counterflow from the sampling line of the fifth cooler. Such an event might occur if the common sampling discharge header offers excessive resistance to flow and when, at the same time, the discharge line of the fifth cooler is inadvertenly closed or accidentally plugged downstream of its sampling point.

Check-valves on each sampling line would eliminate or counterweight the possible faulty situation described hereabove.

Moreover, individual monitoring of each sample line would definitely expedite detection and corrective action in case of necessity.

We assume that during normal operation, the 5 sampling valves are in fully open position whatever the number of coolers in action.

7.2.5 Although no charcoal filter is provided on the main containment ventilation (PSAR p. 6-44), charcoal filter dousing is represented on PSAR fig. 6-2. A small separate internal recirculation system utilizing charcoal filters is provided for removal of iodine as necessary prior to routine access to the containment. Does this filter need dousing when its ventilation is stopped ? Is it used in accidental conditions ?

7.3 CONTAINMENT SPRAY

7.3.1 The charcoal filters in the containment ventilation system have been suppressed as studies on sodium thiosulphate containment spray indicate

./.

their great effectiveness in removing iodine (PSAR p. 2-3). Indeed filter dousing and handling introduce problems.
However experimental verification of the analytical studies are still to be performed, and the problems to be solved are listed. Among these the rapid oxydation and deterioration of the thiosulphate in presence of air will certainly create a difficulty, which leads to question the thiosulphate efficiency in the recirculation phase (if needed). Also, rapid draining of the thiosulphate injection tank (PSAR fig. 6-2) at the beginning of the operation of the two spray pumps should be examined.

7.3.2 Inadvertent operation of the spray system is a continuous concern for the operator, and our experience indicates that manual blocking is often considered if not realized. The possibility to install two double-valve in series, one operated by the containment isolation signal and the other operated by the safety injection signal, should be examined.

7.3.3 In PSAR fig. 6-2 the indications "inside missile barrier" and "outside missile barrier" should be interchanged (PSAR p. 6-40).

7.4 ISOLATION VALVE SEAL WATER SYSTEM

7.4.1 In the containment spray system (PSAR fig. 6-2), the single barrier between the containment and the atmosphere, if the refueling water storage tank is emptied in the course of spraying, would be the check valve. Also, if one pump is not put into operation, leakage could appear at the packings of the manual valves and check valve.
It is suggested that positive closure be installed by manual seal water injection, as provided on the safety injection lines (see PSAR fig. [illegible]), although not mentioned in PSAR table 6-7).

7.4.2 The excess letdown heat exchanger cooling water incoming and outgoing lines should be provided each with two automatic stop valves and seal water injection, as indicated in PSAR table 6-7, but not on PSAR fig. 9-4).

./.

7.4.3 Seal water injection should be provided into the line leading from the reactor coolant drain tank and pressurizer relief tank to the vent header, as indicated in PSAR table 6-7, but not on PSAR fig. 11-1. The same applies for the line leading to the gas analyser.

7.4.4 If an accidental increase of pressure in the containment building was accompanied with the rupture of the nitrogen supply line to the pressuriser relief tank, or of any the line leading to this tank (PSAR fig. 4-2), nitrogen would flow into the containment, increasing the pressure unnecessarily. If the nitrogen reserve is substantial, automatic isolation valves and seal water injection are suggested on this line.

7.4.5 It is shown on PSAR fig. 9-4 that the primary pump cooling is interrupted on a signal of high pressure in the containment building. Are the primary pump stopped by the same signal (they are not designed to run in a vapor atmosphere) ? Will cooling be sufficient during coast down ?

7.4.6 PSAR table 6-7 presents the line from the residual heat exchangers to the safety injection pump as a class 4 penetration (defined in PSAR p. 6-5.). This line should be categorised in class 3 and protected as indicated in PSAR fig. 6-1 and not as in PSAR table 6-7.

7.4.7 It is suggested that the containment sump recirculation line be provided with manual or even automatic seal water injection (PSAR table 6-7 and fig. 6-1).

7.4.8 It is suggested for safety reasons, to investigate what are the auxiliary steam line entering the containment building and the returning auxiliary condensate line, mentioned in PSAR table 6-7.

ACCIDENT ANALYSIS

8.1 In PSAR p. 12-9, it is stated that in case of loss of power to the station auxiliaries, the steam generator safety valves would temporarity lift.

./.

If one of the valves should fail to close, partially or totally could auxiliary feed water pumps be adequately driven ? What would be the consequemces of such an event ?

8.2 In PSAR p. 12-12 care is taken to demonstrate that turbine bursting through the cylinders is not to be expected as a consequence of overspeed. However, we would suggest that such a bursting, due to overspeed, loss of lubrication or mechanical failure be assumed, and reactor safety or at least population safety ascertained. Indeed, we believe that total failure of activity equipments is more probable than the failure of a static equipment as envisaged in the loss-of-coolant accident.

8.3 In the analysis of the loss-of-coolant accident, it is assumed that 0.2 % of the iodine present in the fuel gap appears in the form of methyl iodide ; this is said to be based on the fact that the methyl decomposition rate is at least 500 times larger than the rate if iodine decay (PSAR p. 12-53). However, this would only be the case if the CH_3+ and I^- radicals (or other radicals) generated by decomposition, cannot recompose in CH_3I.
If the recomposition rate is taken into account the theory should be as follows :

Let I be the number of iodine atoms present (including methyl iodide),
X be the number of methyl iodide molecules present,
λ the radioactive decay constant of iodine,
λ' the rate of methyl iodide decomposition
r the rate of methyl iodide formation from iodine (if there is sufficient methyl radicals available).

The $$r(I-X) = \lambda X + \lambda' X$$

and $$\frac{X}{I} = \frac{r}{r+\lambda+\lambda'}$$

Hence the proportion of methyl can approach unity if the rate of formation r is large as compared to the rate of "decay" $\lambda + \lambda'$.
In vue of the great importance of methyl iodide on the population safety, since it is not (or less) absorbed by the sodium thiosulphate (PSAR p. 12-54), further investigation is suggested.

./.

9. PLANT CONTROL

9.1 REACTIVITY SHUT DOWN MARGIN

Shut-down and control rods groups associated with chemical shim maintain a reactivity shut-down margin of at least 1% at the time of a reactor trip. Subsequent boron addition takes care of Xenon decay and moderator cooling (PSAR p. 2-45).

The following comments are presented on the subject :

9.1.1 In order to insure the 1 % shut-down margin, the control rods lower position must be limited. This lower insertion limit is calculated by the rod insertion limit monitor and two alarms alert the operator to take corrective action in the event a control group approaches or reaches its lower limit (PSAR p. 7-5).
In earlier designs this same calculator produced a signal which automatically prohibited the control rod insertion (except by scram) ; why has this automatic insertion be suppressed (PSAR fig. 7.2) ?

9.1.2 Boron addition should be realized through reliable equipment.
What will be the operator's attitude in front of a sustained unavailability of the charging system after shut-down ?

9.1.3 Has it been demonstrated that the 1 % magnitude of shut-down reactivity is large enough to cope with the maximum physical boron dilution rate.

9.1.4 The PSAR demonstrates that continuous boron monitoring is not required. Boron is thus measured in intermittent samples drawn from the primary system. Design improvement over Indian Point 2 lays in the separation of sampling lines.
We still believe that boron continuous monitoring is recommendable. From [illegible] experience, there has been a case at least of an abnormal situation where boron continuous monitoring was the sole mean to assess the reactivity margin of a shutdown core since nuclear instrumentation had been put out of service for several days as a consequence of a fire having damaged nuclear instrumentation wiring.

./..

9.2 NEUTRON SOURCE

In some designs, control rod withdrawal is prohibited on a low counting rate on one source channel. In order to avoid a sudden rapid change of neutron power level with rod withdrawal, this additional protection is suggested (PSAR p. 7.4).

9.3 REACTOR COOLANT AVERAGE TEMPERATURE

The reactor coolant average temperature is used widely for plant control ; the average temperature of each of the four primary loops is averaged to obtain the reactor coolant average temperature.

Is there an automatic action taken when the average temperature measurement in one loop differs markedly from the three others, indicating an instrumental failure ?

Even if this automatic action exists, let us assume that it fails and that later on a slow drift occurs at one thermoresistance of the measured averaged temperatures. As a result there will be a drift in the true reactor coolant average temperature while the apparent average temperature remains as programmed. The drift might be at such a rate that the neutron flux and primary pressure remain within their operation limits by the regulating process.

According to PSAR fig. 7-1 the overpower-overtemperature trip controller is actuated by each of the four average temperatures and temperature differences ; would this circuit trip in time to avoid D N B or excess boiling ?

In the case where a sustained false reactor coolant average temperature indication is possible, what would be the effect of the design transient ?

[illegible]. ELECTRICAL SYSTEM AND WIRING

[illegible] ELECTRICAL FIRES

It is recommended that an analysis be made on fire hazards which might affect :

- the supply of power to major equipments ;
- the integrity of control and instrument vital electrical or pneumatic systems ;
- the habitability of the control-room with respect to smoke and toxic [illegible]

10.2 POWER SUPPLY TO VITAL INSTRUMENTATION

Power supply to vital instrumentation has to be most reliable.

10.2.1 Vital instrumentation indicators or recorders should not be of the positioning servomechanism type unless a special indication warns the operator of any loss of motive power. Otherwise a loss of power will cause the indicator to fail as is, which will indicate a false normal situation in case of disturbance.

10.2.2 In case of loss of power on the instrument system, each indicator should display an indication of disorder.
The same applies in case of failure of signalization lamp. The rupture of a fuse should not induce false indications or should be signalled : special consideration should be given to fuses on remotely operated equipment in this respect.

10.3 Missile protection of vital power supplies

Diesel Power generators, vital transformers, motor centers and cables should be effectively protected against missiles generated by the failure (bursting by overspeed, overpressure, ..) of near-by equipment.

[illegible]

C E N

A D D E N D U M

COMMENTS ON THE PRELIMINARY SAFETY ANALYSIS REPORT OF INDIAN POINT NUCLEAR GENERATING UNIT No.3

7. ENGINEERED SAFEGUARDS

7.1 SAFETY INJECTION

7.1.6 It is suggested that the accidental opening of the pressurizer discharge valves be studied, since the safety injection is not provoked in this case ; the same applies to a rupture in the top of the pressurizer.

October 1967