



E.R. Squibb & Sons
United States

June 12, 1986

U. S. Nuclear Regulatory Commission
Region I
Nuclear Materials Safety Section B
Division of Radiation Safety and Safeguards
531 Park Avenue
King of Prussia, PA 19406

Mail Control No. 105308

Attention: Ms. J. Johansen

In reply to your questions of May 21, 1986, concerning E. R. Squibb & Sons radiological contingency plan, attached and listed below are the comments and corrections that you have requested.

1. Please clarify or correct the following typographical errors.

a. Page 12, 2.1.3.4 paragraph 2: NJAC 18 should read "NJAC 5:18" (see attached revised page 12).

b. Page 13 paragraph 2 "Portable" corrected to potable.

Should read: "Potable" (see attached revised page 13).

c. Page 27a, point II., equation Q: it appears that E-07, E-03, in the equation should all be positive powers E07 and E03.

Should read: E07 and E03 in Q equation (see attached revised page 27a).

d. Page 27b under X [uCi/cc] for stability F the results seem to be in error.

Action: all parameters were reviewed and corrected (see attached corrected page 27b).

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Information in this document was obtained by
conducting a search of the Freedom of Information Act
Database.

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- e. Page 17a, 2nd listing of regional office of USNRC and telephone number should be removed.

Action: 2nd listing of regional office of USNRC and telephone number was removed from page 17a (see attached revised page 17a).

- f. Pages 43b and 44a please check on North Brunswick Police number, it does not coincide with Addendum IV telephone number at bottom of page.

Action: Page 43b and 44a and 45 were changed to reflect the new phone number (see attached revised pages 43b, 44a, and 45).

- g. Page 62, 6.5.3 information is doubled on same line.

Action: Page retyped correctly (see attached page 62 for correct text).

2. Please clarify the changes made to the amount of water available on page 12a.

Clarification: Two 1000 GPM fire pumps taking suction from a 250,000 gallon reservoir were replaced by the addition of one 1500 GPM diesel pump taking suction directly from a 16" New Brunswick city water supply main. The city water main originates approximately 1/4 mile from the plant site where the City of New Brunswick maintains a reservoir, stand pipe and pumping facility. The 16" water main is primarily for supply to the plant site with only domestic taps for residential uses between the New Brunswick utilities site and the plant site.

The changes were made in order to replace the aging 1000 GPM fire pumps. This new system is equal to or better than the system it replaced.

3. Please clarify the change from 60 psi yard hydrant to 40 psi yard hydrants.

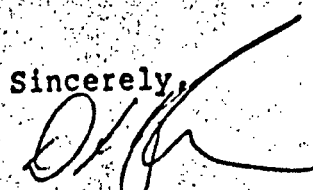
Clarification: The city water supply pressure at the plant site varies dependent upon the head in the New Brunswick city stand pipe and whether or not pumps are running at the city facility. Spot gauge readings at various times may result in various pressures. The Factory Mutual Engineering Association plant site drawing gives an incoming pressure of 54 psi, which could be considered an acceptable average pressure.

During the 1986 review, Squibb's fire department once again was asked to comment on the parts of the radiological contingency plan that would involve them in an emergency. They felt 60 psi was too optimistic a figure for the yard hydrants. For the sake of conservation the figure 40 psi was used. The average figure of 54 psi should be used. This pressure figure change will have no effect on the overall effectiveness of the plan.

Should Read: 54 psi (see attached revised page 13).

If there are any further questions relating to these replies, please call.

Sincerely,


D. K. Balkunow
Radiation Safety Officer

DKB/ldl

Enclosure:

2.1.3.3 Access and Egress of Operating Personnel and Emergency Response Teams

2.1.3.3.1 Onsite

The radiopharmaceutical operations are conducted on the ground floor of the plant making access and egress for the evacuation of personnel an easy task. There are no elevators and the only stairways are those located in the unrestricted office areas and those leading to the second floor machine room.

In addition to the exits used routinely, the plant is also equipped with alarmed emergency exits.

The access control system has been designed to prohibit inadvertent or unauthorized access to high radiation areas and to provide personnel with the knowledge of the presence of radiation or radioactive materials. The access control system eliminates unnecessary exposure and assures exposures are maintained within regulatory limits.

One of the first indications to personnel of a potential hazard is the presence of caution signs at the entrance to radiation areas and labels on the containers of radioactive materials.

2.1.3.3.2 Near Site

Access and egress including the offsite evacuation of personnel as well as for onsite response by offsite based emergency response participants have been established at two site locations; 1) the Ward Street, and 2) the US #1 entrances.

2.1.3.4 Fire and Explosion Resistance and Suppression

All buildings within the site are provided with portable fire extinguishers distributed and maintained in accordance with NFPA 10, as required under the provisions of the OSHA 1910 subpart L and NJAC 5:18.

The plant is provided with Class II interior 1 1/2" hose lines installed in accordance with NFPA 14 and maintained as specified under subpart L of OSHA 1910 and NJAC 5:18.

Every work area where radioactive materials are stored, processed or tested is equipped with automatic sprinklers. It is expected that the hot cells which are constructed of steel, concrete and lead, equivalent to 4 to 8 inches of lead will serve as primary containment following an explosion. The building and the building's charcoal filtration systems are considered secondary containments.

(Bldg. 123) provide water supply for building sprinkler systems and yard hydrants at a design pressure of 90 psi. All fire protection systems are maintained, tested and inspected in conformance with Factory Mutual Engineering requirements for secure properties, and the applicable provisions of subpart L of OSHA 1910 and NJAC 5:18-1.

Potable water is received on site through a 16" pipe from the New Brunswick water supply system and distributed via a looped and gridded system throughout the plant. The city water system in addition to domestic water supply, provides fire protection makeup water, and feeds a system of low pressure (54 psi) yard hydrants.

2.1.3.5 Shielding

The leaded glove boxes and hoods are used to manufacture and fill radiopharmaceuticals of different radioconcentrations. The shielding used varies from one to two inches of lead depending on the radionuclide and activity. The lead is encased in stainless steel which is expected to maintain its effectiveness under the most severe postulated accident conditions. In many cases, additional shielding is provided in the glove boxes and fume hoods to shield the bulk radioactive material as required to maintain radiation levels on the outside of the enclosure as low as practicable.

The hot cells are constructed of steel and concrete equivalent to four inches of lead for ¹³¹I iodine and eight inches of lead for the ⁹⁹Mo Molybdenum operations.

The steel and concrete used in the walls, flooring and ceiling of the hot cell's range from 14 inches to more than three feet in thickness.

It is very unlikely that a fire or explosion would occur within these hot cells. Therefore, it is highly improbable that an accident would occur which would reduce the effectiveness of the shielding.

2.1.4 Control Operations

Plant engineered systems are monitored routinely by plant engineers and the Health Physics group to ensure proper performance.

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The State, Federal and/or local authorities must be informed of an alert condition and the reason for the alert as soon as it is discovered.

The following authorities must be notified immediately by the Health Physics Department Head or his designee:

U.S. Nuclear Regulatory Commission	215-337-5000
Regional Office - Normal work hours	

US Nuclear Regulatory Commission.	301-951-0550
Headquarter operations Center	301-427-4056
(after hours)	301-427-4259
	301-492-8893

N. J. State Department of Environmental Protection	609-882-4200
	609-292-5586
	609-292-5587
	609-292-5588

N. J. State Police	609-882-2000
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Class III

Site Emergency

Radioactive releases that are not contained within the plant and require evacuation of areas within the site. This site emergency involves actual or likely major failures of plant functions needed for protection of the public. Offsite releases are not expected to exceed EPA Protective Action Guidelines.

The State, Federal and/or local authorities must be informed of a site emergency condition and the reason for the site emergency as soon as it is discovered.

The following authorities must be notified immediately by the Health Physics Department Head or his designee:

Consequences

In order to calculate the radiological impact of a general emergency in a radiopharmaceutical area, it is assumed that 45 curies of iodine (I-131) released over a two-hour period through the stack with no filtration or decontamination.

The diffusion calibrations are based on the following:

I. Weather Stability Conditions:

Unstable	Pasquill	A B C
Neutral	Pasquill	D
Stable	Pasquill	E F G

for H = stack height 57.6 feet = 17.6 meters

u = average wind speed = 8.8 ft/sec = 2.68 meters/sec.

II. Pasquill - Gifford Formula:

$$x = \frac{Q}{\pi \sigma_y \sigma_z \bar{u}} e^{-\frac{1}{2} \left(\frac{y}{\sigma_y} \right)^2} \left\{ e^{-\frac{1}{2} \left(\frac{z-H}{\sigma_z} \right)^2} + e^{-\frac{1}{2} \left(\frac{z+H}{\sigma_z} \right)^2} \right\}$$

concentration along center line of plume:

$$x = \frac{Q}{\pi \sigma_y \sigma_z \bar{u}} e^{-\frac{1}{2} \left(\frac{H}{\sigma_z} \right)^2}$$

distances 100M, 200M, 300M, 500M, 1000M

$$Q = \frac{4.5 \text{ E07 uCi}}{(2 \text{ hours}) (3.6 \text{ E03 sec})} = 6.2 \times 10^3 \text{ uCi/sec}$$

The calculated air concentrations for the various distances downwind of the release for the three weather conditions are as follows:

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Stability B

Distance	σ_y	σ_z	$\pi\sigma_y\sigma_z\bar{u}$	$\frac{Q}{\pi\sigma_y\sigma_z\bar{u}}$	$c^{-1/2}\left(\frac{H}{\sigma_z}\right)^2$	$x[\text{uCi}/\text{m}^3]$	$x[\text{uCi}/\text{cc}]$
100M	16	12	1.62E03	3.87E00	3.41E-01	1.32E-00	1.32E-06
200M	32	21	5.66E03	1.10E00	7.04E-01	7.78E-01	7.71E-07
300M	47	32	1.27E04	4.94E-01	8.60E-01	4.24E-01	4.24E-07
500M	83	57	3.98E04	1.57E-01	9.53E-01	1.50E-01	1.50E-07
1000M	140	130	1.53E05	4.08E-02	9.91E-01	4.05E-02	4.05E-08

Stability D

Distance	σ_y	σ_z	$\pi\sigma_y\sigma_z\bar{u}$	$\frac{Q}{\pi\sigma_y\sigma_z\bar{u}}$	$c^{-1/2}\left(\frac{H}{\sigma_z}\right)^2$	$x[\text{uCi}/\text{m}^3]$	$x[\text{uCi}/\text{cc}]$
100M	8	4.9	3.30E02	1.89E01	1.58E-03	2.99E-02	2.99E-08
200M	16	8.7	1.17E03	5.33E00	1.29E-01	6.88E-01	6.88E-07
300M	23	13	2.52E03	2.48E00	4.00E-01	9.93E-01	9.93E-07
500M	37	19	5.92E03	1.06E00	6.51E-01	6.87E-01	6.87E-07
1000M	73	33	2.03E04	3.08E-01	8.67E-01	2.67E-01	2.67E-07

Stability F

Distance (M)	σ_y	σ_z	$\pi\sigma_y\sigma_z\bar{u}$	$\frac{Q}{\pi\sigma_y\sigma_z\bar{u}}$	$c^{-1/2}\left(\frac{H}{\sigma_z}\right)^2$	$x[\text{uCi}/\text{m}^3]$	$x[\text{uCi}/\text{cc}]$
100M	4	2.3	7.75E01	8.07E01	1.93E-13	1.56E-11	1.56E-17
200M	8	4.0	2.69E02	2.32E01	6.25E-05	1.45E-03	1.45E-09
300M	13	5.8	6.35E02	9.85E00	1.00E-02	9.85E-02	9.85E-08
500M	19	8.5	1.36E03	4.60E00	1.12E-01	5.15E-01	5.15E-07
1000M	38	14	4.48E03	1.40E00	4.54E-01	6.33E-01	6.33E-07

* Values for σ_y and σ_z were taken from "Meteorology and Atomic Energy", 1968, David H. Slade, Editor.

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- c. The affected area shall be isolated with a barricade and warning signs shall be placed on all entrances leading to the emergency area.
- d. All personnel not immediately involved with the emergency shall report to an area designated by the emergency team or alternate.

5.2.2 Alert

- a. Persons discovering the emergency condition shall notify the Health Physics office by the most expeditious means available (Telephone 2168; Intercom 60 or 63.)
- b. Health Physics personnel or shift supervisors sounds the appropriate alarm within the plant and notify the Health Physics Department Head of his designee:

Health Physics Department Head: Office

Home

D. K. Balkunow 2451

or designee

E. Truskowski 3158

L. Gaines 3158

(b)(6)

- c. The Health Physics Department Head shall notify:

1. Medical Ext. 3033

2. Fire Ext. 3011

3. Police Ext. 2111

4. Middlesex General Hospital - 828-3000, ext. 286

5. New Brunswick Police - 201-745-5200

6. North Brunswick Police - 201-545-4300

7. Radiopharmaceutical Department Head or designee:

Office

Home

G. Thompson 3061

or designee,

J. Frankowski 3068

(b)(6)

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- c. Health Physics personnel or shift supervisors sound the appropriate alarm (horn) within the radiopharmaceutical production building and notify the Health Physics Department Head or his designee:

Health Physics Department Head: Office

Home

D. K. Balkunow
or designee,

2451

(b)(6)

E. Truskowski

3158

L. Gaines

3158

- d. The Health Physics Department Head shall notify:

1. Medical Ext. 3033

2. Fire Ext. 3011

3. Police Ext. 2111

4. Middlesex General Hospital -828-3000, ext. 286

5. New Brunswick Police - 201-745-5200

6. North Brunswick Police - 201-545-4300

7. Radiopharmaceutical Department Head or designee:

Office

Home

G. Thompson
or designee,

3061

(b)(6)

J. Frankowski

3063

8. U.S. Nuclear Regulatory Commission
Regional Office - Normal work hours

215-337-5000

US Nuclear Regulatory Commission.
Headquarter operations Center
(after hours)

301-951-0550
301-427-4056
301-427-4259
301-492-8893

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f. The Health Physics Department Head shall notify:

V. P. of World Wide Quality
Control and Quality Assurance

Office

Home

E. A. Gusmano

3191

(b)(6)

g. Persons in the immediate area of the emergency condition shall take appropriate action to limit the extent of the incident with available means to the extent possible, then retreat to a safe location and await assistance.

h. Shift operating personnel, not immediately involved with the incident, report to the Health Physics Office.

5.2.4 General Emergency

a. Person(s) discovering the emergency condition shall immediately notify the Health Physics Office by the most expeditious means available (Tel. 2168: Intercom 63 or 60.)

b. Health Physics personnel or shift supervisors sound the appropriate alarm within the radiopharmaceutical production building and notify the Health Physics Department Head or his designee:

Health Physics Department Head: Office

Home

D. K. Balkunow
or designee,

2451

E. Truskowski

3158

L. Gaines

3158

(b)(6)

c. The Health Physics Department Head will notify:

1. Medical Ext. 3033

2. Fire Ext. 3011

3. Police Ext. 2111

4. Middlesex General Hospital - 828-3000, ext. 286

5. New Brunswick police - 201-745-5200

6. North Brunswick Police - 201-545-4300

If the number of patients requires it the guard will call the North Brunswick Squad and other back-up squads as needed.

If not in the plant the Medical Director or his assistant is to be called.

D. The nurse on duty from 3:00 p.m. to 11:00 p.m. will follow the instructions outlined above.

E. From 11:00 p.m. Friday, until 7:00 a.m. Monday, or anytime when there isn't a nurse or doctor on duty, the guards and first aid groups will follow first aid instructions and assist in getting the ill or injured person to a hospital or doctor.

6.5 Emergency Monitoring Equipment

The following is a list of emergency equipment that will be available for personnel and area monitoring as well as that for assessing the release of radioactive materials into the environment:

6.5.1. Model 22A Portable Scaler Rate Meter with Single Channel Analyzer

This equipment is to be used for immediate assessments of radioactive samples. It is portable and therefore convenient and practical for inplant and out of plant operations.

6.5.2 Eberline "Teletector Survey Monitor"

This equipment is to be used for assessing radiation and high radiation areas. Its detector can be extended approximately ten feet to allow emergency personnel to obtain accurate measurements while minimizing radiation exposures to themselves.

6.5.3 G.M. Portable Survey Meter

This equipment is to be used to detect low level external contamination when monitoring operating personnel.

6.5.4 Two (2) Victoreen and/or Eberline Survey Monitors

These equipment will be used for radiation survey measurements during a radiological emergency.

6.5.5 Packard Auto-Gamma Spectrometer

This equipment will be used for accurate analysis of air,