William J. Cahill, Jr.
Vice President

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4 Irving Place, New York, N Y 10003
Telephone (212) 460-3819

February 1, 1980

Re: Indian Point Unit No. 2
Docket No. 50-247

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Denton:

Nuclear facilities have operated safely at Indian Point since 1962. During that time no member of the public has been injured. Safety has been and will continue to be the primary consideration in operating the nuclear facilities at Indian Point.

The existence of above average population densities near the Indian Point site was recognized during the early design and licensing stages of Units 2 and 3. More than eleven years ago, during the construction permit stages, Con Edison, the Atomic Fnergy Commission and the Advisory Committee on Reactor Safety reviewed this matter carefully.

Out of these discussions and Con Edison's own assessments, a common philosophy emerged. That philosophy called for extraordinary measures during all phases of design and operation to reduce any risk to the public. In keeping with this philosophy, protective systems were built into these plants that are not found on contemporary -- or even newer -- plants. Some of these features are the containment weld channel and penetration pressurization system, the isolation valve seal water system, hydrogen recombiners inside containment, a post-loss of coolant accident containment purge system and an internal core cooling recirculation system.

With respect to plant operation and operator training, measures were instituted which went well beyond then current practice. In addition, continuous evolution of our practices in these areas has kept pace with or gone beyond current regulatory standards and industry norms. For example, there is a plant specific simulator located onsite for training Indian Point operators.

It is worth noting that many practices now considered routine by the industry and the Nuclear Regulatory Commission trace their origins to work done at Indian Point. These include such areas as quality assurance and single failure criteria.

Notwithstanding these special features, Con Edison, the Power Authority of the State of New York and Commonwealth Edison have joined together in a program to look at potential accidents beyond the design basis of the plants. These organizations, in conjunction with Westinghouse and several architects-engineers and consultants, have undertaken a program to study potential permanent plant modifications to mitigate the effects of a severe accident, as unlikely as one might be. This effort concentrates on reducing potential radiation releases and increasing available evacuation time. The program also includes evaluations of potential means to further reduce the already low probability of severe accidents, including core melt.

Mitigation of the effects of the very unlikely core melt focuses on the development of means to increase the plant in-depth defense so as to reduce releases of radioactivity. Some of the features being considered are: lining the reactor cavity with sacrificial material such as magnesium oxide, additional hydrogen control measures, augmented containment cooling and filtered containment vents.

The program also will evaluate, using probabilistic risk assessment techniques, methods which might reduce the possibility of severe accidents, including core melt. As major contributors to risk are identified, feasible plant modifications are being evaluated for their effectiveness in reducing the possibility of severe accidents.

Taken together, this record demonstrates a continuous and effective dedication to "safety-first" at Indian Point.

Nonetheless, Con Edison agrees that further safeguards should be studied and, as warranted, be implemented. Since January 11, 1980 we have had frequent discusssions with the Commission staff regarding interim actions that could be taken until the program described above is completed and resulting modifications implemented. Accordingly, we are implementing the actions listed in the attachment to this letter.

Very truly yours,

William J. Cahill, Jr.
Vice President

cc: Mr. T. Rebelowski, Resident Inspector
U. S. Nuclear Regulatory Commission
P. O. Box 38
Buchanan, N. Y. 10511

ATTACHMENT A

INTERIM ACTIONS

The following measures will be taken by each Licensee before its Unit at Indian Point is returned to power:

1. Maintain reactor power level as necessary such that calculated fuel peak clad temperature would not exceed 2000°F under large break LOCA conditions.

2. Revise plant operating procedures as necessary to require a base load mode type of operation only, without load following.

3. Conduct a low pressure gross leak test of containment prior to any start up from cold shutdown conditions. Such a test is currently being performed at Indian Point 3. It may be that other more practical means can be found to verify that all containment valves are in the proper position. If so, these procedures will be proposed to the Commission.

4. Maintain at least two senior reactor operators (SROs), one of whom may be the shift supervisor, in the control room at all times during power operations or hot shutdown, except that the shift supervisor shall be allowed to leave the immediate vicinity of the control room as duties may require, provided he is available to respond to an emergency by returning to the control room within ten minutes. It is considered that the shift or watch supervisor's office is part of the control room.

5. Conduct testing to assure that the LPI/RHR check valves are in fact installed correctly and functioning as pressure isolation barriers throughout the majority of time when the plant is at pressure and producing power. Verification of valve operability shall be performed prior to plant restart and thereafter whenever RCS pressure has decreased to within 100 psig of RHR system design pressure. This test has been conducted within the past five days at Indian Point 3.

6. Submit not later than March 1, 1980 the results of our investigations of possible permanent plant modifications and emergency procedures to further reduce the potential of a radiation release and the area effect.

7. All reactor operators and senior reactor operators shall review the following emergency procedures, including in plant walk-throughs, where applicable. Those reactor operators and senior reactor operators who have not recently received simulator training on these items will all be given such simulator training within 30 days of the date of this letter:

   a. Plant or reactor startups to include a range wherein reactivity feedback from nuclear heat addition is noticeable and heat up rate is established.

   b. Manual control of steam generator level and/or feedwater during startup and shutdown.

   c. Any significant (10%) power change using manual rod control.

   d. Loss of Coolant,

      (i) including significant PWR steam generator leaks

      (ii) inside and outside containment

      (iii) large and small, including leak rate determination

      (iv) saturated reactor coolant response (PWR).

   e. Loss of core coolant flow/natural circulation.

   f. Loss of all feedwater (normal and emergency).

   g. Station blackout.

   h. ATWS.

   i. Stuck open relief valve on secondary side.

   j. Intersystem LOCA.

The following measures will be implemented within 30 days of the date of this letter:

1. A vendor representative will be stationed on site for engineering consultation at Unit 2 and Unit 3 on plant operations and maintenance to increase plant safety. The representative will be from the NSSS vendor architect/engineering or start up engineering firm.

2. Control room habitability under accident conditions will be assured by reexamining ventilation intakes, location of potential plant leakage (ingress and egress), and control room filter capabilities. The results of this review will be provided to the NRC within 30 days.

3. Emergency action levels will be revised to require notification of the NRC for all events in emergency classes as described in NUREG-0610.

4. We commit to the requirements of the October 1979 letter concerning the NRC's "INTERIM POSITION FOR CONTAINMENT PURGE AND VENT VALVE OPERATION PENDING RESOLUTION OF ISOLATION VALVE OPERABILITY".

5. Plant personnel will be trained, retrained in the following areas within one month, or prior to startup if required by the Lessons Learned implementation schedule. Plant personnel will also be retrained in the following areas within one month of the time that there are significant changes to the following procedures or requirements:

   Containment and Degraded Core Sampling
   Degraded Core - Training
   Emergency Power for Pressurizer Heaters and Decay Heat Removal
   Containment Isolation
   Containment Purge/Purge Valve Operation
   Subcooling Meter Operation
   Technical Support Center
   Onsite Operational Support Center
   Near-Site Emergency Operations Center
   Emergency Preparedness Plant
   In-Plant Area Airborne Radioiodine Monitors
   Surveillance Testing of Non-ESF Filtration System

6. Perform diesel generator testing in accordance with Regulatory Guide 1.108 with a corresponding change in the allowable outage time stipulated in the Limiting Conditions of Operation as follows:

Numbers of DG Failures In Prior 100 Tests	Test Interval (R.G. 1.108)	Allowable Outage Time
0 or 1	30	As Is
2	14	As Is
3	7	As Is
4	3	32 hr.
5	3	8 hr.
6 or more	3	None*

* Plant must achieve hot shutdown with 12 hours, etc.

7. Requirements regarding reactor operator qualifications will be revised to incorporate the following for applications submitted after June 1, 1980:

   a. The following experience will be required for senior operator applicants:

      Applicants for senior operator licenses shall have 4 years of responsible power plant experience. Responsible power plant experience should be that obtained as a control room operator (fossil or nuclear), field operator (nuclear) or as a power plant staff engineer involved in the day-to-day activities of the facility, commencing with the final year of construction. A maximum of two years' power plant experience may be fulfilled by academic or related technical training, on a one-for-one time basis. Two years shall be nuclear power plant experience. At least six months of the nuclear power plant experience shall be at the plant for which he seeks a license.

   b. The hot training programs will be modified so that the training concentrates on the responsibilities and functions of the operator, rather than the senior operator. All individuals who satisfactorily complete this hot training program will be allowed to apply for an operator license. Three months' experience as a licensed operator is necessary before applying for a senior operator license.

   c. The three month continuous on-the-job training for hot operator applicants shall be as an extra man on shift in the control room. The hot senior operator applicants will have three months continuous on-the-job training as an extra man on shift in training.

   d. In addition to the presently approved training programs, all replacement applicants will participate in simulator training programs.

   e. Phase 11, 111 and IV cold training program instructors and all hot training program instructors that provide instruction in nuclear power plant operations will hold senior operator licenses and be required to successfully participate in applicable requalification programs to maintain their instructor status.

   f. In addition to the present operator requalification program requirements, all licensees will participate in periodic retraining and recertification on a full scope simulator representative of I.P. 2 or I.P. 3. The frequency of training will be on an annual basis.

   g. The simulator at Indian Point will be available to the NRC for licensee examinations.

The following requirements will be completed within 60 days of the date of this letter:

1. Review the steady state steam generator operating level to determine the optimum steady state level for the purpose of maximizing dryout time with due consideration for overfilling. The results of this study shall be provided to the NRC.

2. Investigate possible co-impregnation of the charcoal in the plants' air effluent filtration systems within KI_3 and an amine such as TEDA (triethylenediamine) to improve the iodine removal capability of these systems. The results of this review shall be submitted to the NRC.

3. The following power reduction measures and limitations of operating parameters will be evaluated:

   a. Determine effects on plant systems stability impact if power is reduced as much as 50%, treat power as a parameter. For example, examine feedwater flow automatic control.

   b. In response to the ATWS issue, we commit to presenting a schedule within 60 days to implement the instrument modification justified in accordance with the Westinghouse analytical results contained in the letter from T.M. Anderson to S.H. Hanauer in NS-TMA-2182 dated 12/30/79.

   c. Examine methods of establishing the highest reliability for the I.P. gas turbines. The following information will be examined:

      (1) Provide details of gas turbine controls, modes of operation, etc., to NRC.

      (2) Evaluate how the starting and running reliability of the gas turbine can be improved.

      (3) Evaluate and initiate actions which will ensure that the gas turbine can be brought on line within one hour after loss of offsite power.

      (4) Determine how gas turbine power can be provided to I.P. 3.

(5) Evaluate the limitation that I.P. 2 not be operated if the all gas turbines are out-of-service.

(d) Establish an on-site group at each I.P. 2 and I.P. 3 reporting to offsite management. The function of the group will be to examine plant operating characteristics, NRC bulletins, Licensing Information Service advisories and other appropriate sources which may indicate areas for improving plant safety. Where useful improvements can be achieved the group would also develop and present detailed recommendation for revised procedures, equipment modifications or other means.

The following measures will be implemented within 90 days of the date of this letter:

1a. Establish the on-site emergency preparedness manning levels on each shift as contained in Table 1 attached.

b. Power Authority and Con Edison will jointly arrange to provide additional personnel as contained in Table 1 available to the plant on call within 60 minutes.

2. Power Authority and Con Edison shall jointly review and identify the significant differences between Unit 2 and Unit 3 and will evaluate these differences in light of present regulatory standards and requirements. A justification for the current design will be provided or design changes recommended.

3. Establish temporary on-site inter-disciplinary review group consisting of as a minimum an NSSS vendor representative, an architect-engineer representative, plant maintenance and operations personnel. This group will review and concur in all existing plant emergency procedures. This group will also review and concur in changes to emergency procedures. Urgent changes may be approved in accordance with current licensee requirements but will be subsequently submitted for concurrence by the review group.

The following measures will be completed within 120 days of the date of this letter:

1. Examine key plant system vulnerability areas and possible operator dependent areas with the intent of maximizing the reliability in the subject areas. Areas that will be specifically examined are as follows:

   a. Verify that the sump for ESF recirculation is free of debris and determine if flow test verification was initially performed. If not, explore means to verify. Strengthen existing procedures and training on recirc alignment and RWST refill.

   b. Strengthen administrative check and verification procedures for assuring that the two single failure points (manual) valves in AFWS supply line are in the correct position.

   c. Impose an Administrative Order stipulating expeditious shutdown whenever an independent train of the auxiliary feedwater system <u>and</u> any one of the following are inoperable: all backup sources of offsite power, the diesel generator supplying power to the other indepdent train or either of the other trains of the auxiliary feedwater system.

   d. Develop station blackout procedures addressing:

      i. grid dispatcher actions
      ii. reactor operator actions
      iii. diesel generator repair procedures

   e. Assure that DC-powered lighting is available at the steam-turbine driven auxiliary feedwater pump.

   f. Verify that the gas turbine station has black-start capability.

   g. Explore causes for, procedures for, and operator training required to diminish the overall number of reactor and main feedwater trips.

h. Develop or review procedures to restore main feedwater promptly after a trip, and procedures/ training on human actions required for ATWS events (e.g. emergency boration and CVCS control).

i. Strengthen administrative controls on the manual valve(s) whose misalignment can fail all ECCS. (RWST line)

2. A review of control room emergency procedures will be conducted for the purpose of improving these procedures from a human factors engineering standpoint. Improvements which can be attained by modifying procedures will be implemented within the 120 days. Control room displays will also be reviewed for the purpose of identifying improvements which will increase the operators' ability to assess plant conditions. A report will be submitted to describe the improvements recommended and the schedule for their implementation.

The following measures will be implemented within six months of the date of this letter:

1. Conduct a review of past Licensee Event Reports (LERs) at each unit. These LERs will be reviewed to identify design inadequacies (common mode failures, systems, interactions, etc.), procedural and training inadequacies, and man-machine/human factor inadequacies. Recommendations will be submitted for correction of the base cause of the subject LERs. Immediate corrections of deficiencies will be made when possible, with the required modifications to be made to NRC.

2. The meteorological acceptance criteria for emergency preparedness contained in Appendix 1 attached will be met.

3. Determine the extent to which Indian Point 2 and 3 meet current rules and regulations, in particular those pertaining to 10 CFR Parts 20 and 50. All Division 1 Regulatory Guides shall be addressed to demonstrate how each guide is met or by describing the method used and justification in meeting the intent of each guide.

4. The reliability and failure modes of selected systems/ components will be evaluated as follows:

Failure Mode Effects Analysis: Examine the failure modes (random failures and consequences of outages in support systems) of the active components on the reactor coolant pressure boundary. Assess the acceptability of these failure modes.

Implement Failure Mode Effects Analysis for minor departures from operating, maintenance and emergency procedures.

Explore ways to improve the reliability of those components with a particularly high failure rate as delineated in NUREG/CR-1205.

5. Attain full compliance with NRC letters concerning AFWS reliability improvements.

Table 1

MINIMUM STAFFING REQUIREMENTS FOR NRC LICENSEES FOR NUCLEAR POWER PLANT EMERGENCIES

Major Functional Area	Major Tasks	Position Title or Expertise	On Shift	Additions Within 60 minutes
Plant Operations and Assessments of Operational Aspects		Shift Supervisor (SRO)	1	--
		Shift Foreman (SRO)	1	--
		Control Room Operators	2	--
		Auxiliary Operators	2	--
Emergency Director and Control (Emergency Coordinator)		Shift Technical Advisor Shift Supervisor or designated facility manager	1**	--
Notification/Communication	Notify licensee, State local and Federal personnel & maintain communication		1	3
Radiological Accident Assessment and Support of Operational Accident Assessment	Emergency Operations Center (EOC) Director	Senior Manager	—	1
	EOC Off-site Dose Assessment	Senior Health Physics (HP) Expertise		1
	Offsite Surveys		—	4
	Onsite (out-of-plant)		—	2
	In-plant surveys	HP Technicans	1	2
	Chemistry/Radiochemistry	Rad/Chem Technicians	1	1
Plant System Engineering, Repair and Corrective Actions	Technical Support	Shift Technical Advisor	1	—
		Core	—	1
		Electrical	—	1
		Mechanical	—	1

Table 1 (cont'd)

Major Functional Area	Major Tasks	Position Title or Expertise	On Shift*	Additions Within 60 minutes
	Repair and Corrective Actions	Mechanical Maintenance/Rad Waste Operator	1**	1 1
		Electrical Maintenance/Instrument and Control (I&C) Technician	1**	2 1
Protective Actions (In-Plant)	Radiation Protection: a. Access Control b. HP Coverage for repair, corrective actions, search and rescue first aid & firefighting c. Personnel monitoring d. Dosimetry	HP Technicians	2**	4
Firefighting	—	—	Fire Brigade per Technical Specifications	Local Support
Rescue Operations and First-Aid	—	—	2**	Local Support
Site Access Control and Personnel Accountability	Security, firefighting communications, personnel accountability	Security Personnel	All per Security plan	
		Total	10	26

Notes:

* For each unaffected nuclear unit in operation, maintain at least one shift foreman, one control room operator and one auxiliary operator. This means that a single unit will require a minimum shift complement of 10, a two -unit complex 13, and a three-unit complex 16.

** May be provided by shift personnel assigned other functions.

*** Overall direction of facility response to be assumed by FOC director when all centers are fully manned. Director of minute-to-minute facility operations remains with senior manager in technical support center or control room.

APPENDIX 1

METEOROLOGICAL CRITERIA FOR EMERGENCY PREPAREDNESS
AT OPERATING NUCLEAR POWER PLANTS

~~(Applies to items II.B.3, II.F.1 and Visible Operating Plant Operators)~~

1. Primary Meteorological Measurements Program

   a. Position: All sites with operating nuclear power plants shall have an adequate operational meteorological measurements program to produce real-time and record historical local meteorological data.

   b. Purpose: To allow a determination of the dispersion of radioactive material due to accidental and routine radioactive releases to the atmosphere by the plant.

   c. Acceptance Criteria:

      (1) The meteorological measurements program shall include measurements and/or calculations of the following parameters:

         (a) Wind direction and speed at a minimum of two levels (RG1.23), one of which is representative of the 10 meter level.

         (b) Standard deviation of wind direction fluctuations (sigma theta) at all measured levels

         (c) Vertical temperature difference for at least one layer;

         (d) Ambient temperature (10 meters)

         (e) Dew point temperature (10 meters)

         (f) Precipitation near ground level; and

         (g) Pasquill stability class used for diffusion estimates.

      (2) The remaining acceptance criteria stated in Revision 1, Section 2.3.3 of NUREG-75/087, Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants, apply.

      (3) A quality assurance program shall be established consistent with the applicable provisions of Appendix B to 10 CFR Part 50. The acceptance criteria stated in Revision 1, Section 17.2 of NUREG-75/087 apply.

(4) The meteorological measurements system and associated controlled environment housing for the equipment shall be connected to a power system which is supplied from redundant power sources.

2. Backup Meteorological Measurements Program

a. Position: All sites with operating nuclear power plants shall have a viable ~~redundant~~ backup system and/or procedures to obtain real-time local meteorological data.

b. Purpose: To provide meteorological information when the primary system is out of service, thus providing assurance that basic meteorological information is available during and immediately following an accidental airborne radioactivity release.

c. Acceptance Criteria:

(1) An independent system and/or procedures shall be established for obtaining measurements of wind direction and speed representative of the 10 meter level and a seven category (A-G) estimator of atmospheric stability (ΔT, wind fluctuations, etc)

NOTE: An independent system is defined as a system installed and maintained by the licensee specifically for the purpose of providing redundant site-specific meteorological information. An independent procedure is defined as a procedure whereby meteorological information can be obtained from an existing well-maintained meteorological installation capable of providing information representative of the site environs.

(2) The system and/or procedures shall provide information representative of the site environs, and should include data from multiple locations ~~where~~ when necessary.

(3) The system and/or procedure shall provide information in a real-time mode in the event necessary parameters from the primary system are

3. Real time Predictions of Atmospheric Effluent Transport and Diffusion

a. Position: All licensees with operating nuclear power plants shall have a demonstrated system for making real-time, site specific, estimates and predictions of atmospheric effluent transport and diffusion during and immediately following an accidental airborne radioactivity release from the ~~at each~~ nuclear power plant. ~~site.~~

b. Purpose: To provide an input to the assessment of the consequences of accidental radioactive releases to the atmosphere. To aid in the implementation of emergency preparedness decisions.

c. Acceptance Criteria:

(1) Real-time, site specific atmospheric transport and diffusion models shall be developed and used when accidental airborne radioactive releases occur. Two classes of models should be developed;

Class A - ~~(a)~~ a model and calculational capability which can produce initial transport and diffusion estimates within fifteen minutes following classification of an incident. Class B - ~~and (b)~~ model and calculational capability which can produce refined estimates for the duration of the release. The models shall incorporate the following features: ~~considerations:~~

(a) Site area topography, local meteorological anomalies (as at coastal locations) and available local meteorological measurements; ~~both classes of models;~~

(b) Variations in time and space of the parameters affecting transport and diffusion, including forecasts of changing meteorological conditions, for model Class B. only;

(c) Information ~~from~~ all local meteorological measuring systems used in making the transport and diffusion estimates shall be identified. The licensee shall make arrangements to transmit data from these systems at 30-minute intervals during an incident

(2) The transport and diffusion estimates shall include current and forecast plume position, dimensions and radioactivity concentrations at 30 minute intervals as a minimum. Forecast capability up to 24 hours in the future is required in three hour increments. Such estimates shall be included as a portion of the information accessible for remote interrogation.

(3) A determination shall be made of the accuracy and conservatism of the models ~~with their input data to estimate~~ in estimating atmospheric transport and diffusion to distances out to 80 km (50 miles).

4. Remote Interrogation of the Atmospheric Measurement and Prediction Systems

a. Position: All systems producing meteorological data and effluent transport and diffusion estimates at sites with operating nuclear power plants shall have the capability of being remotely interrogated.

b. Purpose: To provide simultaneous real-time meteorological data and transport and diffusion estimates in the site vicinity to the licensee, emergency response organizations and the NRC staff, on demand, during emergency situations.

c. Acceptance Criteria:

(1) The meteorological system shall have the capability of being remotely interrogated simultaneously by the licensee, emergency response organization and the NRC.

(2) The meteorological data and effluent transport and diffusion estimates shall be in the format indicated in Enclosure 1.

(3) The systems shall have a dial up connection for a 300 BAUD ASCII terminal of 80 columns via telephone lines (e.g., output format of RS232C in FSK) and a functional back-up communications link (e.g., radio or satellite).

(4) The system shall have the capability of recalling 15 minute averages of meteorological parameters from at least the previous 12-hour period.

(5) The resolution of the data shall meet the system specifications of accuracy given in Section C.4 of Regulatory Guide 1.23.

ENCLOSURE 1

FORMAT FOR INTERROGABLE DATA FROM METEOROLOGICAL SYSTEMS

To facilitate the remote interrogation requirements and the ability of the NRC to correctly access and utilize meteorological data, the procedures outlined below shall be followed. A series of data bases shall be coupled to executable codes to yield a file containing pertinent site information, selected meteorological data, and information regarding transport and diffusion for emergency planning and during emergency situations. The access codes and execution instructions unique to the operational system shall be documented and provided to the NRC and other appropriate organizations ~~at the time of~~ prior to implementation.

The information to be accessed shall be available by executing an online program. Upon execution of the code, a query should be initiated requesting a meteorological data base starting and stopping time and an option to include preliminary estimates of relative concentration. The user response will be in the form of three free field ~~entires~~ entries comprised of 2 time blocks and the number of previous hours for which diffusion estimates are to be provided; i.e., YYJJJHHMM (starting time), YYJJJHHMM (stopping time), I (0 to 12), e.g. 801830015 801831200 12. An all nine field for stopping time (999999999) should conclude the data set with the most recent set of observations. The system response shall include the following: site descriptor, meteorological data field descriptor, meteorological data, diffusion estimate descriptor, and estimated relative concentration coincident with the meteorological data present from the previous I number of hours.

The information presented in the output file shall identify site information contained witin an 8 record block (mandatory 8 line block filled with blank lines, if necessary). ~~Included in these records are~~ These records shall include the following items as a minimum: utility, ~~and~~ plant name, ~~and~~ plant location, elevation at the base of the meteorological tower, measurement heights above grade for meteorological parameters to be presented

and any additional information pertinent to identification of the site, tower, and/or parameters; e.g., last calibration date. The information shall state whether the primary system was fully operational; if not, an indication shall be given for those parameters which represent values recorded by the backup system. Suspect or lost data should be identified by the appropriate error code. The format for the site descriptor is given in Table A-1.

The meteorological information should be preceded by a 3 record block that provides a descriptor for each field of data. This 3 record block should be repeated for every 6 hour block of meteorological data; i.e., every 24 records. The format for the meteorological data field descriptor is given in Table A-2.

The meteorological data considered critical in emergency situations for initial estimation purposes shall be provided by transmission. The information requested in the following list could be altered as procedures for evaluating the consequences of radioactive release change. The list of parameters to be transmitted shall include: 15 minute averaged wind speed and direction at all measured levels, standard deviation of wind direction fluctuations (sigma theta) at all measured levels, vertical temperature difference for all measured layers, ambient and dew point temperature at the 10 meter level, and the precipitation total for the 15 minute period.

All nines in any field indicates a lost record or a parameter not monitored. All eights in any field indicated the sensor is in place and recording; however, the information was deemed suspect. All sevens in the wind direction field indicated calm. If only two levels of data are monitored, use the upper level. The format for presentation of the meteorological data record is given in Table A-3.

The relative radioactivity concentration (unit source team) and the average dose rate calculations shall be presented from each major release point at 30 minutes intervals.

~~points~~ This data may have to be repeated giving priority to those release points providing the highest concentrations. ~~only ground level release~~ The following information shall be presented to a distance of 16km (10 miles): the direction of effluent transport (reported as direction affected), the distance to and estimate of the maximum concentration in the plume exposure pathway and the plume width (the crosswind distance to which the off centerline relative concentration decreases to 1/10 that of the peak axial relative concentrations). Estimates should also be made for locations at 3.2 Km (2 miles), 8 Km (5 miles), and 16km(10 miles) along the direction of effluent transport. This information, on an hourly basis, shall be preceded with 4 records to identify the model characteristics, release characteristics. and the 7 parameters in question. The format for the descriptor and dilution estimates is given in Table A-4.

TABLE A-1

SITE DESCRIPTOR DATA FORMAT
(8 MANDATORY RECORDS)

RECORD	FORMAT	CONTENT
1	80A1	Organization/Utility Name
2	80A1	Plant Name/Tower Identification
3	F10.5	Latitude of Containment (degrees No
	F10.5	Longitude of Containment (degrees We
	F10.0	Elevation of Base of Met Tower (feet
4	F5.1	Height of Wind Sensor Upper Level (-
	F5.1	Height of Wind Sensor Intermediate Le
	F5.1	Height of Wind Sensor Lower Level (-e
	F5.1	Heights of Temperature Difference (Upp Upper Level (meters)
	F5.1	Heights of Temperature Difference (Upp Lower Level (meters)
	F5.1	Heights of Temperature Difference (Upp mediate) Upper Level (meters)
	F5.1	Heights of Temperature Difference (Upp mediate) Intermediate Level (meters)
	F5.1	Heights of Temperature Difference (Inte Lower) Intermediate Level (meters)
	F5.1	Heights of Temperature Difference (Inter Lower) Lower Level (meters)
	F5.1	Height of Ambient Temperature Lower Leve
	F5.1	Height of Dew Point Temperature Lower Le
	F5.1	Precipitation Gage Height (meters)
5-8	80A1	Comment Section

TABLE A-2

METEOROLOGICAL DATA FIELD DESCRIPTOR
(3 RECORDS FOR EVERY 6 HOURS OF DATA)

RECORD		
1	80X	Blank
2	80A1	See Coding Form (Figure A1)
3	80X	Blank

TABLE A-3

METEOROLOGICAL DATA FORMAT
(1 RECORD PER 15 MINUTE AVERAGED DATA SET)

I2	YEAR
I3	JULIAN DATE
I2	HOUR (on 24 hour clock)
I2	MINUTE (ending observation)
F4.0	WIND DIRECTION (degrees)* UPPER LEVEL
F4.0	WIND DIRECTION (degrees)* INTERMEDIATE LEVEL
F4.0	WIND DIRECTION (degrees)* LOWER LEVEL
1X	BLANK COLUMN
F4.1	WIND SPEED (meters/sec) UPPER LEVEL
F4.1	WIND SPEED (meters/sec) INTERMEDIATE LEVEL
F4.1	WIND SPEED (meters/sec) LOWER LEVEL
1X	BLANK COLUMN
F3.0	SIGMA THETA (degrees) UPPER LEVEL
F3.0	SIGMA THETA (degrees) INTERMEDIATE LEVEL
F3.0	SIGMA THETA (degrees) LOWER LEVEL
1X	BLANK COLUMN
F5.1	TEMPERATURE DIFFERENCE (^{o}C/100m) UPPER-LOWER
F5.1	TEMPERATURE DIFFERENCE (^{o}C/100m) UPPER-INTERMEDIATE
F5.1	TEMPERATURE DIFFERENCE (^{o}C/100m) INTERMEDIATE-LOWER
1X	BLANK COLUMN
F5.1	AMBIENT TEMPERATURE (^{o}C) LOWER LEVEL
1X	BLANK COLUMN
F5.1	DEW POINT TEMPERATURE (^{o}C) LOWER LEVEL
1X	BLANK COLUMN
F5.1	PRECIPITATION TOTAL (mm) GROUND LEVEL
1X	BLANK COLUMN
I1	PASQUILL STABILITY CLASS OR EQUIVALENT TO BE ASSUMED FOR DIFFUSI ESTIMATES (1=A, 2=B, 3=C, . . . , 7=G)

*Wind direction indicates the direction from which the wind is co

TABLE A-4

DILUTION FACTOR FORMAT FOR MODEL CLASS A

RECORD		
1	80A1	MODEL CHARACTERISTICS/ASSUMPTIONS
2	80A1	RELEASE POINT/SOURCE CHARACTERISTICS
3	80A1	SEE CODING FORM ATTACHED (FIGURE A-2)
4	80A1	SEE CODING FORM ATTACHED (FIGURE A-2)
5	I2	YEAR
	I3	JULIAN
	I2	HOUR (on 24 hour clock)
	I2	MINUTE(ending observation)
	4X	BLANK
	F4.0	AFFECTED DIRECTION (degrees)*
	4X	BLANK
	F6.0	DISTANCE TO PEAK X/Q (meters)
	2X	BLANK
	1PE10.3	PEAK X/Q (sec/m^3)
	1X	BLANK
	F5.0	PLUME WIDTH TO 1/10 OF PEAK (meters)
	1X	BLANK
	1PE10.3	X/Q (sec/m^3) at 3218 meters (2 miles)
	1X	BLANK
	1PE10.3	X/Q (sec/m^3) at 8047 meters (5 miles)
	1X	BLANK
	1PE10.3	X/Q (sec/m^3) at 16093 meters (10 miles)

*Affected direction indicates the direction to which the wind is going.

NOTE: Dilution factor formate for model class B to be developed

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FIGURE A-1

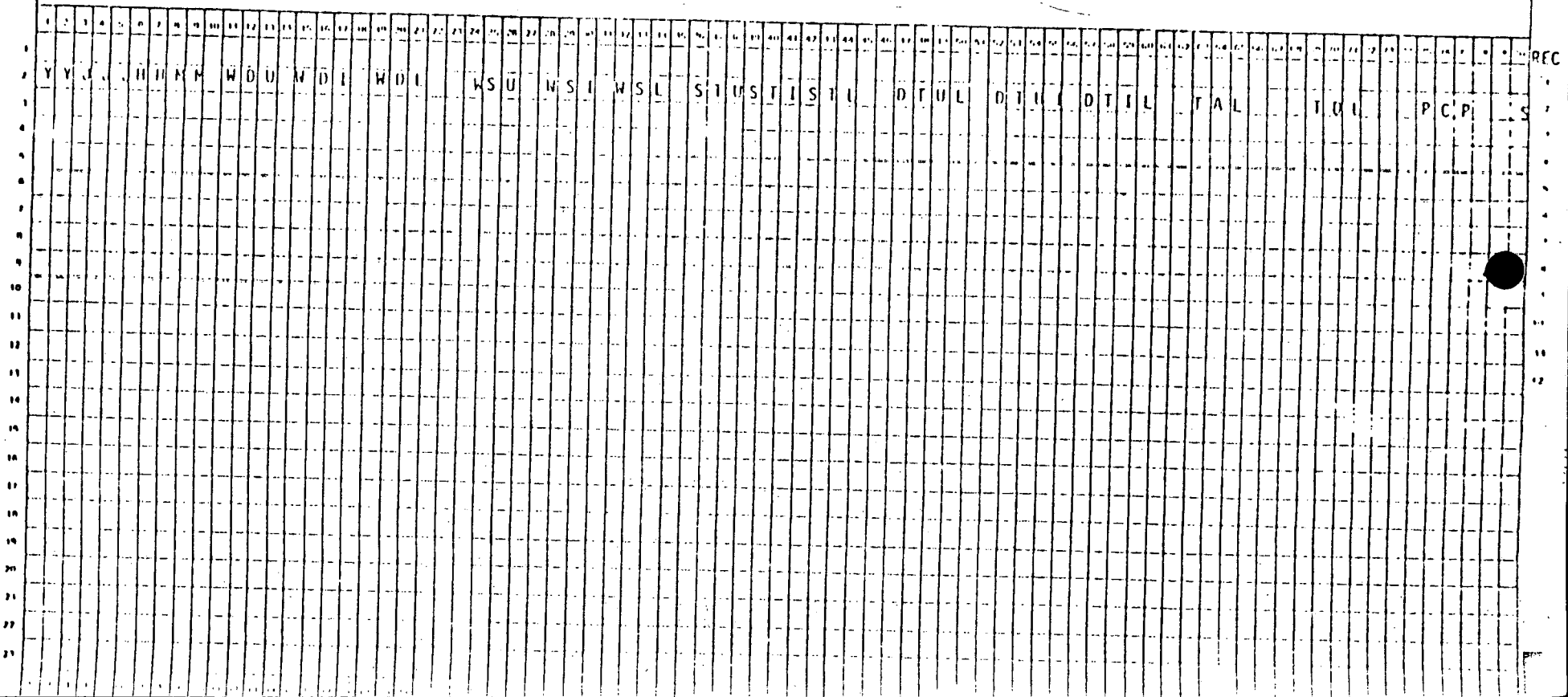

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FIGURE A-2

TIME BLOCK	PLAK PLUME CHI/Q'S AT DOWNWIND DISTANCES
DIRECTION DISTANCE	
AFFECTED TO PEAK	CHI/Q WIDTH 3218 8047 1609

REC

51-2