PROCEDURE E

NEW YORK STATE
RADIOLOGICAL EMERGENCY PREPAREDNESS PLAN

PROCEDURE E – PUBLIC EDUCATION

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(NOT USED)

NEW YORK STATE
RADIOLOGICAL EMERGENCY PREPAREDNESS PLAN

PROCEDURE E – PUBLIC EDUCATION

1.0 PURPOSE

To ensure that a coordinated educational program is developed and implemented to familiarize the public – particularly those living within an 10-mile radius of commercial nuclear power plants – with relevant information pertaining to radiation, preparedness plans, how the public will be notified in an emergency, and what their actions should be in an emergency.

2.0 RESPONSIBILITIES

2.1 The SEMO PIO, in coordination with county and licensee PIOs, has primary responsibility to develop and oversee the public education program to include, but not be limited to the following:

- Potential hazards associated with improper handling or transportation of radiological materials;
- Governmental and private sector mitigation measures to minimize public risk;
- Prompt public notification system and other methods to keep the public informed during an emergency;
- Public protective measures that might be recommended;
- Specific public emergency response information, i.e., evacuation routes, reception centers, EAS stations, etc.; and
- Importance of prompt and consistent public response.

2.2 The SEMO PIO has overall responsibility for development and dissemination of all state educational materials and for coordination of state educational activities with those of the federal and local governments and the nuclear facility operators.

3.0 IMPLEMENTATION

3.1 The SEMO PIO will direct a statewide public education task force to assist in the development of radiological emergency preparedness public education materials, to coordinate public education efforts of all interested groups, to identify needs and the means to meet them, and to limit unnecessary duplication of efforts by the various involved governmental jurisdictions and nuclear facility operators.

3.2 The specific, expert capabilities and resources of all appropriate State agencies will be utilized in the development and implementation of the State's public education plan.

3.3 Educational activities within the statewide program will include, but not be limited to, the following:

- Public service announcements;
- Brochures, pamphlets, posters and other printed materials as necessary;
- Public appearances by subject matter experts in various areas of radiological emergency planning;
- Exhibits at public events;
- Participation, as requested, on radio talk shows and other radio, television and print media informational presentations;
- Informational video presentations on radiological emergency preparedness; and
- Press conferences and media briefings.

3.4 Brochures and calendars have been developed cooperatively by the State, involved counties and nuclear facility operators for dissemination to the public residing in the 10-mile Emergency Planning Zones (EPZs) surrounding nuclear power plant sites. These brochures include information on radiation, public protective measures, evacuation routes, reception and congregate care centers, special provisions for mobility-impaired persons, and points of contact for additional information.

NEW YORK STATE RADIOLOGICAL EMERGENCY PREPAREDNESS PLAN
PROCEDURE F - TRAINING, DRILLS, EXERCISES

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(NOT USED)

1.0 PURPOSE

The purpose of this procedure is to provide the vehicle by which personnel with emergency responsibilities will be trained initially, periodically retrained, and tested by means of drills and exercises in the performance of the functions that may be required of them in the implementation of this Plan.

2.0 SCOPE

Radiological emergency preparedness plans require trained personnel to implement them. The State Emergency Management Office will coordinate this training for emergency personnel and public officials. Training and retraining of State and local officials is provided through a variety of programs, such as formal courses, seminars, conferences, and experience gained in response to drills and exercises as well as actual emergencies.

State and local agencies with emergency response functions will designate individuals within these organizations who are to be trained in functions that are unique to a radiological emergency. Functions that are normal for the agency's usual role, i.e., teaching a police officer to direct traffic, are not considered here. The personnel selected for radiological preparedness training will include those from the following categories:

- Command and Control Personnel
- Key agency personnel assigned to State, or County Emergency Operations Center (EOC) staffs
- Radiological monitoring teams and radiological assessment personnel
- Personnel monitoring and decontamination personnel
- Police, security and fire-fighting personnel
- Medical and rescue personnel
- Personnel assigned to the evacuation of the general public, special populations and mobility-impaired individuals
- Communications personnel
- Reception and Congregate Care Center personnel
- Public information personnel
- Planning personnel

2.2 Exercises will be scheduled to provide that all major elements of the respective State and county organizations are tested in accordance with 10CFR50 and 44CFR350 (see 4.2). These exercises will be conducted, at different times and under various weather conditions.

2.3 In addition to the scheduled exercise, drills shall be conducted as follows:

- Communication between State EOC, and local government EOCs within the Plume Exposure pathway EPZ will be tested at least monthly.
- Communications between State EOC and Connecticut, New Jersey, Pennsylvania and Canada radiological emergency response organization, all within the ingestion pathway for Nuclear facilities located in New York, will be tested at least quarterly.
- Communications between NFOs, State EOC, local EOCs and field assessment teams will be exercised annually.
- Radiological Health staff and local organizations will conduct annual radiological monitoring drills. The drills may include the collection and analysis of water, vegetation, soil and air samples; the communications used for reporting sample results, and the means for keeping records of these sample results. These drills will be included as part of annual exercises.
- The State Radiological Health staff may conduct semi-annual Health Physics drill involving one of the nuclear generating facilities. These drills will involve both the State's and local organizations' analysis of, and response to, conditions arising from simulated elevated airborne and liquid samples and direct radiation measurements in the environment. To the extent possible these drills will be included as part of the required scheduled NFO exercises. New York State, as an NRC agreement State, maintains an offsite environmental sampling program which includes the above activities.
- All or any portion of the State and/or county plans may be drilled as necessary.

3.0 RESPONSIBILITIES

3.1 The New York State Emergency Management Office (SEMO) coordinates the planning and conduct of emergency response training for personnel who will implement radiological emergency preparedness plans. SEMO will:

- Receive technical guidance from the State Health Department and FEMA on the appropriate application of radiological resources to peacetime radiological emergency response.
- Factor the above guidance into the development of appropriate training activities.

- Conduct formal courses for Emergency Operations Center staff and Personnel Monitor Center staff at the State and local level.

- Manage the Independent Study course, "Radiological Emergency Management" (IS-3) as the basic introduction to radiation and radiation detection. Distribution of course material is through a single contact point with each appropriate State agency, local jurisdiction or other large emergency response organization.

- Provide to State agencies and localities technical assistance in the development of their own training capability including training their instructors.

- Provide technical assistance on the planning, conducting, and evaluation of exercises and drills.

- Receive and provide for staff and other agencies as appropriate, training on the use of new instrumentation and equipment procured for radiological emergency responses.

- Assist in identifying and recruiting appropriate State and local Emergency Preparedness applicants for federally-conducted or other appropriate emergency response training activities and courses. These training activities include planning, operations, and response courses sponsored by the Federal Emergency Management Agency which are geared specifically for State and local emergency response personnel. These courses include topics such as radiological accident assessment, analysis, monitoring and response operations.

3.2 The SEMO coordinates with the representatives of the Nuclear Facilities, appropriate counties, Federal and State agencies in exercising of the New York State emergency response organizations. These responsibilities include:

- The designation of elements of the Plan that are to be exercised, to ensure that all elements are exercised in accordance with the federal regulations (see 4.2) under various conditions and times.

- The establishment of the exercise's basic objectives and any appropriate evaluation criteria.

- The date and time of the exercise.

- The agencies, officials and organizations that are expected to participate.

- The scenario to be used to include a schedule of real and simulated events.

- The designation and training of exercise observers.

- Arrangements for materials to be provided to the FEMA Regional Assistance Committee

(RAC) and other observers.

- Arrangements for a critique of each exercise.

3.3 Each agency or organization having a designated emergency responsibility will insure that appropriate training is made available to their emergency response personnel, including annual refresher training. Training of appropriate personnel for accident assessment and evaluation will be the responsibility of the Department of Health, BERP. State agencies are responsible for the continuance and implementation of training programs relating to their respective agency's operating procedures and coordinate their training efforts related to radiological emergencies with SEMO.

In addition, these agencies and organizations will conduct drills to develop, test and maintain their capabilities. These responsibilities include:

- Communications drills to insure the ability to understand and transmit the unique terminology associated with a radiological emergency.
- Radiological monitoring drills.
- As appropriate, medical emergency drills at the local level and health physics drills at the State level.
- Other drills as may be required to improve the capabilities of emergency response personnel.

3.4 Local Emergency Management/Preparedness Offices are responsible for, and coordinate with, SEMO for the following:

- Identification of local training needs and requirements.
- Request of appropriate training courses, which includes designation of times and locations.
- Recruitment of trainees to include Directors and Coordinators of response organizations, radiological monitors, emergency service personnel (fire, police, first-aid, medical support, and rescue), and other appropriate personnel.
- Development of local training capability as required.
- Assist, as applicable, in the conduct of training. This includes the use of local instructor capabilities such as for the training of radiological monitors, etc.
- Conduct and participate in drills and exercises to improve the capabilities of their emergency response personnel.

4.0 IMPLEMENTATION

4.1 In addition to agencies' existing training programs, specialized emergency response training courses are offered to key personnel of those agencies with emergency response responsibilities. The types of training courses to be offered, and the titles and assignments of those who should participate are:

Type of Course	Ref.Attachment	Participants
Public Officials Conferences (POC)	1	Agency heads, and local government chief executives.
Emergency Operations Center Course	2	Agency heads, EOC staff and emergency planning
State Radiological Training Courses	3	Radiological EOC staffs/monitors, and Instructors, Emergency Management, and as appropriate, personnel assigned to REP-related duties. (see Attachment 3).
Federally Sponsored Training Courses	4	Radiological EOC staffs, Medical and Public Safety Personnel (as appropriate)
Nuclear Facility Operator sponsored training courses	5	Emergency Management Personnel Public Safety, Rad monitors and EOC Staff
Professional Development Series PDS Courses	6	Emergency Management Staff, agency representatives, public safety personnel.

4.2 Exercises will be conducted to test the integrated capability of a major portion of the State's and appropriate County's radiological emergency preparedness plan and organization. An exercise will include mobilization of State and local personnel and resources adequate to verify the capability to respond to an accident scenario requiring response. The State and appropriate local governments will conduct an exercise jointly with a nuclear power facility in accordance with the federal regulation set forth in 10CFR50, "Domestic Licensing of Production and Utilization Facilities", Appendix E, and 44CFR350, "Review and Approval of State and Local Radiological Emergency Plans and Preparedness". The State will choose, on a rotational basis, the site(s) at which the required exercise(s) is to be conducted. The scenario should be varied

from exercise to exercise such that all major elements of the plans and preparedness organizations are tested. Each full-scale exercise will include as many actual (hands on) activities as possible within the resources available for the exercise.

Exercising will include the decision-making process (assessment and evaluation), deployment of monitoring personnel and making recommendations of protective action response options to responsible officials. Law enforcement and fire personnel will be exercised on access and traffic control and security. Exercises will include public information activities to demonstrate coordinated efforts by the State, local officials and the licensee in keeping the public informed.

Qualified observers from Federal, State or local governments will critique the exercises. State and local observers will be provided appropriate pre-exercise briefings and, if required, additional training.

A critique will be scheduled as soon as practicable after each exercise to evaluate the ability of organizations to respond to the plan.

Each organization establishes the means for evaluating observer and participant comments on areas needing improvement, including emergency plan procedural changes, and for assigning responsibility for implementing corrective actions. Each organization establishes management control to ensure that corrective actions are implemented.

4.3 Drills involving varying number of personnel and organizations are used to provide practical training. When conducting such a drill, emphasis is on the effectiveness of procedures and use of actual emergency equipment. Observers will be assigned to evaluate the performance of the participants. Drills to test smaller segments of the plan will be held more frequently than exercises. Although a drill is often a component of an exercise, drills will be conducted, in addition to the scheduled exercise, all the frequencies specified in Paragraph 2.3 above. Drills will be supervised and evaluated by qualified instructors. Communication drills are conducted for both radio and hard line modes (RECS) and include the testing of operators' understanding and ability to understand the content of messages transmitted/received. Radiological monitoring drills teach and test procedures for the collection, analysis, recording and reporting of radiation readings. Drills of other emergency functions will be conducted to enhance the capabilities of those persons performing such functions.

4.4 Upon completion of an exercise or drill, the evaluator and observer comments will be collected and evaluated. Plan revisions, arising from the lessons learned, will be incorporated in plans and procedures as appropriate.

4.5 State and local training will be given as described in (Attachment 3). Training documentation will be retained by the entity providing the training.

4.6 Training for individuals responsible for the planning effort includes the following:

- Annual Licensee EAL Training

- National REP conference
- NRC Scheduling Conference
- Continual update on NIMS and ICS training and planning
- State EOC Operations training including updates on new disaster management software.
- Lessons learned from emergency activations of the State EOC
- Review of new federal guidance on radiological monitoring and assessment
- Review new planning guidance as it becomes available
- Semi-annual nuclear safety meetings

ATTACHMENT 1

PUBLIC OFFICIALS CONFERENCES (POCs)

The New York State Emergency Management Office routinely conducts POCs for State, County and City level government officials and is designated to acquaint them with their emergency responsibilities, need for planning, training, and coordinated effort.

This course includes:

1. Review of FEMA's emergency role.

2. Discussion of the New York State Executive and Disaster laws outlining local emergency responsibilities, including a description of the State, District and local command and control structure and responsibilities.

3. Stressing the need for Local Executive Orders assigning specific emergency response functions to local officials.

4. The concept of an emergency operations center.

5. Advising of training that is available and the sequence in which it is given.

6. Emphasis on the benefits of a well-organized and coordinated government that is able to act in time of emergency.

7. The importance of a local resource inventory.

8. The methods for recognizing and identifying hazardous materials.

ATTACHMENT 3

New York State Radiological Training Courses

I. RADIOLOGICAL EMERGENCY PREPAREDNESS PROGRAM

The following is a listing of the various types of courses specifically given for the REP training of emergency workers:

1. REP Monitoring Course - This course is designed for radiological officers, radiological monitors (RM's) and emergency workers and addresses all aspects of peacetime radiological incidents.

2. REP Exposure Control Course - This course has been developed for emergency workers specifically for nuclear power plants and has become the core of instruction, following the subject matter dealing with radiological exposure control from the Emergency Worker Response Manual. (4 Hr.)

3. REP Personnel Monitoring Center (PMC) Course - This course deals with the specific aspects of PMC operations for radiological monitors. Variations of this course also allows for personnel from numerous State, county, and volunteer agencies to receive this training for their responsibility with respect to PMC operations. Please note that this course should be taken after the 4 Hour Exposure Control course by Radiological Monitors who will the stationed at PMC. (4 Hr.)

4. REP Management Course- This course is intended for REP emergency managers, coordinators and supervisors, i.e., County EMO Directors, State Agency personnel, and local elected officials who have decision making responsibilities. (3 Hr.)

5. REP Instructor Course - This course is designed to afford potential REP Trainers, preferably with adult education experience with the necessary information to conduct the training utilizing the NYS REP Instruction/Training Modules.

II. INSTRUCTOR GUIDES

The following training module are available from SEMO to assist in course instruction at the agency level.

Module 1 – REP Planning Overview

Module 2 – Intermediate and Late Phase (Ingestion) Issues

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Module 3 – Radiation Basics

Module 4 – Radiation Detection Instruments

Module 5 - Radiological Exposure Control

Module 6 – Evacuation Travel Time Estimates

Module 7 – Basic Nuclear Power Plant Operations

Module 8 – Emergency Operations Center

Module 9 – Command and Control

Module 10 – Dose Assessment

Module 11 – Field Monitoring Operations

Module 12 – PIO/JIC Operations

- Basic Public Information Officer
- EOC Public Information Roles
- JIC Operations
- Joint Information Center Spokesperson
- EAS Message Preparation and Release
- News Release Writing
- Public Inquiry and Media Monitoring

Module 13 – Personnel Monitoring Center (PMC) Operations

Module 14 – Reception Center Operations

Module 15 – Emergency Operations Facility (EOF) Operations

Module 17 – Fire Service Operations

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Module18 – MS-1 Treatment and Transportation of the Radiologically Contaminated/ Injured/ Exposed Patient

Module 19 – Bus Company and Bus Driver Operations

Module 21 – School Officials Operations

Module 20 – Public Works Operations

II. RADIOLOGICAL MONITORING COURSES

The following courses are administered and conducted by local instructors using materials provided by the State. State agencies will also use these courses to train their own personnel. These courses are for radiological monitors from emergency services or other organizations or industries which have a response role for peacetime radiological incidents. The primary purpose of this training as related to nuclear accidents is to provide a capability for exposure control of emergency workers and the public through detection and removal of surface contamination. Emphasis will also be placed on personnel external dosimetry and exposure records:

a. Emergency Management, Independent Study (IS-3)

An 8-hour programmed independent study course, which serves as an introduction to the nature of radiation and radiation detection instruments.

b. Fundamentals Course for Radiological Response (G320)

An 8-hour follow-up course to the Independent Home Study IS-3 course, which uses a number of exercises in the use of radiation detection instrumentation and sampling instrumentation.

ATTACHMENT 4

Federally-Sponsored Training Courses

Courses dealing with the evaluation of and response to radiation emergencies are sponsored by the Federal Government. DOH coordinates the student selection with SEMO. Courses listed in the latest edition of the "2004-2005 NFA/EMI Training Catalog".

Radiological Emergency Preparedness Planning Course
Radiological Accident Assessment Concepts Course
Radiological Emergency Response Operations Course
Advanced Radiological Incident Operations Course
Radiological Emergency Preparedness Exercise Evaluation
Radiological Series Train the Trainer

The Emergency Management Institute (EMI) offers a variety of additional emergency management courses designed to improve overall management and response capabilities for the emergency management community.

ATTACHMENT 5

Nuclear Facility Operator Courses

The nuclear facilities provide periodic training and retraining for local emergency services located in the vicinity of the facility. Training and/or drills are typically provided on an annual basis for fire, hospital and ambulance personnel. The nuclear facilities provide instructors at numerous state, county training sessions and provide staff to assist in preparation of scenarios used in the simulated emergencies.

In addition, the Nuclear Facility Operators are providing resources to accomplish the required initial training of county staff. State and local officials provide input into the development of these training programs as well as the individual lesson plans. State and local personnel will provide training for new individuals and periodic retraining on an ongoing basis.

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NEW YORK STATE RADIOLOGICAL EMERGENCY PREPAREDNESS PLAN
PROCEDURE G – RADIOLOGICAL EXPOSURE CONTROL PROCEDURES

1.0 PURPOSE

The objectives of these radiological exposure control procedures are:

- To provide State/County agencies with guidance to protect their emergency response personnel from excessive or unnecessary exposure to radiation
- To describe the requirements for and availability of instruments and equipment
- To describe certain technical aspects including: proper use of instruments and equipment, requirements for record keeping, use of exposure protective action guides, personnel monitoring and decontamination.

2.0 SCOPE

This procedure describes the necessary actions by State/County agencies and their personnel when involved in emergency response activities performed in connection with an accident or incident at a fixed nuclear facility large enough to require activation of the State/County Radiological Emergency Preparedness Plan. It also describes some of the support activities available from those State agencies with specific radiological resources.

3.0 PERSONNEL EXPOSURE GUIDANCE

3.1 It will be the responsibility of the DPC agency representative to insure that appropriate agency personnel are trained in exposure control guidelines, procedures, and techniques. Training assistance is available for State Agencies and counties through the Planning Section, State Emergency Management Office (SEMO).

3.2 Supervisors who will have workers in the plume EPZ must also be familiar enough with exposure limits to provide guidance to their subordinates regarding actual or planned unusual exposures. They should also know enough about radiation to answer basic questions from their workers and to seek additional guidance on exposures in excess of the EPA PAGs.

3.3 Supervisors will make every attempt to insure that exposure to emergency workers is kept as low as reasonably achievable. Staff rotation or reassignment should be used as methods for reducing individual dose to the workers.

3.4 The following guidelines apply:

3.4.1 Only required emergency workers (State/County/Federal or Licensee) will be permitted access into the 10-mile plume exposure pathway or any State/County/Federal or Licensee Emergency Operations Center or other facility which is being utilized to conduct

emergency operations. Appropriate identification will be required and will be shown on request of law enforcement officers or appropriate State/County representatives.

3.4.1.1 In the post plume phase, exposure limits for those individuals who are permitted to reenter restricted zones will be established by the Department of Health, Bureau of Environmental Radiation Protection.

3.4.2 Supervisors of State emergency teams or personnel will coordinate with the State and the County EOC's prior to entry into the 10-mile EPZ.

3.4.3 Rescue personnel for lifesaving activities will be selected using the following criteria:

- Should be volunteers or professional rescue personnel who are familiar with the consequences of exposure.
- Whenever possible, volunteers over 45 years of age should be selected.
- Pregnant women or women capable of bearing children should not be selected for lifesaving activities where they could be exposed to radiation exceeding 0.5 rem maximum permissible dose equivalent to the fetus. (Reference U.S. NRC Regulatory Guide 8.13, Instruction Concerning Prenatal Radiation Exposure, Attachment 10).

3.4.4 Emergency Workers' planned dose exposure will not be permitted to exceed the following limits except by express authorization of the Commissioner, NY State Health Department:

- For emergency operations not involving lifesaving activities: 5 rem TEDE.
- For protecting valuable property: 10 rem TEDE if lower dose is not practicable.
- For life saving or protection of large populations: 25 rem TEDE if lower dose is not practicable. This limit may be exceeded upon approval by the Commissioner of DOH, only on a voluntary basis by persons fully aware of the risks involved.
- Exposures in excess of the above guidelines will be approved by the Commissioner of DOH upon:
  - notification by the appropriate supervisor of the need to perform actions which will result in excess exposure;
  - estimation of total exposure to be received;
  - exhaustion of alternatives.

3.5 Exposure control procedures should be prescribed by supervisors that will ensure rapid notification and relief and/or rotation of personnel whose exposure rate indicates that the worker is approaching the maximum limits of 10 rem TEDE (protection of property) or

25 rem TEDE lifesaving or protection of large populations or > 25 rem TEDE lifesaving (voluntary basis).

3.6 Each supervisor will maintain exposure records for personnel on the Group Radiation Exposure Record (see Attachment 2) on the basis of reports to be provided by the emergency workers who are under his/her supervision. A copy of the completed record will be furnished to the State EOC Exposure Control Coordinator, within the Planning Section, A &E Branch, by State personnel and to the County Exposure Control Coordinator by County personnel (see 5.5 below).

3.7 Each emergency worker will maintain an individual Emergency Worker Radiation Exposure Record Card (Attachment l) for each period of duty (or each shift). Basic identification information and the serial numbers of all issued dosimeters (direct-reading and permanent) as well as the individual's total previous exposure (if known) will be recorded at the beginning of each shift. (See 5.5 below and Attachments 1 and 3.)

3.8 Dose Correction Factor: A conversion factor may be applied to the dosimeter reading to correct for TEDE measurements. This factor will be calculated by DOH staff at the SEOC when information on plume composition becomes available. In the absence of this information, a correction factor of 1 should be used. In all cases, the actual dosimeter reading should be recorded on the Emergency Worker Radiation Exposure Record Card. The State/County Exposure Control Coordinator will apply correction factors when completing the employee dose record.

4.0 RADIATION DETECTION INSTRUMENTS/ASSOCIATED EQUIPMENT AND SUPPLIES

4.1 Each emergency worker who is to perform duty within the l0-mile plume exposure pathway EPZ or at any other location where exposure to radiation is possible, including the 50-mile Ingestion Pathway EPZ will be furnished a basic emergency worker kit or packet which will include: (See Attachment 7, 8, and 9).

- Emergency Worker Radiation Exposure Record Card
- One low range (O-5R) or (0-20R) direct-reading dosimeter
- One high range (O-l00R) or (0-200R) direct-reading dosimeter
- One permanent record dosimeter (film, TLD, OSLD, Etc.)
- One packet of potassium iodide (KI) tablets (14 tablets)
- One exposure control information card
- Form letter for declaring Pregnancy
- Lanyard

4.1.1 Other equipment and supplies to provide protection:

CDV-750 (or equivalent) Dosimeter Charger with D-cell battery for charging direct-reading dosimeters (all emergency workers must be given access to a charger prior to going on duty so

that direct-reading dosimeter may be "charged".

Monitoring equipment (as required) for workers who will perform monitoring duties (field, personnel, vehicle, equipment, area or taking samples) may include:

- Geiger-Muller survey meter CDV-700 (or equivalent) low range 0-50 mR/hr.
- Ludlum Model 14C survey meter, low range 0-2R
- Survey Meter CDV-715 (or equivalent) high range (0-500 R/hr)
- Air sampler (field monitoring)
- Sample bags/bottle (field monitoring and taking samples)
- Anti-contamination clothing/hoods/gloves/boots
- Respiratory equipment/protection masks
- Other items for specific function or task

4.2 Permanent Record Dosimeters

4.2.1 Permanent Record Dosimeters may be film, TLD, OSLD, etc. Direct- reading dosimeters are not permanent record dosimeters (See Attachment 8).

4.2.2 Each State Agency or county is responsible for obtaining sufficient quantities of permanent record dosimeters to provide one for each worker anticipated to be entering the plume EPZ.

4.2.3 Purchase, inventory, distribution, periodic replacement or processing, reading and proper record keeping and reporting shall also be the responsibility of the State or County Agency's representative. All such distributions shall be under the control of the SEMO to State Agencies and the County Emergency Management Offices and the County Radiological Officer.

4.2.4 Permanent Record Dosimeters must be located by the agency so they will be immediately available to those workers who will need them in case of emergency.

4.2.5 Permanent Record Dosimeters must be stored to prevent exposure to radiation (other than normal background). At least one dosimeter should be designated and recorded as a "control" to allow for subtraction of background radiation. All permanent record dosimeters will be exchanged in accordance with vendor's recommendations, except in an emergency. The State Health Department will advise State Agencies on the frequency of exchange during an emergency.

4.3 Source of Instruments

4.3.1 Radiation detection instruments that are currently stored at SEMO include:

- Direct-reading dosimeters
  CDV-730 (0-20R)

CDV-742 (0-200R)
DCA-611 (0-5R)
CDV-138 (0-200mR) training only
FEMA –730 (0-20R)

- Dosimeter Charger - CDV-750, CDV-750-6
- Survey Meters - CDV-700 (0-50mR/Hr)
  Ludlum 14C (0-2R)
  CDV-715 (0-500 R/Hr)
- Other - See Appendix G

4.3.2 Other required instruments and supplies are available for purchase from commercial sources.

4.4 Instrument Inventory and Maintenance

4.4.1 Each state agency anticipated to have emergency workers in the 10-mile plume EPZ will obtain a sufficient number of dosimeters to issue to each emergency worker and have a charger available while in the Plume EPZ.

4.4.2 State DPC agencies may request and receive dosimeters, dosimeter chargers, and batteries from SEMO according to available supplies.

4.4.3 Replacement batteries, one per CDV-750 charger may be provided by SEMO at the request of the State agency every two years.

4.4.4 One individual in each such DPC agency will be accountable for these instruments and responsible for subsequent distribution within the agency and periodic inventory, operational checks and maintenance to insure availability and readiness of the instrument at all times.

4.4.5 Dosimeters will be rechecked by the agency in this fashion annually.

4.4.6 Dosimeter chargers will be checked upon receipt and at least annually for their ability to move a dosimeter hairline up and down scale.

4.4.7 Defective dosimeters and dosimeter chargers will be returned to SEMO for repair or replacement as necessary and according to available supplies.

5.0 PERSONNEL CONTAMINATION CONTROL

5.1 State Emergency Worker Personnel Monitoring Center (PMC) Locations

- Two locations for each upstate nuclear facility site will be used as state emergency worker PMCs. There are four designated locations identified for the Indian Point Energy Center, one in each of the 4 EPZ counties. (See Appendix C for State PMC locations.)

- PMCs will be established outside the 10-mile plume EPZ.
- PMCs will be readily accessible from areas within the plume EPZ and will be available for 24-hour use.

5.2 PMC Requirements

- PMCs will have sufficient parking available for vehicles transporting state emergency workers to the PMC after completion of their assignments within the plume EPZ.
- PMCs will preferably have a separate entrance and exit from the building.
- PMCs will have an area, for which access can be controlled, of at least 10 x 20 feet of open floor space where personnel monitoring will be performed.
- Adjacent to the monitoring area, there will be a decontamination area for which access can be controlled. This area will contain a sink and a shower or other suitable facility, which can be used for decontamination.
- An area will be designated for waste storage near the decontamination areas. Such stored wastes will be disposed of in a manner specified by the State Health Department. The licensee involved in the accident will collect and properly dispose of contaminated waste from both State and county operations.
- Contaminated water from the decontamination of personnel and vehicles should be allowed to flow directly into the normal sewer system. Any contamination present will be greatly diluted by the volume of water in the system and would pose no health hazard to the public.

5.3 Personnel and Equipment Monitoring

5.3.1 Unless otherwise directed, all state emergency workers who have been in the plume EPZ during the accident response will report to the Personnel Monitoring Center (PMC) for monitoring.

5.3.2 DPC agency personnel who have been trained in the techniques and procedures to be used will perform all monitoring. This operation will be supervised by a Radiation Technical Specialist. Personnel from the State Health Department will be available by telephone to provide technical assistance.

5.3.3 Personnel, vehicles, and other equipment will be monitored upon arrival at the PMC for external radioactive contamination using portal monitor and/or a Beta/Gamma sensitive GM survey instrument with beta shield open and probe covered with plastic to prevent instrument contamination. All outer clothing worn and equipment or supplies used in the

plume EPZ will also be monitored. (See Attachments 4, 5, & 6).

5.3.4 If the survey instrument indicates any areas on the person or object with a reading in excess of 360 cpm above background, that individual or object is considered contaminated.

5.3.5 Decontamination will be provided if any area on the individual's skin, hair, etc. is found to be contaminated. Contaminated clothing will be removed and retained per 5.4.2 below.

5.3.6 After decontamination actions are taken the individual will be monitored again and released if the meter reading is below 360 cpm above background.

5.3.7 If several attempts at decontamination do not result in levels below 360 cpm above background, the contamination will be classified as non-removable and the individual released. If a reading above 3600 cpm above background persists the case will be referred to the State/County Exposure Control Coordinator for evaluation and determination if referral to a special facility for further decontamination is required.

5.3.8 The personnel monitoring area will be periodically monitored, especially the floor where workers stand during monitoring, and steps taken to minimize contamination spread.

5.4 Personnel and Equipment Decontamination

5.4.1 Contaminated vehicles or other objects which may be easily decontaminated will be decontaminated as soon as possible to insure their continued availability.

5.4.2 Contaminated clothing will be removed, tagged with the owner's identification, and retained at the PMC in plastic bags. Replacement clothing will be available at the PMC.

5.4.3 Contamination on the skin or hair will be removed by rinsing and washing using water, soap or other available cleansing agents, taking care not to abrade the skin. A sink and shower will be available for this purpose.

5.4.4 Individuals whose decontamination is complicated by the presence of wounds will be referred to a medical facility for further treatment and decontamination. These persons will be transported via an appropriately trained and equipped ambulance service. A list of ambulance services is maintained in each county radiological emergency response plan.

5.4.5 The decontamination area will be periodically monitored especially sink, shower floor and waste storage area and necessary steps taken to minimize contamination spread. Appropriate precautions will be taken to minimize exposure to contaminated run-off water.

5.5 Record keeping

5.5.1 There are two types of basic records on exposure of workers, the individual's Emergency Worker Radiation Exposure Record Card and the Group Radiation Exposure Record. Additional exposure records will be available after processing of permanent record dosimeters.

5.5.2 Each worker will be responsible for keeping the individual Emergency Worker Radiation Exposure Record Card (see Attachment 1).

5.5.3 Each supervisor will maintain the exposure records of his personnel in the plume EPZ on the Group Radiation Exposure Record (see Attachment 2) on the basis of reports provided by workers returning from the area. A completed copy of these records will be provided to the Personnel Monitoring Center or the State EOC.

5.5.4 Each worker reporting to the PMC will bring the individual Emergency Worker Radiation Exposure Record Card.

5.5.5 If the PMC is not activated, these cards will be examined and collected by the worker's supervisor who will forward them to the State EOC.

5.5.6 Before an individual Emergency Worker Radiation Exposure Record Card is collected, a new card will be provided so the worker can record the cumulative exposure to date on the new card. If he returns to the plume EPZ he will use the new card.

5.5.7 If an individual is found not to be contaminated after monitoring at the PMC, the word "CLEAN" will be stamped/written on the individual's Emergency Worker Radiation Exposure Record Card.

5.5.8 If an individual is found to be contaminated, the word "DECON" will be written on his Emergency Worker Radiation Exposure Record Card, as well as the general location(s) of contamination. After successful decontamination the word "CLEAN" will be stamped/written on the card.

5.5.9 If an individual remains contaminated enough to require referral to a special facility for further decontamination, the location to which the individual was referred and the time of referral will be recorded on his Emergency Worker Radiation Exposure Record Card as well as the body locations and instrument readings.

5.5.10 For referral cases, a separate description of the specific contamination problems will be completed using the Personnel Contamination Referral Sheet (see Attachment 4). One copy of the sheet is retained at the PMC and one taken with the individual to the special facility.

5.5.11 Copies of the Contamination Referral Sheet will be given to the supervisor of the PMC operation for follow-up action.

5.5.12 Each person monitored at the PMC, will turn in his individual Emergency Worker Radiation Exposure Record Card upon release. The card will be marked with the results of the monitoring as indicated above.

5.5.13 Each individual exposure record card will be collected either:

- Immediately after the word "CLEAN" is entered on it in accordance with the above procedure, or
- Upon completion of the Contamination Referral Sheet.

5.5.14 Individual exposure record cards will be examined at the PMC.

- Those cards with a total exposure less than 1 R and with the word "CLEAN" entered will be set aside for later reference.

- Those cards with an exposure exceeding 1 R for the day, or for individuals referred to a special facility for further decontamination will be given to the supervisor of the PMC operation for follow-up action.

5.5.15 Appropriate information from the exposure cards and contamination referral sheets will be provided to the radiation technical specialist assigned to the PMC for review and follow-up as appropriate. Such notification will be made when fixed contamination exceeds 1 mR/hr or whenever the whole body cumulative dose reaches 3 rem.

5.5.16 A record must be kept on each individual processed at the PMC.

5.5.17 A copy of exposure records, including permanent record dosimeter readings, will be forwarded to the Bureau of Environmental Radiation Protection for permanent filing.

6.0 THYROID EXPOSURE CONTROL

6.1 Thyroid exposure estimates

The thyroid dose to an emergency worker in the plume EPZ can be estimated from knowledge of the airborne iodine concentration and the time spent in the plume.

6.2 Thyroid exposure limitation

Thyroid exposure can be reduced by utilizing one of several methods. Staff and/or material availability will dictate which of the following methods is to be used in a specific situation:

6.2.1 Removal from the plume pathway

Emergency workers in the plume pathway can be rotated so as to limit exposure to any one individual. If their presence is not essential they may be removed from the area until the iodine exposure is reduced.

6.2.2 Authorized use of KI by Emergency Workers

When authorized by the Commissioner NYS Department of Health, Emergency Workers will take one 130 mg KI tablet per day while working in the plume EPZ , in order to reduce the effects of radioactive iodine exposure (see Appendix K).

ATTACHMENT 1

FORM 9

Emergency Worker Radiation Exposure Record Card

Name: _____
Agency: _____
Business Address: _____
_____
Telephone # (B) _____ (H) _____
Social Security # _____
Date of Birth: _____
Emergency Worker Assignment _____
Direct Reading Dosimeter (DRD)
1 Serial #: _____ Range: _____
2 Serial #: _____ Range: _____
OSL Badge Dosimeter
Serial #: _____
Date: _____ Work Hours: _____

NEW YORK STATE

DISASTER PREPAREDNESS COMMISSION

Rev. 3/07

TOTAL INCIDENT EXPOSURE _____ INITIAL READINGS: DRD 1 _____ DRD 2 _____

DRD 1/2 Reading	Time	DRD 1/2 Reading	Time	Remarks

Record: name _____ Date _____ Time _____

Report Reading to Supervisor of ER, SM, EE

DRD Tool (first reading – final reading) _____

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REV. 9/19/2008

ATTACHMENT 2

GROUP RADIATION EXPOSURE RECORD

Location or Class _____ Date _____

Address _____

Remarks _____

Name	Dosimeter Serial No.	Initial Reading	Final Reading	Exposure (R or mR)

Exposure = Final Reading minus Initial Reading.

ATTACHMENT 3

EMERGENCY WORKER EXPOSURE CONTROL PROCEDURES

A. Before entering the plume exposure EPZ each field supervisor will:

1. Obtain enough direct-reading and permanent record dosimeters for use in the field as needed.

2. Obtain enough dosimeter chargers to assure that a charger will be readily accessible to each emergency worker in the field.

3. Make sure that all dosimeters and chargers are functional.

4. Make sure that all emergency workers know what their responsibilities are as indicated below.

B. Before entering the plume Emergency Planning Zone (EPZ) each worker will:

1. Obtain a direct-reading and permanent record dosimeter.

2. Zero the direct-reading dosimeter using a dosimeter charger.

3. Prepare an individual Emergency Worker Radiation Exposure Record Card by completing side one and entering the date, time, total dose to date and initial dosimeter reading (usually zero) on side two.

4. Make sure that a dosimeter charger will be readily accessible while in the plume EPZ.

5. Make sure that a timepiece and writing implement will be constantly available to insure the keeping of proper records.

C. While in the plume EPZ each worker will:

1. Record the time and dosimeter reading (usually zero) upon entering the area.

2. Following a release, record the time and dosimeter reading on the Emergency Worker Radiation Exposure Record Card every 15 to 30 minutes.

3. If the dosimeter hairline registers 1R, record the time and reading on the individual Emergency Worker Radiation Exposure Record Card and notify your immediate supervisor.

4. Notify your supervisor immediately if any of the following occurs:

   a. Your dosimeter hairline has gone off-scale or is not visible, or;

   b. You have received a total exposure of 1 R, or;

   c. You have received a total exposure of 3 R

   d. You have received a total exposure of 5R

5. Report your dose to your supervisor at least every 12 hours if you remain in the plume EPZ.

D. After leaving the plume EPZ each worker will:

1. Immediately record the time and dosimeter reading on the Emergency Worker Radiation Exposure Record Card.

2. Notify the supervisor of the total exposure received while in the plume EPZ.

3. Follow any instructions you receive from your supervisor regarding the dosimeters and charger.

4. Unless told not to do so, report to the Emergency Worker Personnel Monitoring Center (PMC) to be checked for contamination. Take your individual exposure record card with you.

5. At the PMC follow the instructions of the monitors, receive a new individual exposure card, and turn in the old card.

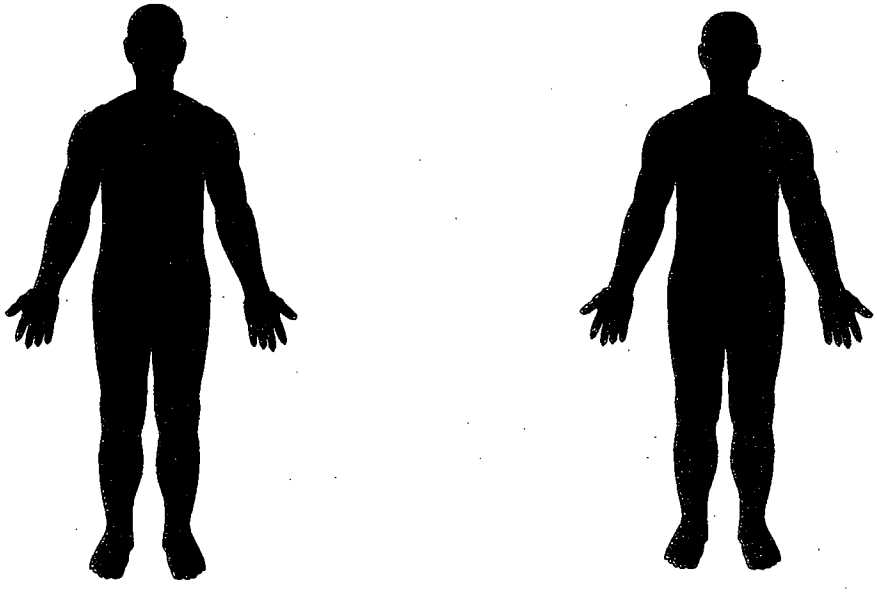
6. If personnel monitoring is not necessary, your supervisor will collect your individual exposure record card and give you a new card. Complete new card as instructed in B.3 above.

7. Prior to re-entry into the plume EPZ , refer to Part A of this procedure.

ATTACHMENT 4

NEW YORK STATE EMERGENCY WORKER
Personnel Contamination Referral Sheet

1. DATE:_____ TIME: _____ STATE AGENCY:_____
2. PMC LOCATION:_____
3. NAME: _____
   WORK ADDRESS:_____
   HOME TELEPHONE:_____WORK TELEPHONE:_____
4. BRIEFLY DESCRIBE PERSON'S LOCATION PRIOR TO ARRIVAL:_____
   _____
5. CONTAMINATION DIAGRAM: MARK ALL BODY AREAS CONTAMINATED AND INDICATE RADIATION READINGS



FRONT BACK

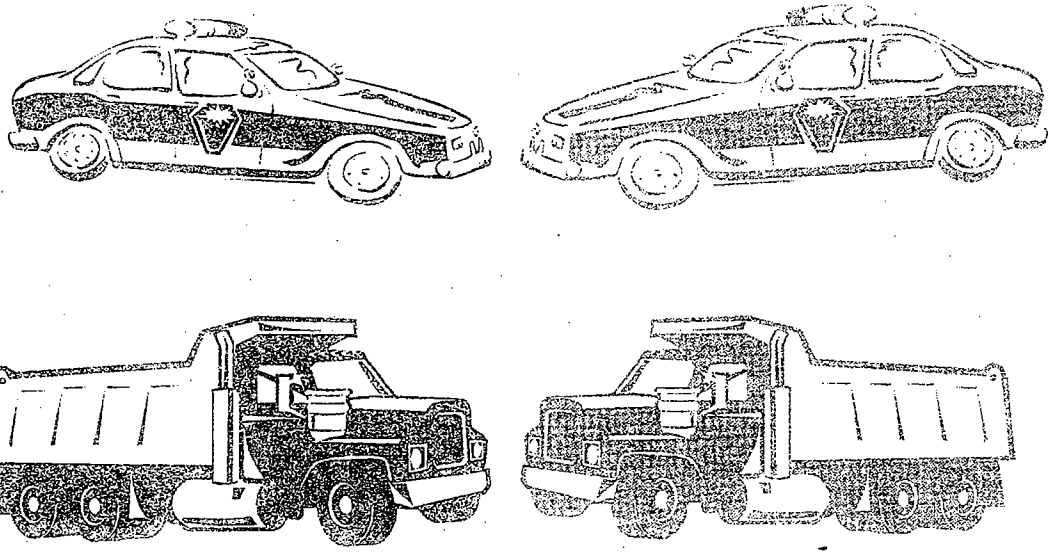
6. METHOD(S) USED AND RESULT OF INITIAL DECONTAMINATION EFFORTS:
   _____
   _____
7. ACTION TAKEN: (CHECK ONE)
   _____DECONTAMINATED TO 360 CPM ABOVE BACKGROUND OR LESS AND RELEASED
   _____PERSON REMAINS CONTAMINATED. CONTACT TEAM LEADER AND/OR EOC FOR FURTHER INSTRUCTIONS.
   _____REFERRED FOR DECONTAMINATION LOCATION_____ TIME_____

_____ _____
SIGNATURE OF INITIAL MONITOR SIGNATURE OF DECON MONITOR

ATTACHMENT 5

NYS EMERGENCY VEHICLE CONTAMINATION REFERRAL SHEET

1. DATE:_____ _____TIME:_____
2. PMC LOCATION_____ _____
3. OPERATOR'S NAME_____ STATE AGENCY_____ _____
4. YEAR:_____MAKE/TYPE_____COLOR_____ _____
   LICENSE PLATE_____AGENCY/OTHER ID_____ _____
5. DESCRIBE THE EXTENT OF CONTAMINATION AND INDICATE CONTAMINATION LOCATION ON DRAWING BELOW_____ _____
   _____ _____
   _____ _____
   _____ _____



6. METHOD(S) USED AND RESULT OF DECONTAMINATION EFFORTS:_____ _
   _____ _____
   _____ _____
7. ACTION TAKEN: (CHECK ONE)
   _____DECONTAMINATED TO 360 CPM ABOVE BACKGROUND OR LESS AND RELEASED.
   _____VEHICLE REMAINS CONTAMINATED and SENT TO DESIGNATED CONTAMINATED PARKING AREA. CONTACT PMC TEAM LEADER and/or PMC RADIATION TECHNICAL SPECIALIST

_____ ____ _____
SIGNATURE OF INITIAL MONITORING AREA RECORDER

SIGNATURE OF DECON MONITORING AREA RECORDER

ATTACHMENT 6

EQUIPMENT CONTAMINATION REFERRAL SHEET

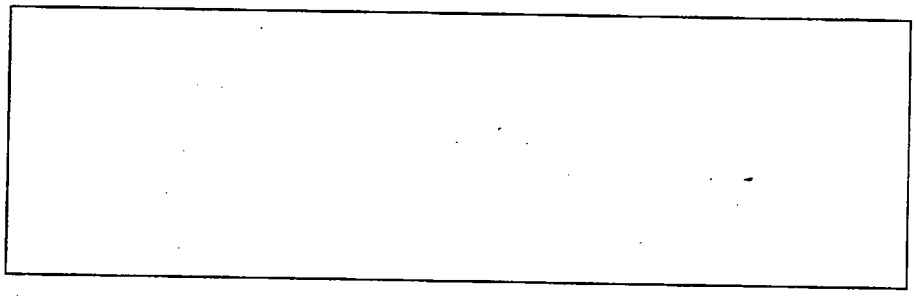
1. DATE:_____ TIME:_____

2. PMC LOCATION: _____

3. DESCRIBE EQUIPMENT:_____

4. OWNER'S NAME:_____
   WORK ADDRESS:_____
   HOME TELEPHONE: _____WORK TELEPHONE: _____
   STATE AGENCY_____

5. DESCRIBE THE EXTENT OF CONTAMINATION AND INDICATE LOCATION OF DRAWING: _____
   _____



6. METHOD(S) USED AND RESULT OF DECONTAMINATION EFFORTS
   _____

7. ACTION TAKEN: (CHECK ONE)
   ____ DECONTAMINATED TO 360 CPM ABOVE BACKGROUND OR LESS AND RELEASED
   ____ ITEM REMAINS CONTAMINATED. RETAIN ITEM. CONTACT PMC TEAM LEADER AND/OR RADIATION TECHNICAL SPECIALIST.

_____ _____
SIGNATURE OF INITIAL MONITOR SIGNATURE OF DECON MONITOR

ATTACHMENT 7

STANDARD OPERATING PROCEDURE

FOR THE INITIAL ISSUE, ACCOUNTABILITY AND MAINTENANCE OF DIRECT-READING DOSIMETERS FOR THE RADIOLOGICAL EMERGENCY PREPAREDNESS PROGRAM

1. 0-5R and 0-20R direct-reading dosimeters are issued to State emergency workers in the event of an accident at a nuclear power plant.

2. Distribution of these dosimeters is each Agency's responsibility.

   a. Issue dosimeters in accordance with the State distribution plan. Be sure to prepare receipt forms, verify counts and record the serial numbers of the dosimeters.

   b. Issue one CDV-750 OR 750 Model 6 dosimeter charger per four dosimeters.

3. Each recipient of these dosimeters will inventory them by serial number on an annual basis.

   The enclosed format (Attachment 7A) will be used to report the inventory of Model 611 dosimeters. CD issued dosimeters utilized for REP operation will also be inventoried.

4. The following procedures will be followed by all dosimeter recipients:

   a. Dosimeters will be zeroed by receiving agency personnel upon receipt and again after 24 and 48 hours and then will be checked after another 24 hours for drift. Any dosimeter found to read more than one-twentieth of full scale after the three charges is defective. (Defective dosimeters and dosimeter chargers will be returned to the SEMO Radiological Instrument Facility for replacement as necessary and according to available supplies).

   b. Dosimeter will be rechecked by the agency in this fashion annually.

   c. Dosimeter chargers will be checked upon receipt or according to manufacturer's specifications, whichever is more frequent, for their ability to move a dosimeter hairline up and down scale.

   d. To assure proper control of the instruments, a listing by serial number of each dosimeter should be maintained by each agency. Dates of quarterly and annual checks should appear after each serial number. Dosimeter charger maintenance should be handled in the same manner or according to manufacturer's specifications or on an annual basis, whichever is more frequent. A sample form (Attachment 7B) is attached for maintenance control. Each receiving distribution point (state agency) should designate an individual to be responsible for the actual checking and record keeping involved in the quarterly and annual maintenance checks.

5. It is the responsibility of the recipient to annually evaluate emergency worker dosimeter requirements.

ATTACHMENT 7A

_____
County/Agency

Page _____ Date _____

DOSIMETER AND CHARGER STOCKPILE AND DISTRIBUTION PLAN

A. Total Allocation To This Organization

1. Dosimeters Model 611 (0-5R) : _____

2 Dosimeter Chargers CDV-750 : _____

B. Summary of Present Distribution

	611	CDV-750
1. Quantity in central storage at EOC.....:	_____	_____
2. Quantity distributed to decentralized Storage :	_____	_____
3.. Quantity distributed to individuals.:	_____	_____
TOTAL:	_____	_____

C. Inspection

1. Date dosimeters last charged.....: _____

2. Date of last inventory.....: _____

D. Location of Equipment Distributed

1. Name of Individual Or Facility	2. Quantity 611	3. Quantity CDV-750 or 750 Model 6	4. Address (Street & City)

ATTACHMENT 7B

_____
County/Agency

Page _____ Date_____

DOSIMETER AND CHARGER MAINTENANCE FORM

Dosimeter Serial#	Initial Zero Date	Zero Date Plus 24 Hrs	Zero Date Plus 48 Hrs	Zero Date Plus 72 Hrs. Drift Check

ATTACHMENT 8

STANDARD OPERATING PROCEDURE

FOR THE ISSUE, ACCOUNTABILITY AND MAINTENANCE
OF PERMANENT RECORD DOSIMETRY

1. In accordance with the State Radiological Emergency Preparedness (REP) Plans, permanent record dosimeters (Film, TLD, OSLD, Etc.) will be provided to all emergency workers within the 10 mile Emergency Planning Zone in the event of a nuclear power plant incident. These dosimeters will be utilized in conjunction with direct reading dosimeters and will be the permanent legal record of radiation exposure for all emergency workers.

2. Distribution of permanent record dosimeters will be in accordance with the State distribution plan developed by the Bureau of Environmental Radiation Protection and SEMO.

3. Upon receipt of the permanent record dosimeters from the supplier, the SEMO Radiological Instrument Facility will perform the following actions:

   a. Verify the count of permanent record dosimeters received from the vendor.

   b. Issue permanent record dosimeters in accordance with the State distribution plan to include: preparing receipt forms, verifying counts and recording serial numbers.

   c. Maintain, by serial number, a record of issue of these permanent record dosimeters to State agencies. Also provide copies of serial numbers to recipients.

4. At the present time (2008), the State of New York provides Optically Stimulated Luminescent Dosimeters (OSLDs) to be utilized as the permanent (legal) record dosimeters for State emergency workers. Procedure G, Section 4.2, of the New York State Radiological Emergency Preparedness Plan outlines further the requirements and procedures for permanent record dosimeters.

5. Upon receipt of permanent record dosimeters, State agencies shall:

   a. Verify count and serial numbers.

   b. Develop appropriate plans for the distribution and storage of permanent record dosimeters to emergency response personnel or agencies. A control dosimeter is to be kept at each separate distribution and storage point to record appropriate natural background radiation. A listing, by serial number, shall be maintained of permanent record dosimeters stored at each location. The control dosimeter must also be identified by serial number.

ATTACHMENT 8

STANDARD OPERATING PROCEDURE

6. Permanent record dosimeters will be exchanged annually through the following procedure:

a. SEMO Radiological Instrument Facility will distribute replacement permanent record dosimeters to each agency that initially received them. Upon receipt of these permanent record dosimeters, the recipient will distribute the permanent record dosimeters per item 5 above. Previously issued permanent record dosimeters, with the appropriate control dosimeter, will be collected for return to the following address:

NY State Emergency Management Office
Radiological Instrument Facility
Building 22, Ste. 101
1220 Washington Ave.
Albany, New York 12226

Note: It is the responsibility of the recipient to insure that each permanent record dosimeter is returned as required. If the number of dosimeters returned for replacement is less than the number of dosimeters initially issued, the recipient will be responsible for the appropriate replacement cost.

7. In the event of a nuclear power plant incident, all emergency workers will record their permanent record dosimeter serial numbers on their individual Emergency Worker Radiation Exposure Record Card. At the termination of the incident or upon request of the State Department of Health, Emergency Worker Radiation Exposure Record Cards will be collected in accordance with REP Plan procedures. It is the responsibility of the recipient to record emergency worker personnel information (name, social security number, etc.) on the Emergency Worker Radiation Exposure Record Card.

8. Upon request from the State Department of Health, a copy of the permanent record dosimeter serial number listing and all emergency worker permanent record dosimeters used and control dosimeters shall be sent to the SEMO Radiological Instrument Facility for shipment to the supplier for recording of radiation exposure. Replacement permanent record dosimeters will be provided to the recipient per item 6 above.

9. It is the responsibility of the recipient to annually evaluate emergency worker permanent record dosimeter requirements.

10. The NYS Department of Health, Bureau of Environmental Protection, is responsible for maintaining dose records for each individual. These records will include the person's name, social security number, dosimeter serial number, dosimeter reading, estimate of internal dose (whole body and organ, if applicable), and total effective dose equivalent.

11. Internal doses will be estimated based on air sample analysis and length of time each person was exposed to airborne contamination.

12. Following an accident at a nuclear power facility, NYS have an agreement that Landauer, the supplier of the OSLD badges, will provide a reader which can be utilized to promptly provide a reading on the emergency worker's permanent record dosimeter.

13. Emergency workers who have been identified as being exposed to the plume will also receive a whole body scan.

(NOT USED)

ATTACHMENT 9

STATEWIDE POTASSUIM IODIDE (KI) INVENTORY

	130mg Tablets	65 mg Tablets	65 mg Liquid
NEW YORK STATE			
-Field Distribution to DPC agencies	1300	0	0
-Sing Sing Correctional Facility	11,000		
- Storage Supply - SEMO	385,000	22400	18000
- Storage Supply – Glen Falls			2,922,000
- Storage Supply - Rochester			240000
COUNTY GOVERNMENT (INCLUDES SCHOOLS)	644082	573790	783330
NON-GOVERNMENT ORGANIZATIONS (Daycare & Nursery Schools)	2949	3550	15480
Totals	**1,044,331**	**599740**	**3,978,810**

1. The New York State field distribution is to State Agencies, emergency workers and eight NYS Emergency Worker Personnel Monitoring Centers throughout the State. The storage supply is located at the State Emergency Management Office Headquarters in Albany. Other storage locations include the SEMO Region III Office in Queensbury and the Monroe County Department of Health in Rochester. All locations are temperature controlled.

2. Since the inception of the KI program in 2002, NYS has made distribution of KI to County government for their direct distribution to members of the general public within the 10-mile EPZ. Counties have also made KI available at their general population reception centers and at various municipal locations throughout the County. KI inventory is used for the general population, schools, institutions, emergency workers and bulk storage.

3. Non-government organizations consist of business and daycares and nursery schools.

ATTACHMENT 10

U.S. NRC REGULATORY GUIDE 8.13

Office of Nuclear Regulatory Research

REGULATORY GUIDE 8.13 (Draft was issued as DG-8014)

INSTRUCTION CONCERNING PRENATAL RADIATION EXPOSURE

A. INTRODUCTION

The Code of Federal Regulations in 10 CFR Part 19, "Notices, Instructions and Reports to Workers: Inspection and Investigations," in Section 19.12, "Instructions to Workers," requires instruction in "the health protection problems associated with exposure to radiation and/or radioactive material, in precautions or procedures to minimize exposure, and in the purposes and functions of protective devices employed. " The instructions must be "commensurate with potential radiological health protection problems present in the work place."

The Nuclear Regulatory Commission's (NRC's) regulations on radiation protection are specified in 10 CFR Part :20, "Standards for Protection Against Radiation"; and 10 CFR 20.1208, "Dose to an Embryo/Fetus," requires licensees to "ensure that the dose to an embryo/fetus during the entire pregnancy, due to occupational exposure of a declared pregnant woman, does not exceed 0.5 rem (5 mSv)." Section 20.1208 also requires licensees to "make efforts to avoid substantial variation above a union monthly exposure rate to a declared pregnant woman." A declared pregnant woman is defined in 10 CFR 20.1003 as a woman who has voluntarily informed her employer; in writing, of her pregnancy and the estimated date of conception.

This regulatory guide is intended to provide information to pregnant women, and other personnel, to help them make decisions regarding radiation exposure during pregnancy. This Regulatory Guide 8.13 supplements Regulatory Guide 8.29, "Instruction Concerning Risks from Occupational

Radiation Exposure" (Ref 1), which contains a broad discussion of the risks from exposure to ionizing radiation.

Other sections of the NRC's regulations also specify requirements for monitoring external and internal occupational dose to a declared pregnant woman. In 10 CFR 20.1502, "Conditions Requiring Individual Monitoring of External and Internal Occupational Dose," licensees are required to monitor the occupational dose to a declared pregnant woman, using an individual monitoring device, if it is likely that the declared pregnant woman will receive, from external sources, a deep dose equivalent in excess of 0.1 rem (1 mSv). According to Paragraph (e) of 10 CFR 20.2106, "Records of Individual Monitoring Results," the licensee must maintain records of dose to an embryo/fetus if monitoring was required, and the records of dose to the embryo/fetus must be kept with the records of dose to the declared pregnant woman. The declaration of pregnancy must be kept on file, but may be maintained separately from the dose records. The licensee must retain the required form or record until the Commission terminates each pertinent license requiring the record.

The information collections in this regulatory guide are covered by the requirements of 10 CFR Parts 19 or 20, which were approved by the Office of Management and Budget, approval numbers 3150-0044 and 3150-0014, respectively. The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

B. DISCUSSION

As discussed in Regulatory Guide 8.29 (Ref. 1), exposure to any level of radiation is assumed to carry with it a certain amount of risk. In the absence of scientific certainty regarding the relationship between low dose exposure and health effects, and as a conservative assumption for radiation protection purposes, the scientific community generally assumes that any exposure to ionizing radiation may cause undesirable biological effects and that the likelihood of these effects increases as the dose increases. At the occupational dose limit for the whole body of 5 rem (50 mSv) per year, the risk is believed to be very low.

The magnitude of risk of childhood cancer following in utero exposure is 1.U1certain in that both negative and positive studies have been reported. The data from these studies "are consistent with a lifetime cancer risk resulting from exposure during gestation which is two to three times that for the

adult" (NCRP Report No.116, Ref. 2). The NRC has reviewed the available scientific literature and has concluded that the 0.5 rem (5 mSv) limit specified in 10 CFR 20.1208 provides an adequate margin of protection for the embryo/fetus. This dose limit reflects the desire to limit the total lifetime risk of leukemia and other cancers associated with radiation exposure during pregnancy. In order for a pregnant worker to take advantage of the lower exposure limit and dose monitoring provisions specified in 10 CFR Part 20, the woman must declare her pregnancy in writing to the licensee. A form letter for declaring pregnancy is provided in this guide or the licensee may use its own form letter for declaring pregnancy. A separate written declaration should be submitted for each pregnancy.

C. REGULATORY POSITION

1. Who Should Receive Instruction

Female workers who require training under 10 CFR 19.12 should be provided with the information contained in this guide. In addition to the information contained in Regulatory Guide 8.29 (Ref: 1), this information may be included as part of the training required under 10 CFR 19.12.

2. Providing Instruction

The occupational worker may be given a copy of this guide with its Appendix, an explanation of the contents of the guide, and an opportunity to ask questions and request additional information. The information in this guide and Appendix should also be provided to any worker or supervisor who may be affected by a declaration of pregnancy or who may have to take some action in response to such a declaration.

Classroom instruction may supplement the written information If the licensee provides classroom instruction, the instructor should have some knowledge of the biological effects of radiation to be able to answer questions that may go beyond the information provided in this guide. Videotaped presentations may be used for classroom instruction. Regardless of whether the licensee provides classroom training, the licensee should give workers the opportunity to ask questions about information contained in this Regulatory Guide 8.13. The licensee may take credit for instruction that the worker has received within the past year at other licensed facilities or in other courses or training.

3. Licensee's Policy on Declared Pregnant Women

The instruction provided should describe the licensee's specific policy on declared pregnant women, including how those policies may affect a woman's work situation. In particular, the instruction should include a description of the licensee's policies, if any, that may affect the

declared pregnant woman's work situation after she has filed a written declaration of pregnancy consistent with 10 CFR 20.1208.

The instruction should also identify who to contact for additional infom1ation as well as identify who should receive the written declaration of pregnancy. The recipient of the woman's declaration may be identified by name (e.g., John Smith), position (e.g., immediate supervisor, the radiation safety officer), or department (e.g., the personnel department).

4. Duration of Lower Dose Limits for the Embryo/Fetus

The lower dose limit for the embryo/fetus should remain in effect until the woman withdraws the declaration in writing or the woman is no longer pregnant. If a declaration of pregnancy is withdrawn, the dose limit for the embryo/fetus would apply only to the time from the estimated date of conception until the time the declaration is withdrawn. If the declaration is not withdrawn, the written declaration may be considered expired one year after submission.

5. Substantial Variations Above a Uniform Monthly Dose Rate

According to 10 CFR 20. 1208(b), "The licensee shall make efforts to avoid substantial variation above a uniform monthly exposure rate to a declared pregnant woman so as to satisfy the limit in paragraph (a) of this section,"that is, 0.5 rem (5 mSv) to the embryo/fetus. The National Council on Radiation Protection and Measurements (NCRP) recommends a monthly equivalent dose limit of 0.05 rem (0.5 mSv} to the embryo/fetus once the pregnancy is known (Ref: 2). In view of the NCRP recommendation, any monthly dose of less than 0.1 rem (1 mSv) may be considered as not a substantial variation above a uniform monthly dose rate and as such will not require licensee justification. However, a monthly dose greater than 0.1 rem (1 mSv) should be justified by the licensee.

D. IMPLEMENTATION

The purpose of this section is to provide information to licensees and applicants regarding the NRC staffs plans for using this regulatory guide.

Unless a licensee or an applicant proposes an acceptable alternative method for complying with the specified portions of the NRC's regulations, the methods described in this guide will be used by the NRC staff in the evaluation of instructions to workers on the radiation exposure of pregnant women.

REFERENCES

1. USNRC, "Instruction Concerning Risks from Occupational Radiation Exposure," Regulatory Guide 8.29, Revision 1, February 1996.

2. National Council on Radiation Protection and Measurements, *Limitation of Exposure to Ionizing Radiation,* NCRP Report No.116, Bethesda, MD, 1993.

APPENDIX

QUESTIONS AND ANSWERS CONCERNING PRENATAL RADIATION EXPOSURE

1. Why am I receiving this information?

The NRC's regulations (in 10 CFR 19.12, "Instructions to Workers") require that licensees instruct individuals working with licensed radioactive materials in radiation protection as appropriate for the situation. The instruction below describes information that occupational workers and their supervisors should know about the radiation exposure of the embryo/fetus of pregnant women.

The regulations allow a pregnant woman to decide whether she wants to formally declare her pregnancy to take advantage of lower dose limits for the embryo/fetus. This instruction provides inforn1ation to help women make an information decision whether to declare a pregnancy.

2. If I become pregnant, am I required to declare my pregnancy?

No. The choice whether to declare your pregnancy is completely voluntary. If you choose to declare your pregnancy, you must do so in writing and a lower radiation dose limit will apply to your embryo/fetus. If you choose not to declare your pregnancy, you and your embryo/fetus will continue to be subject to the same radiation dose limits that apply to other occupational workers.

3. If declare my pregnancy in writing, what happens?

If you choose to declare your pregnancy in writing, the licensee must take measures to limit the dose to your embryo/fetus to 0.5 rem (5 millisievert) during the entire pregnancy. This is one-tenth of the dose that an occupational worker may receive in a year. If you have already received a dose exceeding 0.5 rem (5 mSv) in the period between conception and the declaration of your pregnancy, an additional dose of 0.05 rem (0.5 mSv) is allowed during the remainder of the pregnancy. In addition, 10 CFR 20.1208, "Dose to an Embryo/Fetus," requires licensees to make efforts to avoid substantial variation above a uniform monthly dose rate so that all the 0.5 rem (5 mSv) allowed dose does not occur in a short period during the pregnancy.

This may mean that, if you declare your pregnancy, the licensee may not permit you to do some of your normal job functions if those functions would have allowed you to receive more than 0.5 rem, and you may not be able to have some emergency response responsibilities.

4. Why do the regulations have a lower dose limit for the embryo/fetus of a declared pregnant woman than for a pregnant worker who has not declared?

A lower dose limit for the embryo/fetus of a declared pregnant woman is based on a consideration of greater sensitivity to radiation of the embryo/fetus and the involuntary nature of the exposure. Several scientific advisory groups have recommended (References 1 and 2) that the dose to the embryo/fetus be limited to a fraction of the occupational dose limit.

5. What are the potentially harmful effects of radiation exposure to my embryo/fetus?

The occurrence and severity of health effects caused by ionizing radiation are dependent upon the type and total dose of radiation received, as well as the time period over which the exposure was received. See Regulatory Guide 8.29, "Instruction Concerning Risks from Occupational Exposure" (Ref. 3), for more information. The main concern is embryo/fetal susceptibility to the harmful effects of radiation such as cancer.

6. Are there any risks of genetic defects?

Although radiation injury has been induced experimentally in rodents and insects, and in the experiments was transmitted and became manifest as hereditary disorders in their offspring, radiation has not been identified as a cause of such effect in humans. Therefore, the risk of genetic effects attributable to radiation exposure is speculative. For example, no genetic effects have been documented in any of the Japanese atomic bomb survivors, their children, or their grandchildren.

7. What if I decide that I do not want any radiation exposure at all during my pregnancy?

You may ask your employer for a job that does not involve any exposure at all to occupational radiation dose, but your employer is not obligated to provide you with a job involving no radiation exposure. Even if you receive no occupational exposure at all, your embryo/fetus will receive some radiation dose (on average 75 mrem (0.75 mSv)) during your pregnancy from natural background radiation.

The NRC has reviewed the available scientific literature and concluded that the 0.5 rem (5 mSv) limit provides an adequate margin of protection for the embryo/fetus. This dose limit reflects the desire to limit the total lifetime risk of leukemia and other cancers. If this dose limit is exceeded, the total lifetime risk of cancer to the embryo/fetus may increase incrementally. However, the decision on what level of risk to accept is yours. More detailed information on potential risk to the embryo/fetus from radiation exposure can be found in References 2-10.

8. What effect will formally declaring my pregnancy have on my job status?

Only the licensee can tell you what effect a written declaration of pregnancy will have on your job status. As part of your radiation safety training, the licensee should tell you the company's policies with respect to the job status of declared pregnant women. In addition, before you declare your pregnancy, you may want to talk to your supervisor or your radiation safety officer and ask what a declaration of pregnancy would mean specifically for you and your job status.

In many cases you can continue in your present job with no change and still meet the dose limit for the embryo/fetus. For example, most commercial power reactor workers (approximately 93%) receive, in 12 months, occupational radiation doses that are less than 0.5 rem (5 mSv) (Ref. 11). The licensee may also consider the likelihood of increased radiation exposures from accidents and abnormal events before making a decision to allow you to continue in your present job.

If your current work might cause the dose to your embryo/fetus to exceed 0.5 rem (5 mSv), the licensee has various options. It is possible that the licensee can and will make a reasonable accommodation that will allow you to continue performing your current job, for example, by having another qualified employee do a small part of the job that accounts for some of your radiation exposure.

9. What information must I provide in my written declaration of pregnancy?

You should provide, in writing, your name, a declaration that you are pregnant, the estimated date of conception (only the month and year need be given), and the date that you give the letter to the licensee. A form letter that you can use is included at the end of these questions and answers. You may use that letter, use a form letter the licensee has provided to you, or write your own letter.

10. To declare my pregnancy, do I have to have documented medical proof that I am pregnant?

NRC regulations do not require that you provide medical proof of your pregnancy. However, NRC regulations do not preclude the licensee from requesting medical documentation of your pregnancy, especially if a change in your duties is necessary in order to comply with the 0.5 rem (5 mSv) dose limit.

11. Can I tell the licensee orally rather than in writing that I am pregnant?

No. The regulations require that the declaration must be in writing.

12. If I have not declared my pregnancy in writing, but the licensee suspects that I am pregnant, do the lower dose limits apply?

No. The lower dose limits for pregnant women apply only if you have declared your pregnancy in writing. The United States Supreme Court has ruled (in *United Automobile Workers International Union* v. *Johnson Controls, Inc.,* 1991) that "Decisions about the welfare of future children must be left to the parents who conceive, bear, support, and raise them rather than to the employers who hire those parents" (Reference 7). The Supreme Court also ruled that your employer may not restrict you from a Specific job "because of concerns about the next generation." Thus, the lower limits apply only if you choose to declare your pregnancy in writing.

13. If I am planning to become pregnant but am not yet pregnant and I inform the licensee of that in writing, do the lower dose limits apply?

No. The requirement for lower limits applies only if you state in writing that you are already pregnant.

14. What if I have a miscarriage or find out that I am not pregnant?

If you have declared your pregnancy in writing, you should promptly inform the licensee in writing that you are no longer pregnant. However, if you have not formally declared your pregnancy in writing, you need not inform the licensee of your nonpregnant status.

15. How long is the lower dose limit in effect?

The dose to the embryo/fetus must be limited until you withdraw your declaration in writing or you inform the licensee in writing that you are no longer pregnant. If the declaration is not withdrawn, the written declaration may be considered expired one year after submission. I

16. If I have declared my pregnancy in writing, can I revoke my declaration of pregnancy even if I am still pregnant?

Yes, you may. The choice is entirely yours. If you revoke your declaration of pregnancy, the lower dose limit for the embryo/fetus no longer applies.

17. What if I work under contract at a licensed facility?

The regulations state that you should formally declare your pregnancy to the licensee in writing. The licensee has the responsibility to limit the dose to the embryo/fetus.

18. Where can I get additional information?

The references to this Appendix contain helpful information, especially Reference 3, NRC's Regulatory Guide 8.29, "Instruction Concerning Risks from Occupational Radiation Exposure," for general information on radiation risks. The licensee should be able to give this document to you.

For information on legal aspects, see Reference 7, "The Rock and the Hard Place: Employer Liability to Fertile or Pregnant Employees and Their Unborn Children-What Can the Employer Do?" which is an article in the journal *Radiation Protection Management*.

You may telephone the NRC Headquarters at (301) 415-7000. Legal questions should be directed to the Office of the General Counsel, and technical questions should be directed to the Division of Industrial and Medical Nuclear Safety.

You may also telephone the NRC Regional Offices at the following numbers: Region I, (610) 337-5000; Region II, (404) 562-4400; Region ill, (630) 829-9500; and Region IV, (817) 860-8100. Legal questions should be directed to the Regional Counsel, and technical questions should be directed to the Division of Nuclear Materials Safety.

REFERENCES FOR APPENDIX

1. National Council on Radiation Protection and Measurements, *Limitation of Exposure to Ionizing Radiation,* NCRP Report No.116, Bethesda, MD, 1993.

2. International Commission on Radiological Protection, 1990 *Recommendations of the International Commission on Radiological Protection,* ICRP Publication 60, Ann. ICRP 21: No.1-3, Pergamon Press, Oxford, UK, 1991.

3. USNRC, "Instruction Concerning Risks from Occupational Radiation Exposure," Regulatory Guide 8.29, Revision 1, February 1996.11 (Electronically available at www.nrc.gov/NRC/RG/index.htrn1)

4. Committee on the Biological Effects of Ionizing Radiations, National Research *Co\Ulcil,Health Effects of Exposure to Low Levels of Ionizing Radiation* (BEIR V), National Academy Press, Washington, DC, 1990.

5. United Nations Scientific Committee on the Effects of Atomic Radiation, *Sources and Effects of Ionizing Radiation,* United Nations, New York, 1993.

6. R Doll and R. Wakeford, "Risk of Childhood Cancer from Fetal Irradiation," ***The British Journal*** *of Radiology, 70,* 130-139,1997.

7. David Wiedis, Donald E. Jose, and Timm 0. Phoebe, "The Rock and the Hard Place: Employer Liability to Fertile or Pregnant Employees and Their Unborn Children-What Can the Employer *Do?' Radiation Protection Management,* 11, 41-49, January/February 1994.

8. National Council on Radiation Protection and Measurements, *Considerations Regarding the Unintended Radiation Exposure of the Embryo, Fetus, or Nursing Child,* NCRP Commentary No.9, Bethesda, MD, 1994.

9. National Council on Radiation Protection and Measurements, *Risk Estimates for Radiation Protection,* NCRP Report No.115, Bethesda, MD, 1993.

1 Single copies of regulatory guides, both active and draft, and draft NUREG documents may be obtained free of charge by writing the Reproduction and Distribution Services Section, OCIO, USNRC, Washington, DC 20555-0001, or by fax to (301)415-2289, or by email to <DISTRIBUTION@NRC.GOV>. Active guides may also be purchased from the National Technical Information Service on a standing order basis. Details on this service may be obtained by writing NTIS, 5285 Port Royal Road, Springfield, VA 22161. Copies of active and draft guides are available for inspection or copying for a fee from the NRC Public Document Room at 2120 L

Street NW., Washington, DC; the PDR's mailing address is Mail Stop LL-6, Washington, DC 20555; telephone (202)634-3273; fax (202)634-3343.

10. National Radiological Protection Board, *Advice on Exposure to Ionising Radiation During Pregnancy,* National Radiological Protection Board, Chilton, Didcot, UK. 1998.

11. M.L. Thomas and D. Hagerneyer, "Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities, 1996," Twenty-Ninth Annual Report, NUREG-O713, Vol. 18, USNRC, 1998.22

12. Copies are available at current rates from the U.S. Government Printing Office, P .0. Box 37082, Washington, DC 20402-9328 (telephone (202)512-1800); or from the National Technical Information Service by writing NTIS at 5285 Port Royal Road, Springfield, V A 22161. Copies are available for inspection or copying for a fee from the NRC Public Document Room at 2120 L Street NW ., Washington, DC; the PDR's mailing address is Mail Stop LL-6, Washington, DC 20555; telephone (202)634-3273; fax (202)634-3343.

FORM LETTER FOR DECLARING PREGNANCY

This form letter is provided for your convenience. To make your written declaration of pregnancy, you may fill in the blanks in this form letter, you may use a form letter the licensee has provided to you, or you may write your own letter.

DECLARATION OF PREGNANCY

To: _____

In accordance with the NRC's regulations at 10 CFR 20.1208, "Dose to an Embryo/Fetus," I am declaring that I am pregnant. I believe I became pregnant in _____(only the month and year need be provided).

I understand the radiation dose to my embryo/fetus during my entire pregnancy will not be allowed to exceed 0.5 rem (5 millisievert) (unless that dose has already been exceeded between the time of conception and submitting this letter). I also understand that meeting the lower dose limit may require a change in job or job responsibilities during my pregnancy.

_____
(Your signature)

_____
(Your name printed)

_____
(DATE)

REGULATORY ANALYSIS

A separate regulatory analysis was not prepared for this regulatory guide. A regulatory analysis prepared for 10 CFR Part 20, "Standards for Protection Against Radiation" (56 FR 23360), provides the regulatory basis for this guide and examines the costs and benefits of the rule as implemented by the guide. A copy of the "Regulatory Analysis for the Revision of 10 CFR Part 20" (PNL-6712, November 1988) is available for inspection and copying for a fee at the NRC Public Document Room, 2120 L Street NW , Washington, DC, as an enclosure to Part 20 (56 FR 23360).

ATTACHMENT 11

Federal Emergency Management Agency
Washington, D.C. 20472

December 1988

POLICY STATEMENT ON DISPOSAL OF WASTE WATER AND CONTAMINATED PRODUCTS FROM DECONTAMINATION ACTIVITIES

The Federal Emergency Management Agency (FEMA) was requested to provide guidance on:". . monitoring and disposal of contaminated waste water resulting from decontaminating, when necessary, members of the general public, emergency workers, automobiles and equipment in the event of an accident. . ." at a commercial nuclear power plant. This guidance was requested by the Pennsylvania Emergency Management Agency (PEMA) for the annual update of their State and local emergency response plans. The following information is provided in response to that request and has been developed in consultation with members of the Federal Radiological Preparedness Coordinating Committee, Subcommittee on Offsite Emergency Instrumentation, and the E-6 Subcommittee of the Conference of Radiation Control Program Directors.

Guidance

The applicable guidance for this issue is contained in NUREG-0654/FEMA-REP-1, Rev. 1; and Supp. 1, evaluation criterion K.5.b: "The offsite response organization, as appropriate, shall establish the means for radiological decontamination of emergency personnel wounds, supplies, instruments and equipment, and for waste disposal."

Background

Additional Federal guidance on this issue is general. However, the three following documents can be used to clarify and interpret evaluation criterion K.5.b.

1. Environmental Protection Agency (EPA) Manual of Protective Action Guides and Protective Actions For Nuclear Incidents, Chapter 7, Implementing the Protective Action Guides for the Intermediate Phase, draft dated August 12, 1988.

2. FEMA Prefiled Testimony dated April 10, 1987, before the Atomic Safety and Licensing Board (ASLB) in the Matter of Long Island Lighting Company, Shoreham Nuclear Power Station, Unit 1, Docket No. 50-322-0L-3, Remand Issue D.

3. Chapter 16, Decontamination, TID-21919, Radiological Emergency Operations, Student Manual, USAEC Division of Technical Information.

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Attached to this policy statement is a copy of item numbers 1 and 3 and selected portions of item number 2.

Discussion

The Nuclear Regulatory Commission issues licenses for the operation of commercial nuclear power plants and for the use of other byproduct materials. Any constraints that are imposed on the licensee through 10 CFR regulations apply to radioactive material under the licensee's control during normal operations.

The situation involves radioactive material that is not controlled by NRC rules and regulations. The concern is with an accident, I e., an uncontrolled event. There are no Federal limits for contamination that apply in such emergency situations. Obviously, sound health physics principles and practices should be followed to protect the health and safety of the public under anticipated emergency conditions.

The fact that decontamination is necessary is the result of a radioactive release which contaminates personnel, equipment, and/or vehicles. There are two principal ways in which contamination can occur. First, evacuees and emergency workers and/or their vehicles could initially intercept a portion of the airborne plume which would have otherwise deposited on the fixed surfaces in the plume path. Second, contamination deposited on the ground could subsequently be picked up by evacuees and emergency workers and/or their vehicles from an area previously contaminated by plume passage. The act of bringing evacuees and emergency workers together at a single location for monitoring and, if necessary, decontamination, does not create contamination, i.e., radioactive material; it merely facilitates the movement and relocation of a portion of the radioactive material which was initially released into the environment.

The decontamination of personnel, equipment, and vehicles and the discharge of the waste liquids directly into a water supply source, such as an underground aquifer, pond, lake, stream, or river, may significantly increase the level of radioactive contamination in the water supply source; but this will not significantly increase the potential threat of that body of water to the general public. This assumes that the decontamination is accomplished at a location not too distant from the area that was initially contaminated by deposition from the plume and that all run-off from the decontamination will be deposited in the same watershed contaminated by the plume. If a threat exists, precipitation (i.e., rain or snow, falling on the surface of the land mass) which would also have been contaminated by the plume passage, would have a much greater potential for contaminating the water supply. The problem, if any, created by the disposal of decontamination waste liquids is trivial when compared to potential problems resulting from the leaching or runoff of radioactive material deposited on the ground surfaces in the plume path.

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In the August 12, 1988, draft of EPA 400 Chapter 7, "Implementing the Protective Action Guides for the Intermediate Phase," this statement is made on page 7-29: "Do not waste effort trying to contain contaminated wash water" when discussing the control of surface contamination on persons and equipment. Also, on the same page, "Establish monitoring and personnel decontamination (bathing) facilities at evacuation centers. Encourage evacuated persons who did not go to an evacuation center but who were in specified areas at specified times (based on the location of the airborne plume) to bathe, change clothes, wash clothes, and wash other exposed surfaces such as cars, and trucks and their contents and then report to these evacuation centers for monitoring."

Personnel contamination will most likely involve spot contamination on an individual's soles of the feet; fingers and palms of the hands; any place that the individual would touch with his hands (even unsuspectingly), especially the face in the area of the head; the hair (especially if outside and not wearing any head covering); the seat of the pants, etc. The most likely personnel decontamination would require spot cleaning of an individual's body that was not covered with clothing. This can usually be accomplished with a good cleansing soap and water at a wash basin, sink, etc. If the hair is contaminated, then a good shampoo would be helpful. In extreme cases of significant personnel contamination, a thorough shower using a liberal amount of a good shampoo and cleansing soap, or if necessary, a stronger detergent would be recommended. If an individual's clothing is contaminated it would be preferable to remove it and replace it with clean clothing until it can be decontaminated. If an individual's shoes are contaminated, it will likely be only the soles. A stiff brushing with detergent and water should remove enough of the contamination so that the individual can retain the shoes. All waste water can be run down the drain as is normally done. Thus, holding tanks for collecting the contaminated waste water are not needed. Also, waste liquid from decontamination of the general public does not need to be monitored for radioactive contaminants.

If individuals are contaminated to levels that require decontamination of the person, then the individual's clothing will undoubtedly require storage for decay or decontamination/cleaning. Contaminated clothing should be collected in plastic bags and stored until it can be cleaned. Replacement clothing of some type must be provided. The utility may be able to provide a laundry facility on-site. After the clothing is washed and dried, it should be checked for contamination by utility personnel prior to being returned to the person. If contamination over a large area is involved, then it may be necessary for the utility to secure an off-site laundry facility near each decontamination station or reception and care center. A commercial dry cleaning facility may also be needed. The water used for washing clothes can be run down the drain as is normally done. The used dry cleaning fluid should be disposed of by the utility as they consider appropriate.

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Small pieces of equipment that are contaminated offsite should likewise be wiped down with a concentrated detergent solution, or if it can be immersed in water, it can be soaked in the detergent solution. The used solution can also be disposed of down any drain that can be used for waste water. If water could be harmful to the equipment, then any non-aqueous solvent could be used (e.g., alcohol or mineral spirits). Likewise, these solvents should be disposed of by the utility as they consider appropriate.

Decontamination of vehicles and other large pieces of equipment would normally be by washing down with a water spray, either (1) manually through the use of a garden hose or preferably a fire hose that delivers a larger quantity of water, or (2) through the use of fixed spray nozzles mounted on vertical and horizontal pipes. The area selected for the vehicle decontamination must have a surface that will avoid becoming a large mud puddle. A concrete or blacktopped area which drains well could be used. The waste water could be drained directly into a storm sewer or other sewerage system, preferably one that results in the waste water going through a treatment process before returning to a body of water which is used for a drinking water supply. Certainly, any drinking water supply intake should not be immediately below the discharge point for a storm sewer if the water is not treated prior to discharge. If a concrete or blacktopped area of sufficient size is not generally available, an area covered with several inches of crushed rock over a layer of sand or other porous material could be easily constructed in advance. This approach could also allow for the waste water to be naturally filtered so that the majority of the contaminants could be retained in the porous material. A regular commercial car wash could be used for vehicle decontamination if located in the general vicinity where a vehicle decontamination station is required. If the wash water is recycled, then the filter medium should be checked for contamination and properly disposed of, if necessary.

Clothing, tools, equipment, and other usable materials, which are contaminated, should be considered as contaminated waste when the time and effort spent in decontamination efforts would exceed the value of these materials. Contaminated equipment damaged beyond repair and other solid contaminated debris, such as automobile air filter elements, should be considered waste material and should be bagged in plastic and provided to the utility for appropriate disposal. For selected items contaminated by short-lived radio nuclides, storage which would allow decay to effect the decontamination might be feasible, in lieu of disposal.

Attachments
As Stated

APPROVED

Richard W. Krimm
Assistant Associate Director
Office of Natural and
Technological Hazards Program

TABLE OF CONTENTS

Attachments

(NOT USED)

1.0 RADIOLOGICAL ASSESSMENT PURPOSE

The objective of radiological assessment is to determine potential or actual off-site consequences of a radiological emergency. The purpose of this procedure is to identify how such an assessment is to be achieved and how it will influence the selection and initiation of appropriate protective measures.

2.0 SCOPE

This procedure will define the State staff involved in the assessment process, their roles, and their interaction with the Nuclear Facility Operator (NFO) and local and Federal agencies.

3.0 RADIOLOGICAL ASSESSMENT STAFF

3.1 Assessment & Evaluation

Assessment at the initial stages of an accident will be performed by the Nuclear Facility Operator (NFO). The NFO will use available information on plant status and releases and on-site and off-site monitoring data to project doses off-site and determine the accident classification. Once an emergency classification has been determined, the NFO will promptly notify the State and local authorities. In cases where radioactive materials are released as a result of the emergency, the NFO will promptly provide information on the release, and will provide on-site and off-site monitoring data as it becomes available. State Radiological Health Staff will perform an independent assessment of the public health effects of the emergency. If the accident is classified as an Alert, Site Area Emergency or General Emergency, accident assessment activities will be conducted at the State Emergency Operation Center (EOC) in Albany. State representatives will be also dispatched to the NFO's Emergency Operations Facility (EOF) to will participate in accident assessment activities. Typically, State representatives will be dispatched to the EOF at an Alert or higher emergency classification.

3.2 Lead Role

The State Health Department has the lead role in assessing the off-site health impacts resulting from radioactive releases. The Bureau of Environmental Radiation Protection (BERP) within the Health Department is responsible for carrying out this role. The State Emergency Management Office supports the Bureau of Environmental Radiation Protection in performing this assessment. Specific responsibilities of BERP staff are provided in Section 4.0.

Additional technical support is provided as follows:

The NYS Department of Health Laboratory of Inorganic and Nuclear Chemistry (Wadsworth Center) will complete a laboratory analysis of samples collected.

The NYS Department of Environmental Conservation (DEC) will provide staff to support in meteorology, dose assessment, and environmental monitoring and sampling.

The NYS Department of Agriculture and Markets (A&M) will provide staff to support sampling of milk and evaluation of the need for protective actions relating to the milk and food supply.

The NYS Emergency Management Office (SEMO), Department of Public Service (DPS) and NYS Energy Research and Development Authority (NYSERDA) will provide staff to assist DOH staff in the assessment and evaluation of the status of the reactor systems.

4.0 BUREAU OF ENVIRONMENTAL RADIATION PROTECTION ACTIVITIES

The Bureau of Environmental Radiation Protection is responsible for overall accident assessment and for providing radiological health expertise to other state and local agencies as required.

The Bureau staff conducts their activities during a radiological emergency from a variety of locations. These are:

4.1 Bureau Office in the Health Department:

Initial notification (during working hours) will be received at the Bureau of Environmental Radiation Protection (BERP) office. Initial contacts with the NFO and key State and local staff will be conducted from these offices.

In case of an Unusual Event, the State EOC will not be activated and all activities relating to the situation will be conducted from the Bureau offices. BERP staff will:

- maintain periodic contact with the NFO
- maintain periodic contact with the NRC
- maintain periodic contact with the state EOC
- keep key Health Department staff, the NRC, other State agencies and local officials informed of all significant developments relating to the situation.

During non-business hours, the above activities will be completed from the homes of appropriate BERP staff.

4.2 State EOC

If the emergency classification is Alert or more severe, the State EOC will be either partially or fully activated. In both cases the A & E Branch as defined in Item 3.1 will proceed to the State EOC. Following initial contact with the NFO and notification of key Health Department staff, two radiological health specialists and a specialist in reactor systems and operations will proceed to the State EOC. The EOC Planning Section, A & E Branch staff controls and directs the State radiological emergency response effort and has the following responsibilities:

- establishing initial contact with the NFO using the call back number on RECS Part 1 Form (Procedure B, attachment 7);
- maintaining contact with the NFO and NRC and obtaining updated information periodically;
- evaluating information on plant status, assessing potential for releases to the environment and estimating magnitude of likely release;
- projecting doses off-site and comparing them to the Protective Action Guides (PAGs);
- recommending protective actions to prevent or reduce potential exposures to the off-site population;
- determining the need for and issuing the recommendation to ingest potassium iodide (KI);
- preparing a sampling program as needed, and initiating sampling activities as appropriate;
- determining the need for off-site monitoring, and taking action to initiate the monitoring program as appropriate;
- determining the need for, and/or requesting through SEMO, Federal radiological assistance through the USDOE's Brookhaven Area Office;
- maintaining flow of current information and data between the EOC and EOF;
- calculating the ratio of the Total Effective Dose Equivalent (TEDE) to the radiation dosimeter reading when sufficient information on radionuclide mixture in the release has been obtained, and providing dosimeter correction factor to State and local staff as appropriate;
- advising the Commissioner of Health in situations when personnel exposure may exceed PAGs for emergency workers and should be authorized;
- recommending relaxation of protective actions as the emergency conditions ease; and
- conducting briefings for the Chairman of the Disaster Preparedness Commission, the EOC Command staff, the Commissioner of Health, and other officials as appropriate.

4.3 EOF

When activated, the EOF becomes the center where data from the NFO and affected counties is shared. Accident assessment is performed at the affected county's EOC, State EOC, and the EOF. The State will typically send two representatives to the EOF. These will include a radiological health specialist and a specialist in reactor systems and operations.

The State EOF liaison staff will have the following responsibilities:

- participate in the accident assessment process at the EOF;
- interface with county liaisons;
- maintain flow of current information and data between the EOF and the State EOC; and
- represent the State at briefings conducted in the EOF.

4.4 Local EOC

In general, local radiological health specialists or radiological officers are responsible for the radiological aspects of the emergency response at the county level.

If requested by the affected county, a State radiological health specialist will proceed to the county EOC and will act as a radiological consultant to the county.

4.5 Monitoring Teams

During the plume exposure pathway phase of an emergency, the NFO and county field monitoring teams have the primary responsibility for evaluating the magnitude of the off-site exposure levels and concentrations of radioactive releases.

The State may also request assistance for aerial and ground monitoring from federal resources through the Brookhaven Area Office, USDOE. This assistance may be internal USDOE departmental Radiological Assistance Program (RAP teams) or federal interagency support through the National Response Framework (NRF)

4.5.1 Collection and Dissemination of Field Data

Prior to activation of the NFO EOF:

- Data collected by county or NFO field monitoring teams will be transmitted to their EOC or TSC, respectively, according to existing procedures.
- NFO staff receiving field data from NFO's field monitoring teams reviews, tabulates and promptly transmits data to the A&E Branch of the State EOC.
- Radiological assessment and evaluation staff in the State EOC promptly transmits field data received from state field teams to TSC and counties as appropriate.

After activation of the NFO EOF:

- Field monitoring data collected by NFO's monitoring teams will be transmitted to the EOF according to NFO's existing procedures.
- NFO radiological assessment staff tabulate and review field data.
- Data collected by county teams will be transmitted to their respective county EOCs.
- County radiological assessment staff tabulate and review field data.
- County EOC promptly transmits all field data to the EOF and Planning Section , A&E Branch at the SEOC.
- EOF staff makes copies of field data (both generated by NFO or received from counties) and distributes to State, County and Federal liaison persons in the EOF. Each liaison person is responsible for assuring that copies of all appropriate data are transmitted from the EOF to their respective EOCs.
- If a county liaison officer has not arrived at the EOF, the State representative will assure that appropriate field monitoring data are transmitted to that county's EOC from the EOF.
- Should a county who does not have a representative at the EOF have any questions concerning the data, they should address them to the State liaison at the EOF or to the SEOC.

5.0 OTHER AGENCIES ACTIVITIES

Assessment and Evaluation (A&E) in New York State is an interagency team effort which brings together, in the State Emergency Operations Center, technical experts from various state agencies.

The following is a list of functional areas with information on the resources employed and tasks assigned.

5.1 Assessment and Evaluation (A&E) Area Facilities and Readiness

The State Emergency Management Office (SEMO) Planning Section designs and develops the appropriate workspace and systems needed, in consultation with the A&E participants. SEMO staff make sure that the A&E area is maintained and that the reference documents, plans, maps, forms, computers, software and other items needed for A&E are appropriately maintained, stored and retrieved when needed.

In the early stages of an event, SEMO staff will make final preparations for activation of A&E, and will carry out those initial tasks necessary to insure continuity of the operation. These efforts will gradually evolve into an integrated A&E operation as the various A&E staff members arrive.

To support the activities of the A&E Area, SEMO provides a variety of administrative and support personnel. These include the following:

- Planning Section personnel assist the DOH group leader in managing and coordinating A&E activities.
- State EOC staff manage the information flow in the A&E Area.
- The Information/Administrative Assistant distributes and records information, delivers messages, and provides essential support services.
- Meteorological technical specialist provides support to the A&E team leader.

5.2 Weather Information

Meteorological assessment, as part of the State A & E area, obtains, processes, displays and disseminates meteorological information.

In an emergency, Meteorologists from the NYS Department of Environmental Conservation (DEC) are activated to the State EOC to assume its operation. Prior to the arrival of the DEC Meteorologists, the SEMO Technical Specialist in the Planning Section carries out the essential tasks of the operation.

In a nuclear emergency, the Weather Center obtains and analyzes all meteorological data relevant to plume transport, dispersion and deposition, dose assessment, and the operational needs of the response. Data are obtained, as needed, from the NFO, the National Weather Service, NYS DEC, Weather Services International (WSI) and other sources.

Meteorological information is provided to the A&E group, the command room and the operations room, and is posted in the areas provided. Weather forecasts are prepared and distributed for future dose projections for any potential releases of radioactive material and to inform responders of the conditions under which they will have to operate.

5.3 Nuclear Engineering

Specialists in reactor systems and operations (nuclear specialists) are part of the A&E Branch and act under the direction of the DOH A&E Team Leader at the State EOC. Nuclear specialists gather, assess and relay plant systems information to DOH and other State decision-makers. A minimum of two nuclear specialists are normally needed during emergency operations. The

State Department of Health, NYS Department of Public Service, SEMO, and the State Energy Research and Development Authority provide nuclear specialists.

The nuclear specialists obtain information from the NFO on the plant status, sequence of events, operating and safety systems and problems, critical parameters and time frames, corrective actions taken or planned, and the prognosis for improvement or worsening of the situation. They determine the effect of engineering matters on plant operations and public safety; keep the A&E Branch advised of plant status as it relates to potential releases of radioactive material; and provide briefings to the command room staff, operations personnel and, when required, the public information officer.

Their analysis includes use of the NFO's Emergency Plans and Procedures and the Final Safety Analysis Reports, the NRC's Emergency Response Data System (ERDS) and other information relating to the plant, and its operating and safety systems. When possible, they work side-by-side with nuclear engineers from the Nuclear Regulatory Commission and the NFO who are dispatched to the state EOC.

5.4 Dose Assessment

As circumstances warrant, other agencies may assist the DOH personnel in performing dose assessment. Trained individuals who may provide such assistance come from SEMO, the NYS DEC, the USDOE, and the affected NFO. The use of such assistance depends on the requirements of the operation and availability of trained personnel.

5.5 Ingestion Pathway

Decisions regarding the sampling requirements and procedures for ingestion pathway analysis involve a number of agencies. These include Health, Environmental Conservation, Agriculture and Markets, Transportation and State Police. When appropriate, representatives from these agencies will be called upon to discuss sampling issues and related food and water protective actions. A list of the involved agencies and types of samples they are responsible for is found in Attachment 7. Additional information is found in the special procedures for ingestion pathway response located in Procedures K, L, M, and N of this plan.

6.0 ASSESSMENT INPUT INFORMATION REQUIRED

The assessment process utilizes four sources of information. These are the following:

- Previously developed data
- Relayed real-time radiological and meteorological data
- NFO supplied information
- Federal monitoring and assessment information

6.1 Previously Developed Data

Previously developed data includes information that is independent of the nature of the accident which is needed for a determination of the impact on public health resulting from the accident. These data include the following:

1. Site map showing facility layout
2. Site map showing plume EPZ
3. Site map showing ingestion EPZ
4. Maps, or overlays for the appropriate maps showing

    a. population distribution
    b. special facilities
    c. milk and food processing plants
    d. open reservoirs
    e. ERPAs/Protective Action Areas and evacuation routes
    f. relocation centers
    g. local and State EOCs and EOF
    h. locations of fixed monitoring stations and assigned mobile monitoring points (if predesignated)
    i. watersheds
    j. farms

5. Precalculated off-site projected doses for design basis accidents
6. Site specific emergency procedures

6.2 Relayed real-time Radiological and Meteorological Data

The protective action recommendations in a fast developing emergency are made by the NFO, who is the only entity in a position to identify the emergency and evaluate its on-site and off-site consequences within a short period of time. Any supplementary information from State or Federal agencies on the releases is delayed by a number of hours, and thus is not usable for preliminary assessment of the accident. Available information is to be provided promptly to the Bureau of Environmental Radiation Protection staff at Health Department offices or at home prior to activation of the EOC. Updates should be supplied periodically to the EOC, once activated.

Primary responsibility for offsite monitoring for exposure rates and radioiodine concentration in the plume EPZ will be conducted by the NFO staff and field monitoring teams of the at-risk county. Pre-selected monitoring and sampling locations for the various teams have been identified. These are shown in the county component of the NYS REP Plan.

Monitoring capability support for extended periods of time will be supplied by the other NFOs. Agreements are established by which mutual radiological assistance will be made available to any facility suffering an accident. Monitoring staff from one facility will be available to support

the other. For example, support to Ginna may be supplied by staff from Nine Mile Point and Fitzpatrick, as these two sites are only 50 miles apart. Ginna staff can also support Nine Mile Point and Fitzpatrick.

6.2.1 NFO Supplied Information

Source term information:

a. shutdown time
b. physical form of release (liquid or gas)
c. radionuclides released and inventory available for potential release
d. iodine/noble gas ratio
e. release rate and possible change in rate
f. time offsite release started, or projected time of start of offsite release
g. projected duration of release
h. effective height of release point

Meteorological Information (current and forecast)

a. on and off-site low level wind speed and direction
b. upper-air wind speed and direction for on and off-site
c. atmospheric stability class
d. precipitation data
e. temperature, pressure, humidity

Off-site radiological information - measured

a. exposure rates at monitoring points and time of measurement
b. cumulative dose at fixed monitoring points (where available)
c. airborne concentrations and radionuclides measured and time and location of measurement
d. location of ground deposition and radionuclide composition

Reactor status information

a. the reactor operational status
b. status of engineered safeguards
c. projected effect on release rate and/or duration
d. length of operating cycle
e. time delay of release after shutdown

Off-site Dose Information

The NFO will provide the following information and will identify whether it is measured or projected:

a. sectors affected
b. dose rate at various distances downwind and time of measurement (or projection) for whole body and thyroid
c. projected dose at site boundary and at various distances downwind (2, 5 and 10 miles)
d. projected dose for special facilities downwind

Protective Actions Information

a. on-site NFO's protective measures involving off-site emergency response teams
b. NFO's recommendation for off-site protective actions

6.2.2 Federal Monitoring and Assessment Information

The Federal Emergency Management Agency has the responsibility for coordinating Federal response to nuclear incidents. SEMO will request all federal radiological assistance through FEMA. The coordination of the logistical support necessary for this operation will be the responsibility of SEMO and FEMA.

The NRF sets forth the federal government's operational concept of radiological emergency response. It primarily addresses the off-site federal response in support of the state and local authorities having jurisdiction over the emergency site. When the NRF is implemented, the agency responsible for the overall federal response is referred to as the Coordinating Agency. However, because of the complexity of collecting, analyzing, evaluating, assessing, and interpreting off-site radiological data, the NRF specifies that a technical operations center must be established where these activities will be conducted. This center is the Federal Radiological Monitoring and Assessment Center (FRMAC).

The FRMAC is implemented as soon as possible after the radiological emergency commences and continues operations until the LFA and the state agree that the FRMAC is no longer needed. The FRMAC becomes a coalition of all federal offsite monitoring and assessment efforts to assist the LFA, state and local authorities in a timely manner. The Department of Energy (DOE) is assigned initial management of the FRMAC.

The FRMAC field organization will accomplish the following specific tasks:

- Provide, in cooperation with other federal components, the personnel and equipment to coordinate and perform environmental monitoring and assessment activities.

- Request supplemental assistance and technical support from other federal agencies when needed and when considered necessary to maintain the credibility of the off-site assessment.

- Manage the responding FRMAC resources in the most time-effective and efficient manner possible to support the needs of the Coordinating Agency and New York State.

- Manage and direct the federal, off-site, environmental, radiological monitoring, assessment, and evaluation activities and maintain a FRMAC liaison with state and local authorities that have similar responsibilities.

- Maintain a common set of off-site, environmental, radiological monitoring data in an accountable and retrievable form and ensure the technical integrity of the data.

- Provide data and interpretations as well as exposure-rate contours, dose projections (including future radiation levels and potential dose commitments), and other requested radiological assessments to the, Coordinating Agency, state, or other designated agencies or jurisdictions as quickly as possible.

- Support the Coordinating Agency in providing off-site monitoring, analysis, and assessment. Provide data to the Coordinating Agency for developing Protective Action Recommendations (PARs) and promote the involvement of other federal agencies in this process.

- Provide technical and medical advice for handling radiological contamination.

- Assist in planning the recovery of the off-site area and promote the involvement of agencies having radiological expertise in participating with the federal, state, and local agencies This recovery may involve planning for decontamination, reentry, relocation, and return

The Coordinating Agency is the federal agency that owns, authorizes, and regulates the facility or is otherwise deemed responsible for the facility or radiological activity causing the emergency and has authority to take onsite action. When it is necessary for the Coordinating Agency to deploy to the site, the it will manage federal actions on-site; assist in developing, evaluating, or recommending off-site protective actions to be taken by the state based on federal Protective Action Guides (PAGs); provide advice on issues such as reentry; and help implement those actions if requested by the state.

Major DOE Resources

U.S. DOE radiological assistance will be requested for emergencies classified as Site Area or General Emergencies. Data from the DOE teams will be coordinated with other data in the EOF and transmitted from there to the State EOC and the FRMAC. The DOE teams will be the primary source of information on aerial monitoring of the plume. Aircraft of the Aerial Measuring System (AMS) are maintained to be ready to supply state-of -the-art remote sensing equipment to map large areas that may have been affected by an accidental release. A computer based system, the National Atmospheric Release Advisory Capability (NARAC) uses actual weather and

terrain data to predict on a regional scale the transport, diffusion, and deposition of any radioactivity released to the environment.

The information supplied by this monitoring mode includes:

- exposure rates and radionuclide concentrations in the plume
- isotopic identification of radionuclide releases
- delineation of plume extent
- extent of ground deposition

Radiological Assistance Program (RAP)

The function of the Radiological Assistance Program (RAP) is to respond with appropriate scientific and medical advice and technical assistance to incidents involving loss of control over radioactive materials. The RAP mission includes making initial radiological monitoring assessments; identifying radioactively contaminated personnel, equipment, vehicles, or property; determining the need for additional technical resources; providing advice on personnel monitoring, decontamination, and recovery; and recommending sources of medical advice for treating injuries due to radiation exposure or complications from radioactive contamination.

RAP teams stationed at Brookhaven National Laboratory can respond to any site in the State within 4 to 6 hours if air transport is used. (If air transport cannot be used due to weather conditions, motor vehicles will be used. The use of motor vehicles may add about 3 hours to response time for an incident at Indian Point; add about 9 hours for an incident at NMP/JAF; and add about 11 hours for an incident at Ginna Station).

Aerial monitoring capabilities are expected to arrive from Andrews AFB, Maryland. This capability is expected to be functional 4 hours after take-off.

RAP advance teams at Knolls Atomic Power Laboratory (KAPL), Environmental Measurements Laboratories (EML) and the West Valley Demonstration Project, may be able to respond in a shorter time frame depending upon the site of the emergency. KAPL teams can respond to any nuclear power site in the State within 5 hours. The EML team can respond to Indian Point within 2 to 3 hours. West Valley teams can respond to Ginna within 2 to 3 hours and NMP/JAF within 3 to 5 hours.

Environmental Protection Agency (EPA) Monitoring Network (RadNet)

The EPA RadNet program is a national network of more than 200 monitoring stations distributed across all 50 states and the American Territories. The EPA RadNet program was initially responsible for monitoring radiation associated with nuclear weapons testing, but the program was later expanded to include monitoring radiation emergencies, following trends in environmental radioactivity levels, and providing data for dose calculations. During its operation beginning in 1973, RadNet's predecessor, ERAMS, collected over half million high environmental samples. The current database primarily provides data that was collected between 1978 and present. These data can be accessed and studied to provide information about releases of radioactivity to the environment at http://www.epa.gov/enviro/html/erams/

RadNet normally operates in a "routine" mode, sampling radiation in all media on a regularly defined schedule.

Media	Sampling Frequency
Air Particulates	Twice Weekly
Precipitation	Per Event
Drinking Water	Quarterly
Milk	Quarterly

Sampling stations and media sampled in New York State are:

Location	Media Sampled
Albany	Air Particulates, Precipitation, Drinking Water
Buffalo	Milk
Lockport	Air Particulates, Near Real-Time Gamma -
Hauppauge	Air Particulates
New York City	Air Particulates, Drinking Water, Near Real-Time Gamma
Niagara Falls	Drinking Water
Syracuse	Air Particulates, Drinking Water, Milk
Yaphank	Air Particulates, Precipitation, Near Real-Time Gamma

If there is a major nuclear accident or threat of an event which would result in significant radiation release, RadNet operates in an "emergency" (or alert) mode, accelerating the frequency of sampling and generating many more data records for a given period of time compared to its routine mode. Data from RadNet can be used for dose assessment; to determine the immediate and long-term environmental and public health impacts. The system would help determine whether additional sampling or other actions are needed in response to particular releases of radioactivity to the environment. When atmospheric dispersion of significant levels of radionuclides occurs, the air and precipitation component provides immediate information on airborne particulates and precipitation, while the pasteurized milk component provides information on the uptake and transfer of these radionuclides in milk.

Other EPA Programs

- Assist in developing recommendations regarding measures to protect the public health and safety.
- Assess the nature and extent of the environmental radiation hazard.
- Assist DOE in monitoring radioactivity in the environment during the emergency and intermediate phases; assume primary responsibility for monitoring in the recovery phase.

Food and Drug Administration (FDA) Analytical Capabilities

FDA manages a program whereby representative samples of foods in a typical diet are taken from various locations throughout the country. These foods, including dairy products are then examined for their radionuclide content, commonly tritium, Sr-90 Cs-137 and K-40. Under emergency conditions, FDA facilities can be used to analyze milk samples taken by FDA regional field staff.

Food Emergency Response Network (FERN)

The Food Emergency Response Network (FERN) integrates the nation's food-testing laboratories at the local, state, and federal levels into a network that is able to respond to emergencies involving biological, chemical, or radiological contamination of food. The FERN structure is organized to ensure federal and state inter-agency participation and cooperation in the formation, development, and operation of the network.

The FERN plays a number of critical roles related to food security and food defense. These include:

1. Prevention: FERN provides a national surveillance program that will offer early means of detecting threat agents in the American food supply;
2. Preparedness: FERN prepares the nation's laboratories to be able to respond to food-related emergencies;
3. Response: FERN offers significant surge capacity that will strengthen the nation's response towards widespread complex emergencies, intentional or inadvertent related to agents in food; and
4. Recovery: The FERN network of laboratories enhances the ability of the country to restore confidence in the food supply following a threat or an actual emergency targeting the nation's food supply.

Department of Health and Human Services

- Guidance to State and local officials on the use of radio-protective substances, including dosage, and on projected doses that warrant such measures.
- Guidance to State on protective action guides for food and animal feeds.

Department of Agriculture

- Provide the State with advice on the minimization of losses to agricultural resources from radiation effects.
- Procurement of food
- Inform and assist farmers and others in returning to pre-emergency conditions.
- Assist in the implementation of protective measures to minimize contamination through food ingestion.
- Assist in the collection of samples within the 50 mile EPZ.

6.3 Sampling Data

Data from laboratory analysis of air, soil, water, milk and vegetation samples collected in the area surrounding the plant are important for defining the magnitude and extent of contamination resulting from the release. These data not available during the initial phases of the accident and may be delayed up to several days depending upon the radionuclides present, contamination levels and sampling media involved. This is not used in the decision process in the preliminary stages of the accident where the dose from inhalation and whole body exposure determines the protective action options recommended.

However, laboratory data will be used for:

- modification of protective actions taken already
- prescribing protective actions for the ingestion pathway
- determining the need for decontamination

Sampling will be conducted by the NFO and State agencies. Additional sampling by the Federal agencies (EPA, FDA, NRC, DOE) may be requested through USDOE if needed.

Samples collected by or for the State are analyzed by the radiological laboratory in the State Department of Health. The laboratory's equipment and staff capabilities are listed in Appendix G. The director of the radiological laboratory will coordinate the laboratory analysis activities of the various agencies. Additional sample analysis capability is provided through Federal support coordinated by USDOE.

The State sampling program involves collecting and analyzing samples of the following:

6.3.1 Air Samples

The Bureau of Environmental Radiation Protection maintains sampling points around the nuclear power plant sites that include sampling for particulate and radioiodine releases from the plant. The frequency of sampling and the number of the samples will be increased in an emergency. The state also has portable air samplers and 5 Mobile Vehicle-based Emergency Radiation System (MOVERS) vans that can be deployed as necessary.

6.3.2 Water Samples

Water samples will be collected initially from open reservoirs downwind within the plume EPZ and the tap water from water supplies using these reservoirs. Sampling locations can be extended beyond the plume EPZ as necessary. The Bureau of Water Supply in the Division of Environmental Health Protection, State Department of Health, will be responsible for the collection of water samples and delivering them to the radiological laboratory for analysis.

In the event of a significant release to a river or lake, water samples from the river or the lake will be collected from locations near the point of release as well as down-stream from the release point by the NFO and the state health department. Water samples near public water supply intake points that may be affected by the release will also be collected.

6.3.3 Milk Samples

The milk sampling locations will be coordinated with the State Department of Agriculture and Markets, who will be responsible for sample collection.

Milk samples will be collected from a representative sample of farms in the ingestion EPZ concentrating on farms located in the down-wind direction. Samples will also be collected from milk processing plants that draw milk from farmers in the ingestion EPZ. NYS Department of Agriculture and Markets has identified potential monitoring locations in each EPZ. Radiological assessment information will be used by State DOH BERP and Agriculture and Markets to determine the most efficient means of collecting the necessary dairy samples, e.g., at transfer/processing plants or at each dairy farm. Equipment and resources for this response action are listed in Procedure M.

6.3.4 Vegetation Samples

Vegetation samples are collected in order to determine the contamination level of edible vegetables (in season) and to determine the need for reducing the potential of radionuclide intake through that route.

Samples are also collected from vegetation that constitutes farm animal feed in order to determine potential intake of radionuclides by milk producing animals or those that are used for human consumption. State Departments of Agriculture and Markets and Health will be responsible for the collection of these samples.

6.3.5 Soil Samples

While aerial monitoring may outline the extent of land contamination resulting from deposition of airborne activity, analysis of soil samples collected within the area of contamination determines the radionuclides present and their concentrations. BERP and DPC agencies will be responsible for obtaining these samples.

6.3.6 Fish and Biota Samples

These will be collected when appropriate, to assess potential doses to fishermen and hunters and their family members. DEC will be responsible for obtaining the samples.

7.0 UTILIZATION OF INFORMATION

The assessment and evaluation branch (A&E) at the EOC will use available information to perform the following:

7.1 Dose Projection

The staff performing the accident assessment at the State EOC will take all the available information described in Item 6 above into consideration when calculating actual or projected doses to the public.

7.1.1 Exposure to the Plume

The purpose of the assessment calculation in the plume EPZ is to estimate the projected dose resulting from airborne radionuclides, as a function of time and distance from the facility, to an individual if no protective measures are taken, and the projected dose for different combinations of protective actions. These are:

- unprotected exposure followed by sheltering in place
- unprotected exposure followed by evacuation

- unprotected exposure followed by sheltering in place, then evacuation

Total Effective Dose Equivalent (TEDE) resulting from exposure from the plume as well as estimates of projected Committed Dose Equivalent (CDE) thyroid dose due to inhalation of radioiodines in the plume will be calculated.

Preliminary dose estimates for the plume EPZ will be based on the output from RASCAL, licensee specific dose assessment programs, and/or on methods used in the EPA Protective Action Guide Manual and Response Technical Manual. Attachment 1 describes the procedures that will be used to make preliminary dose estimates using various types of available information.

7.1.2 Deposition

There are three different pathways that lead to radiation exposure resulting from deposited radionuclides. These are ingestion of contaminated food or water, external exposure due to surface contamination, and exposure to and inhalation of resuspended radionuclides. The dose resulting from these pathways depends upon a number of factors including the physical properties and chemical form of the radionuclide, their concentrations and the nature of the contaminated surfaces.

In general, the dose due to ingestion of contaminated food (particularly milk), will be the most significant in the early stages after deposition. Concentrations of ^{131}I, ^{134}Cs, ^{137}Cs, ^{90}Sr and ^{89}Sr (the most significant radionuclides for this pathway) will be obtained through laboratory analysis of collected milk and food samples. The measured concentrations of these radionuclides in food or water can be related to dose commitments from uncontrolled ingestion using the methods used in FDA's *Accidental Radioactive Concentration of Human Food and Animal Feeds: Recommendations for State and Local Agencies*, Issued August 13, 1998 (FDA's PAGs). The dose commitment resulting from ingestion of food or water contaminated with other radionuclides will be estimated using the method used by FDA or tables given in EPA's *Manual of Protective Action Guides and Protective Actions for Nuclear Accidents*, EPA 400-R-92-001, May 1992 (EPA PAG Manual). The dose commitment due to external exposure to contaminated grounds can be estimated from an analysis of the contaminants using the procedures and tables in the EPA PAG Manual, Chapter 7.

The dose commitment due to resuspension can be calculated for a standard man from knowledge of the air concentrations of airborne radionuclides, using procedures and tables in the EPA PAG Manual, Chapter 7. Attachment 1 outlines the procedure that will be used to obtain projected dose commitments for the various pathways for certain key nuclides.

7.2 Recommendation of Protective Action Options

Based upon the projected doses, and the applicable PAGs, A&E branch will make protective action recommendations to the State Commissioner of Health. These, if implemented, will institute, alter or rescind previously ordered protective action measures. The criteria used in

arriving at these recommendations are described below in Sec. 8, Evaluation and Protective Action Options.

7.3 Deployment of Monitoring and Sampling Resources

The incoming information on the nature of the release and the prevailing conditions will be used by the A&E branch when determining the need for additional monitoring and sampling. The nature and duration of the release, wind direction and speed and the demographic and topographic characteristics of the areas downwind from the point of release will be taken into consideration when determining the monitoring and sampling needs. Due to the limited monitoring and sampling resources available at the early stages of a developing emergency, sampling priorities will be established. These priorities will be incident-specific and determined by the Field Team Coordinator in consultation with the A&E Team Leader.

7.4 Preparation of Briefing Material

The data received in the EOC and the results of the analyses performed will be reduced by the assessment group into concise and understandable information that will give a clear view of the situation. Briefing material will be presented to the EOC staff and the Public Information Officer. The A&E brach will also assist the PIO in preparing public information messages.

The information prepared should utilize graphic displays and should include the following:

- Identification of the facility experiencing the emergency and the time the incident began;
- Identification of the communities or geographic areas affected by the emergency;
- Brief description of the type of emergency;
- The hazard, particularly in terms of potential risk or absence thereof, to the affected populace;
- Instructions with regard to specific protective measures to be taken by residents of the affected areas and their effectiveness relative to no action and other options;
- Type and extent of participation of involved emergency response organizations;

8.0 EVALUATION AND PROTECTIVE ACTION OPTIONS

Projected doses will be used to determine whether protective actions should be taken to reduce the population exposure. This decision is based upon whether the projected dose exceeds predetermined trigger levels recommended by the EPA Protective Action Guides (PAGs) for plume exposure, FDA PAGs for ingestion of contaminated milk and other foodstuffs, and EPA

Protective Action Guides (PAGs) for exposure to deposited radioactivity during the intermediate phase of an accident. FDA and EPA PAGs are listed in Attachments 2, 3, and 5, respectively.

8.1 Plume Protective Actions

The protective action(s) that will result in the maximum dose reduction will depend upon the nature and duration of the release, the time delay prior to initiation of the protective action, the time needed to complete the protective action and the time delay until the plume arrival to the area under consideration. These times are dependent upon the release characteristics, the meteorological and climatic conditions and logistic and demographic distribution constraints. Protective action decisions may also be based on the Emergency Classification Level (ECL) or plant conditions. In general there are three options that can reduce the exposure of an individual to the plume. These are evacuation, shelter in place, ingestion of KI, or a combination of the above.

The selection of the optimum protective action involves an evaluation of the dose to the individual that will be averted by taking that protective action. The doses already received will not be considered when comparing the various options in order to evaluate their relative effectiveness.

Protective actions are recommended prior to detailed analysis in the case of a declaration of a General Emergency. In this situation, evacuation for the 2-mile radius around the plant and 5 mile downwind area will be considered, along with implementation of the NYS KI Plan (See Appendix K). As more information becomes available, these initial protective actions will be modified as needed.

8.2 Ingestion Protective Actions

Population exposure can result from intake of radioactive material due to consumption of food and water which have been contaminated by the radionuclides released in the accident. The primary exposure pathways to be considered are the milk, food & water pathways. (See Appendix G for Department of Agriculture Markets radiological control resources listings.)

In 1998, the FDA set the ingestion pathway PAG at 0.5 rem (5 mSv) committed effective dose equivalent (CEDE) or 5 rem (50 mSv) CDE to an individual tissue or organ, whichever is more limiting. FDA further defined Derived Intervention Levels (DIL) which correspond to the concentrations in food which, if eaten, could lead to an individual receiving a radiation dose equal to the PAG. Food products with concentration equal to or greater than these DILs will not be allowed to be distributed for public consumption.

The relationship between PAG and DIL is given in Attachment 2. DIL values derived by FDA for a number of radionuclides are also given in Attachment 2.

Implementation of protective measures will be carried out by the Department of Agriculture and Markets in coordination with the Department of Health according to their specific operating procedures.

8.2.1 Milk

In the early stages of an emergency, the milk pathway is the most significant route of exposure. Thus, early protective actions for preventing contamination of milk in the affected area are recommended prior to obtaining confirmatory data.

If a Site Area Emergency classification is declared, an immediate recommendation will be made to place milk animals located within a 10-mile radius of the plant on stored feed and water. As more information becomes available, this recommendation may be modified as required. In the case of an immediate General Emergency declaration, a secondary consideration will be to place milk animals within 10 miles on stored feed and water. Primary consideration will be to reduce exposure to the population from the radioactive plume by evacuation or sheltering in place.

8.2.2 Food

Consumable agricultural products such as fruits, vegetables, meat and meat products will be embargoed if the contamination level exceeds the PAGs.

Farmers will be advised not to use contaminated animal feed for livestock used for meat production if the projected dose to the meat consumer exceeds the PAG.

8.2.3 Water

Maps showing water supplies in the ingestion EPZ are available at the State Department of Health and the State EOC. Due to dilution, water treatment, and time lag between contamination of surface water and drinking water at the tap, immediate protective actions prior to confirmatory measurements may not be warranted. However, if measurements show contamination of the drinking water supply in excess of the applicable drinking water standards, (10 NYCRR SubPart 5-1.51, Table 7), one or more of the following options will be recommended:

- use alternative uncontaminated source for drinking, limiting the use of the contaminated water source for sanitary and fire-fighting purposes
- initiate special treatment procedures for water to remove contaminants
- limit water supply sources to uncontaminated water

8.3 Deposition

While the primary source of population dose resulting from ground deposition of radionuclides in the ingestion EPZ is expected to be that resulting from ingestion of contaminated milk (in the short term) and other food products, external exposure due to contaminated surfaces might also be significant.

The Effective Dose Equivalent (EDE) due to the surface contamination and CEDE from inhalation of resuspended materials can be calculated from knowledge of the various radionuclides that make up the surface contamination and the projected time of exposure. Should the TEDE exceed the EPA's intermediate phase PAGs for TEDE, protective actions will be recommended.

The nature of the protective action recommended will depend upon the half-life of the contaminant, the nature of the contaminated surface, weather conditions, magnitude and extent of the contamination. The protective actions could range from simple decontamination to relocation, depending upon the severity of the contamination problem.

9.0 ASSESSMENT AND EVALUATION PROCEDURE

9.1 Notification of Unusual Event (NUE)

The Bureau of Environmental Radiation Protection, State Health Department:

1. Receives notice of an NUE from NFO or SEOC.
2. Contacts NFO and obtains more detailed information.
3. Notifies DOH PIO, DOH Public Health Preparedness staff, and Director of Center for Environmental Health (CEH) by telephone or e-mail.
4. Notifies DOH Regional/Area office (during working hours), the DOH Duty Officer (after hours) and DEC.
5. Completes and distributes Problem Alert form to DOH staff (Attachment 6).
6. Continues contact with NFO until emergency is terminated or is escalated to a more severe class.
7. If emergency is terminated, prepares and distributes an update to the Problem Alert form.
8. If emergency is escalated, takes appropriate action as indicated in the following sections.

9.2 Alert

The Bureau of Environmental Radiation Protection, State Health Department:

1. Receives notice of an Alert from NFO or SEOC.
2. Takes steps 2-5 under Unusual Event.

3. Notify Staff responsible for radiological assessment that EOC is partially activated and recommends deployment as necessary.
4. Proceeds to EOC.
5. Once at the EOC establishes contact with the NFO, to advise that the EOC has been activated.
6. Keeps State Commissioner of Health, CEH Director, and PIO advised of all significant changes.
7. Prepares briefing material.
8. Maintains Alert status until emergency is terminated, or escalates to a more severe class emergency.

9.3 Site Area Emergency

The Bureau of Environmental Radiation Protection, State Health Department:

1. Receives notice of a Site Area Emergency from NFO or SEOC.
2. Contacts NFO for confirmation and obtains a brief information update.
3. Notifies CEH Director, Director of Radiological Sciences Laboratory and PIO and advises that the following will be recommended:
   - placing all emergency workers on standby;
   - placing milk animals within 10 miles on stored feed.
4. Proceeds to the EOC.

(The following actions will be taken by the assessment staff at the EOC).

5. Establishes contact with the NFO and the State liaison Staff in the EOC, and Local Government EOCs.
6. Requests notification of the USDOE at Brookhaven Area Office and requests radiological monitoring and sampling support.
7. Obtains more detailed information of the plant status and possibility of a release.
8. Performs preliminary ("what-if") dose projections at various distances downwind (2, 5, and 10 miles), based on plant conditions and possible release pathways.
9. Recommends protective actions based on preliminary dose estimates, taking into consideration the NFO's projected plant status and recommendations.
10. Continues to update preliminary dose projections according to data received.
11. Revises recommended protective actions as indicated by updated data.
12. Advises EOC staff of all significant changes and revisions in projected doses and recommended protective actions.
13. Prepares briefing material including graphical representation of data and projections for use by PIO and others.
14. Manages emergency worker's exposure.
15. Maintains Site Area Emergency status until closeout or reduction of emergency class, or escalation to General Emergency class.

9.4 General Emergency

The Bureau of Environmental Radiation Protection, State Health Department:

1. Receives notice of a General Emergency from NFO or SEOC.
2. Contacts NFO for confirmation and obtains a brief information update.
3. Notifies CEH Director, Director of Radiological Sciences Laboratory and PIO and advises that the following will be recommended:
   - Evacuation for 2 mile radius and 5 miles downwind;
   - Dispatching of emergency workers to duty stations within 5 miles radius and alerting all others to standby;
   - Placing milk animals within 10 miles on stored feed.
   - Implementation of the NYS KI Plan (See Appendix K).
4. Proceeds to the EOC.

(The following actions will be taken by the assessment staff at the EOC).

5. Establishes contact with the NFO and the State liaison Staff in the EOC, and Local Government EOCs.
6. Notifies USDOE at Brookhaven Area Office and requests radiological monitoring and sampling support.
7. Obtains more detailed information on the plant status and on the release if it has occurred.
8. Performs dose projections at various distances downwind (2, 5 and 10 miles).
9. Recommends protective action based on preliminary dose estimates taking into consideration the NFO's projected plant status and recommendations.
10. Calculates TEDE to dosimeter reading ratio, and provides correction factor to appropriate state and local organizations (see Attachment 9).
11. Determines the need for additional monitoring and sampling and initiates programs by contacting appropriate contact persons listed in Attachment 7.
12. Continues to update dose projections according to data received.
13. Revises recommended protective actions as indicated by updated data.
14. Advises EOC staff of all significant changes and revisions in projected doses and recommended protective actions.
15. Provides State monitoring and sampling data to the EOF and county EOCs as these become available.
16. Prepares briefing material, including graphical representation of data and projections for use by PIO and others.
17. Manages emergency worker's exposure.
18. Maintains General Emergency status until closeout or reduction of emergency class.

ATTACHMENT 1

DOSE ESTIMATION PROCEDURES

Dose estimates will be made for a number of downwind locations including the site perimeter, 2, 5, and 10 miles from the site. They will be based upon data developed by the NFO and others. State dose assessment staff will use RASCAL as the primary dose assessment tool. The applicable licensee dose assessment methodology (computerized and/or manual, see Attachment 8) will be run in parallel with RASCAL, and will provide verification of dose projections. Additional verification of dose projections may be derived using methodologies from the RTM-96 or EPA PAG manual.

In the absence of computer-based methodologies, hand calculations may be used (Attachment 10). The dose estimating procedures that are available to project Total Effective Dose Equivalent (TEDE), Committed Dose Equivalent (CDE) to the thyroid, Committed Effective Dose Equivalent (CEDE) from inhalation, external and internal doses resulting from deposition and skin beta dose from inhalation are outlined below. Methods to be used to extrapolate doses and concentrations from the point of measurement to other locations are also included.

The assessment procedure will consist of calculating the TEDE, and the CDE to the thyroid using any of the methods discussed. Once the TEDE and CDE are calculated, they will be compared to the PAGs to determine the need for Protective Action Recommendations (PARs). Terms and definitions used throughout this attachment are as follows:

Terms and Definitions

H_T:	Dose, (rem)
E:	Gamma exposure rate, (mR/hr)
POI:	Point of interest
POM:	Point of measurement
Q:	Release rate, (Ci/sec)
t_a:	Cloud travel time, (hrs) = (x/u)/3600
t_e:	Estimated exposure time, (hrs)
t_r:	Time between shutdown and release, (hrs)
t_s:	Time since shutdown, (hrs)
u:	Average wind speed, (m/sec)
O:	Concentration, (Ci/m^3)
x:	Downwind distance to POI or POM, (m)

Definitions

Deep Dose Equivalent, (Hd) which applies to external whole body exposure, means the dose equivalent at a tissue depth of 1 cm (1000 mg/cm^2).

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Committed Dose Equivalent ($H_{T,50}$) means the dose equivalent to organs or tissues of reference (T) that will be received from an intake of radioactive material by an individual during the 50-year following intake.

Weighting Factor (W_T) for an organ or tissue (T) means the proportion of the risk of stochastic effects resulting from irradiation of that organ or tissue to the total risk of stochastic effects when the whole body is irradiated uniformly. For calculating the effective dose equivalent, the values of W_T are:

Organ Dose Weighting Factors

Organ or Tissue	W_T
Gonads	0.25
Breast	0.15
Red Bone Marrow	0.12
Lung	0.12
Thyroid	0.03
Bone Surfaces	0.03
Remainder	0.30
Whole Body	1.00

Effective Dose Equivalent (H_E)means the sum of the products of the dose equivalent to each organ or tissue (H_T) and the weighting factor (W_T) applicable to each of the body organs or tissues that are irradiated.

$$H_E = E\ W_T\ H_T$$

Committed Effective Dose Equivalent, ($H_{E,50}$) is the sum of the products of the weighting factors applicable to each of the body organs or tissues that are irradiated and the committed dose equivalent to each of these organs or tissues.

$$H_{E,50} = E\ W_T\ H_{T,50}$$

Total Effective Dose Equivalent means the sum of the deep dose equivalent for external exposures and the committed effective dose equivalent for internal exposures.

$$TEDE = H_d + H_{E,50}$$

1.0 EARLY PHASE DOSES

There are several approaches that can be used to estimate offsite doses during the early phase. The selected approach will depend primarily on the type of information available at the time. This attachment describes the various approaches that may be used.

1.1 Using RASCAL

Radiological Assessment System for Consequence Analysis (RASCAL) will be the primary tool used for estimating offsite doses. The RASCAL program contains tools to estimate source term, atmospheric transport, and dose from a radiological accident; to estimate dose from field measurements of radionuclide concentrations; and to compute decay of radionuclides. It provides dose estimates out to 50 miles in affected directional sectors. This model is designed to provide a rough comparison with EPA PAGs and thresholds for acute health effects. RASCAL was developed by the NRC as a tool to conduct independent assessments of dose projections during nuclear power plant accidents. The RASCAL Version 3 Workbook is available in the State EOC, and RASCAL is loaded on all computers in the A&E room.

RASCAL can be used in any of the three following modes depending on the data available at the time:

- ST-DOSE Model (source term to dose) – Used to calculate TEDE and CDE to the thyroid based on release rates, radiation monitor readings, and/or plant conditions.
- FM-DOSE Model (field measurement to dose) – Used to calculate dose at the point of measurement and compare it to the appropriate PAG
- Decay model – Used to calculate radiological decay and daughter ingrowth
- Meteorological Data Processor – used to input additional weather information from surrounding locations

1.2 Final Safety Analysis Report (FSAR) Evaluated Incident

Early in the event, prior to a release of radioactive material or availability of data from effluent monitors and the offsite monitoring program, it is possible to estimate offsite doses using information such as the type of reactor, type of accident, plant conditions and the status of engineered safeguards as provided by the Control Room or TSC.

1.2.1 Data Required

a. Type of accident, status of safeguards.
b. FSAR Accidents Analysis and Estimated Dose Projections.

c. Meteorological data - atmospheric stability class, wind direction, and speed.
d. Diffusion overlays and base map (Indian Point only).

1.2.2 Procedure

External dose estimates at a specific distance from the reactor are determined from the FSAR Accidents Analysis and Estimated Dose Projections when the type of accident and status of the safeguards is known. Although this method is crude and does not take into account decay as the cloud travels, it may be the only method available during the early stages of an accident. Results are to be refined as source term information or monitoring data comes in.

1.3 Source Term Known

The first "hard data" likely to be available to the A&E staff that can be used to estimate the external dose component is the release rate obtained from effluent monitors or other direct measurements.

1.3.1 Data Required

a. Release rate, Q, Ci/sec
b. Meteorological data - atmospheric stability class, wind speed and direction.
c. Diffusion overlays and base map (Indian Point only).
d. Atmospheric dilution factors (Xu)/(Q) from RTM-96, Table F-10
e. Duration of exposure, t_e, hrs.
f. Time after reactor shutdown, t_s, hrs.
g. Dose Conversion Factors from EPA PAG Manual, Tables 5-1 and 5-2, or from tables H-1 and H-2 below for gross noble gas or gross iodine releases.

1.3.2 Procedure

Meteorological data is used to select and align the appropriate diffusion overlay on the base map (Indian Point only). Atmospheric dilution factors (Xu)/(Q) are obtained from the overlay at the points of interest (Indian Point only) or from RTM-96, Table F-10, and concentration at the point of interest is obtained by multiplying (Xu)/(Q) by the source term Q and dividing by the average wind speed u.

$$\chi_{POI} = \left(\frac{\chi u}{Q}\right)_{POI} \left(\frac{Q}{u}\right)$$

This gives you the concentration in units of Ci/m^3. The dose at the point of interest can then be calculated by multiplying the concentration in units of $\mu Ci/cm^3$ by a dose conversion factor. ($\mu Ci/cm^3$ is equal to Ci/m^3).

$$TEDE = X\ (\mu Ci/cm^3)\ x\ DCF$$

$$CDE_{thyroid} = X\ (\mu Ci/cm^3)\ x\ DCF$$

This will give you the dose for a 1 hour exposure at the point of interest. For longer exposure times, multiply by the number of hours exposed.

1.3.2.1 Isotope Mix Unknown

If theisotope mix is not known, use the Dose Conversion Factors for mixes of Noble Gases and Iodines from Tables H-1 and H-2 below.

Table H-1 DCFs for Mixtures of Noble Gases (rem per $\mu Ci\text{-}cm^{-3}$-hour) as a function of time after shutdown and expected exposure time

Time between shutdown and start of release (hours)	Estimated Exposure Time (hours)				
	1.0	2.0	3.0	5.0	10.0
1	2.6 E+2	2.4 E+2	2.2 E+2	1.9 E+2	1.5 E+2
2	2.2 E+2	2.0 E+2	1.9 E+2	1.6 E+2	1.2 E+2
3	1.8 E+2	1.7 E+2	1.6 E+2	1.4 E+2	1.1 E+2
5	1.3 E+2	1.2 E+2	1.1 E+2	1.0 E+2	7.7 E+1
10	6.3 E+1	5.9 E+1	5.6 E+1	5.1 E+1	4.2 E+1
DCF for Kr-87 is 5.1 E+2. Use of Kr-87 DCF is conservative.					

Table H-2 Thyroid DCFs for Mixtures of Iodines (rem per $\mu Ci\text{-}cm^{-3}$-hour) as a function of time after shutdown and expected exposure time

Time between shutdown and start of release (hours)	Estimated Exposure Time (hours)				
	1.0	2.0	3.0	5.0	10.0
1	3.2 E+5	3.3 E+5	3.5 E+5	3.8 E+5	4.3 E+5
2	3.5 E+5	3.7 E+5	3.8 E+5	4.1 E+5	4.5 E+5
3	3.9 E+5	4.0 E+5	4.1 E+5	4.3 E+5	4.7 E+5
5	4.4 E+5	4.5 E+5	4.6 E+5	4.8 E+5	5.1 E+5
10	5.3 E+5	5.4 E+5	5.5 E+5	5.6 E+5	6.0 E+5
DCF for I-131 is 1.3 E+6. Use of I-131 DCF is conservative.					
As time after shutdown increases, DCF approaches I-131 DCF.					
Only I-133 ($T_{1/2}$ = 21 hours) has much influence on dose calculations as compared to I-131.					

1.3.2.2 Isotopic Mix Known

If the nuclide mix is known, use the Dose Conversion Factors from the EPA PAG Manual, Tables 5-1 for TEDE and 5-2 for $CDE_{thyroid}$. Sum doses over all nuclides present.

1.3.2.3 Iodine 131 Source Term Known

The procedure here is the same as in the previous section except that the I-131 concentration must be converted to total iodine concentration. Based upon the equilibrium core inventory of radioiodines and noble gases present in a typical light water reactor (NUREG/BR-150, Vol. 1, Rev. 5) and analysis of the decay of each iodine species present, the ratio of total radioiodine to I-131 can be determined. I-131 concentrations are multiplied by the factors listed in Table H-3 to get total radioiodine concentration. $CDE_{thyroid}$ is then determined by multiplying the concentration by the appropriate dose conversion factor from Table H-2, above.

Table H-3 Multiplication Factors to calculate total radioiodines when I-131 concentration is known

Time After Shutdown	Multiplication Factor
0	9
1 Hour	6
2 Hours	5
3 - 5 Hours	4
6 -12 Hours	3
13 - 24 Hours	2
After 2 Days	1

1.3.2.4 Doses from Immersion, Inhalation, and Deposition

For doses specifically from either immersion in the radioactive plume, inhalation of the radioactive plume, or exposure to deposited radioactive materials, use the Dose Conversion Factors from the EPA PAG Manual, Tables 5-3, 5-4, and 5-5. Sum doses for all radionuclides present.

2.0 Offsite Monitoring

2.1 External Dose

The external dose component of TEDE may also be obtained from offsite monitoring data. Since the external dose rate is measured directly in the field, this method should yield the most accurate results. It is likely however, that the required data will not be available until some time

after other dose estimating procedures have been used. This method will therefore be used to refine dose estimates and protective action recommendations. This method does not take into account decay as the cloud travels downwind.

2.1.1 Data Required

a. Gamma exposure rate, dE/dt, mR/hr.
b. Meteorological data - atmospheric stability class, wind direction.
c. Diffusion overlays and base map (Indian Point only).
d. Exposure time, t_e, hrs.

2.1.2 Procedure

The external dose equivalent at the point of measurement is calculated by multiplying the gamma exposure rate by the time of exposure.

$$\mathbf{H_{T\ POM} = (dE/dt)\ (t_e)}$$

The methods of Attachment 1, Section 3 are used to obtain the dose at other POI.

If the exposure rate is known, the noble gas concentration can be approximated by dividing the exposure rate by the appropriate 1 hour exposure DCF from Table H-1, above.

2.2 Internal Dose

2.2.1 Data Required

a. Total Iodine or I-131 concentration from air sample
b. Dose Conversion Factors from the EPA PAG Manual, Table 5-2, or Table H-2 above.

Note: Ci/m^3 is equal to $\mu Ci/cm^3$

2.2.2 Procedure

$CDE_{thyroid}$ at a specific location can be calculated from air sampling data. Multiply the radionuclide concentration by the appropriate dose conversion factor from the EPA PAG Manual, Table 5-2, or Table H-2 above.

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3.0 EXTRAPOLATION OF DOSES AND CONCENTRATION TO SELECTED LOCATIONS

Two methods may be used to project exposure rates, doses or concentration from the point of measurement to other locations that might be of interest. The first uses diffusion overlays and the second uses an analytical expression from the EPA Manual of Protective Action Guides.

3.1 Diffusion Overlays (Indian Point only)

Atmospheric stability class is used to select the appropriate diffusion overlay and it is aligned over the base map according to the prevailing wind direction. The atmospheric dilution factor for any point of interest and for the point of measurement are obtained from the overlay and their ratio is multiplied by either the exposure rate, dose or concentration, as appropriate to obtain the value at the point of interest.

$$(H_T, E, \chi)_{POI} = \frac{\left(\frac{\chi u}{Q}\right)_{POI}}{\left(\frac{\chi u}{Q}\right)_{POM}} (H_T, E, \chi)_{POM}$$

3.2 Direct Computation Method

Use the relationship:

$$\frac{E_1}{E_2} \text{ or } \frac{H_{T1}}{H_{T2}} \text{ or } \frac{\chi_1}{\chi_2} = \left(\frac{x_2}{x_1}\right)^n$$

n = exponent as a function of stability class as listed in Table H-4:

ATTACHMENT 1

Table H-4 Exponent as a Function of Stability Class	
Stability Class	**n**
A	2.5 (good only for 0.25-1.5 miles)
B	2.0
C	1.8
D	1.5
E	1.4
F	1.3

4.0 INTERMEDIATE PHASE

4.1 External Pathway (EDE)

4.1.1 Data Required

a. Surface concentration of each radionuclide contributing significantly to exposure (pCi/m^2)
b. Tables of gamma exposure rate and effective dose equivalent due to an initial uniform concentration from the EPA PAG Manual Tables 7.1 and 7.2

4.1.2 Procedure

Determine surface concentration of each radionuclide contributing significantly to exposure. Determine the relative contribution to the gamma exposure rate at 1 meter by multiplying each activity by the corresponding value in Column 3 of Table 7.1 or 7.2. Sum for all radionuclides present. To determine relative integrated dose for 1 year, 2 years, or 50 years, multiply each activity by columns 4, 5, or 6 of Table 7.1 or 7.2. Sum for all radionuclides present.

$$EDE = E\{\text{Activity} \times \text{Dose Coefficient}_{(1,\ 2,\ \text{or}\ 50\ \text{years})}\}$$

4.2 Inhalation (CEDE)

4.2.1 Data Required

a. Air concentration of each radionuclide contributing significantly to exposure (pCi/m^3)
b. Tables of dose conversion factors for inhalation of resuspended material due to an initial uniform concentration from the EPA PAG Manual Table 7.4

4.2.2 Procedure

Determine concentration of each radionuclide contributing significantly to exposure. Determine the relative contribution to committed effective dose equivalent by multiplying each activity by the corresponding value in Table 7.4. Sum for all radionuclides present. To determine relative integrated dose for 1 year or 2 years multiply each activity by the appropriate column of Table 7.4. Sum for all radionuclides present.

$$CEDE = E\ \{Activity \times Dose\ Coefficient_{(1\ or\ 2\ years)}\}$$

4.3 TEDE

TEDE is the sum of the effective dose equivalent for external exposures and the committed effective dose equivalent for internal exposures.

$$TEDE = EDE + CEDE$$

4.4 Skin Beta Dose

b. Data Required

c. Surface concentration of each radionuclide contributing significantly to exposure (pCi/m^2)
d. Tables of skin beta dose conversion factors for deposited radionuclides from the EPA PAG Manual Table 7.5

4.4.2 Procedure

Determine surface concentration of each radionuclide contributing significantly to exposure. Determine the skin beta dose by multiplying each activity by the corresponding value in Table 7.5. Sum for all radionuclides present.

$$Beta\ Dose = E\ \{Activity \times Dose\ Conversion\ Factor\}$$

5.0 INGESTION PATHWAY

Section 3 of Procedure H describes the pathways of concern during the early phase or plume phase. Once the plume has passed, there are other pathways of concern, resulting from the deposition of radioactive materials from the passing cloud. This section describes the approach used to calculate potential doses resulting from ingestion of contaminated foodstuffs. Dose assessment techniques are presented here for CEDE and $CDE_{thyroid}$ exposures resulting from ingestion of contaminated food. In addition, calculations of accident-specific derived intervention levels (DILs) are presented to aid in decisions regarding food embargo.

5.1. CDE Thyroid Exposure (Ingestion Pathway)

5.1.1 Data Required

a. Concentration of radionuclide of interest in food of interest, (pCi/kg for solids, pCi/l for liquids)
b. Dose conversion factor (mrem/pCi) (from the thyroid column of Table 2.2 in Federal Guidance Report No. 11 for standard man)
c. Annual ingestion rate (kg/yr or l/yr)

NOTE: To convert Sv/Bq to mrem/:Ci, multiply by 3.7×10^9

5.1.2 Procedure

$$CDE_{thyroid} = E \{\text{Concentration} \times \text{Dose Conversion Factor} \times \text{Annual Ingestion Rate}\}$$

The annual amount of a radionuclide ingested is calculated by multiplying the concentration of the radionuclide by the annual ingestion rate for the appropriate food. $CDE_{thyroid}$ dose is calculated by multiplying the dose conversion factor for the radionuclide of interest by annual amount of that radionuclide ingested. For multiple radionuclides, sum contributions for all radionuclides. This dose can be related to other ingestion periods through consideration of the actual ingestion period and correction for decay that occurs prior to ingestion.

5.2. CEDE (Ingestion Pathway)

5.2.1 Data Required

a. Concentration of radionuclide of interest in food of interest (pCi/kg or pCi/l).
b. Dose Coefficient (mrem/pCi) (from the effective column of Table 2.2 in Federal Guidance Report No. 11 for standard man)
c. Annual ingestion rate (kg/yr or l/yr)

5.2.2 Procedure

The annual amount of a radionuclide ingested is calculated by multiplying the concentration of the radionuclide by the annual ingestion rate for the appropriate food. CEDE is calculated by multiplying the dose conversion factor for the radionuclide of interest by annual amount of that radionuclide ingested. For multiple radionuclides, sum contributions for all radionuclides. This dose can be related to other ingestion periods through consideration of the actual ingestion period and correction for decay prior to ingestion.

CEDE = E {Concentration x Dose Coefficient x Annual Ingestion Rate}

5.3 Calculations of Accident-Specific DILS

The Derived Intervention Levels (DILs) are limits on the concentrations of various radionuclides permitted in human food distributed in commerce for human consumption. DILs are expressed in units of μCi/kg or Bq/kg.

See Attachment 2 for derivation of DILs.

5.3.1 Data Required

a. Isotopic analysis of contaminated food, Bq/kg
b. Isotope specific DILs for most sensitive age group, Bq/kg (FDA PAGs Table D-6 and E-7)

5.3.2 Procedure

Divide the sample results by the appropriate DILS. If any ratio is greater than 1, the food exceeds the PAGs and embargo should be considered DO NOT sum contributions for all radionuclides.

6.0 TOTAL POPULATION EXPOSURE

Total population dose will be estimations will be performed consistent with the procedures contained in US NRC Regulatory Guide 1.109, Appendix D), using data derived using the above-listed procedures.

6.1 Population total effective dose equivalent (TEDE) and thyroid committed effective dose equivalents ($CDE_{thyroid}$) will be calculated annually for the population living within the 50-mile EPZ.

6.2 The 50-mile region may be divided into a number of subregions, consistent with the nature of the exposure from the radioactive release, i.e., population dose in areas downwind from the plant will be calculated separately from population dose is areas upwind from the plant or otherwise unaffected by the radioactive plume. Each subregion will be described based on dispersion factors, population data, and other information.

6.3 All significant exposure pathways will be evaluated. For purposes of this evaluation, a significant pathway is one that contributes 10% or more to the total dose. Pathways include:

- Ingestion of potable water
- Inhalation of airborne effluents
- External exposure to airborne and/or deposited radionuclides
- Ingestion of aquatic and terrestrial food products

6.4 Calculation of total population dose will be the responsibility of the NYS Department of Health, Bureau of Environmental Radiation Protection. Technical assistance with this effort is available through the US DOE, Brookhaven National Laboratories.

ATTACHMENT 2

INGESTION PATHWAY PROTECTIVE ACTION GUIDES

1. Protective Action Guides (PAG)

   The PAG recommended by FDA is the more limiting of:

   - 0.5 rem (5 mSv) committed effective dose equivalent (CEDE)
   - 5 rem (50 mSv) committed dose equivalent (CDE) to an individual tissue or organ.

2. Derived Intervention Levels (DIL)

   The DILs are limits on the concentrations of various radionuclides permitted in human food distributed in commerce for human consumption. DILs are expressed in units of μCi/kg or Bq/kg. DILS are calculated using the expression:

   $$DIL = PAG / (f \times I \times DC)$$

   Where

f	is the fraction of food intake assumed to be contaminated
I	is the quantity of food intake in the appropriate period of time, kg
DC	is the dose coefficient for the specific radionuclide, rem/μCi or mSv/Bq.

The fraction f, of food intake that is assumed to be contaminated is equal to 0.3, except for ^{131}I in infant diets where f is equal to 1.0.

For a radionuclide whose decay half-life is 55 days or longer, the food intake, I, is taken to be equal to the annual dietary intake of food and beverage. For radionuclides with a half-life less than 55 days, I corresponds to the dietary intake over a period of time during which the radionuclide concentration decays to 0.01 of its initial value. For example, for ^{131}I, FDA uses a value which corresponds to food intake over a period of 60 days in calculating the DIL.

Because of the variation of I and DC with age, FDA calculated DIL values which correspond to 6 age groups. These are 3 months, 1, 5, 10, 15 years and adults. The most limiting DIL value for all age group diets is used as the limit for determining whether a food product can be allowed to be distributed for human consumption.

ATTACHMENT 2

The values used by FDA for the annual food and beverage intake for the different age groups are:

Age Groups	3 months	1 year	5 years	10 years	15 years	Adults
Annual Intake (kg)	418	506	660	779	869	943

The most limiting DIL and the corresponding age group have been given by FDA for a number of radionuclides (Tables D-6 and E-7 of the FDA's PAG document). The following are extracted from these tables:

Derived Intervention Levels			
Radionuclides	DIL Bq/kg	DIL µCi/kg	Limiting Age Group
^{89}Sr	1400	0.038	3 months
^{90}Sr	160	0.004	15 years
^{131}I	170	0.005	1 year
^{132}Te	4400	0.12	3 months
^{134}Cs	930	0.025	Adult
^{137}Cs	1360	0.037	Adult
Cs Group	1200	0.032	Adult
^{103}R	6800	0.18	3 months
^{106}Ru	450	0.012	3 months

ATTACHMENT 3

Protective Action Guides for the Early Phase of a Nuclear Incident

Protective Action	PAG (projected dose)	Comments
Evacuation (or Sheltering in place[a])	1 - 5 Rem[b]	Evacuation (or for some situations, sheltering in place[a]) should normally be initiated at 1 Rem.
Administration of stable iodine[d]	5 Rem[c]	Requires approval of State/County medical officials.

[a] Sheltering in place may be the preferred protective action when it will provide protection equal to or greater than evacuation, based on consideration of factors such as source term characteristics, release duration, and temporal or other site-specific conditions.

[b] The sum of the effective dose equivalent resulting from exposure to external sources and the committed effective dose equivalent incurred from all significant inhalation pathways during the early phase. Committed dose equivalents to the thyroid and to the skin may be 5 and 50 times larger, respectively.

[c] Committed dose equivalent to the child thyroid from radioiodine.

[d] This recommendation will be made at the General Emergency ECL.

ATTACHMENT 4

Guidance on Dose Limits for Emergency Workers

Dose limit[a] (rem)	Activity	Condition
5	All	
10	Protecting valuable property	Lower dose not practicable
25	Life saving or protection of large populations	Lower dose not practicable
>25	Life saving or protection of large populations	Only on a voluntary basis to persons fully aware of the risks involved

[a] Sum of external effective dose equivalent and committed effective dose equivalent to nonpregnant adults from exposure and intake during an emergency situation. Workers performing services during emergencies should limit dose to the lens of the eye to three times the listed value and doses to any other organ (including skin and body extremities) to ten times the listed value. These limits apply to all doses from an incident, except those received in unrestricted areas as members of the public during the intermediate phase of the incident.

ATTACHMENT 5

Protective Action Guides for Exposure to Deposited Radioactivity During the Intermediate Phase of a Nuclear Incident

Protective Action	PAG (projected dose) [a] in the first year	Comments
Relocate the general population [b]	TEDE $\geq$ 2 rem	Beta dose to the skin may be up to 50 times higher (100 rem)
Apply simple dose reduction techniques [c]	TEDE <2 rem	These protective actions should be taken to reduce doses to as low as practicable levels

[a] The projected sum of effective dose equivalent (EDE) form external gamma radiation and committed effective dose equivalent (CEDE) from inhalation of resuspended materials, from exposure or intake during the first year. Projected doses refer to doses that would be received in the absence of shielding from structures or the application of dose reduction techniques. These PAGs may not provide adequate protection from some long-lived radionuclides.

[b] Persons previously evacuated from areas outside the relocation zone defined by this PAG may return to occupy their residences. Cases involving relocation of persons at high risk from such action should be evaluated individually.

[c] Simple dose reduction techniques include scrubbing and/or flushing hard surfaces, soaking or plowing soil, minor removal of soil from spots where radioactive materials may have concentrated, and spending more time than usual indoors or in other low exposure rate areas.

Longer Term Objectives of the Protective Action Guides

It is the objective of these PAGs to assure that:

- Doses in any single year after the first year do not exceed 0.5 rem
- The cumulative dose over 50 years (including the dose from the first and second years) will not exceed 5 rem

For source terms from reactor incidents, a PAG of 2 rem projected dose for the first year is expected to meet both the second year and 50-year objectives through decay, weathering, and normal part-time occupancy in contaminated areas.

ATTACHMENT 6

Problem Alert

Message #: cac04-4
DRAFT

Date: 10/17/2008 - 02:06:31 PM **Status:** New **Classification:**

Subject:

Information

Original Information:

From: **Prepared By:** Cynthia A. Costello

Notification is **automatically** sent to NYSDOH executive staff, CEH, and CEH Regional/ District Office staff.
Please note these groups in the NYSDOH Address Book: CEH, CEHALERT, CEHREGIONAL, CEHDISTRICT, DODIR.

Additional NYSDOH Notification:

Latest Notification sent:
Notification sent by:

Additional External Notification:

Latest Notification Sent:
Notification sent by:

Incident Information

Date/Time of Incident:
Incident Location:
County of Incident:
Site Contact:

ATTACHMENT 6

Name: **Affiliation:** **Phone:** **Fax:** **email:**

Incident Category:
Weather Disturbance **Hazardous Substance Incident** **Radiological Incident** **Water Supply Related** **Disease Outbreak** **Other**

County/Area of Concern: maps
Statewide **Western** **Central** **Metropolitan**

Evacuation:

Number of Individuals: **ill:** **Injured:** **Deceased:**

Samples Taken:

Attachments:

ATTACHMENT 7

Contact List for Initiating Sampling Procedures			
Type	**Agency**	**Title**	**Telephone#**
Milk	A&M	Director, Division of Food Safety and Inspection	518-457-4492
Drinking Water Supplies	Health	Director, Bureau of Water Supply Protection	518-402-7650
Air	Health	Director, Bureau of Environmental Radiation Protection	518-402-7550
	Environmental Conservation	Director, Bureau of Radiation	518-402-8579
Soil	Health	Director, Bureau of Environmental Radiation Protection	518-402-7550
	Environmental Conservation	Director, Bureau of Radiation	518-402-8579
Farm products	A&M	Director, Division of Food Safety and Inspection	518-457-4492
Water (lakes & rivers)	Environmental Conservation	Director, Bureau of Radiation	518-402-8579
Fish and biota	Health	Director, Bureau of Toxic Substance Assessment	518-402-7800
	Environmental Conservation	Director, Bureau of Radiation	518-402-8579

This list is maintained by NYSDOH. Distribution of telephone numbers is controlled and numbers will be given on a need-to-know basis. Lists are updated on a quarterly basis.

During an emergency, staff from these agencies will be in the operation center at the State EOC. Requests for sampling will be coordinated through agency staff at the State EOC.

ATTACHMENT 8

NFO Dose Assessment Methodologies Available for Use at State EOC

Dose Assessment Procedures	Citation from NFO Emergency Plan
Nine Mile Point	Procedure EPIP-EPP-8, (current revision)
Ginna	Proc. EPIP - 2-4 (current revision) Proc. EPIP - 2-5 (current revision)
Fitzpatrick	EAP-4.1 (current revision)
Indian Point 2 and 3	EP-310 (current revision)

NOTE:
Licensee dose assessment procedures are maintained in the state EOC and are available for use by the Assessment and Evaluation staff. These documents are controlled by the respective licensee's document control procedures.

CAUTION: When evaluating licensee program outputs for CDE thyroid dose calculations, verify whether a time dependency is used to correct for isotopic decay. If the time factor is not utilized, the calculations may not be consistent with EPA and NRC RASCAL results. Also verify whether the program calculates child $CDE_{thyroid}$ or adult $CDE_{thyroid}$.

ATTACHMENT 9

PROCEDURE FOR CALCULATING WORKER DOSE CORRECTION FACTOR

A&E staff will use this procedure to calculate a dosimeter correction factor to account for internal exposures. Since a dosimeter only measures external radiation exposure, a correction factor must be calculated to take internal radiation doses into account. This correction factor is multiplied by the dosimeter reading to calculate TEDE. This correction factor will be relayed to the counties in the affected EPZs as soon as information on the isotopic mix is available.

NOTE: IT IS IMPORTANT THAT THE COUNTIES AND EOF* ARE NOTIFIED IMMEDIATELY, SINCE THEY HAVE BEEN INSTRUCTED TO USE C_f=1 UNLESS TOLD DIFFERENTLY.

*EOF is for information purposes only.

These correction factors are estimates. Data used to calculate these correction factors are based on assumptions that may have large uncertainties.

PROCEDURE FOR USING RASCAL TO CALCULATE WORKER DOSE CORRECTION FACTOR (WITHOUT KI)

The following formula is used to calculate a dosimeter correction factor for emergency workers who <u>have not</u> ingested KI.

1. <u>Once a release has occurred</u>, run RASCAL using either the release rate or plant conditions option. Actual field measurements used to calculate I/NG ratio are the best data to input into RASCAL.

2. Extract the following data from the output summary:

   - Cloud shine dose (CS) = _____ Rem
   - Period ground shine dose (PGS) = _____ Rem
   - CEDE (inhalation) dose (CEDE) = _____ Rem

3. Use the following formula:

$$C_f = \frac{(CS + PGS + CEDE)}{(CS + PGS)}$$

C_f = _____

4. Transmit Correction Factor to appropriate counties.

PROCEDURE FOR USING RASCAL TO CALCULATE WORKER DOSE CORRECTION FACTOR (WITH KI)

The following formula is used to calculate a dosimeter correction factor for emergency workers who have ingested KI. This correction factor is an estimate. Data used to calculate these correction factors are based on assumptions that may have large uncertainties.

1. Once a release has occurred, run RASCAL using either the release rate or plant conditions option. Actual field measurements used to calculate I/NG ratio are the best data to input into RASCAL.

2. Extract the following data from the output summary:

   - Cloud shine dose (CS) = _____ Rem
   - Period ground shine dose (PGS) = _____ Rem
   - CEDE (inhalation) dose (CEDE) = _____ Rem
   - Thyroid dose (THY) = _____ Rem

ATTACHMENT 9

3. Calculate the contribution from the thyroid dose to the total dose (ThyC):

$$ThyC = (THY * 0.03)$$

ThyC = _____ Rem

4. Use the following formula:

$$C_f = \frac{((CEDE - ThyC) + CS + PGS)}{(CS + PGS)}$$

C_f = _____

5. Transmit Correction Factor to appropriate counties.

PROCEDURE FOR USING EPA DCFs to CALCULATE WORKER DOSE CORRECTION FACTOR (WITHOUT KI)

The following formula is used to calculate a dosimeter correction factor for emergency workers who have not ingested KI using the methods in the EPA PAG Manual. In order to use this method, you must know which isotopes are in the plume.

$$Cf = \frac{0.7\ Rem/R \times TEDE}{EDE_{immersion} + 1/96\ EDE_{deposition}}$$

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(NOT USED)

NEW YORK STATE RADIOLOGICAL EMERGENCY PREPAREDNESS PLAN
PROCEDURE K - RADIOLOGICAL INGESTION EXPOSURE

1.0 INTRODUCTION

The purpose of this procedure is to establish a framework for the responsibilities of the New York State Disaster Preparedness Commission (DPC) with respect to the radiological ingestion exposure pathway. This procedure also identifies State agency emergency management readiness, response and recovery activities.

The contents of this document reflect the current policies and criteria associated with the radiological ingestion exposure pathway from the operating nuclear power plants located within New York State, as well as those that border the State, and therefore require an ingestion exposure pathway component for response. Attachment 1 depicts the operating nuclear power plants for which this procedure has been developed.

The information identified in this procedure relies upon the ability of the DPC, through appropriate State agencies, to accomplish the following:

- activate appropriate State agency field staff;
- collect, transport and analyze ingestion pathway samples;
- assess and evaluate the potential impact of ingestion pathway contamination; and
- alert local governments of the emergency and the potential for adverse public health impact.

The DPC is responsible to the Governor for the implementation of the radiological emergency preparedness program. This procedure calls for State agency coordination among federal and local governments, the nuclear facility operators, and the private sector for information, technical assistance or resources as necessary.

In response to an ingestion pathway incident, State, County and Federal governments will all be responsible for specific roles and activities in a coordinated response. The State's role, which is built around existing regulatory authority and ongoing programs, includes:

- assessment of impact;
- evaluation of response options; and
- implementation of necessary response actions

The role of the Federal government, which would be assisting the State through the Department of Energy, the Federal Radiological Monitoring and Assistance Center, and the National Response Plan, would include:

- technical resource supplement;
- personnel;
- monitoring and assessment; and
- laboratories

The impacted county(ies) would be called upon to provide the following support:

- maintenance of ongoing monitoring programs (i.e., public water supply);
- providing information on local agricultural activities;
- guiding State/Federal responders; and
- supporting State response for ingestion concerns

The licensee that owns the affected plant would continue to work to stabilize and return the plant to pre-accident conditions. Offsite monitoring would also be supplied by the licensee to supplement the county/state resources.

When considering ingestion pathway responses and actions, short term and long-term aspects of this response must be kept in mind. Short-term consideration would be given to establishing intensive monitoring, sampling and evaluation programs aimed at preventing contamination of ingestion pathways or minimizing consumption of contaminated foodstuffs or water. Long term considerations will include: identification of restricted zones requiring relocation of the impacted population; return to this area once radiation levels have been reduced and dealing with the economic impact of an ingestion pathway incident.

Technical Federal support is an integral part of New York State's ingestion pathway response. In the early hours of a radiological emergency, support will be provided through the U.S. Department of Energy's Radiological Assistance Program (RAP). Technical expertise with sophisticated monitoring, sampling and laboratory analysis capability will be provided from the Brookhaven Area Office with USDOE and Brookhaven National Laboratory staff. Advance RAP teams are also available from the Knolls Atomic Power Laboratory, West Valley Demonstration Project, and the Environmental Measurements Laboratory. If the emergency conditions warrant, the Federal Radiological Monitoring and Assessment Center (FRMAC) will be activated to obtain Federal interagency technical support. FRMAC is administered by USDOE. USDOE will provide sophisticated aerial monitoring capability and plume modeling using NARAC. USDOE resources from Region I will be supplemented as required from other DOE facilities including the National Laboratories. (See Procedure H, Section 6.2.2 for a complete summary of available Federal assistance.)

Sampling teams, which will be fielded by NYS in response to ingestion concerns, can be comprised of representatives from the DPC agencies and local Cooperative Extension/USDA, depending upon the situation. The DPC agencies will provide vehicles for the transport of the sampling teams and for the transport of samples to the DOH lab in Albany.

Each State agency which has a role in responding to an ingestion exposure pathway incident will use existing agency procedures based upon its responsibilities as defined in the NYS REP Plan.

2.0 CONCEPT OF OPERATIONS

The concept of operations for this procedure stems from those existing governmental and utility responsibilities currently identified within this plan. The procedures contained in this plan form the basis for State response to an ingestion exposure pathway incident. However, unlike the plume exposure pathway, the radiological exposure concerns from the ingestion pathway are not as direct and may not require immediate protective actions. The information contained within this procedure centers around these ingestion exposure pathways (see Attachment 2):

- Milk
- Foodstuffs
- Animal feeds
- Water

From an emergency management and public health perspective, the milk pathway is of primary concern. The radioactive materials enter the human food chain through deposition of radioactive material to pasture land, ingestion and concentration of this radioactive material by lactating animals, and consumption of contaminated milk and further concentration of radioactive materials by the human population. The two-step concentration of radioactive materials plus the short time period between initial deposition of the radioactive materials and its ingestion by the public, amplified by the potential detrimental impact upon children and infants who are most sensitive to the biological effects of radiation, are what make the milk pathway a critical concern.

For potential ingestion exposure pathways, State agencies have prepared procedures which would be implemented under the direction of the Chairman of the DPC. The DPC Chairman is designated as the lead agent on behalf of the Governor. Appropriate State agency procedures contain information for sampling, detecting the presence of contamination, analyzing and evaluating the problem, and recommending and implementing protective actions.

Response levels for Protective Actions Guides are based on U.S. Food and Drug Administration guidance, shown in Attachment 2 to Procedure H (USFDA PAG's).

Notification Information and Coordination of Agency Response and Recovery Procedures

Coordination and communication are necessary to effectively implement ingestion exposure pathway protective actions. New York State, through the SEMO system, will coordinate all operational and informational requirements with local governments and bordering states and the Province of Ontario. SEMO will insure that this information is coordinated among appropriate officials as necessary in accordance with the State Comprehensive Emergency Management Plan and the REPP. In addition, State agencies, as appropriate, will maintain periodic contact with counterparts in contiguous states and provinces to provide specific details pursuant to respective responsibilities.

3.0 ALERT AND NOTIFICATION

Procedures for the alert and notification of State agencies for a nuclear power plant accident are contained in Procedure B, Attachment 10, of this plan, and will be used as appropriate for mobilization of State agencies for the ingestion exposure pathway response. Procedures for notification of other affected governments are contained in Procedure B, Attachment 12. This ingestion procedure deals with the responsibilities of State Government for alert and notification to local government and other appropriate officials in the event of an ingestion exposure pathway concern.

Upon confirmation by the State Planning Section, A & E Branch personnel that radiological ingestion is of concern, SEMO will implement procedures for alert and notification of all potentially affected local governments. State assessment personnel will provide SEMO with a listing of those counties within the actual or potentially affected areas and continual status updates. SEMO will notify appropriate State agencies who send representatives to the State EOC, and potentially affected local governments. In addition, notification will be made to other states and the Province of Ontario (as appropriate) and the Federal Emergency Management Agency who will in turn notify appropriate Federal agencies and Canadian officials.

Procedure B Attachments 3, 4, and 5 comprise SEMO's procedures for alert and notification, by operating nuclear power plant site, for the ingestion exposure pathway.

In the event that expeditious notification to county emergency management offices is required, SEMO will use NY-Alert, the National Warning System (NAWAS) and New York State Police Information Network (NYSPIN). NAWAS and NYSPIN provide the capability for simultaneous notification of local governments on the circuit.

The alert and notification procedures, as defined for the three operating nuclear power plant sites in New York, can be expanded to cover all NYS, or different areas of NYS, as the situation warrants.

As a means of augmenting alert and notification for an incident, DPC agencies will employ their respective communications systems.

4.0 DIRECTION AND CONTROL RESPONSIBILITIES

In the event of a nuclear power plant incident, Emergency Operations are managed from the Command Room at the State EOC in Albany. From this location, the Chairman of the DPC as the Governor's designee and other State officials direct the emergency management response and recovery operations. The Command Room is supported by the Operations Section, the Planning Section (including radiological assessment and evaluation), communications and public information. These components provide the necessary information to Command Room personnel to facilitate the State's decision-making.

From the Command Room, decisions concerning State response and recovery are provided.

The objectives of the Command Room operation are:

- to assess the magnitude of the situation;
- define radiological impact;
- implement procedures to respond to the situation;
- implement protective actions;
- initiate public information procedures;
- coordinate all actions with appropriate government officials.

With respect to a plume exposure pathway response, Command Room personnel use the existing "Executive Hotlines", which are dedicated landlines, or other bridge lines to coordinate emergency management actions with County Executive personnel. Attachment 3 depicts Command Room informational flow and coordination responsibilities for the ingestion exposure pathway.

The following is a checklist of Command Room activities which will be completed in the event of an ingestion exposure pathway incident:

- assess the magnitude of the ingestion pathway concern;
- determine appropriate protective actions to be employed to protect public health, property and the environment;
- implement protective actions or measures as required in coordination with local officials;
- coordinate the dissemination of public information through the Joint Information Center (when one exists);
- keep local officials informed of protective action recommendations (PARs), the implementation of PARs and public information;
- determine the requirement for Federal resources that may be necessary to augment the State efforts pursuant to the National Response Framework, or the U.S. Department of Energy's Radiological Assistance Program;
- provide periodic briefings to the Governor from Chairman of the DPC on the current and projected status of the incident and provide recommendation on the requirement for a State Disaster Emergency Declaration pursuant to Article 2-B of State Executive Law;
- as the incident progresses, evaluate protective actions and adjust as necessary in the interest of public safety;
- provide periodic updates on the status of the management of the incident to all components in the State EOC ;

- manage the implementation of short- and long-term State recovery actions; and

- insure that all information is coordinated with other bordering states and the Province of Ontario, Federal authorities and the nuclear facility operator.

5.0 ORGANIZATIONAL RESPONSIBILITIES

In the event of a radiological ingestion exposure pathway accident, State agencies will provide the necessary resources to protect public health, property and the environment. State agencies involved in the ingestion exposure pathway response will use their own specific agency procedures. Activities will be coordinated by SEMO at the State EOC. The following is a listing of the State Agency responsibilities associated with the radiological ingestion pathway:

A. Department of Health

As the State's lead agency for the protection of public health for radiological incidents, DOH will:

- collect samples of potable water, soil, produce and vegetation;
- take environmental radiation measurements;
- provide laboratory analysis for samples taken in the field;
- recommend protective actions;
- assist in the coordination and delivery of public information relating to protective actions implemented;
- serve as the focal point in the State EOC for the analysis and assessment of radiological information;
- provide technical training as required;
- provide technical support for PMC's.

B. Department of Agriculture and Markets

- maintain an inventory of crop farms, dairy farms, food processing plants and stock farms;
- collect samples of milk;
- may collect produce, meats, animal feeds, etc., from processing plants and the marketplace;
- recommend protective actions;
- implement protective actions as appropriate for milk, produce and animal feeds;
- embargo produce and milk in contaminated areas;
- restrict use of animal feeds;
- provide information and direction to all farmers within the affected areas;
- assist in the development and release of public information;
- coordinate with appropriate local and federal agencies (Cooperative Extension, USDA) for necessary resources;

- provide technical training as required;
- identify milk shed including location of diary farms and amount of milk produced in each EPZ;
- Maintain an inventory of milk processing plants and subsequent sale locations; and
- identify time of year for cows and goats on pasture.

C. Department of Environmental Conservation

- collect samples of environmental flora and fauna;
- using agency resources, transport samples to laboratory facilities;
- implement protective actions with respect to environmental flora and fauna;
- assist in public information for protective actions;
- support communications using agency resources;
- provide regulatory oversight for waste management and disposal; and
- assist DOH in field monitoring and other activities.

D. Division of State Police

- provide division resources to support communications;
- expedite the delivery of samples for laboratory analysis;
- maintain access control points; and
- provide personnel at State Emergency Worker Personnel Monitoring Centers (PMC).

E. Department of Transportation

- provide department resources for delivery of samples to appropriate laboratory for analysis;
- assist in the maintenance of access control points;
- support communications with agency resources;
- provide resources for transporting ingestion field teams;
- provide resources and personnel at State Emergency Worker PMCs; and
- maintain accessibility of routes during severe weather conditions.

F. State Emergency Management Office

- act as transportation coordinator for collection and transportation of samples to appropriate laboratories;
- provide coordination for response and recovery activities for the State EOC and the SEMO Regional Offices, if activated;
- provide notification to Federal, State and local governments;
- assist the State DOH in radiological assessment at the State EOC;
- provide training and awareness to State and local officials;
- coordinate the delivery and implementation of resources to sustain operational requirements;
- support communications with agency resources;

- coordinate the State's Public Information Program;
- assist in the implementation of protective actions;
- coordinate the overall ingestion pathway planning components of the State's procedure;
- provide liaison to appropriate Federal agencies;
- provide dosimetry and survey and sampling instruments.

6.0 PUBLIC INFORMATION RESPONSIBILITIES

The potential magnitude and impact of an ingestion exposure pathway incident requires an extensive public alert and notification capability on the part of state and local government. There is a requirement for notification to the general public, agricultural industry, retail and wholesale food and commodity distributors, industrial representatives and other appropriate entities.

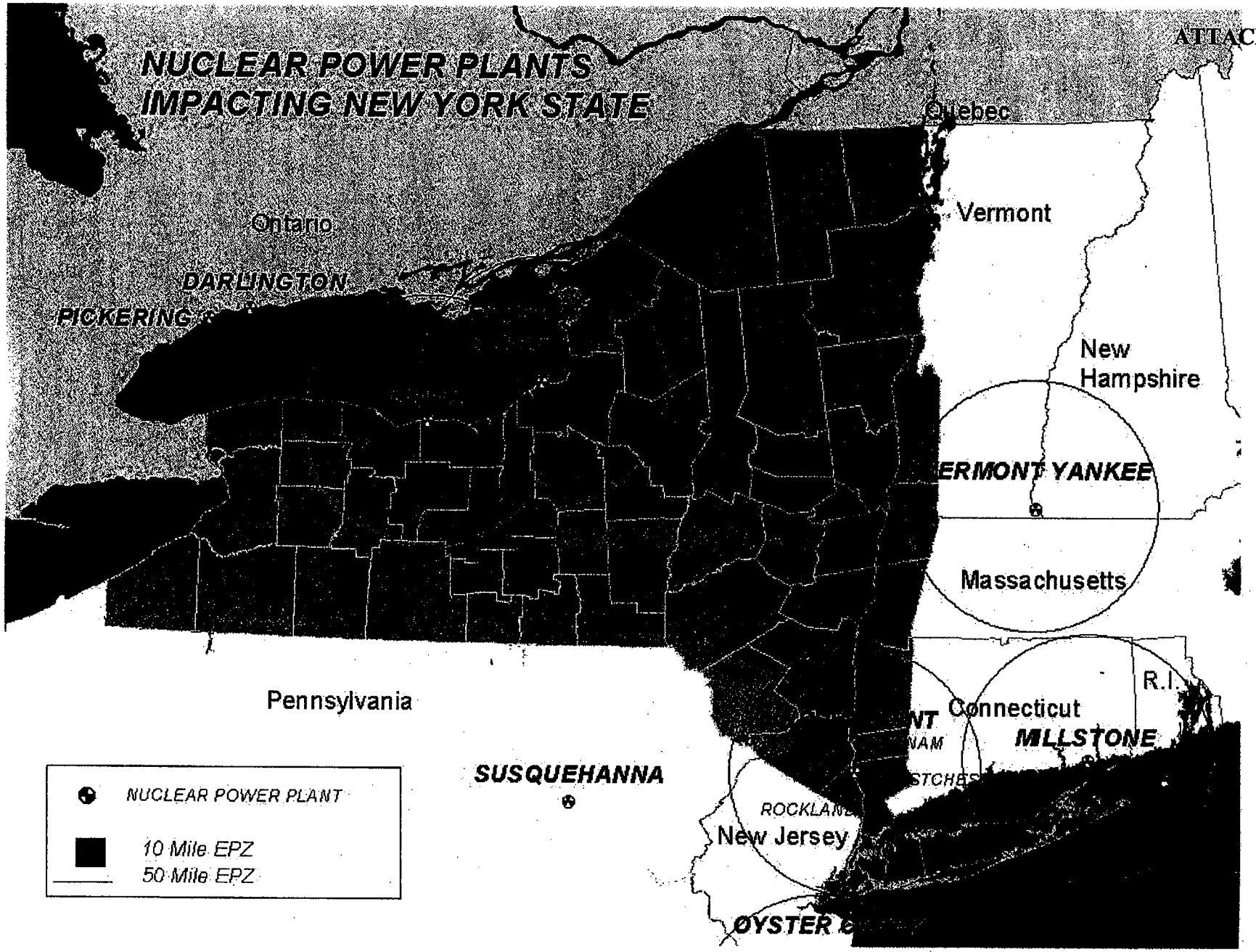
Procedures exist in this plan for public information during a nuclear power plant incident. Through the use of a Joint Information Center (JIC) located near to the potentially affected area, local, State, Federal and licensee public information officers coordinate and disseminate all information to the general public on the status of the incident and protective measures to be employed for public safety. The JIC (when one exists) is the designated location for the release of information to the public during an ingestion exposure pathway response.

The JIC may, at the discretion of the NYS DPC, continue to operate for the initial portions of an ingestion pathway response. For long-term ingestion pathway activities, the public information function may return to Albany. In the event that no JIC exists in the areas with ingestion pathway impact, the information will be provided to the public from Albany or another designated location.

To provide effective public information releases to the general public, the New York State Emergency Alert System (EAS) can be activated if determined to be necessary. Additionally, NY-Alert may be utilized to disseminate EAS and other emergency notifications. The primary means for accessing EAS for dissemination of protective action decisions will be with the assistance of local access (county) personnel. If the EAS cannot be accessed locally, or if a large region must be notified simultaneously, SEMO will coordinate the issuance of the message via EAS as appropriate. (Reference EAS procedures on file at the EOC.) Public information may also be disseminated to specific areas through NY-ALERT and/or reverse dialers such as CODE RED.

While the JIC is operational, all public information news releases and EAS and other messages will be compiled and written at the JIC. This information will be provided to the representative for the public information function at the State EOC upon completion.

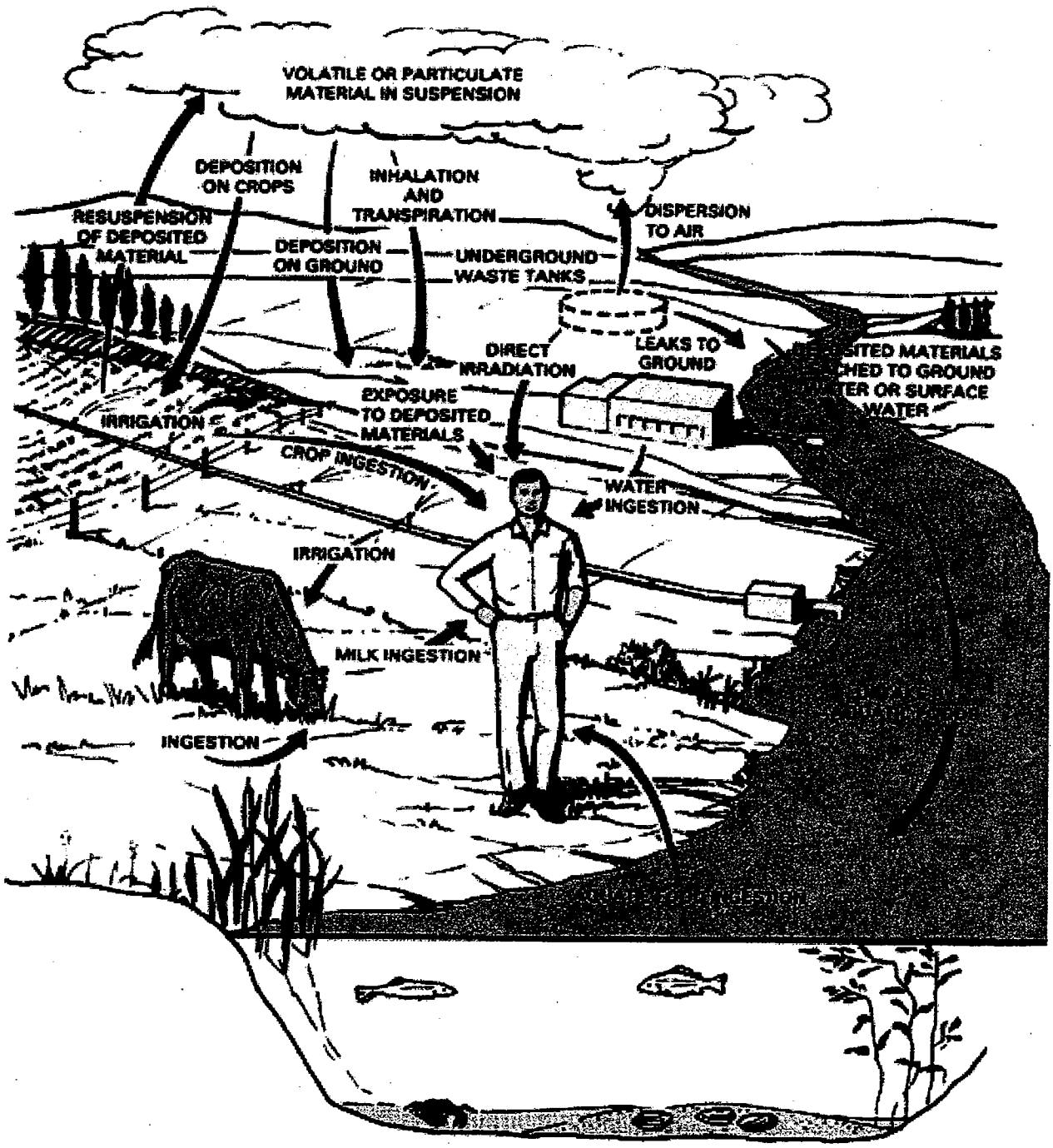
ATTACHMENT 1



(NOT USED)

ATTACHMENT 2

PATHWAYS FOR EXTERNAL AND INTERNAL EXPOSURE OF MAN FROM AIRBORNE AND LIQUID RELEASES OF RADIOACTIVE EFFLUENTS

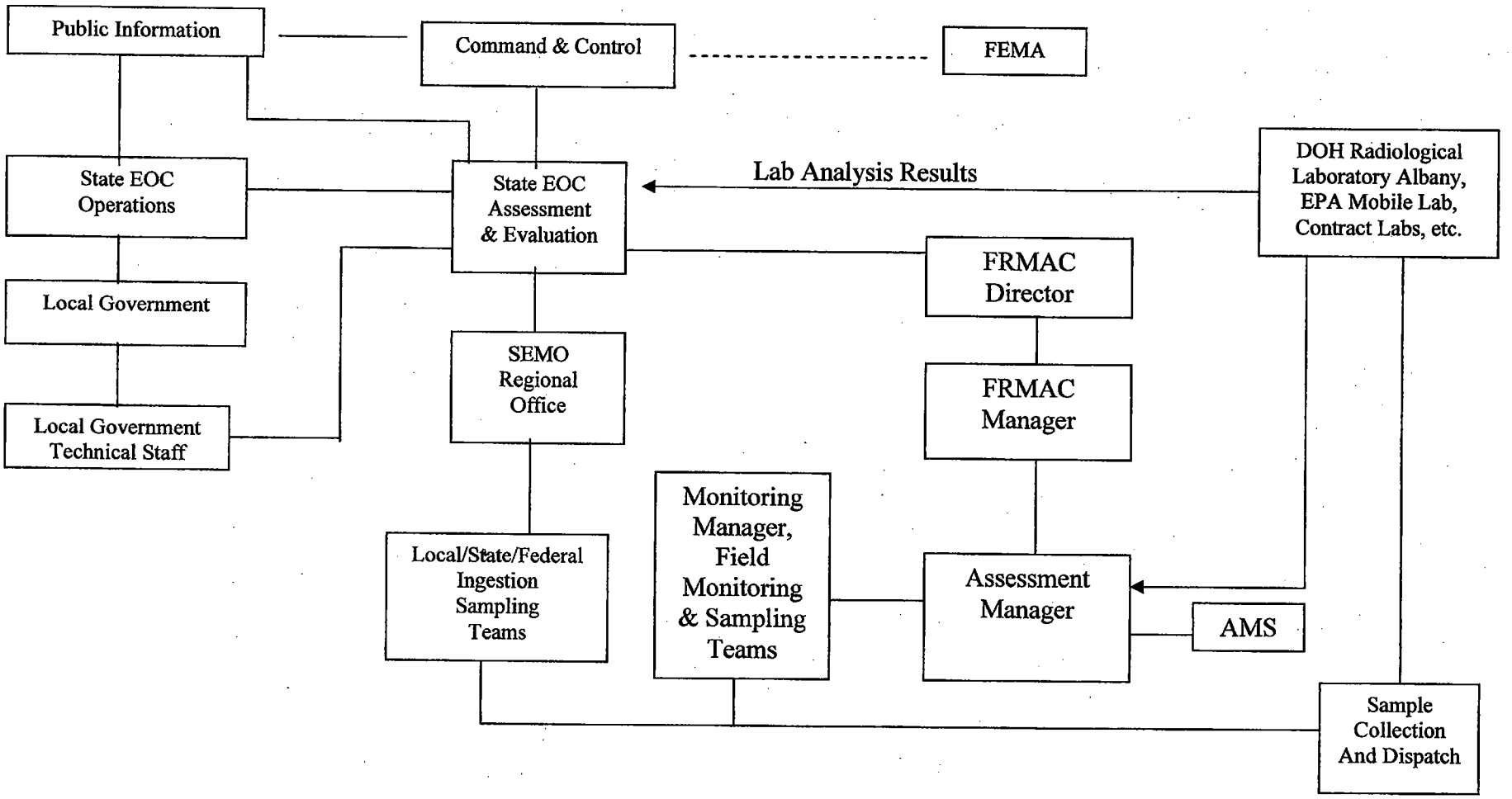


NEW YORK STATE RADIOLOGICAL EMERGENCY PREPAREDNESS PLAN

(NOT USED)

ATTACHMENT 3

COMMAND ROOM INFORMATIONAL FLOW AND COORDINATION RESPONSIBILITIES



(NOT USED)

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NEW YORK STATE RADIOLOGICAL EMERGENCY PREPAREDNESS PLAN

(NOT USED)

NEW YORK STATE RADIOLOGICAL EMERGENCY PREPAREDNESS PLAN
PROCEDURE L - RELOCATION/RETURN/REENTRY/INGESTION

This procedure identifies actions to be taken following the termination of radioactive releases from a nuclear power plant accident. This procedure is to be implemented by the Disaster Preparedness Commission (DPC) member agencies in coordination with impacted counties, contiguous states/Canada and Federal agencies.

1.0 PREREQUISITE

Determine from the licensee that the plant is in a stable condition and radioactive releases have been terminated (State Assessment and Evaluation B). Coordinate this determination with the NRC.

2.0 INITIAL ACTIONS

2.1 Develop a monitoring plan (1-meter dose rates and soil samples) to determine the plume footprint.

2.1.1 Review all available plume radiological monitoring team data (DOH).

2.1.2 Review DOE flyover data (DOH).

2.1.3 Determine projected plume footprint (DOH).

2.1.4 Consider number of available teams from all sources (DOH).

2.1.5 Coordinate sample transport to available laboratories (DPC).

2.2 Determine dose limits (Procedure G), brief and dispatch teams (Procedure M) (DOH).

2.3 Establish initial restricted zone.

2.3.1 Identify plume footprint from soil sample analysis and dose rate data (DOH).

2.3.2 Determine exposure rate that corresponds to a 2 Rem dose for the first year provided that the soil samples indicate consistent isotopic mix (Procedure H, Attachment 1). This exposure rate is called a derived response limit (DRL). If there is not a consistent isotopic mix, multiple DRLs may need to be calculated (DOH).

2.3.3 Using calculated DRLs, determine areas exceeding 2 Rem PAG for first year (DOH).

2.3.4 At a minimum, set the initial restricted zone to include areas exceeding 2 Rem in the first year. In order to provide an adequate buffer zone, include all areas in the plume footprint which were previously evacuated (DOH).

2.3.5 In coordination with the impacted counties, expand the restricted zone to a point where access control is practical (DPC).

2.3.6 Establish Access Control Points (DPC/local law enforcement agencies).

2.3.7 Coordinate with contiguous states and the Province of Ontario (SEMO/DOH/DSP).

2.3.8 Approve protective action decisions (DPC).

2.3.9 Inform counties of decisions (SEMO).

2.4 Reentry (controlled temporary access) into the initial restricted zone.

2.4.1 Establish allowable reasons for reentry (e.g. recovery operations, retrieval of property, security patrol, operation of vital services, care/feeding of farm/other animals) with input from State/local officials (DPC).

2.4.2 Establish location(s) for issuing reentry passes and dosimetry in coordination with local officials (DOH/SEMO).

2.4.3 Establish dose limits for reentry (DOH).

2.4.4 Identify any areas to avoid during reentry (DOH).

2.4.5 Consider the use of vehicles that remain in the restricted zone to limit the spread of contamination (DOH/SEMO).

2.4.6 Establish monitoring/decontamination facility(ies) close to restricted zone boundary at selected access points in coordination with local officials (DOH/SEMO).

2.5 Issue news advisories as decisions are made (DPC).

2.6 Consider requesting Federal Disaster declaration (DPC).

3.0 ONGOING ACTIONS

3.1 Coordinate activities (sampling, protective actions, implementation) with other states, Province of Ontario and Federal Response (DPC).

3.2 Review staffing and adjust as conditions warrant (DPC).

3.3 Develop environmental sampling plan (see Attachment 1) (DOH).

3.3.1 Determine commercial dairy producers, public water supplies, and crops in season in and out of the plume footprint (Ag&Mkts/DOH).

3.3.2 Consider soil samples to verify restricted zone boundary (DOH).

3.3.3 Have teams monitor for locations exceeding exposure rate (DRL) corresponding to 2 rem first year dose to identify hot spots (DOH).

3.3.4 Collect environmental TLDs (DOH).

3.3.5 Consider private garden sampling if resources permit (DOH).

3.3.6 Prioritize sampling and sample analysis (see Attachment 2) (DOH).

3.3.7 Coordinate sample transport and distribution (DOH/SEMO).

3.4 Determine dose limits (see Procedure G), brief, and dispatch teams (see Procedure M) (DOH).

3.5 Develop/Implement protective actions for the ingestion pathway (milk, food, water).

3.5.1 Determine areas where sample results exceed derived intervention levels (DILS) for food (see Procedure H, Attachment 1) (DOH).

3.5.2 Determine protective actions for those areas (DOH).

3.5.3 Expand areas for practical implementation (DOH/Ag&Mkts/DEC).

3.5.4 Consider embargo and quarantine measures (DOH/Ag&Mkts).

3.5.5 Coordinate protective actions with contiguous states and the Province of Ontario (SEMO/DOH/Ag&Mkts/DSP).

3.5.6 Approve protective action decisions (DPC Chairman).

3.5.7 Inform counties of decisions (SEMO).

3.5.8 Issue news advisories (DPC).

3.6 Redefine restricted zone.

3.6.1 As more detailed information becomes available, redefine restricted zone boundaries to include only areas where the projected dose is greater than 2 Rem in the first year

(plus a small buffer zone) in coordination with impacted counties (DPC). It may be practical to use the 5 rem in 50 years projected dose line to define the buffer zone.

3.6.2 Move Access Control Points and monitoring/decontamination facility(ies) to correspond to redefined restricted zone in coordination with impacted counties (DOH/SEMO/DPC/local law enforcement agencies).

3.6.3 Allow return of the population into areas outside the boundary of the redefined restricted zone. Coordinate return with local officials (DPC).

3.6.4 Relocate people not included in the initial restricted zone in coordination with local officials (DPC).

3.6.5 Coordinate with contiguous states and the Province of Ontario (SEMO/DOH/DSP).

3.6.6 Approve protective action decisions (DPC Chairman).

3.6.7 Inform counties of decisions (SEMO).

3.6.8 Issue news advisories (DPC).

3.7 Decontamination of land/property.

3.7.1 Determine areas where the second and 0-50 year dose commitments will be exceeded (see Procedure H, Attachment 1) (DOH).

3.7.2 Consider decontamination of land/property in selected areas of deposition inside/outside of restricted zone (DOH).

3.8 Assist with long term needs of relocated population (DPC).

3.9 Interface with American Nuclear Insurers (DPC).

3.10 Repeat above steps as necessary (All).

3.11 Establish long term sampling and recovery plans (DPC).

ATTACHMENT 1

MONITORING AND SAMPLING PLAN

The monitoring and sampling plan is a generic plan that will provide a path for completing the priorities set down by DOH. If FRMAC is activated, these priorities will be discussed with the Consequence Management Home Team prior to the arrival of FRMAC. The plan will list the equipment and generically describe the techniques that will be used to accomplish the priorities listed. The monitoring and sampling plan will outline the types of survey (e.g., contamination vs. exposure rate) and radiation types such as alpha, beta, gamma, and neutron. The plan will list the types of samples to be collected and the frequency for collecting those samples.

PRIORITIES

- Assess the footprint to determine the area of radiological concern.
- Assess the contamination run –off/deposition (movement of radioactive materials).
- Identify location of and characterize access control points.
- Survey main transportation corridors to determine if they can be reopened.
- Identify areas that have not been evacuated but where early health effects are possible (e.g., 100 rem in four days).
- Identify areas that have not been evacuated, but where the Protective Action Guide (PAG) for evacuation may be exceeded (greater than one rem in four days).
  Determine the isotopic ratios following a deposition.
  Establish air sampling stations to measure resuspension and future plume releases.
- Monitor institutions, facilities, and/or residences located in the evacuated zone which were not evacuated or where people must reenter.
- Sample drinking water from surface supplies and open-air water treatment facilities in the affected area.
- Monitor farms, dairies and food processing plants

DEPOSITION

Identify the isotope mix and verify the deposition models by taking appropriate radiation measurements using roadways and monitoring aircraft to traverse the predicted foot print. The chosen roadways and flight paths should intersect a representative number of predicted radiation contours. I*n situ* gamma spectrometry systems are the preferred field-team instrument to be used with an exposure rate meter.

Routes for the monitoring teams will be developed using the best available information on the release. This includes NARAC plots, AMS flyover data, on-site monitoring, and off-site results gathered by county and licensee field teams. The routes developed will depend on the priorities of the situation. Generally, the first routes established will verify the NARAC models, define the

edges of deposition, and determine if additional areas must be relocated. Additional routes will be developed to collect air, soil, water, and vegetation samples throughout the affected area.

As a rule of thumb, soil and vegetation samples should be collected at every order of magnitude change in measured radiation levels.

Initiate monitoring in the downwind direction from the plume footprint. If practical, monitoring activities should be initiated at a distance well beyond the deposition footprint and moved toward the incident center. A serpentine pattern should be followed as closely as roadways allow. Representative measurements should be made at all state, local and licensee monitoring locations. Monitor where people are residing in non-evacuated areas. Attempt to monitor along the edge of the inhabited zones closest to the evacuated areas.

In coordination with local officials, monitor institutions, facilities and residences located in the evacuated areas where people were not evacuated or where people must reenter in the near future. Monitor the exterior as well as the interior. Interior monitoring may include wipes of representative surfaces.

MILK

Radioiodine will begin to appear in the milk of exposed cows and goats within 3-4 hours. Radioiodine concentrations will peak in approximately three days. Therefore, milk sampling should begin the day after the plume passes. Dairies within the deposition footprint will receive lowest priority as milk is assumed contaminated in these areas and products will not be immediately marketable. Milk processing facilities outside the evacuated area will be monitored and sampled in order of their importance. In order to characterize a specific dairy, sampling should begin with the first milking after the plume passes and continue daily. When milk is collected, samples of the animal's feed and water should also be collected.

NOTE: Goat's milk will have radioiodine concentrations four times greater than cow's milk.

MEAT

Meat sampling will be coordinated with the NYS Department of Agriculture and Markets and the USDA. The primary isotopes of concern are cesium-134 and cesium-137. The biological half-life of cesium is approximately 4 months, therefore contamination levels are expected to be below the applicable limits unless the animal is butchered soon after exposure. Meat from processing plants within the contamination footprint will be sampled before it is allowed to go to market.

ATTACHMENT 1

WATER

Community surface drinking water supplies and open air treatment facilities located within the deposition footprint should be sampled following the passage of the plume and resampled daily until radioactivity levels are below the FDA and EPA Protective Action Guidelines. Daily sampling should continue until usability of the water is ascertained (i.e., does it meet drinking water standards or is it a non-flowing body of water that is sufficiently contaminated that it can not be used as a drinking water supply for some time). Generally, public water supplies will be sampled by regional DOH staff or water supply operators. In addition, sediment samples should be collected from surface drinking water supplies located within the deposition footprint. Repeat sediment sampling as necessary. Community surface drinking water supplies located outside of the deposition footprint, but in its proximity, should be sampled daily for a minimum of three days or until acceptable radioactivity levels are below the FDA and EPA Protective Action Guidelines .

PRODUCE

Sampling at farms within the deposition footprint will receive lowest priority as contamination is insured, and products will not be immediately marketable. Farms outside of the deposition footprint should be monitored in order of the perishability of the crops. Include samples from roadside stands and u-pick operations,. Food and animal feed processing facilities outside the evacuated area will be monitored and sampled in order of their importance. Sampling should continue until food is cleared.

NUMBER OF SAMPLES

Care should be exercised in collecting environmental samples, as the analytical laboratory may become inundated. A sufficient number of samples should be collected to adequately characterize the environment and satisfy monitoring requirements, but the collection of samples should be performed prudently.

ATTACHMENT 2

EXAMPLE PRIORITIES LIST

The following considerations should be used when a decision to prioritize sampling is necessary:

1. Assess the footprint to determine the area of radiological concern

   - Determine resuspension factors
   - Determine isotopic ratios
   - Identify hotspots
   - Establish air sampling stations to measure resuspension and/or future plume releases
   - Validate the dispersion model in use
   - Identify location of and characterize access control points

2. Perform surveys of special facilities (Hospitals, Nursing Homes, Prisons, Schools, Food, Drug, Agricultural, etc.)

   - Identify contaminated areas where people have not relocated and non-contaminated areas where the people can return.
   - Identify areas that have not been evacuated, but where early health effects are possible (100 rem in four days, i.e., 1 rem/hour exposure rate).
   - Identify areas that have not been evacuated, but where the federal Protective Action Guide (PAG) for evacuation may be exceeded (greater than 1 rem in four days, i.e., 10 mrem/hour).
   - Monitor close to evacuated areas where people are located.
   - Provide monitoring data to allow decision-makers to identify evacuated areas where the public can return.

3. Perform surveys to determine if the main transportation corridors can be reopened (including highways, surface roads, railroads, air and water transport)

4. Sample surface drinking water supplies and open air water treatment facilities

   - Assess contamination run-off/deposition (movement of radioactive e material).

5. Support reentry, clean-up, and mitigation activities
   - Support monitoring and decontamination of emergency workers and equipment
   - Support monitoring and decontamination efforts for the population
   - Support reentry efforts.

PROCEDURE M

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ATTACHMENTS

FIELD TEAM INSTRUCTIONS

Sampling teams will ideally be composed of three members or more depending on the availability of personnel and the time into the event. Initial and late sample teams may have limited personnel availability, but never less than two persons will be deployed as a team. Teams will be composed of, if available, (1) DOH Radiological Health Specialist, (1) DEC Environmental Radiation Specialist, (1) Agriculture and Marketing Staff or a local non-technical person (who can drive, take notes, read procedures out loud, perform other tasks as directed, etc.). Federal assets may also be assigned to field teams. One member should be designated Field Team Leader.

Each team will:

1. Receive initial briefing and initial assignments from the Field Team Coordinator. Items to be discussed during the briefing are included in Attachment 1.

2. Obtain appropriate equipment and information. Refer to attachments for sample forms.

   - Obtain the telephone number of the Field Team Coordinator in case radio contact is lost.
   - Obtain telephone number the A&E staff at the SECC.

3. Obtain an OSLD and pocket dosimeter and/or self-reading dosimeter, if required.

   - Record initial dosimeter reading on your *Emergency Worker Radiation Exposure Record Card* before departing for the field.
   - Check dosimeter reading every 15-30 minutes during exposure or as requested by the Field Team Coordinator and record data on a *Emergency Worker Radiation Exposure Record Card.*

4. Perform quality control (QC) checks on survey instruments, including battery check at the beginning and end of each shift.

5. Complete a *Team, Instrument, & Equipment Information* form and submit the form to the Field Team Coordinator before departing for field.

6. Preload any air sampling heads with the filter/cartridge and seal in a plastic bag. Note arrow on cartridge indicating proper direction of airflow.

7. Bag instruments if instructed by the Field Team Coordinator or as required for surveys in contaminated areas.

- Take background reading with each survey instrument and initial readings with global positioning system (GPS) device and record on a *Field Monitoring Log*.

8. Put on protective clothing and respiratory equipment, if necessary, as instructed by the Field Team Coordinator.

9. Proceed to designated monitoring area, as directed by the Field Team Coordinator. The Field Team Coordinator receives meteorological and dose assessment information and provides updated information, as necessary.

10. Use the most sensitive instrument (e.g. Ludlum MicroR) to provide the first indication of encountering radiation from plume deposition or contaminated area.

11. Once ground level plume deposition boundary is reached, notify the Field Team Coordinator of location and readings.

12. Upon arrival at the monitoring location, conduct requested surveys and sampling and then report these results to the Field Team Coordinator.

OBTAINING EQUIPMENT

The following equipment is used for Ingestion Pathway sampling and should be picked up prior to departing for the sampling location:

Vehicles
Sampling kits
Air Samplers (F&J)
Cell phones
Radiation dosimeters
Survey meters
Global Positioning System Units (GPS)
Batteries

Vehicles will be borrowed from the State Emergency Management Office (SEMO) or rented.

Sampling kits will be picked up from SEMO. There are three kits. The teams are called Red, White and Blue. Each team has four supply containers which resemble trunks with handles.

Each team should obtain cell phones from the SEMO. Personal cell phones may be used as a back up.

Each individual should pick up 0-5R and 0-20R Direct Reading Dosimeters and a permanent record radiation badge (OSLD) at the SEMO Radiological shop.

Each team should pick up a portable Micro-R-Meter and a Ludlum 14C Survey Meter with GM Pancake Probe from the SEMO radiological shop.

Batteries are available at SEMO for survey meters, flashlights, dosimeter chargers and other uses.

F&J Air Samplers and GPS units may be picked up at DOH BERP at 547 River Street, Troy NY, 12180, Room 530. If time permits, detailed maps of the sampling locations can be loaded into the GPS units. If DOH GPS units are not available, GPS units may be obtained from SEMO.

DUPLICATE SAMPLES

A duplicate sample is a second sample which is approximately equal in mass or volume to the first sample and which is collected in the same manner, location, and time, and analyzed for the same parameters. Duplicate samples are typically collected to document the overall precision of the sampling and analysis process. Collecting these samples is of secondary importance to limiting exposure of field teams to ionizing radiation and other safety considerations.

Field teams collect duplicate samples at the direction of the Field Team Coordinator. Any duplicate sample is collected, handled, packaged, and documented in the same manner as the original sample. Remarks on the *Sample Control Form* identify the sample as a duplicate and reference the original sample control number.

CHAIN-OF-CUSTODY

Chain-of-Custody is the sample tracking and control procedure used for ensuring that samples and data maintain their original identity and integrity throughout the collection, shipment, and analysis processes. The record of Chain-of-Custody is kept on the *Sample Control Form.*

The Chain-of-Custody procedure requires that samples are identified and their location and handling be known from initial acquisition through eventual consumption, storage, or disposal. This includes sealing the sample when it is collected and logging all activities affecting the sample through signature documentation of receipt, possession, and release by all persons handling the sample.

Each person handling samples is responsible for the security and documentation required for the Chain-of-Custody procedure. Samples are transferred only to authorized personnel.

The sample, with documentation, is under custody when:

- It is in your possession, or
- It is in your view, after being in your possession, or
- It was in your possession and you locked it up, or
- It is in a designated, secure area.

Each time the sample changes hands, the persons relinquishing and receiving the sample will sign the Chain-of-Custody section of the *Sample Control Form.*

SAMPLE TRANSFER TO WADSWORTH CENTER

After performing the sample collection and preparation procedures given in the specific procedure for the type of sample collected, transport the sample(s) to the Field Team Coordinator or "base". The Field Team Coordinator will coordinate transfer of field team samples to the courier and may temporarily retain the samples until arrival of the courier.

The Field Team Coordinator will notify the laboratory as soon as possible that samples are coming in to be analyzed. The Field Team Coordinator shall call the Wadsworth Laboratory Director at (518) 473-4854 or the Nuclear Emergency Officer at (518) 474-3025 to notify them of the estimated time of arrival of the samples. To improve processing, include an estimate of number and type of samples and estimated range of radiation readings. Vehicle identification (i.e. license plate number, name and organization of driver) of the courier vehicle should be provided as well.

1. Place PRIORITY or HIGH PRIORITY label on bag, if necessary. Separate samples labeled HIGH PRIORITY and PRIORITY. Presorting samples will further aid processing and counting.

2. Check sample container for contamination. This may be accomplished by taking a wipe sample of the container and counting the wipe with a GM meter in a low background area.

3. Complete Section 3 of *Sample Control Form.*

4. Place several of the samples into a larger bag or other container for handling convenience by the courier.

5. Load samples into courier vehicle for transport to the Wadsworth Center.

6. Transfer custody of the sample by completing and signing the Chain-of-Custody section of the *Sample Control Form.*

7. The Field Team Coordinator should retain the original and one copy of each *Sample Control Form*. The third copy will be provided to the courier to accompany the samples to the laboratory. Minimize contamination by placing copies in a clean manila envelope or plastic bag.

8. The courier shall provide safe, secure transport of samples to Wadsworth Center and arrive on or about the prearranged time or contact the Wadsworth Laboratory and notify of the delay.

9. Give the courier the map, driving directions and Lab contact phone numbers to the Wadsworth Center (Attachment 9).

10. The Field Team Supervisor will fax one copy of each *Sample Control Form* to SEMO A&E at (518) 322-4982.

NOTE: Samples are never to be left unattended and unsecured.

AIR SAMPLES

Purpose: To obtain grab air samples following a nuclear emergency, in order to estimate the impact of re-suspended, respirable particulates on the total effective dose equivalent received by the target population.

Equipment:

1. Disposable Gloves/Booties
2. GPS*
3. Dosimetry (OSLD and DRD or electronic dosimeter)*
4. Radioactive waste bag
5. Decon supplies (towelettes, water, decontamination soap solution, paper towels, etc.)
6. *Sample Control Form* and *Field Monitoring Log*
7. Writing instruments (Pen and Sharpie or equivalent)
8. Mobile phone*
9. Survey meter – GM or ion chamber*
10. Tags or self-affixing labels
11. 1" or 2" tap
12. 12. Radeco H-809C air sampling pump or F&J Specialty Products Air Flowmeter, Model DF-AB-40L*Filter and charcoal cartridge sampling head assembly
13. Glass Fiber Filters
14. Forceps
15. Glassine envelope and 3 small plastic bags
16. Timing Device (Stop watch)
17. Charcoal cartridges

*Not in kit. Refer to page M-2 for location.

The Radeco H-809C is a portable air sampling device designed to be used in conjunction with the 12-volt power supply common to all motor vehicles; namely the vehicle's battery. The unit, when properly configured, will draw approximately 1-2 cubic feet per minute through a glass fiber filter and a charcoal cartridge in the sampling head.

A sample of at least 50 cubic feet (1400 liters) would be required to obtain the necessary data on the effect of re-suspended particulates.

These air samples may be taken at the same sites that are being used to obtain other representative environmental samples. Field teams should locate the vehicle to reduce the effects of passing traffic and/or team activities. The vehicle should be well off the road and the sampling should not start immediately after parking the vehicle. It may be necessary to run the air sampler after performing other duties.

NOTE: Prior to starting on an assigned route, sampling heads should be "loaded" with the filter/canister and sealed in a plastic bag. Note arrow on cartridge indicating proper direction of airflow.

Procedure:

1. Upon arrival at the sampling site, make any required or predetermined notifications
2. Take and record GPS reading on the *Field Monitoring Log.*
3. Put on gloves and booties.
4. Prior to sampling, measure and record one meter and one cm (ground) dose rates on the *Field Monitoring Log.*
5. Remove plastic covering and screw the sampling head into the air pump.

****

If using F&J air sampling device, use the following steps:

6A. Open the cover on the air flowmeter and push the "On/Off" button. The LED display should read "0.00" and the "flow" LED should be lit.

7A. Push the "RESET" button to begin air sampling. The flow rate should gradually increase to about 0.96 to 1.00 cfm. Close and latch the cover.

8A. The air flowmeter has been programmed to collect a 10 (ten) cubic foot air sample. Running at a flow rate of about 1.0 cfm, it will require about 10 minutes to collect the sample. After collecting 10 cubic feet, the air flowmeter will shut off.

Continue with Step 11.

****

If using the Radeco air sampling device, use the following steps:

6B. Open hood of vehicle and place air pump on fender so that the filter head is perpendicular to the front and attach the terminal clamps of the sampling unit to the battery. The **RED** clamp should always be attached first to the **POSITIVE** (+) terminal of the battery. The **NEGATIVE (-)** or **BLACK** clamp may be attached to the vehicle chassis, engine block or negative terminal on the battery. Be sure that the sampling unit if **OFF** while attaching clamps.

CAUTION: **Batteries produce Hydrogen gas, which can be ignited by sparks and/or open flames. Before attaching cables, be sure the unit is OFF and the polarity is correct.**

7B. Start engine of vehicle and then start the air pump, simultaneously starting timing.

8B. Note airflow rate (middle of ball) and record. Determine length of run time based on the observed flow rate and the required sample volume of 50 cu. ft. (50 cu.ft. / flow rate = time required for sample).

9B. After the elapsed time determined in step 8, note the sample flow rate and turn off the air pump.

10B. Turn engine off and disconnect air pump clamps from battery. Remove **RED** clamp first.

Continue with Step 11.

****

11. Record the following information on the *Sample Control Form*:
    - (Start Time and Flow Rate)
    - (Stop Time and Flow Rate)

12. Remove outer ring of sampling head and using forceps, carefully remove filter disk and insert into glassine envelope.

13. Remove next ring to get access to the charcoal cartridge. Remove and place in plastic bag.

14. Fill out sample tag with enough information to be able to match it to the *Sample Control Form* and affix to the plastic bag. At a minimum, include:

    - Sample location description, map grid coordinates and/or GPS coordinates
    - Sample date and time
    - Sampling team designation
    - Sample type/size
    - Sample Number (from *Sample Control Form*)

15. Place bagged canister and glassine envelope into a second plastic bag.

16. Fill out security seal. When no security seals are available, one can be made from masking or adhesive tape.

    - Write the sample date/time and initials of the person collecting the sample on the security seal.
    - Wrap the security seal around the plastic bag with the ends making a flag, or seal over the top of the sealable bag or sample container.
    - Ensure information on security seal can be read.

17. Fill out the *Sample Control Form.*

    - Section 1 - Sampling Information
    - Section 2 - Air
    - Section 4 - Chain of Custody

18. Decontaminate (wipe off sampling head with towelettes) all sampling tools. Monitor with GM and place in plastic bag. Discard decontamination materials, disposable gloves, shoe covers, and any other potentially contaminated materials in the radioactive waste container.

19. Make any required or predetermined notifications.

SOIL SAMPLES

Purpose: To collecta representative surface soil sample, which reflects recent deposition of radionuclides from plume passage prior to any effect of weathering.

Equipment:

1. Disposable Gloves/Booties
2. GPS*
3. Dosimetry (OSLD and DRD or electronic dosimeter)*
4. Radioactive waste bag
5. Decon supplies (towelettes, water, decontamination soap solution, paper towels, etc.)
6. *Sample Control Form* and *Field Monitoring Log*
7. Writing instruments (Pen and Sharpie or equivalent)
8. Mobile phone*
9. Survey meter – GM or ion chamber*
10. Tags or self-affixing labels
11. 1" or 2" tape
12. Disposable bench pads (for kneeling on potentially contaminated ground)
13. Tape measure or a 1-ft. ruler
14. ½-gallon plastic bags or 500-mL wide-mouth plastic jar
15. Custom-made FRMAC type sampling tool (if available), garden trowel, or 4" putty knife.
16. Disposable scoops or disposable spatulas

* - Not in kit. Refer to page M-2 for location.

Procedure:

1. Upon arrival at the sampling site, make any required or predetermined notifications
2. Take and record GPS reading on the *Field Monitoring Log.*
3. Put on gloves and booties.
4. Prior to sampling, measure and record one meter and one cm (ground) dose rates on the *Field Monitoring Log.*
5. Within the designated grid area or sector, locate an area of undisturbed soil with little or no vegetative cover, and few stones or twigs. Avoid locations next to roads, trees, drainage areas, areas prone to erosion or flooding, and wet, low-lying areas. If an area without vegetation can not be located, remove the vegetation (as described in the procedure for sampling vegetation) and package as a sample, then sample the soil

underneath. On the *Sample Control Form*, indicate that both a soil and vegetation sample were taken.

6. To avoid contamination, place plastic bags or some other barrier on the ground and then lay the clipboard, instruments and tools on them.

7. If kneeling is necessary, place a disposable bench pad (or a plastic bag) on the ground next to the selected area to prevent contamination of clothing.

8. Sample Collection

   A. If using the custom made FRMAC type sampling tool:

   - Using a trowel, dig a trench 45 cm long X 15 cm wide X 15 cm deep (18 X 6 X 6 in). Fashion a vertical surface that is as straight as possible.
   - Place the open end of the sampling frame against the edge of the trench to form a 10 X 10 cm (4 X 4 in) square sample area. Press or tap the cutter edge into the soil until it hits the depth stop wings (2 cm).
   - Slide the flat custom trowel under the sampling frame. Pick up the sample. Slowly dump it into a sealable bag, a 500-ml (16 oz) jar or similar sample container.

-OR-

   B. If using a conventional putty knife, trowel and disposable scoop:

   - Mark off a 4" x 4" (10cm x 10cm) area using the tape measure and the 4" putty knife or the trowel.
   - Using a disposable scoop or the putty knife, carefully collect the top 7/8" (2 cm) layer of soil from this area, and transfer it into a sealable bag, a 500-ml (16 oz) jar or similar sample container.

9. Fill out sample tag with enough information to be able to match it to the *Sample Control Form* and affix to the sample container. At a minimum, include:

   - Sample location description, map grid coordinates and/or GPS coordinates
   - Sample date and time
   - Sampling team designation
   - Sample type/size
   - Sample Number (from *Sample Control Form*)

10. Place sample container into a second plastic bag.

11. Fill out security seal. When no security seals are available, one can be made from masking or adhesive tape.
    - Write the sample date/time and initials of the person collecting the sample on the security seal.
    - Wrap the security seal around the plastic bag with the ends making a flag, or seal over the top of the sealable bag or sample container.
    - Ensure information on security seal can be read.

12. Fill out the *Sample Control Form.*
    - Section 1 - Sampling Information
    - Section 2 - Ground
    - Section 4 - Chain of Custody

13. Decontaminate all sampling tools and place in plastic bag. Monitor tools with a GM in low background area prior to reuse.

14. Discard decontamination materials, disposable gloves, shoe covers, and any other potentially contaminated materials in the radioactive waste container.

15. Make any required or predetermined notifications.

SURFACE WATER SAMPLES

Purpose: To obtain representative samples of surface water from streams, creeks, ponds, open wells, drainage ditches or standing water locations which may be affected by a release of radioactive materials.

These samples are not considered to be representative of public water supplies, although they may be used for irrigation, farm ponds, fish farming or private drinking water supplies. Public water supply samples will be obtained by system operators or local/district health departments and will be submitted for analysis through other channels.

Equipment:

1. Disposable Gloves/Booties
2. GPS*
3. Dosimetry (OSLD and DRD or electronic dosimeter)*
4. Radioactive waste bag
5. Decon supplies (towelettes, water, decontamination soap solution, paper towels, etc.)
6. *Sample Control Form* and *Field Monitoring Log*
7. Writing instruments (Pen and Sharpie or equivalent)
8. Mobile phone*
9. Survey meter – GM or ion chamber*
10. Tags or self-affixing labels
11. 1" or 2" tape
12. Disposable bench pads (for kneeling on potentially contaminated ground)
13. 2-liter plastic bottle and shipping box
14. 2 x ½-gallon plastic bags
15. ¾" or 1" Teflon, electrical, or other conformable vinyl tape
16. Dipper and funnel

*Not in kit. Refer to page M-2 for location.

Procedure:

1. Upon arrival at the sampling site, make any required or predetermined notifications
2. Take and record GPS reading on the *Field Monitoring Log*.
3. Put on gloves and booties.
4. Prior to sampling, measure and record one meter and one cm (ground) dose rates on the *Field Monitoring Log*.

5. If kneeling is necessary, place a disposable bench pad (or a plastic bag) on the ground next to the selected area to prevent contamination of clothing.

6. To avoid contamination, place plastic bags or some other barrier on the ground and then lay the clipboard, instruments and tools on them.

The characteristics of the body of water being sampled shall determine the method chosen to obtain the sample. If the water is moving and is deep enough, the sample container can be used to allow the water to flow into and fill the bottle. Where the water is not deep enough or access is difficult, the dipper and funnel may be used. Bridges, boat docks and boats may be used to obtain the water sample and avoid sediment. Collect as much surface film or pond scum as possible. Oil slicks and debris should be avoided. If using the direct fill method, follow procedure A. If using the dipper method, follow procedure B.

7. Sample Collection

A. Direct Fill Method

- Without disturbing bottom sediment, partially fill and rinse the 2-liter bottle three times, discarding the rinse water downstream or away from the sampling point.

- Partially submerge the 2-liter bottle in the water at the selected sampling point. Collect approximately 2-liters of water. Do not over fill the bottle; leave at least a 2" headspace.

-OR-

B. Dipper Method

- Using the dipper and funnel, partially fill the bottle and rinse three times. Be careful to discard the water in such a manner that either bottom sediment or mixing of the rinse and sample does not occur.

- Slowly skim the surface water with the dipper and collect approximately 2-liters of water.

8. Cap the bottle and seal with conformable vinyl tape.

9. Wipe and dry the surfaces of the bottle with absorbent towels. Discard towels into rad waste container.

10. Place bottle into a plastic bag and seal with 1" or 2" tape.

11. Remove and discard disposable gloves and shoe covers. Place the gloves, shoe covers and bench pad in the rad waste container.

12. Place the bagged bottle in a cardboard shipping box. Fill out sample tag with enough information to be able to match it to the *Sample Control Form* and affix to the box. At a minimum, include:

    - Sample location description, map grid coordinates and/or GPS coordinates
    - Sample date and time
    - Sampling team designation
    - Sample type/size
    - Sample Number (from *Sample Control Form*)

13. Place box into a second plastic bag.

14. Fill out security seal. When no security seals are available, one can be made from masking or adhesive tape.

    - Write the sample date/time and initials of the person collecting the sample on the security seal.
    - Wrap the security seal around the plastic bag with the ends making a flag, or seal over the top of the sealable bag or sample container.
    - Ensure information on security seal can be read.

15. Fill out the *Sample Control Form.*

    - Section 1 - Sampling Information
    - Section 2 - Water
    - Section 4 - Chain of Custody

16. Decontaminate all sampling tools and place in plastic bag. If a dipper and funnel were used, wipe and dry all surfaces of both. Before using this equipment for milk samples, be sure to wash with decon soap solution and dry.

17. Discard decontamination materials, disposable gloves, shoe covers, and any other potentially contaminated materials in the radioactive waste container.

18. Make any required or predetermined notifications.

SNOW

Purpose: To obtain representative samples of snow which may have radioactive materials deposited on its surface as a result of plume passage during a nuclear emergency.

Equipment:

1. Disposable Gloves/Booties
2. GPS*
3. Dosimetry (OSLD and DRD or electronic dosimeter)*
4. Radioactive waste bag
5. Decon supplies (towelettes, water, decontamination soap solution, paper towels, etc.)
6. *Sample Control Form* and *Field Monitoring Log*
7. Writing instruments (Pen and Sharpie or equivalent)
8. Mobile phone*
9. Survey meter – GM or ion chamber*
10. Tags or self-affixing labels
11. 1" or 2" tape
12. Disposable bench pads (for kneeling on potentially contaminated ground)
13. Tape measure or ruler
14. (2) 10 gal. plastic bags and 5 gal. bucket with lid
15. Shovel or Trowel
16. Scale

*Not in kit. Refer to page M-2 for location.

Procedure:

1. Upon arrival at the sampling site, make any required or predetermined notifications
2. Take and record GPS reading on the *Field Monitoring Log.*
3. Put on gloves and booties.
4. Prior to sampling, measure and record one meter and one cm (ground) dose rates on the *Field Monitoring Log.*
5. If kneeling is necessary, place a disposable bench pad (or a plastic bag) on the ground to prevent contamination of clothing.
6. To avoid contamination, place plastic bags or some other barrier on the ground and then lay the clipboard, instruments and tools on them.

7. Locate a relatively flat surface away from trees, buildings, foot traffic, and if possible, unaffected by drifting. The type of snow; dry powder, wet icy, may dictate the surface area required for sampling. Dry powdery snow may require a two square meter ($2m^2$) area, while wet snow will require one square meter to obtain the necessary water content of 2-liters, for analysis. Snow can be weighed on the scale to determine if an adequate volume has been obtained (2 kg or 4.5 lbs = 2 liters).

   The sampling team may also be required to remove layers of snow from the sampling area if snow has fallen during or after plume passage. In this case, multiple samples may be obtained from the same site.

8. Depending on the type of snow, mark off an area of 1 sq. m. using the tape measure and shovel. Measure the depth of snow cover adjacent to the sampling area.

9. Remove the top 2.5 cm. (1 in.) from the designated area and place into a 5-gallon bucket with lid.

10. Place bucket into a 10-gallon plastic bag. Remove air from bag and seal with tape.

11. Fill out sample tag with enough information to be able to match it to the *Sample Control Form* and affix to the bag. At a minimum, include:

    - Sample location description, map grid coordinates and/or GPS coordinates
    - Sample date and time
    - Sampling team designation
    - Sample type/size
    - Sample Number (from *Sample Control Form*)

12. Place sample into a second plastic bag.

13. Fill out security seal. When no security seals are available, one can be made from masking or adhesive tape.

    - Write the sample date/time and initials of the person collecting the sample on the security seal.
    - Wrap the security seal around the plastic bag with the ends making a flag, or seal over the top of the sealable bag or sample container.
    - Ensure information on security seal can be read.

14. Fill out the *Sample Control Form.*

    - Section 1 - Sampling Information
    - Section 2 - Water/Other
    - Section 4 - Chain of Custody

15. Decontaminate all sampling tools and place in plastic bag. Monitor tools with a GM in low background area prior to reuse.

16. Discard decontamination materials, disposable gloves, shoe covers, and any other potentially contaminated materials in the radioactive waste container.

17. Make any required or predetermined notifications.

MILK

Purpose: To obtain representative samples of milk from producers, transporters, processors and distributors to assess the impact of potentially deposited radioactive materials following plume passage during a nuclear emergency.

Note that in most cases staff from the NYS Department of Agriculture and Markets (Ag & Mkts) will do the collection of milk samples since special certification is necessary in order to collect a milk sample. In the absence of Ag & Mkts staff, the farmer may collect the sample.

Equipment:

1. Disposable Gloves/Booties
2. GPS*
3. Dosimetry (OSLD and DRD or electronic dosimeter)*
4. Radioactive waste bag
5. Decon supplies (towelettes, water, decontamination soap solution, paper towels, etc.)
6. *Sample Control Form* and *Field Monitoring Log*
7. Writing instruments (Pen and Sharpie or equivalent)
8. Mobile phone*
9. Survey meter – GM or ion chamber*
10. Tags or self-affixing labels
11. 1" or 2" tape
12. 2 Liter plastic bottle and shipping box
13. 2 Plastic bags
14. 20 g vial of Sodium Bisulfite Preservative
15. Funnel
16. Dipper
17. Sanitizer (bleach)
18. ¾" or 1" Teflon, electrical, or other conformable vinyl tape

*Not in kit. Refer to page M-2 for location.

Procedure: Attempt to contact commercial dairies or farms prior to arrival. This notification should be accomplished through Ag & Mkts staff at the state EOC.

1. Upon arrival at the sampling site, make any required or predetermined notifications
2. Take and record GPS reading on the *Field Monitoring Log*.

3. Put on gloves and booties.

4. Prior to sampling, measure and record one meter and one cm (ground) dose rates on the *Field Monitoring Log.*

   Milk samples will be collected by the Ag & Mkts representative on the sampling team following the routine procedures established by their department. DOH staff will only take milk samples if Ag & Mkts representative is unavailable and the farmer can not provide the sample.

5. Activate the mechanical agitator for at least five minutes prior to sampling. (Be sure switch is returned to automatic position if manual activation is used.)

6. Sanitize sampling tools using the Chlorine based sanitizer and shake off excess (Do Not Rinse)

7. Using a funnel and the stainless steel dipper, obtain at least a 2-liter sample.

WARNING: Do not attempt to collect a milk sample from an outlet valve on either a milk truck or storage tank. Use manholes or sample petcocks where applicable.

8. Preserve the sample with Sodium Bisulfite (20 g/2 liter sample, 40 g/gallon sample)

9. Seal the 2-liter bottle cap with vinyl tape, place bottle in plastic bag; remove air and seal with tape.

10. Fill out sample tag with enough information to be able to match it to the *Sample Control Form* and affix to the bag. At a minimum, include:

    - Sample location description, map grid coordinates and/or GPS coordinates
    - Sample date and time
    - Sampling team designation
    - Sample type/size
    - Sample Number (from *Sample Control Form*)

11. Place tagged sample in second plastic bag.

12. Fill out security seal. When no security seals are available, one can be made from masking or adhesive tape.

    - Write the sample date/time and initials of the person collecting the sample on the security seal.
    - Wrap the security seal around the plastic bag with the ends making a flag, or seal over the top of the sealable bag or sample container.
    - Ensure information on security seal can be read.

13. Insert in cardboard shipping box and seal. Alternatively, the sample may be placed in a cooler.

14. Fill out the *Sample Control Form.*

    - Section 1 - Sampling Information
    - Section 2 - Milk
    - Section 4 - Chain of Custody
    - Additional information to be included in remarks: name and address of dairy farm, transfer station, or milk plant, sample size, bulk tank capacity, date and time of last pickup (this refers to the length of time and number of milkings between exposure and sample collection), origin of milk sampled (area from which milk is received, if sample is obtained at a transfer station, processing facility or tanker truck.)

15. Decontaminate all sampling tools and place in plastic bag. Monitor tools with a GM in low background area prior to reuse.

16. Discard decontamination materials, disposable gloves, shoe covers, and any other potentially contaminated materials in the radioactive waste container.

17. Make any required or predetermined notifications.

PRODUCE

Purpose: To obtain representative samples of edible produce, potentially contaminated by the deposition of radioactive materials resulting from an airborne release of radioactive materials

These samples would represent the types of produce scheduled to be harvested within 30 days following plume passage and would be non-root, non-tuber, edible portions, excluding roots and stems.

Sampling priority will be established by A&E and Ag & Mkts staff at the state EOC and would probably be as follows (see Procedure L, Attachments 1 and 2):

1. Large commercial production farms
2. Roadside stands - commercial/family
3. Family gardens
4. Retail stores

Chose locations not protected from wind by trees, structures, etc. Collect all moisture or ice that is on the produce.

Equipment:

1. Disposable Gloves/Booties
2. GPS*
3. Dosimetry (OSLD and DRD or electronic dosimeter)*
4. Radioactive waste bag
5. Decon supplies (towelettes, water, decontamination soap solution, paper towels, etc.)
6. *Sample Control Form* and *Field Monitoring Log*
7. Writing instruments (Pen and Sharpie or equivalent)
8. Mobile phone*
9. Survey meter – GM or ion chamber*
10. Tags or self-affixing labels
11. 1" or 2" tape
12. Tape Measure
13. (2) One-gallon plastic bags
14. Shears, pruners, knife or other suitable cutting tool.
15. Sample form
16. Scale

*Not in kit. Refer to page M-2 for location.

Procedure: The type of produce collected will be dictated by the harvest time of the crops grown in the affected area. While all food crops will eventually need to be sampled; under emergency conditions, the crops nearest to harvest and market should be sampled first. Sampling is to measure deposition, not plant uptake.

Generally, only the edible portions of the plant are needed for a sample. For most produce the edible is quite obvious, but there may be some plants for which this is not clear. The following guide may be used to determine both the appropriate portion and size of the sample.

Berries - Berry only - 4 qts.

Fruits - Edible whole fruit only - about 5lbs.

Head vegetables - For head vegetables like cabbage or lettuce collect the entire head, cutting at ground level. For heads like broccoli or cauliflower cut the flowering head, unless it's known that the leaves are used for other purposes.

Grains and Cereals- If crop is growing in the field collect only the top seed portion of the plant. A one square meter area should be sampled. If the crop has already been harvested and is being stored, obtain 2-kg (5lb).

Greens- In some instances the tops of root vegetables are harvested as part of a thinning process and used as leaf vegetables. If this is the case, obtain a one square meter area of sample, if possible. If you cannot cut out a measured area, obtain a 2kg. (5lb) sample.

Onions-Scallions-Chives- If the top or green portions of the crop are to be harvested, you must determine if a square meter or 2kg. (5lb) sample is appropriate.

Sweet Corn- Ears only, no stalks.

Roots/Tubers- Unless the root/tuber crop is out of the ground for harvesting, or if the tops are used for food, no sample is required at this time.

This list is by no means all inclusive. There will be instances where produce is available for sale or consumption that does not fall under any of the above categories. It is therefore important that the sampling teams use their best judgement as to what constitutes edible portions and sample accordingly.

1. Upon arrival at the sampling site, make any required or predetermined notifications
2. Take and record GPS reading on the *Field Monitoring Log.*
3. Put on gloves and booties.
4. Prior to sampling, measure and record one meter and one cm (ground) dose rates on the *Field Monitoring Log.*
5. If kneeling is necessary, place a disposable bench pad (or a plastic bag) on the ground to prevent contamination of clothing.
6. To avoid contamination, place plastic bags or some other barrier on the ground and then lay the clipboard, instruments and tools on them.
7. Determine whether a one square meter area or weight sampling criteria is appropriate.
8. Obtain sample and place in plastic bag.
9. Remove air from bag and seal with tape.
10. Fill out sample tag with enough information to be able to match it to the *Sample Control Form* and affix to the bag. At a minimum, include:

    - Sample location description, map grid coordinates and/or GPS coordinates
    - Sample date and time
    - Sampling team designation
    - Sample type/size
    - Sample Number (from *Sample Control Form*)

11. Place tagged sample in second plastic bag.
12. Fill out security seal. When no security seals are available, one can be made from masking or adhesive tape.

    - Write the sample date/time and initials of the person collecting the sample on the security seal.
    - Wrap the security seal around the plastic bag with the ends making a flag, or seal over the top of the sealable bag or sample container.
    - Ensure information on security seal can be read.

13. Fill out the *Sample Control Form.*

    - Section 1 - Sampling Information
    - Section 2 - Other/Produce
    - Section 4 - Chain of Custody
    - Additional information to be included in remarks: Sample size - AREA or WEIGHT, type of produce.

14. Decontaminate all sampling tools and place in plastic bag. Monitor tools with a GM in low background area prior to reuse.

15. Discard decontamination materials, disposable gloves, shoe covers, and any other potentially contaminated materials in the radioactive waste container.

16. Make any required or predetermined notifications.

VEGETATION

Purpose: To collect vegetation samples potentially contaminated by an airborne release of radioactive material, consumption of which could lead to an indirect human exposure from the vegetation/animal/human pathway.

In most instances, these samples are not classified as vegetables but are types of vegetation which may be incorporated in farm feeding programs. This includes: pasture grasses, feed corn, green chop or leafy vegetation, and shrubs and bushes that can be consumed by grazing or browsing animals.

Equipment:

1. Disposable Gloves/Booties
2. GPS*
3. Dosimetry (OSLD and DRD or electronic dosimeter)*
4. Radioactive waste bag
5. Decon supplies (towelettes, water, decontamination soap solution, paper towels, etc.)
6. *Sample Control Form* and *Field Monitoring Log*
7. Writing instruments (Pen and Sharpie or equivalent)
8. Mobile phone*
9. Survey meter – GM or ion chamber*
10. Tags or self-affixing labels
11. 1" or 2" tape
12. Tape Measure
13. (2) One-gallon plastic bags
14. Tape measure
15. Grass shears, pruners, knife or other suitable cutting tool
16. Work gloves, if desired
17. Scale

*Not in kit. Refer to page M-2 for location.

Procedure: Because of the variety of vegetation which may be sampled, some general guidelines include the following:

A. Grasses should be cut as close to the ground as possible without getting roots and soil in the sample. Depending on the height of grasses, one square meter area should be adequate.

B. Leafy vegetation samples should include only the leaf portion, not the stems and roots. Sample one square meter.

C. Crops such as corn, used as chopped forage, should be cut into small 3-4 inch segments, rather that individual stalks.

D. For most purposes, a one kilogram (2 lb) sample should be sufficient for analysis. This usually corresponds to a one square meter area. Corn would be an exception and sample size should be based on weight of chopped material, rather than an area sampled.

1. Upon arrival at the sampling site, make any required or predetermined notifications.

2. Take and record GPS reading on the *Field Monitoring Log*.

3. Put on gloves and booties.

4. Prior to sampling, measure and record one meter and one cm (ground) dose rates on the *Field Monitoring Log*.

5. Locate an undisturbed area, away from trees, buildings, road spray or foot traffic. Chose locations not protected from wind by trees, structures, etc.

6. If kneeling is necessary, place a disposable bench pad (or a plastic bag) on the ground to prevent contamination of clothing.

7. To avoid contamination, place plastic bags or some other barrier on the ground and then lay the clipboard, instruments and tools on them.

8. Depending on the type and height of the vegetation; mark off one (1) sq. meter area with the tape measure.

9. Starting along the periphery of the measured area, cut the vegetation as close to the ground as possible, transferring the cuttings to the plastic bag. If grasses are tall, start at the top and work down to the soil. Collect all moisture or ice that is on the produce.

10. Determine if at least 1 kilogram (2 lb) of sample has been obtained from the measured area chosen. If not, sample another equivalent measured area and make note of the total area sampled on both the tag and form.

11. Remove air from the bag and seal with tape.

12. Fill out sample tag with enough information to be able to match it to the *Sample Control Form* and affix to the bag. At a minimum, include:

    - Sample location description, map grid coordinates and/or GPS coordinates
    - Sample date and time
    - Sampling team designation
    - Sample type/size
    - Sample Number (from *Sample Control Form*)

13. Place tagged sample in second plastic bag.

14. Fill out security seal. When no security seals are available, one can be made from masking or adhesive tape.

    - Write the sample date/time and initials of the person collecting the sample on the security seal.
    - Wrap the security seal around the plastic bag with the ends making a flag, or seal over the top of the sealable bag or sample container.
    - Ensure information on security seal can be read.

15. Fill out the *Sample Control Form.*

    - Section 1 - Sampling Information
    - Section 2 - Other/Vegetation
    - Section 4 - Chain of Custody
    - Additional information to be included in remarks: Sample size - AREA or WEIGHT, type of vegetation.

16. Decontaminate all sampling tools and place in plastic bag. Monitor tools with a GM in low background area prior to reuse.

17. Discard decontamination materials, disposable gloves, shoe covers, and any other potentially contaminated materials in the radioactive waste container.

18. Make any required or predetermined notifications.

ATTACHMENT 1

FIELD TEAM BRIEFING

Provide the following information to field sampling teams prior to deployment:

- Status of the emergency and classification
- Protective actions ordered
- Areas evacuated, sheltered, or potentially under consideration for relocation
- Radioactive plume deposition and footprint, including areas to avoid
- Communications protocols, including phone numbers, sample location call in, and frequency of calls
- Use of dosimetry and turn back values
- Location to report for monitoring/decontamination
- Sample assignments and priorities
- Protective clothing requirements
- Sample drop-off location
- Vehicle assignments
- Location/maps of sampling areas
- Team designation and assigned route
- Return of samples and completed paperwork to field team coordinator

ATTACHMENT 2

DAILY INSTRUMENT QC CHECKS

The Daily Instrument QC Checks form is used to record quality control information for each instrument at the beginning and end of every shift.

Event	Write name of event.
Team #	Write team number / name.
Instrument Number	Write instrument model number and serial number.
Instrument Type	Write instrument type.
Depart Date/Time	Record departure date following example below. Record departure time using military notation, as below. Example: 02/09/1997 1745
QC Check Source Type/ID#	Write the type of check source used. Include number of check source, if available.
Check Source Activity	Record activity of source and units. If instrument has different scales, record scale used.
Acceptable Operating Range	Write acceptable range of operation.
Depart Actual Reading	Record actual meter reading (Reading x Scale) at time of departure.
Initials	Record initials of person performing QC check.
Return Date/Time	Record return date and time following example above.
Return Actual Reading	Record actual meter reading (Reading x Scale) on return.
Initials	Record initials of person returning instrument.

DAILY INSTRUMENT QC CHECKS

ATTACHMENT 2 (cont.)

PAGE _____ of _____

EVENT _____ **TEAM** _____ **REVIEWED BY** _____

Instrument Number	Instrument Type	Depart Date/Time	QC Check Source Type/ID #	Check Source Activity	Acceptable Operating Range	Depart Actual Reading	Initials	Return Date/Time	Return Actual Reading	Initials

ATTACHMENT 3

DATA ACQUISITION LOG

The *Data Acquisition Log* is used by the Field Team Coordinator to record field monitoring data reported by Field Monitoring Teams.

> **NOTE**
> Columns on *Data Acquisition Log* correspond to those on *Field Monitoring Log*. Therefore, report data in order recorded on *Field Monitoring Log*.

Event	Write name of event.
Team #	Write team number / name.
Instrument ID	Write instrument type, model number and serial number.
Time of Day	In military time.
Location	Description of survey site; i.e., street address, town, intersection, highway, sector, distance, if applicable.
Latitude	In degrees, and decimal degrees.
Longitude	In degrees, and decimal degrees.
Measurement	Reported reading.
Units	Units in which instrument reads (cpm or mR/hr)
Radiation Type/Energy	Used primarily by the Accident Response Group program. For FRMAC purposes, use descriptive comments such as alpha, beta, gamma, neutron, Pu (plutonium), Am (americium), etc.
Measurement Surface	Examples: grass, soil, filter, etc.
Remarks	Any factors pertinent to instrument measurements, and any other environmental conditions.

ATTACHMENT 3 (cont.)

DATA ACQUISITION LOG

DATE _____ **EVENT** _____ **TEAM** _____ **PAGE** _____ **of** _____

INSTRUMENT ID _____ **REVIEWED BY** _____ **DATA ENTRY BY** _____

Time (military)	Location Description	Latitude	Longitude	Measure-ment	Units	Radiation Type	Measurement Surface	Remarks (If samples are collected at this site, note sample ID and type here)

ATTACHMENT 4

FIELD MONITORING LOG

The *Field Monitoring Log* is used by Field Monitoring Teams to record field monitoring data and sample collection by sample number.

Event	Write name of event.
Team #	Write team number / name.
Survey Instrument ID	Write instrument type, model number and serial number.
GPS ID	Write instrument type, model number and serial number.
Time of Day	In military time.
Location	Description of survey site; i.e., street address, town, intersection, highway, sector, distance, if applicable.
Latitude	In degrees, and decimal degrees.
Longitude	In degrees, and decimal degrees.
Measurement	Reported reading.
Units	Units in which instrument reads (cpm or mR/hr).
Radiation Type/Energy	Used primarily by the Accident Response Group program. For FRMAC purposes, use descriptive comments such as alpha, beta, gamma, neutron, Pu (plutonium), Am (americium), etc.
Measurement Surface	Examples: grass, soil, pavement, filter, etc.
Remarks	Any factors pertinent to instrument measurements, and any other environmental conditions.

NOTE: A *Field Monitoring Log* entry is completed for each measurement taken.

ATTACHMENT 4 (cont.)

FIELD MONITORING LOG

DATE **EVENT** **TEAM** **PAGE** **of**

SURVEY INSTRUMENT ID **GPS UNIT ID** **REVIEWED BY** **TRANSMITTED BY**

Time (military)	Location Description	Latitude	Longitude	Measure-ment	Units	Radiation Type	Measurement Surface	Remarks (Include all pertinent measurement factors, ground conditions, mist, rain, etc. If samples are collected at this site, note sample ID and type here)

ATTACHMENT 5

SAMPLE CONTROL FORM

Field	Data
Collection Team ID	Enter Team Name or Number
Collector's Name	Enter Collectors Name
Org	Enter Collectors Home Organization
Location	Enter Location either GPS-Longitude/Latitude, Description (*i.e.*, Address, Mile Marker, Sector, Distance). The recommended format is degrees and decimal degrees. *(i.e.*, Longitude = W 108°.27976).
Collection Date	Enter the Date the Sample was Collected (mm-dd-yyyy)
Collection Time	Enter the Time the Sample was Collected (Military)
# of Containers	If more than one sample container is collected enter the number
Contact Dose Rate	If background permits, enter the Radiation Level with units
Remarks	Enter any pertinent information not already entered (i.e. Grab/Composite Sample, Multiple Analysis Required)
Sample Type	Check the appropriate Sample Type. Enter all available information.
Air Sample	Enter Air Sampler Type, Filter Size and Type, Date On & Off (mm-dd-yyyy), Time On & Off (Military). Enter either Start & Stop Flow Rate (Corrected) or Total Volume.
Milk Sample	Check Type of Milk Sampled, if Other describe in the remarks. Enter feed type the cattle eat. If Other, describe in the remarks. Enter Milking Date (mm-dd-yyyy) & Time (Military)
Soil Sample	Enter Depth of soil sample in cm and/or Dimensions of sample area give units. Check if Vegetation Sample was collected with soil sample. If yes enter Vegetation Sample Contro Number.
Water Sample	Check Water Sample Collection Area, if Other, describe in the remarks.
Other	Check Other Sample Type, and Enter description of sample and size or volume of sample (i.e. Vegetation 1-gal sealable bags grass, Swipe 100 cm^2)
Processing Priority	Identify Rush Samples. Add Rush labels to sample bags
Split # / Dup #	If Samples are to be split, create duplicate paperwork and assign a new sample number to the dup or split.
Forms and Sample bags checked for contamination	Check exterior of sample bags and forms for contamination. This can be done with a large area wipe check in the field with a survey instrument. These should be reserved at the hot line.
Sample Remarks/ Special instructions	Enter any other descriptive information for the sample or special instructions (*i.e.*, homogenize sample)
Relinquished by	Signed by person releasing custody of the sample - must be done to a person or secured area
Date	Date relinquished
Time	Time (military) relinquished
Received by	Signed by the person receiving the sample - if relinquished to a secure area, the relinquisher must enter the secure location to which the sample is relinquished
Date	Date received or relinquished to a secure area
Time	Time (military) received or relinquished to a secure area

ELDARS Accession # _____

Sample No. _____

1. Sampling Information

Collection Team ID: Collector's Name: Org:

Location: ☐ GPS Latitude _____ Description: _____
Longitude _____

Collection Date: Collection Time (Military): # of Containers: Contact Dose Rate:

Remarks: _____

2. Sample Type (use only one)

Air	Sampler ID:	Type: Filter Size & Type:
	Date ON: (MM/DD/YYYY)	Time ON: (Military) Date OFF: (MM/DD/YYYY) Time OFF: (Military)
	Start Flow:	Stop Flow: OR Total Volume: Unit:
Milk	☐ Cow ☐ Goat ☐ Other:	☐ Stored Feed ☐ Pasture ☐ Other:
	Milking Date:	Milking Time: Number of Animals sampled:
Ground	Depth of soil sample: cm	Vegetation collected with soil samples? ☐ Yes ☐ No
	Sample surface area:	If vegetation in separate container, provide sample #:
Water	☐ Surface ☐ Ground/Well ☐ Potable/Tap ☐ Other:	
Other	☐ Vegetation ☐ Feed ☐ Produce ☐ Swipe ☐ Other:	
	Describe:	

3. Sample Preparation for Transport

Processing Priority: ☐ **Contamination Check:** Forms and sample bags surveyed.

Dup Sample #: Split Sample #:

Sample Remarks/Special Instructions: _____

4. Custody Transfer (Signatures)

Collected by:	Date	Time	Received by:	Date	Time
Relinquished by:	Date	Time	Received by:	Date	Time
Relinquished by:	Date	Time	Received by:	Date	Time
Relinquished by:	Date	Time	Received by:	Date	Time
Relinquished by:	Date	Time	Received by:	Date	Time

Original with Sample Copy to Field Team Coordinator Copy to SEOC

ATTACHMENT 6

TEAM, INSTRUMENT, & EQUIPMENT INFORMATION LOG

The *Team, Instrument, & Equipment Information Log* is completed and submitted to the Field Team Coordinator before leaving base.

Top portion	Complete with team member information.
Bottom portion	Complete with instrument and equipment information, including license information of vehicle(s).

ATTACHMENT 6 (cont.)

TEAM, INSTRUMENT, & EQUIPMENT INFORMATION LOG

Field Team Supervisor Initials _____

Team Number:			
Today's Date:		Start Time:	
Team Leader (Last, first M.I.):			
Team Leader Organization:			

TEAM MEMBERS

	Name (Last, First, M.I.)	Organization
1		
2		
3		
4		
5		

INSTRUMENT AND EQUIPMENT INFORMATION

Instrument/Equipment Number	Instrument/Equipment Type	Instrument/Equipment Number	Instrument/Equipment Type

Cellular Phone		Radio Number
Serial Number	Phone Number	
	( ) -	

VEHICLE INFORMATION

License Plate Number	State	License Plate Number	State

Revision Date – March 2002

This form must be completed and turned in to the Field Team Supervisor prior to field deployment

Original to Data Center **Yellow copy to Field Monitoring Division**

ATTACHMENT 7

EMERGENCY WORKER RADIATION EXPOSURE RECORD CARD

Emergency Worker Radiation Exposure Record Card

Name:_____
Agency:_____

NEW YORK STATE

DISASTER PREPAREDNESS COMMISSION

Business Address:_____
_____
Telephone#: (B) _____ (H) _____
Social Security:_____
Date of Birth:_____
Emergency Worker Assignment: _____
Direct Reading Dosimeter (DRD)
#1 Serial #: _____ Range: _____
#2 Serial # _____ Range _____:
OSL Badge Dosimeter
Serial #: _____
Date: _____ Work Hours: _____

Rev. 3/07

(SIDE 1)

Total Incident Exposure _____ Initial Reading: DRD1 _____ DRD 2 _____

DRD 1/2	Time	DRD 1/2 Reading	Time	Remarks

KI use: yes/no Directed by: _____ Date: _____

Report Reading to Supervisor of 1R, 3R, 5R _____ | DRD Total (Final reading – initial reading) =

ATTACHMENT 8

NEW YORK STATE EMERGENCY SAMPLING KITS

There are three sets of kits, each with four cases, designated RED, WHITE, and BLUE. Each set of kits contains:

SAMPLE CONTAINERS:

Plastic Bags - various sizes (quart, gallon, etc.)
2 Liter Polyethylene Bottles
500-ml Polyethylene Jars
Vials with 40 grams Sodium Bisulfite preservative

SAMPLING TOOLS & CARRYING CASE:

Shovels - Garden and Snow Shovels
Trowel - (garden)
4" Putty Knife
FRMAC-style soil sampling tool
Grass Shears
Knife
Hedge Trimmers or Pruners
Scissors
Tape Measure
Funnel
Stainless Steel Dipper
Sanitizer
Teflon, Electrical, or other conformable vinyl tape
Waterproof Tape - 1 roll
Masking Tape - 1 roll
Radioactive Material Warning Tape - 1 roll
Sample Tags
Sample Forms
Glassine Envelopes
Forceps
Charcoal Cartridges
Glass Fiber Filters
Clipboard, Paper, Maps, Pencils, Pens, Marking Pen
0-10 Lbs Spring Scale

ATTACHMENT 8 (cont.)

INSTRUMENTS:

1 Ludlum Micro RMeter
1 Ludlum GM Meter with Pancake Probe
Personnel Dosimeters (OSLD, Film Badge, Pocket Dosimeters and charger)
1 Radeco 809C Air Pump with Sampling Head(s)
Batteries for Instruments

INSTRUCTIONS:

Sampling Procedures
Sample Forms
Monitoring Data Forms

SAMPLE CONTAMINATION CONTROL

2 - Liter Bottle Clean Water
1 - Pt. Iso-Clean, Absorbent Pads, Paper Towels, Towelettes
Heavy Duty Plastic Bags and Garbage Can for Radioactive Waste
Disposable Bench Pads
Disposable Gloves - 1 box
Work Gloves 2-Pair.
Disposable Foot Covers - 2 rolls and 1 pair heavy duty/person. Pull on Totes if available.

ATTACHMENT 9

DIRECTIONS TO WADSWORTH CENTER at the Empire State Plaza, P-1 North Delivery Level, Albany

- **Coming from New York City or points South of Albany**

  Take the NYS Thruway (I-87) North to Exit # 23. At the Exit 23-toll plaza, follow I-787 (North).

  Exit I-787 at Exit #3 "Empire Plaza", which goes to the Empire State Plaza (ESP). On the exit ramp, bear Right and follow signs to the "Empire Plaza" complex. Stay in the Right lane, and follow signs to "P-1 North". P-1 North is the 1st turn-off on the Right, just as the roadway goes under the complex.

  Stop at the Security Booth and notify the guard that you have a "specimen" delivery. The ESP Security Guard or State Police officer will have advance notification of the specimen/sample delivery. You may be required to produce a driver's license or another form of photo ID.

  The ESP Security Guard or State Police officer will then escort you to P-1 South, Dock J, where INC Lab staff and/or Wadsworth Lab Security Personnel will take possession of the samples.

- **Coming from Buffalo or points West of Albany**

  Take the NYS Thruway (I-90) East to Exit #24. At the Exit 24-toll plaza, go straight ahead onto I-90 East. Continue on I-90 East for approximately 5.8 miles, bear Right and take I-787 South to Albany.

  Exit I-787 at Exit #3a "Empire Plaza", which goes to the Empire State Plaza (ESP). On the exit ramp, bear Right and follow signs to the "Empire Plaza" complex. Stay in the Right lane, and follow signs to "P-1 North". P-1 North is the 1st turn-off on the Right, just as the roadway goes under the complex.

  Stop at the Security Booth and notify the guard that you have a "specimen" delivery. The ESP Security Guard or State Police officer will have advance notification of the specimen/sample delivery. You may be required to produce a driver's license or another form of photo ID.

  The ESP Security Guard or State Police officer will then escort you to P-1 South, Dock J, where INC Lab staff and/or Wadsworth Lab Security Personnel will take possession of the samples.

- **Coming from Plattsburgh or points North of Albany**

Take the Northway (I-87) South to Exit #1 "I-90 East/West". Where the exit ramp splits, bear Left and take I-90 East towards Boston. Continue on I-90 East for approximately 5.8 miles, bear Right and take I-787 South to Albany.

Exit I-787 at Exit #3a "Empire Plaza", which goes to the Empire State Plaza (ESP). On the exit ramp, bear Right and follow signs to the "Empire Plaza" complex. Stay in the Right lane, and follow signs to "P-1 North". P-1 North is the 1st turn-off on the Right, just as the roadway goes under the complex.

Stop at the Security Booth and notify the guard that you have a "specimen" delivery. The ESP Security Guard or State Police officer will have advance notification of the specimen/sample delivery. You may be required to produce a driver's license or another form of photo ID.

The ESP Security Guard or State Police officer will then escort you to P-1 South, Dock J, where INC Lab staff and/or Wadsworth Lab Security Personnel will take possession of the samples.

- **Coming from Binghamton or points Southwest of Albany**

Take I-88 to the intersection with the NYS Thruway (I-90). Follow I-90 East towards Albany to Exit #24. At the Exit 24-toll plaza, go straight ahead onto I-90 East. Continue on I-90 East for approximately 5.8 miles, bear Right and take I-787 South to Albany.

Exit I-787 at Exit #3a "Empire Plaza", which goes to the Empire State Plaza (ESP). On the exit ramp, bear Right and follow signs to the "Empire Plaza" complex. Stay in the Right lane, and follow signs to "P-1 North". P-1 North is the 1st turn-off on the Right, just as the roadway goes under the complex.

Stop at the Security Booth and notify the guard that you have a "specimen" delivery. The ESP Security Guard or State Police officer will have advance notification of the specimen/sample delivery. You may be required to produce a driver's license or another form of photo ID.

The ESP Security Guard or State Police officer will then escort you to P-1 South, Dock J, where INC Lab staff and/or Wadsworth Lab Security Personnel will take possession of the samples.

- **From Downtown Albany**

From Capital Park (front lawn of the NY State Capital) at the intersection of State Street, Washington Avenue, and Eagle Street, follow State Street down the hill to South Pearl Street.

Turn Right on South Pearl Street and go past the Pepsi Arena to the traffic light at Market Street (3rd cross street after turning onto South Pearl Street).

Turn Right on Market Street. Proceed on Market Street up the ramp to the "Empire Plaza" (Empire State Plaza or ESP). Stay in the Right lane, and follow signs to "P-1 North". P-1 North is the 1st turn-off on the Right, just as the roadway goes under the complex.

Stop at the Security Booth and notify the guard that you have a "specimen" delivery. The ESP Security Guard or State Police officer will have advance notification of the specimen/sample delivery. You may be required to produce a driver's license or another form of photo ID.

The ESP Security Guard or State Police officer will then escort you to P-1 South, Dock J, where INC Lab staff and/or Wadsworth Lab Security Personnel will take possession of the samples.

(NOT USED)

ATTACHMENT 10

In addition to the Wadsworth Center, samples may be sent to a number of other radiochemistry laboratories. FRMAC maintains a list of radiochemistry laboratories in the US that they may use for sample analysis.

NYS regulations require that laboratories analyzing environmental samples for NYS be approved by the Environmental Laboratory Accreditation Program (ELAP). A list of certified laboratories may be obtained from the Wadsworth Center.

ELAP Certified Radiochemistry Laboratories

IN STATE

NYSDOH INORGANIC & NUCLEAR CHEM LAB
WC EMPIRE STATE PLAZA D224
ALBANY NY 12237
DR. LIAQUAT HUSAIN

(518) 473 -4854

URS CORPORATION
10282 ROCK SPRINGS ROAD
WEST VALLEY NY 14171-9799
MR. DAVID M. SCALISE

(716) 942 -4160

WASTE STREAM TECHNOLOGY
302 GROTE STREET
BUFFALO NY 14207
DR. BRIAN S. SCHEPART

(716) 876 -5290

LIFE SCIENCE LABORATORIES INC - BRITTONFIELD
5000 BRITTONFIELD PARKWAY SUITE 200
EAST SYRACUSE NY 13057
MR. MICHAEL PETTERELLI

(315) 437 -0200

pCi/LABS INC
103 SOUTH GREENBUSH RD
ORANGEBURG NY 10962
DR. THOMAS KAZMIERCZAK

(845) 680 -0031

SUFFOLK CO PUBLIC & ENV HEALTH LAB
BLDG 487, COUNTY COMPLEX 725 VETERAN'S HIGHWAY
HAUPPAUGE NY 11788
MR. KENNETH M. HILL

(631) 853 -5528

WESTCHESTER CO LABS AND RESEARCH

10 DANA ROAD
VALHALLA NY 10595
MR. DAVID L. VINCI

(914) 231 -1768

OUT OF STATE

MWH LABORATORIES
750 ROYAL OAKS DRIVE - STE 100
MONROVIA CA 91016-3629
DR. ANDREW EATON

(626) 386 -1100

EBERLINE SERVICES-OAK RIDGE LAB

601 SCARBORO ROAD
OAK RIDGE TN 37830
MR. AHMED A. HALOUMA

(865) 481 -0683

TELEDYNE BROWN ENGINEERING - ENVIRONMENTAL SERVICES
2508 QUALITY LANE
KNOXVILLE TN 37931-3133
MR. KEITH JETER

(865) 690 -6819

PROCEDURE N

NEW YORK STATE RADIOLOGICAL EMERGENCY PREPAREDNESS PLAN
PROCEDURE N - LABORATORY PROCEDURES

LABORATORY PROCEDURES

INORGANIC AND NUCLEAR CHEMISTRY LABORATORY
WADSWORTH CENTER
NEW YORK STATE DEPARTMENT OF HEALTH

Revised 10/10/2008

Approved by _____
Patrick Parsons, Ph.D.

Lab Chief: Dr. Patrick Parsons
Wadsworth Center
Empire State Plaza, Rm D144
Albany, NY 12201-0509

(Office) (518)444-5475
(Fax) (518)473-2895
(Home) (518)783-9306
(Cell) (518)577-9001
pparsons@wadsworth.org

Nuclear Emergency Officer: Laurie Duncan
Wadsworth Center
Empire State Plaza, Rm B940
Albany, NY 12201-0509

(Office) (518)473-8034
(Fax) (518)474-3908
(Home) (518)
(Cell) (518)
lhd01@health.state.ny.us

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NEW YORK STATE RADIOLOGICAL EMERGENCY PREPAREDNESS PLAN

(NOT USED)

NEW YORK STATE RADIOLOGICAL EMERGENCY PREPAREDNESS PLAN
PROCEDURE N - LABORATORY PROCEDURES

1.0 INITIAL RESPONSE

1.1 Overview of Responsibility

The Wadsworth Center - Laboratory of Inorganic and Nuclear Chemistry's role in a nuclear power plant incident is to provide rapid radiological analysis of a variety of samples, prevent sample and laboratory contamination, provide quality assurance and data quality management, communicate analytical results in a timely manner, and maintain a permanent, retrievable record of all analytical results.

1.1.1 Acronyms and Abbreviations

A&E - Assessment and Evaluation
BERP - Bureau of Environmental Radiation Protection
CEH - NYS DOH Center for Environmental Health
CLP - Clinical Laboratory Program
DOH - NYS Department of Health
ECC - Emergency Coordination Center
ESP - Empire State Plaza
INC - Inorganic and Nuclear Chemistry Laboratory
RSO - Radiation Safety Officer or Radiation Safety Office
SEMO - State Emergency Management Office (NYS Executive Branch Department)
WC - Wadsworth Center

1.1.2 Responsibilities

SEMO has responsibility for directing response to emergency.
Emergency Coordination Center (ECC)
Building 22, Suite 101, State Campus
1220 Washington Avenue
Albany, NY 12226-2251
Telephone (518)-292-2200
Fax (518)-322-4982

BERP has responsibility for notifying the WC of the emergency.
- Notifies INC laboratory chief or alternate (see p. 38)
- WC is to follow notification scheme in section 2.0.

Telephone (518)-402-7550
Fax (518)-402-7554

WC RSO has responsibility for sample receipt and initial screening.
- Samples enter WC only at Dock J, P-1 South at ESP.
- WC RSO: Laurie Duncan, Office (518)-473-8034, Fax (518)-474-3908, email LHD01@health.state.ny.us

WC INC has responsibility for the rapid analysis of samples and generation of data needed to evaluate the extent of the problem. Laboratory staffing as per staffing plan is in section 2.0.

1.2 Classification of Nuclear Power Plant Emergencies and Response

Four classes of nuclear emergency are as follows:

- Unusual Event – lab assistance not required/no notification
- Alert – lab assistance not required/no notification
- Site Area Emergency - INC on standby or report to work
- General Emergency - INC on standby or report to work

When a call is received regarding a nuclear emergency or a drill, the person taking the call (most likely P. Parsons, S. Lehner, D. Koreman, K. Aldous, or L. Duncan) should obtain the following minimum information.

The caller's name, affiliation and phone number
The class of nuclear emergency
The nuclear facility involved
The estimated time of arrival of emergency samples
The name of person driving truck
Description of Vehicle
Brief description of samples

For Site Area Emergency and General Emergency, the INC will go on full alert status as follows:

Implement the notification scheme
Place the INC emergency cart in position
Place the RSO emergency items in position
RSO designate receiving area on Dock J
Shift supervisor designate screening area on Level B
All INC sections prepare to accept emergency samples

2.0 NOTIFICATION AND STAFFING

2.1 Notification Procedure

If the emergency occurs during non-business hours, all staff members are to be notified by telephone per the notification scheme on pages 38 and 39, and are to be directed to report for work or to standby. If an employee, who has not been reached by phone, hears a report of a nuclear emergency, he/she should contact Dr. Patrick Parsons at (518)783-9306 (home) (518)577-9001 (cell), or the INC office at (518)474-7161.

If the emergency occurs during business hours, all staff in the laboratory will be notified per the notification list on page 41. Staff not at work will be contacted by phone via the notification scheme on pages 38 and 39, and directed to report for work or to standby.

Use NEP NOTIFICATION RECORD, Form NEP-1, to record all calls. In the event someone under you in the notification scheme is unavailable for any reason and (s)he is responsible for notifying staff of the emergency, you must assume responsibility for contacting those on his/her calling list.

2.2 Staffing Plan

Currently, we have 11 regular Nuclear Chemistry Laboratory staff and 12 additional INC staff available for assignment during a nuclear emergency operation. In addition, two staff from the WC RSO will be involved in the nuclear emergency response, as well as two of the INC secretarial staff.

2.3 Responsibilities of Shift Supervisor (P. Parsons)

The shift supervisor has overall responsibility for the operation of the laboratory during the nuclear emergency.

The major responsibility of the shift supervisor is overseeing results as they are generated by the data processing group and maintaining status of samples as they move through the laboratory.

The shift supervisor is responsible for insuring that each section has a qualified supervisor and adequate staff. If a section needs additional staff, the shift supervisor should contact the laboratory chief.

The shift supervisor is responsible for notifying the reception desk of the nuclear emergency and instructing the receptionist to direct emergency samples to the Dock J area at P-1 South.

The shift supervisor will contact the ESP Mailroom (Room B760) at (518)-474-6171 to inform them that emergency samples will be arriving. The Mailroom will alert Receiving (Room B776) at (518)-474-2950.

The shift supervisor will notify the Director of Laboratory Operations, Barbara (or secretary), at (518)-474-1152 that Room B750 (Lunch Room) is needed to accession and sort incoming nuclear emergency samples. This is the area of choice, because it is least disruptive of WC operations. If unavailable, Receiving Room B776 will be the alternate accessioning area.

The shift supervisor will make arrangements for a vehicle to be available for use by the courier as needed during the nuclear emergency. Call Barbara Ryan (or secretary) at (518)-474-1152.

The shift supervisor will brief section supervisors at the outset of the emergency and prior to the start of each new shift throughout the duration of the emergency.

The shift supervisor is responsible for reporting of all data to A&E and maintaining liaison with A&E (Tel: 518-301-2016, 301-2059, 301-2031, 301-2045 and FAX: 518-292-2481).

2.4 Responsibilities of Section Supervisors

Each section supervisor is responsible for insuring that his/her section is adequately staffed and briefed.

Each section supervisor should be thoroughly familiar with the contamination control and radiation safety protocols in section 3.0 and is responsible for implementing these protocols within each section.

Each section supervisor is responsible for seeing to that section being properly equipped and ready to handle emergency samples. This includes insuring that emergency supplies and equipment are available and in working order.

Each section supervisor is responsible for keeping the shift supervisor informed of problems and the status of samples during the emergency.

3.0 EMERGENCY OPERATIONAL CONDITIONS

There are two primary goals for the laboratory:

- to expedite the analysis of samples; and
- to control and prevent insofar as possible laboratory contamination and the cross-contamination of samples.

General laboratory operations during a nuclear emergency and protocols for contamination control and radiation safety are the focus of this section.

Laboratory operations for purposes of handling nuclear emergency samples are as follows:

- Sample receipt and initial survey meter screening
- Accessioning and screening
- Sample Preparation
- Counting
- Data Processing and Reporting

Operations during sample receipt and sample preparation present a risk of laboratory contamination and sample cross-contamination. Therefore all necessary steps must be taken to minimize contamination. General contamination control is discussed in section 3.2.

3.1 Contamination Control Protocols

Contamination control is extremely important in the processing of nuclear emergency samples. All sample containers, packaging and supporting documents as originally collected must be considered to be potentially contaminated.

In order to minimize laboratory contamination and possible cross-contamination of samples, a color code system and a team approach will be in place during nuclear emergency operations.

The following color codes will be used to designate samples, work areas and staff that are assumed to be contaminated, potentially contaminated, or clean:

- RED - assumed contaminated
- YELLOW - potentially contaminated
- GREEN - clean

3.2 Team Designations and Assignments

The Sample Receipt section will have three teams, a RED TEAM, a YELLOW TEAM, and a GREEN TEAM.

The sample processing section in both the low-level and high-level laboratory will each have two teams, a YELLOW TEAM and a GREEN TEAM.

Staff assigned to the accessioning, counting, and data processing sections will be designated as GREEN TEAM only.

The RED TEAM will handle the unloading of the delivery vehicle and all contaminated materials.

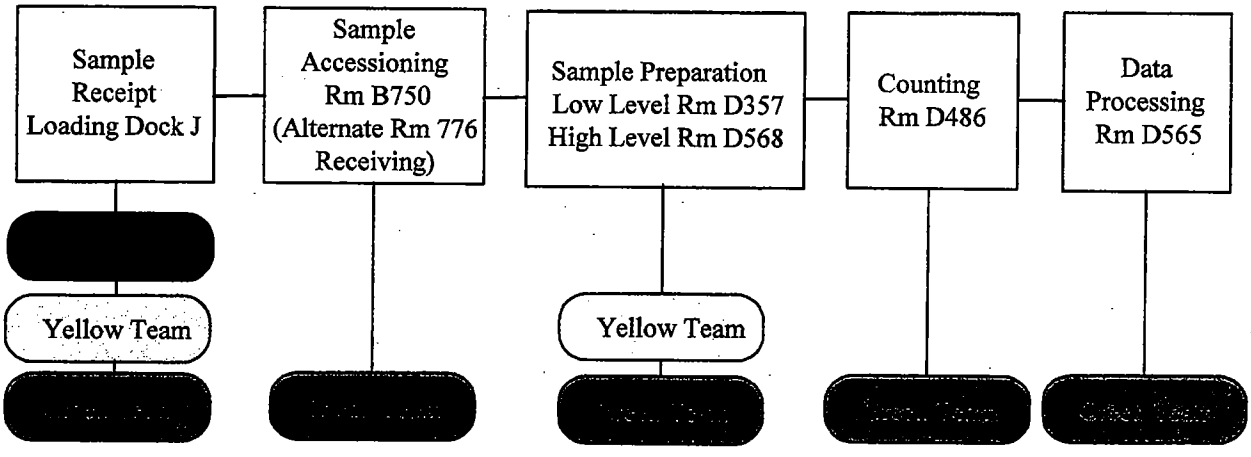
Staff designated as YELLOW TEAM will handle any tasks which require the handling of potentially contaminated material.

The staff assigned to a GREEN TEAM will handle only clean materials.

Personnel will be identified as to team assignment by wearing RED BADGES, YELLOW BADGES, or GREEN BADGES. These badges may be obtained from the NEP cart in the cafeteria (Rm 750), the LINK office D224, or the section supervisor.

To summarize:

- Sample Receipt — RED TEAM, YELLOW TEAM, and GREEN TEAM
- Sample Accessioning — GREEN TEAM
- Sample Preparation — YELLOW TEAM and GREEN TEAM
- Counting — GREEN TEAM
- Data Processing — GREEN TEAM



3.3 Work Area Designations

Work areas will be designated in the following manner:

- RED AREA — assumed contaminated surface
- YELLOW AREA — potentially contaminated surface
- GREEN AREA — clean surface

3.4 Color-coding of Samples

Sample containers and packages will be designated in the following manner:

- RED LABEL — assumed contaminated surface
- YELLOW LABEL — potentially contaminated surface
- GREEN LABEL — clean surface

Careful adherence to these protocols should insure that samples, as received in the counting room, are clean and present a minimal risk of detector contamination.

Specific procedures for contamination control in sample receipt and sample preparation will be discussed in sections 7.0 and 9.0.

3.5 General Safety Protocols

There is a potential for both an external and internal radiation dose to laboratory personnel during the processing of nuclear emergency samples. The external dose might well be minimal for the majority of environmental samples; however, precautions must be taken to minimize the personnel's risk of exposure. Protective clothing, particularly disposable gloves, will be used to minimize the potential for skin contamination or ingestion. Hand surveys will be required whenever an individual removes his/her disposable gloves. If dry soil samples are processed, a dust mask may be required. The RSO will initiate any additional precautions and monitoring deemed necessary.

3.6 Protective Clothing

1. Lab coats shall be worn by each staff member.

2. Protective gloves must be worn when handling samples or containers in which the sample was received.

3. Dust masks must be worn if handling samples that may form respirable particles.

3.7 Survey Meter Monitoring

1. Staff assigned to the RED TEAM and those on the YELLOW TEAM working in the high-level laboratory are to monitor their hands with a survey meter after removing protective gloves.

2. Surfaces and work areas in the RED AREA and the high-level laboratory should be monitored with a survey meter before vacating the area or turn-over to the next shift.

3. Record all results on the NEP RADIATION SURVEY RECORD, Form NEP-3.

3.8 Bioassay Monitoring

1. In the event of significant hand contamination as indicated by survey meter monitoring, a bioassay should be considered. The shift supervisor is to review the Radiation Survey Log and request a bioassay sample when there is a high probability of ingestion of radioactivity. The shift supervisor may consult any RSO in this matter.

2. In the event of an inhalation hazard, appropriate bioassay procedures should be considered.

3. The most common bioassay procedure will probably be analysis of a urine sample using a general screening procedure for medium- and high-energy beta (MEB and HEB). In the event these test results are high, a more specific test may be required.

4. In the event that tritium or radioiodine is a contaminant, bioassay procedures specific for these radionuclides will be used.

3.9 Emergency Medical Treatment

The most likely medical emergency is a serious cut or laceration requiring medical treatment. This may be compounded by the possibility of radioactive contamination of the wound.

1. Clean the wound and surrounding area with soap and water to remove any potential radioactive contamination. Rinse with water. Do not attempt this decontamination procedure if it is likely to aggravate the wound or cause further injury.

2. Before covering the wound, try to get a survey-meter reading of the wound without touching the wound. This information may be important to the medical staff that treats the wound.

3. Obtain medical treatment at the ESP nursing station or arrange for transport of the patient to the Albany Medical Center. Provide as much information as you can to the medical staff regarding potential radioactive contamination of the wound or injury.

GENERAL EMERGENCY TELEPHONE NUMBERS

WC Safety Office	ESP Room B940	(518)-473-8034
ESP Nursing Station	ESP South Concourse	(518)-474-2314
State Police	Empire State Plaza	(518)-474-5330
EMERGENCY	Empire State Plaza	911
Albany Medical Center	Emergency Room	(518)-262-3131
Doctors Ambulance	310 State Street, Albany	(518)-463-3333
(Alternate - Ambulance Service Capital District)	89 West St.	(518)-434-4444

3.10 Communication Protocols

Communication will be primarily be telephone, Email, or by fax. If the situation warrants, a courier will be used.

Maintain a telephone log and a FAX log of all calls. Use NEP TELEPHONE LOG, Form NEP-4, and NEP FAX LOG, Form NEP-5. If a courier is used, maintain a courier log using NEP COURIER LOG, Form NEP-6.

3.11 Emergency Telephone and FAX Numbers

INC	Dr. Patrick Parsons	(518)-474-5475
INC	FAX	(518)-473-2895
ECC	Telephone	(518)-457-2200
ECC	FAX	(518)-457-9930

3.12 Rumor Control

All questions and inquiries regarding the nuclear emergency or analytical results for emergency samples will be referred to the ECC.

Calls to outside agencies are to be made by the laboratory director or shift supervisor; otherwise, only if specific authorization is given to a section supervisor to release data.

3.13 Useful Telephone Numbers During Nuclear Emergency

INC Office	D224	Patrick Parsons	(518)-474-5475
Safety Office	B940	Laurie Duncan	(518)-473-8034
Mailroom	B760		(518)-474-6171
Data Processing	D565	Eileen Fielman	(518)-474-3179
Counting Room	D486	Douglas Haines	(518)-474-0144
Photocopy Room	D297		(518)-474-4175
Low-level Lab	D486	Abdul Bari	(518)-473-8013
High-level Lab	D568	Ilham Almahamid	(518)-474-6095

4.0 ANALYTICAL METHODS

The following is a list of standard analyses available from the laboratory, the standard methods they are based on, and the standard operating procedures used to conduct them. A copy of the SOPs may be obtained from the Quality Assurance Officer (see Section 5.1).

Analysis	Method	SOP
Gross Alpha and Gross Beta Activity	EPA 900.0	DOH-LINC-911
Determination of Tritium as HTO	EPA 906.0	DOH-LINC-913
Isotopic Gamma Determination	EPA 901.1	DOH-LINC-914
Isotopic Plutonium Determination	NYS Pu-02	DOH-LINC-916
Isotopic Uranium Determination	ASTM D3972-90	DOH-LINC-917
Determination of Sr-89 and Sr-90	EMSL-CI EPA1976, p.29	DOH-LINC-919
Determination of I-131	EPA 901.1	DOH-LINC-914
Determination of I-125 and I-129	NYS I-08L	DOH-LINC-921

5.0 QUALITY CONTROL AND ASSURANCE

5.1 Quality Assurance Officer (QAO)

Quality Assurance Officer: Dr. Robert Smith
Wadsworth Center
Empire State Plaza, Rm D203
Albany, NY 12201-0509
smithr@wadsworth.org

(Office) (518)-474-4323
(Fax) (518)-473-2895
(Home) (518)-877-6056

5.2 Accreditation

INC holds either National Environmental Laboratory Accreditation Program (NELAP) or New York State Environmental Laboratory Approval Program (ELAP) accreditation for all test methods listed in Section 4.0 in the potable and non-potable water matrix.

5.3 National Environmental Laboratory Accreditation Conference (NELAC) Compliance

INC complies with all requirements of Chapter 5 and Appendix D Section 4 of the National Environmental Laboratory Accreditation Conference (NELAC) Quality Systems standard.

5.4 Proficiency Test Participation

INC participates in proficiency testing through Environmental Resource Associates twice a year as required to maintain certification.

5.5 Quality Control Protocols

Quality control protocols closely follow the CLP quality control protocols and meet or exceed all EPA and ELAP requirements.

The following quality control measures are in place for typical radioactivity measurements.

QC Measure	Frequency	Control Limit
Method blank	1/20	variable by radionuclide (γ)
Method blank	1/20	=/< 1 pCi/L for Drinking Water (Gross α/β) =/< 3 pCi/L for Waste Water (Gross α/β)
Method control	1/20	Lower Control Limit %Recovery = 80% Upper Control Limit %Recovery = 120%
Matrix duplicate	1/10	Upper Control Limit %Difference = 20% or if result is < 5 x Detection Limit, the UCL = DL
Matrix spike	1/20	Lower Control Limit %Recovery = 75% Upper Control Limit %Recovery = 125%
Instrument Calibration Verification Standard	Daily	$\bar{X} \forall$ 3 Standard Deviations
Instrument bkg	Daily	$\bar{X} \forall$ 3 Standard Deviations

Analytical balances must be serviced annually and a sticker with the date serviced displayed on each balance. Balances must be checked with two Class S weights weekly and the readings recorded.

Procedure-specific quality control measures may be found in the individual SOPs.

6.0 SUPPLIES AND EQUIPMENT

6.1 INC Emergency Supplies

The following supplies are to be stored exclusively for use in the event of a nuclear emergency. A store of these supplies is to be located in both the low-level laboratory (Room D357) and in the high-level laboratory (Room D568). The storage areas are to be conspicuously labeled with a sign stating Nuclear Emergency Supplies.

Durasorb Plastic-backed Absorbent Pads
Plastic Trays, 14"x18"
Disposable gloves
Plastic Bags, assorted sizes
Paper Towels
Wipers, cotton
Isoclean
Permanent Markers
Radioactive Label Tape
Red Pre-apply Labels
Yellow Pre-apply Labels
Green Pre-apply Labels
Roll of Red Tape
Roll of Yellow Tape
Roll of Green Tape
Zip-lock Bags, 9"x12"
Emergency Log Forms (NEP-1 through NEP-10; DOH-4148 and -4149)
Marinelli Containers, disposable, 1.4 L and 0.5 L, with snap-on lids
Wide-mouth Jars, disposable, 250-mL geometry
Plastic Bottles, disposable, 50 mL geometry
Plastic Knives and Spoons, disposable
Glassine Envelopes
Wooden Tongue Blades
Mixing Rods, disposable
Dust Masks

6.2 INC Emergency Cart

A 3"x3" NaI detector with a counter is to be permanently assembled on a cart. The cart is to reside in the counting room (Room D486). At the time of a nuclear emergency or drill, the cart is to be moved to Room B750 to screen incoming samples. The following components are needed for the NaI assembly:

NaI Detector, 3"x3"
HV Power Supply
Preamplifier/Amplifier/Discriminator/Counter/Timer/Cables
Lead Bricks and Steel Plates for Shielding
Heavy-duty Steel Cart
GM Meter (such as Ludlum Model 3)

In addition, the following supplies are to be kept on the bottom of the cart:

Durasorb Plastic-backed Absorbent Pads
Plastic Trays
Disposable Gloves
Plastic Bags, assorted size
Paper Towels
Wipers, cotton
Isoclean
Permanent Markers
Pens
Flashlight with Batteries
Post-it notes
Note pad (for making signs etc.)
Radioactive Label Tape
Lab Coats
Lead Apron
Dust Masks
Red Pre-apply Labels
Yellow Pre-apply Labels
Green Pre-apply Labels
Red, Yellow, and Green Badges
Roll of Red Tape
Roll of Yellow Tape
Roll of Green Tape
White Computer Labels printed with "PRIORITY"
White Computer Labels printed with "LOW –LEVEL LAB"

White Computer Labels printed with "HIGH-LEVEL LAB"
White Computer Labels printed with "2 x BKG"
White Computer Labels printed with ">1 mR/hr"

6.3 INC Emergency Equipment

The following equipment for weighing samples is located in Room D465:

Top-loading Balances, 0-4000 grams and 0-10,000 grams

The high level lab has two balances of its own in Room D568.

6.4 RSO Emergency Equipment

The following equipment and material are to be kept in the Radiation Safety Office and available for immediate use in case of a nuclear emergency.

Radioactive Waste Drums (2)
Survey Meter, Ludlum Model 3, with GM pancake probe
Survey Meter, Ludlum Model 3, with NaI gamma probe

6.5 Equipment Checks and Supply Audits

Conduct periodic equipment checks and a supply audits in all Nuclear Chemistry Laboratory and RSO locations once every six (6) months.

Record the results of the emergency supplies audit on the NEP EMERGENCY SUPPLY AUDIT, Form NEP-7.

Record the results of the emergency cart checks on NEP EMERGENCY CART AUDIT, Form NEP-8.

7.0 SAMPLE RECEIPT

7.1 Staffing and General Overview

Supervisory Staff, Section Supervisor and RSO: Laurie Duncan

The WC RSO has primary responsibility for Sample Receipt and contamination control.

Immediately upon notification of a nuclear emergency, the INC lab chief or his alternate will contact the RSO. The lab chief will also contact the **Bureau of Management Services**, at **(518)-474-2002**, Fax (518)-474-8163, ESP Corning Tower, Rm 2230.

The shift supervisor will notify the Director of Laboratory Operations, **Barbara Ryan** (or secretary), at **(518)-474-1152**, who will notify the **WC E-level receptionist**, at **(518)-474-2160**, and **State Police**, at **(518)-474-5330**, to direct the sender/driver to P-1 North for security verification and admission to the ESP loading docks. Samples are to be delivered and unloaded only at the ESP, P-1 South, Loading Dock J.

If an after-hours delivery is expected, the shift supervisor must insure that someone is available in the dock area to accept samples.

If sample delivery is expected during business hours, the shift supervisor is to inform the Mailroom staff to call the RSO at (518)-474-1465 or the INC at (518)-473-4854 as soon as samples arrive.

The RSO has responsibility for contamination control and decontamination procedures at the receiving dock. The RSO is to survey the delivery vehicle and the driver after it has been unloaded.

In the event of contamination of the delivery vehicle, the RSO is to coordinate with the ECC the decontamination and release of the vehicle.

The RSO is to survey the P-1 South dock area after the samples have been routed to the screening area and carry out decontamination procedures as needed.

7.2 Emergency Specimen (Sample) Delivery Protocols

Emergency specimen (sample) delivery is a specimen (sample) delivery to the Wadsworth Center for which advance notification of the Dockmaster is not possible.

7.2.1 BUSINESS HOURS (MONDAY - FRIDAY: 6:00 A.M. - 6:00 P.M.)

Lab Personnel Responsibilities:

1) Inform the Safety and Security Office at 474-3215 of the pending delivery. Provide the following information:

    1) Name of organization making delivery
    2) Expected date/time of delivery

3) Vehicle make, model and license plate number
4) Drivers name
5) Wadsworth Center contact name and phone number
6) Description of what is being delivered.

2) Inform the sender/driver that they need to make it known, upon arrival, that they have a "specimen" delivery.

3) Inform the sender/driver to enter the ESP through P1-North and unload at P1-South.

Safety & Security Office Responsibilities:

1) Inform the Dockmaster at dockmaster@ogs.state.ny.us (7:00 a.m. - 4:00 p.m. only) of the pending delivery.

2) Inform the State Police at P1-North (486-7864) of the pending delivery.

3) Provide the following information to both the Dockmaster and the State Police:

1) Name of organization making delivery
2) Expected date/time of delivery
3) Vehicle make, model and license plate number
4) Drivers name
5) Wadsworth Center contact name and phone number
6) Description of what is being delivered

State Police/OGS Responsibilities:

1) Verify delivery and allow access.

7.2.2 AFTER HOURS, HOLIDAYS AND WEEKENDS

Lab Personnel Responsibilities:

1) Contact the Safety and Security office at 474-3215 (Monday - Friday: 8:00 - 4:00), or the B-Level Security Desk at 486-2678 (all other times). Provide the following information:

1) Name of organization making delivery

2) Expected date/time of delivery
3) Vehicle make, model and license plate number
4) Drivers name
5) Wadsworth Center contact name and phone number
6) Description of what is being delivered.

2) Inform the sender/driver to proceed to P1-North, press the intercom to contact the State Police and inform them that they have a "specimen" delivery.

Safety & Security Office Responsibilities:

1) Inform the State Police Patrol Supervisor (474-5330) of the pending delivery. If lab personnel want to accept it, provide their name to the State Police. If not, inform them that you will be accepting it.

2) Lab/Security personnel must meet the State Police and courier at P1-South dock to accept delivery. Whoever accepts the delivery, must display photo ID to the State Police.

3) Contact the appropriate lab personnel that the specimen has arrived.

State Police Responsibilities:

1) Contact Wadsworth Center B-Level Security of pending delivery (486-2678)

2) Escort the courier over to P1-South dock area.

7.3 Preparation for Receipt of Samples

Sample receipt will be carried out in two steps. There will be an initial receiving area up on Loading Dock J, P-1 South. This area will be used only to off-load the samples from the delivery vehicle. The samples are then transported immediately to a secure area in the laboratory complex on Level B. The second phase of sample receipt which will include sorting, processing and survey meter screening, will take place in Room B750.

1. The RSO should contact the shift supervisor to determine the estimated time of arrival of samples.

2. The RSO shall designate an area on Dock J, P-1 south, for the off-loading of samples from the delivery vehicle.

    a. This will be coordinated with the shift supervisor, since OGS and the State

Police at (518)-474-5330, must be alerted to the emergency situation.

b. Mark off a 10-ft x 10-ft area on the P-1 South dock-J with radioactive warning tape. Place a plastic drop cloth on the floor in this area. Provide two lab carts, one designated RED and the other designated YELLOW, with absorbent pads on each for transport of samples to Room B750. Have a radioactive waste drum available in this sample receipt area.

3. The RSO is to designate a RED AREA, a YELLOW AREA and a GREEN AREA in Room B-750. This area will be used for the initial sorting, processing and survey-meter screening of samples.

   a. Mark off three adjacent areas of 10 ft x 8 ft using red tape, yellow tape and green tape to designate the three work areas (see figure 1). The YELLOW AREA should be located in the middle with the RED AREA and the GREEN AREA immediately adjacent on each side. Mark off the entire room with radioactive warning tape.

   b. Cover the floor in the RED AREA with a plastic drop cloth. Locate a radioactive waste drum in the RED AREA and have a supply of absorbent pads and plastic trays available in the RED AREA.

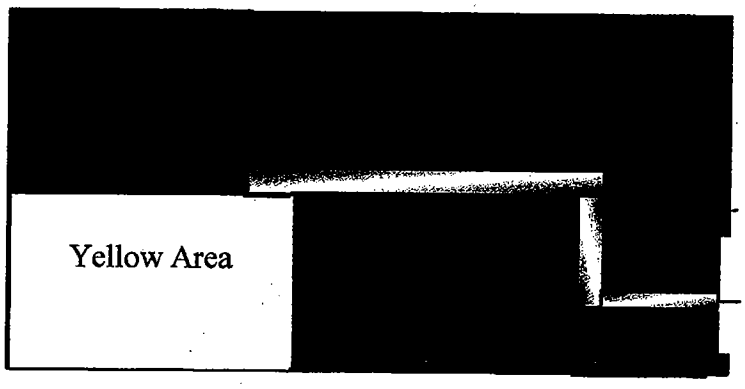


Figure 1. Red, Yellow, Green, and Accessioning areas in Room B750

7.4. Chain of Custody

A Chain of Custody form (DOH-3349 (5/95)) must be completed for any sample which might be used in enforcement proceedings or litigation. During transport of the sample from sampling site to the laboratory, the chain of custody must be unbroken. Generally this will require the sample be delivered by the sample collector or his designated representative who will sign for the receipt, integrity and transfer of the sample during shipment. If integrity of the sample is questionable, describe the problem on the reverse side of the form.

Chain of custody will be maintained for any samples that are received with a chain of custody form. These samples and their forms will be stored in the locked cabinet in room D366.

7.5. Unloading Delivery Vehicle

The RSO staff is designated as the RED TEAM and will unload the delivery vehicle with the assistance of the YELLOW TEAM from the RSO and INC.

1. Before the truck is unloaded, the YELLOW TEAM should obtain the field data sheets and chain of custody forms from the vehicle driver. Undocumented and unlabeled samples are to be set aside, until documented. At the laboratory's discretion, each field sheet may be sealed in an individual plastic bag as follows:

    a. With a GREEN TEAM member holding a clean 9 x 12 inch zip-lock bag, the YELLOW TEAM member carefully places the field sheet in the bag, assuring that the sheet is readable. The bag is then sealed by a GREEN TEAM member.

    b. Place a GREEN LABEL on each bag and forward the sealed field sheets to the accessioning section.

2. The RED TEAM then should unload any leaking or surface-contaminated samples from the delivery vehicle in the following manner:

    a. Leaking samples are to be stabilized before being removed from the truck by placing the samples in a plastic tray. This tray then should be placed on the RED cart on the P-1 South dock. Place a RED LABEL on these samples.
    b. Surface contaminated samples are to be removed next. These should be placed in a second plastic tray and transferred to the RED cart. Place a RED LABEL on each of these samples.

3. After the RED TEAM has unloaded leaking and surface contaminated samples, the YELLOW TEAM will unload the remainder of the samples, whose containers should be clean and dry. Place a YELLOW LABEL on each of these samples and put them on the Yellow cart.

Transport all samples on the RED and YELLOW carts directly to Room B750 or its designated alternate.

7.6 Vehicle and Dock Area Survey

A survey of the delivery vehicle and driver must be made before the delivery vehicle is released. Also, the receiving area on the dock should be surveyed as soon as all samples have been transported to the secure area. This task should be carried out by the RED TEAM.

1. Survey the delivery vehicle and driver. Decontaminate as necessary.

2. Survey the dock work area and decontaminate as necessary.

3. Discard all contaminated material into radioactive waste drum(s).

4. Release vehicle following decontamination. Impound the vehicle and contact the ECC in the event that decontamination efforts are unsuccessful.

7.7 Sorting of Samples in Receipt Area

Samples arriving in Room B-750 from the dock area should be treated in the following manner:

1. Samples with a RED LABEL should be placed in the RED AREA.

2. Samples with a YELLOW LABEL should be placed in the YELLOW AREA.

7.8 Processing Contaminated Samples

Leaking and surface-contaminated samples should be processed in the RED AREA.

1. The RED TEAM working in the RED AREA is to carry out the following tasks:

   a. Transfer leaking samples to new containers.
   b. Mark the new container with appropriate ID and sampling information.

2. The RED TEAM and YELLOW TEAM working in their respective areas are then to carry out the following tasks:

   a. A RED TEAM member is to put each re-packaged sample into a clean plastic bag held by a member of the YELLOW TEAM.

   b. The YELLOW TEAM member is then to seal the bag and place a YELLOW LABEL on it.

   c. These samples now stay in the YELLOW AREA and are processed with the rest of the samples in the YELLOW AREA.

7.9 Re-bagging of Samples

1. The YELLOW TEAM and the GREEN TEAM each working in their respective areas are to carry out the following tasks:

   a. The YELLOW TEAM is to put each sample into a clean plastic bag held open

by a member of the GREEN TEAM working in the adjacent GREEN AREA.

b. The GREEN TEAM is then to seal the bag and place a GREEN LABEL on it.

c. The bagged samples now in the GREEN AREA can be considered clean as long as the outer bag remains sealed.

7.10 Survey Meter Screening of Samples

1. In the GREEN AREA the following tasks are to be carried out:

a. Monitor all samples with a survey meter.

b. Place a white computer label reading "2 x BKG" on any sample with a survey meter reading greater than twice background.

c. Place a white computer label reading ">1 mR/hr" on any sample with a survey meter reading greater than 1 mR/hr. Record actual meter reading in mR/hr on the label and notify shift supervisor of these samples.

d. Transfer all samples to accessioning area.

8.0 SAMPLE ACCESSIONING

8.1 Staffing and General Overview

Supervisory Staff, Section Supervisor: Ilham IlMahamid

The accessioning area is to be located in Room B-750 near the receiving area.

The section supervisor should designate the accessioning area in coordination with the RSO staff member who is setting up the sample receipt and screening area.

Samples and field sheets coming into this area will be clean and may be handled freely as long as sealed bags are not opened.

Samples are to be sorted and matched with field sheets. Any discrepancies are to be brought to the attention of the shift supervisor. Process priority samples first.

For an emergency response event, laboratory accession numbers will be assigned as 8Y5*** (BERP UNSCHEDULED), where Y corresponds to the last digit of the year and *** to the numeric sequence 001 through 999. The sequence can be extended through 8Y6***, etc.

NOTE: At this time, in order to expedite processing and to avoid cross-purposes with routine reporting, the information for these samples will **not** be entered into the WC ELDARS database. Until the nuclear emergency is over, laboratory accession numbers and field ID numbers are to be entered on the emergency sample log only. After the event has been declared terminated by the ECC, a WC accessioning number will be assigned, and the sample collection information, field ID number, and analytical results will be entered into ELDARS.

8.2 Preparing Accessioning Area

The shift supervisor will notify the accessioning section supervisor of the nuclear emergency. The shift supervisor will immediately set up an accessioning area in Room B750 carrying out the tasks described below.

1. In coordination with the RSO, who will be setting up a sample receipt and screening area in Room B750, the section supervisor will designate a GREEN AREA for accessioning near the sample receipt area. Mark off a 10-ft x 20-ft area with green tape.

2. Set up a table and chairs for processing the field sheets and entering information on the Emergency Sample Log.

3. Locate the NaI-screening unit in this area and check the instrument to see that it is functioning properly.

8.3 Sorting and Accessioning

1. As soon as the sealed field sheets are received from the sample receipt section, make two photocopies of each sheet.

2. Working with the photocopied field sheets, sort them by sample type.

3. Assign a laboratory accession number to each sample and write it at the top left of both field sheet copies. Keep one copy with the sample and forward the second copy to the shift supervisor. The original copy will be kept in room D366 along with the stored sample.

4. Enter all accessioned samples on the NEP EMERGENCY SAMPLE LOG, Form NEP-9. Make a copy of NEP-9 and forward it to the shift supervisor.

8.4 NaI Screening and Lab Routing

1. Identify priority samples by placing a white computer label reading "PRIORITY" on the sample and on the corresponding field sheet. Also indicate priority on the Emergency Sample Log by placing a letter "P" next to the accession number.

2. Sort samples by sample type.

3. Match field sheets to samples. Bring any discrepancies between field sheet data and sample label data to the attention of the shift supervisor. Write the accession numbers on the samples.

4. Send all samples with "2 x BKG" label and/or ">1 mR/hr" labels directly to the high-level laboratory after completing the following:

    a. Place a white computer label reading "HIGH-LEVEL LAB" on the sample and on the field sheet.

    b. Using Form DOH 4148, assign type of detector and geometry.

5. Screen all samples having no warning labels ("2 x BKG" or ">1 mR/hr") with the NaI detector.

    a. Send samples that read less than twice background to the low-level laboratory after completing the following:

        1. Place a white computer label reading "LOW-LEVEL LAB" on the sample sheet and on the field sheet.

        2. Assign type of detector and geometry, and record on Form DOH-4148.

    b. Send samples that read greater than twice background to the high-level laboratory after completing the following:

        1. Place a white computer label reading "HIGH-LEVEL LAB" on the sample sheet and the field sheet.

        2. Assign type of detector and geometry, and record on Form DOH-4148.

8.5 General Guide for Assigning Detector and Geometry

In general, all samples, especially any sample which is likely to have a complex gamma-ray spectrum, are to be analyzed on a germanium (Ge) detector, with distribution to be determined by corresponding detector efficiency and availability. Currently, the following Ge detectors are operational:

Ge03 (102%) *Ge04 (20%)* *Ge07 (well, 65%)* *Ge08 (102%)* *Ge09 (131%)*

Low-level samples are to be counted on a 100+ % (relative to NaI). High-level samples should be measured on the 20% Ge detector, or if unavailable, one of the 100+ % units.

Form DOH 4148 is used for germanium measurements. Detectors and geometries for the various sample types are listed below. If more than one geometry is listed, use the first geometry if there is sufficient sample. If sample quantity necessitates, revert to one of the smaller volume geometries.

Sample Type	Detector	Geometry
Milk	Ge	1.4-L Marinelli or 0.5-L Marinelli
Water	Ge	1.4-L Marinelli or 0.5-L Marinelli
Soil	Ge	1.4-L Marinelli, 0.5-L Marinelli, or 250-mL Jar
Vegetation	Ge	1.4-L Marinelli, 0.5-L Marinelli, or 250-mL Jar
Crops	Ge	1.4-L Marinelli, 0.5-L Marinelli, or 250-mL Jar
Fallout	Ge	1.4-L Marinelli, 0.5-L Marinelli, or 250-mL Jar
Precipitation	Ge	1.4-L Marinelli, 0.5-L Marinelli, or 250-mL Jar
Iodine Cartridge	Ge	50-mL plastic bottle
Particulate Filter	Ge	5-cm filter

9.0 SAMPLE PREPARATION

9.1 Staffing and General Overview

Supervisory Staff,	Section Supervisor:	Low-Level Lab:	A. Bari
		High-Level lab:	I. AlMahamid

A variety of environmental and food samples may be measured during a nuclear emergency. These may include the following:

- Water and Milk
- Crops, Food, Vegetation and Forage
- Soil
- Air Particulate Filters and Wipes
- Radioiodine Cartridges
- Fallout and Precipitation

Environmental samples such as air filters, soil and fallout are analyzed in the usual manner.

Food samples are analyzed in a manner that determines radioactivity content of the edible portion, unless instructed otherwise by the ECC. Remove inedible portions of the sample.

Washing to remove surface contamination to an acceptable level may be requested. Such requests will come from the ECC. Otherwise, do not wash.

Soil samples are analyzed to determine radionuclide deposition.

Vegetation and forage samples are also useful in providing an indication of deposition levels and in determining whether the forage should be used as feed for livestock.

Gamma analysis by high purity germanium detectors will be the primary measurement on most emergency samples. Alpha-, beta-, and liquid scintillation counting systems are available as well as other analyses requiring radiochemistry (such as I-125 and I-129) upon request.

Analysis	Method	SOP
Gross Alpha and Gross Beta Activity	EPA 900.0	DOH-LINC-911
Determination of Tritium as HTO	EPA 906.0	DOH-LINC-913
Isotopic Gamma Determination	EPA 901.1	DOH-LINC-914
Isotopic Plutonium Determination	NYS Pu-02	DOH-LINC-916
Isotopic Uranium Determination	ASTM D3972-90	DOH-LINC-917
Determination of Sr-89 and Sr-90	EMSL-CI EPA1976, p.29	DOH-LINC-919
Determination of I-131	EPA 901.1	DOH-LINC-914
Determination of I-125 and I-129	NYS I-08L	DOH-LINC-921

Since samples may be highly contaminated, disposable containers and utensils are to be used to the fullest extent possible. Non-disposable Marinelli containers are to be washed and measured to check for contamination prior to re-use.

9.2 Contamination Control during Sample Preparation

These protocols are to be used in section 9.3 through 9.10 in both the low-level laboratory and the high-level laboratory. The section supervisor is to insure that the laboratory staff is thoroughly familiar with these contamination control protocols.
Samples as received from the accessioning section should be considered externally "clean". However, as soon as the sealed plastic bag containing a sample is opened for processing there is a potential for laboratory contamination or cross-contamination of samples.

Samples identified as ">1 mR/hr" label are to be handled and processed by the most experienced person in the section at the time.

1. The section supervisor is to form a YELLOW TEAM and a GREEN TEAM.

2. In the high-level lab, the section supervisor is to designate a YELLOW AREA and a GREEN AREA and delineate these areas with yellow tape and green tape.

3. Absorbent pads are to be placed in both work areas. A radioactive waste disposal drum should be located in the YELLOW AREA.

4. The YELLOW TEAM is to handle the samples as received from the accessioning section. All sample preparation and handling of the sample or sample container is to be carried out by the YELLOW TEAM.

5. The GREEN TEAM is to handle only the counting container and any bags or envelopes used to cover the counting container prior to transfer to the counting room. The GREEN TEAM will also be responsible for such operations as weighing and marking the filled counting containers, as well as completing records (e.g., weight, volume, geometry, etc.).

6. When the YELLOW TEAM has a sample ready for counting, the GREEN TEAM will hold the counting container while the YELLOW TEAM fills it, taking care not to spill sample on the outside of the container during the filling process.

7. The GREEN TEAM will then cap the container, seal it, clean it with wipers and Isoclean, place a green label on the outside of the container, and seal the cap with tape.

8. After placing an accession label on the container, the GREEN TEAM will then place the sealed sample on a clean cart to await transfer to the counting room.

9. Excess sample should be re-bagged as follows.

a. The YELLOW TEAM is to place a yellow label on the sample bag or container if one is not already affixed.

b. The YELLOW TEAM is to put the sample into a clean bag held by a member of the GREEN TEAM.

c. The GREEN TEAM is then to seal the bag and place a green label on the outside of this bag.

d. The bagged sample now in the GREEN AREA can now be considered clean as long as the bag remains sealed.

9.3 Water and Milk Samples

1. Measure and transfer an aliquot of the water or milk sample to a pre-marked Marinelli of the geometry specified on the lab data sheet.

2. Record the volume in liters as the "quantity analyzed" on the lab data sheet.

3. Record the analyst on the lab data sheet.

Write the sample number on the sample container and place the container on a lab cart until a batch of 3-4 samples is ready for transfer to the counting room.

9.4 Crop and Food Samples

1. Prepare the fruit or vegetable sample so that only the edible portion is analyzed, unless other instructions are given.

2. Determine if the sample is to be washed before processing. If so, rinse with water. Do not wash unless instructed to do so.

3. Remove husks, rind or other inedible portions of the sample.

4. Cut the sample into small pieces. If the sample is corn, remove kernels from the cob.

5. Tightly pack the sample into a tared, pre-marked 1.4-L Marinelli. Try to minimize the void space. If the sample quantity is insufficient, use a 0.5-L Marinelli or a 250-mL jar.

6. Weigh the sample and container. Subtract the container tare weight to give net weight. Record the net weight as the "quantity analyzed" on the lab data sheet.

7. Record the analyst on the lab data sheet.

8. Write the sample number on the sample container and place the container on a lab cart until a batch of 3-4 samples is ready for transfer to the counting room.

9.5 Soil Samples

1. Weigh the entire sample and record this weight to the right of the quantity analyzed space on the lab data sheet.

2. Line a large dish or pan with polyethylene (split plastic bag). Transfer the entire sample to the dish. If the sample contains large rocks (>1cm), sticks or other material, check with section supervisor before proceeding.

3. Blend the sample with a disposable rod. Transfer a sample aliquot to a tared 0.5-L Marinelli. Fill to the pre-marked sample volume level.

4. Weigh the sample and container. Subtract the container tare weight to obtain net weight. Record the net weight as "quantity analyzed" on the lab data sheet. Record the "aliquot factor" to allow estimate of areal activity ($\mu Ci/m^2$), if area sampled is provided.

5. Record the analyst on the lab data sheet.

6. Write the sample number on the sample container and place the container on a lab cart until a batch of 3-4 samples is ready for transfer to the counting room.

9.6 Vegetation and Forage Samples

1. Cut the sample into small pieces. Tightly pack the sample into a tared, pre-marked 1.4-L Marinelli container. If the sample quantity is insufficient to fill the 1.4-L Marinelli to the pre-marked level, use a tared, pre-marked 0.5-L Marinelli.

2. Weigh the sample and container. Subtract the container tare weight to give the net weight. Record the net weight as "quantity analyzed" on the lab data sheet.

3. Record the analyst on the lab data sheet.

4. Write the sample number on the sample container and place the container on a lab cart until a batch of 3-4 samples is ready for transfer to the counting room

9.7 Air Particulate Filters and Wipes

1. If an air filter or wipe is received in a glassine envelope or clear bag, do not remove it. Place the filter and envelope or bag intact into another small plastic bag and seal with tape. Place any uncovered air filter samples into a glassine envelope and seal with tape.

2. Record the geometry on the lab data sheet.

3. Record the analyst on the lab data sheet.

4. Write the sample number on the envelope or bag and place the package on the lab cart until a batch of 3-4 samples is ready for transfer to the counting room.

9.8 Charcoal or Silver Zeolite Cartridges for Radioiodine Analysis

1. Pry open the cartridge (Sampler CP-200) using forceps or pliers.

2. Quantitatively transfer the contents to a 2-oz bottle (50-mL geometry) and tighten the screw-cap. Vortex the sample for 2 minutes to homogenize.

3. Record the geometry on the lab data sheet. Record the analyst on the lab data sheet. The quantity analyzed is computed by the Data Processing Group.

4. Write the sample number on the plastic bag and place on the lab cart until a batch of 3-4 samples is ready for transfer to the counting room.

9.9 Fallout and Precipitation Samples

1. If the sample is delivered in more than one container, mix the contents of all the containers together. Measure the total volume of the collected sample. Record the total quantity collected to the right of the "quantity analyzed" space on the lab data sheet.

2. Measure a thoroughly mixed sample aliquot into a container of the geometry specified on the lab data sheet. Fill to the pre-marked sample volume level. If there is not enough sample to fill the specified container to the correct volume level, check with the Section Supervisor.

3. Record the measured volume as the "quantity analyzed" on the lab data sheet.

4. Record the "aliquot factor" and the analyst on the lab data sheet.

5. Write the sample number on the sample container and place the container on a lab cart until a batch of 3-4 samples is ready for transfer to the counting room.

9.10 Snow Samples

1. Melt the snow before mixing. Determine the total sample volume. Record this volume to the right of the "quantity analyzed" space on the lab data sheet.

2. Measure a thoroughly mixed sample aliquot into a container of the geometry specified on the lab data sheet. Fill to the premarked sample quantity.

3. Record the measured volume as the "quantity analyzed" on the lab data sheet.

4. Record the "aliquot factor" and the analyst on the lab data sheet.

5. Write the sample number on the sample container and place the container on a lab cart until a batch of 3-4 samples is ready for transfer to the counting room.

9.11 Storage of Samples and Decontamination of Utensils

1. After counting has been completed, return samples to the laboratory in which they were prepared. High-level samples should be stored in the high-level laboratory (D568) and low-level samples should be stored in the INC designated storage area (D366).

2. Store the samples in the counting container. Do not transfer samples or sample aliquots back into the original container. However, if the Marinelli containers are to be re-used, transfer the counted samples to clean labeled plastic bottles, thoroughly clean the Marinelli containers, and count them to assure no contamination.

3. Soak all utensils that are to be reused in 2% Isoclean solution overnight. If utensils must be reused immediately, soak in hot 2% Isoclean solution for at least 20 minutes.

4. Check decontaminated utensils by wet-wiping and gamma counting the wipes.

10.0 SAMPLE COUNTING

10.1 Staffing and General Overview

Supervisory Staff, Section Supervisor: T. Semkow

Isotopic gamma analyses will be performed with germanium (Ge) detectors. Low-level samples are to be counted on a 100+ % (relative to NaI) Ge detector. High-level samples should be measured on the 20% Ge detector, or if unavailable, one of the 100+ % units.

All samples will be counted for 20 minutes. The detection limits for the three geometries used for emergency samples are listed in Section 10.3. If lower detection limits are required, counting times may be increased. This will be determined by the section supervisor only on request from the ECC and should be indicated on the lab data sheet.

10.2 Counting Procedures

1. Check the integrity of all samples, including the seal (either caulk, tape, or plastic bag). Reject unacceptable samples; return them to originating laboratory..

2. Count samples as soon as possible in the order of receipt in the counting room, unless instructed otherwise. Priority samples ("P" labels) should be counted first.

3. Count all samples for 20 minute, unless instructed otherwise.

4. Follow normal counting procedures for Ge measurement.

   a. Calibrate detectors according to the SOP manual, trice weekly.

   b. Standardize detectors according to the SOP manual.

   c. Run the instrument calibration verification source according to the SOP manual twice weekly

   d. Verify the detector performance and correct, if necessary.

   e. Load each sample on the appropriate detector.

   f. For each sample, record the detector, start time, count date and time, length of count and tag number on the lab data sheet and store the spectrum after measurement has been completed.

   g. Provide the lab data sheet to the section supervisor for his review. The section supervisor is to review and initial the lab data sheet, then forward it to the data processing section.

   h. At least once per shift, measure a 20-minute background on all detectors; do so immediately after any instance of suspected detector contamination.

   i. If Marinelli containers are to be re-used, measure empty containers for contamination.

10.3 Detection Limits (μCi/L) for Emergency Samples

Values below are calculated for a water sample counted on a 102% Ge detector for 20 minutes following a 0.9-day decay time. Detection limit values (μCi/L) will be the same for any samples with a density near 1 g/cm^3.

Nuclide	Z	Half Life	Energy keV	1.4 L Marinelli	0.5 L Marinelli	250 mL Jar
^{58}Co	27	70.8d	811	2.6×10^{-6}	6.1×10^{-6}	1.7×10^{-5}
^{60}Co	27	5.27y	1173	2.6×10^{-6}	6.1×10^{-6}	1.7×10^{-5}
^{60}Co	27	5.27y	1332	2.6×10^{-6}	6.9×10^{-6}	1.7×10^{-5}
^{65}Zn	30	244d	1115	6.1×10^{-6}	1.7×10^{-5}	3.5×10^{-5}
^{91}Sr	38	9.5h	555	8.7×10^{-6}	2.6×10^{-5}	6.1×10^{-5}
^{91}Sr	38	9.5h	1024	2.6×10^{-5}	6.1×10^{-5}	1.7×10^{-4}
^{91}Y	39	9.5h	1205	8.7×10^{-4}	2.6×10^{-3}	6.1×10^{-3}
^{95}Zr	40	64d	757	3.5×10^{-6}	6.9×10^{-6}	1.7×10^{-5}
^{97}Zr	40	16.9h	743	4.3×10^{-6}	8.7×10^{-6}	2.6×10^{-5}
^{95}Nb	41	35d	766	1.7×10^{-6}	4.3×10^{-6}	8.7×10^{-6}
^{99}Mo	42	66h	740	2.6×10^{-5}	5.2×10^{-5}	8.7×10^{-5}
^{99}Tc^{m}	43	6h	140	2.6×10^{-5}	6.9×10^{-5}	1.7×10^{-4}
^{103}Ru	44	39.4d	497	3.5×10^{-6}	6.9×10^{-6}	1.7×10^{-5}
^{106}Ru	44	367d	622	1.7×10^{-5}	3.5×10^{-5}	8.7×10^{-5}
^{127}Sb	51	3.9d	686	8.7×10^{-6}	2.6×10^{-5}	6.1×10^{-5}
^{127}Sb	51	3.9d	784	2.6×10^{-6}	5.2×10^{-5}	8.7×10^{-5}
^{129}Sb	51	4.4h	813	1.7×10^{-4}	3.5×10^{-4}	8.7×10^{-4}
^{129}Sb	51	4.4h	915	2.6×10^{-4}	6.1×10^{-4}	1.7×10^{-3}
^{127}Te^{m}	52	109d	57	1.7×10^{-3}	3.5×10^{-3}	3.5×10^{-3}
^{129m}Te	52	33.5d	696	1.7×10^{-4}	2.6×10^{-4}	5.2×10^{-4}
^{131m}Te	52	30h	774	7.8×10^{-6}	1.7×10^{-5}	3.5×10^{-5}
^{131m}Te	52	30h	852	1.7×10^{-5}	3.5×10^{-5}	7.8×10^{-5}
^{132}Te	52	78h	228	4.3×10^{-6}	8.7×10^{-6}	1.7×10^{-5}
^{131}I	53	8d	364	2.6×10^{-6}	6.1×10^{-6}	1.7×10^{-5}
^{132}I	53	2.28h	668	1.7×10^{-3}	3.5×10^{-3}	8.7×10^{-3}
^{133}I	53	20.9h	530	5.2×10^{-6}	8.7×10^{-6}	2.6×10^{-5}
^{135}I	53	6.6h	1131	8.7×10^{-5}	1.7×10^{-4}	4.3×10^{-4}

Nuclide	Z	Half Life	Energy keV	1.4 L Marinelli	0.5 L Marinelli	250 mL Jar
^{134}Cs	55	2y	605	2.6×10^{-6}	5.2×10^{-6}	8.7×10^{-6}
^{134}Cs	55	2y	796	3.5×10^{-6}	6.9×10^{-6}	1.7×10^{-5}
^{136}Cs	55	13d	818	1.7×10^{-6}	4.3×10^{-6}	8.7×10^{-6}
^{137}Cs	55	30y	662	3.5×10^{-6}	7.8×10^{-6}	1.7×10^{-5}
^{140}Ba	56	12.8d	537	7.8×10^{-6}	1.7×10^{-5}	4.3×10^{-5}
^{140}La	57	40.3h	486	3.5×10^{-6}	7.8×10^{-6}	1.7×10^{-5}
^{141}Ce	58	32.5d	145	6.0×10^{-6}	8.7×10^{-6}	2.6×10^{-5}
^{143}Ce	58	33h	293	7.8×10^{-6}	1.7×10^{-5}	3.5×10^{-5}
^{144}Ce	58	284d	133	1.7×10^{-5}	4.3×10^{-5}	8.7×10^{-5}
^{147}Nd	60	11d	531	1.7×10^{-5}	3.5×10^{-5}	8.7×10^{-5}
^{239}Np	93	2.35d	106	8.7×10^{-6}	2.6×10^{-5}	5.2×10^{-5}
^{241}Am	95	433y	59.5	4.2×10^{-5}	7.9×10^{-5}	9.4×10^{-5}

11.0 CALCULATIONS AND REPORTING

11.1 Staffing and General Overview

Supervisory Staff, Section Supervisor M. Kitto

All photo peaks that are significantly above background are identified and quantified. If the following radionuclides of concern (^{131}I, ^{132}Te, ^{134}Cs, ^{137}Cs, ^{103}Ru and ^{106}Ru) do not yield a positive value, compute a "less than" value.

Results are to be reported in the following units:

- Liquids (water, milk) — µCi/L
- Soils and snow — µCi/100cm^2 or µCi/sample
- Fallout and Precipitation — µCi/m^2/day
- Solids (food, vegetation, etc.) — µCi/kg
- Air (particulate filter, iodine cartridge) — µCi/m^3

Results are to be reported to the ECC by e-mail in an Excel spreadsheet ordered by atomic number. Example:

Nuclide	Sample Results µCi/L
Zr-95	0.00E ± 00
I-131	0.00E ± 00

Cs-137 0.00E ± 00

11.2 Procedure

1. Process the Ge spectral data using the normal procedures.

2. Compute activity for all photopeaks significantly above background. If the following radionuclides of concern (^{131}I, ^{132}Te, ^{134}Cs, ^{137}Cs, ^{103}Ru and ^{106}Ru) do not yield a positive value, compute a "less than" value. Print peak areas.

3. Provide a copy of the report package with the field sheet to the data processing section supervisor.

4. The data processing section supervisor should review the sample results by confirming the presence of all photopeaks using the table in section 11.3 He or she should then initial the reports and forward them to the shift supervisor.

5. The shift supervisor is to review and initial the results and transmit the report promptly to BERP by e-mail.

Notify BERP by phone that you have sent an e-mail or a FAX:

a) When SEMO is activated 518-301-2016, or -2059, or -2031, or -2045
b) When SEMO is deactivated 518-402-7550

Backup Methods of Communication:

a) When SEMO is activated Fax 518-292-2481
b) When SEMO is deactivated Fax 518-402-7554
c) By messenger

Primary contact:	**Cindy Costello**	cac04@health.state.ny.us
cc a copy to:	Dr. Adela Salame-Alfie	asa01@health.state.ny.us
	Stephen Gavitt	smg03@health.state.ny.us
	Robert Snyder	rps02@health.state.ny.us
	Mark Virgil	mgv01@health.state.ny.us

Email is preferred and should be in **Microsoft Excel** or Word format.

11.3 Confirming Peaks for Germanium Spectra

Radionuclide	Primary Peak Energy (keV)	Primary Peak Abundance (%)	Secondary Peak Energy (keV)	Secondary Peak Abundance (%)
^{58}Co	811	99	None	
^{60}Co	1173	100	1332	100
^{91}Sr	556	61	1024	33
^{91}Y	1205	1	None	
^{95}Zr	756	55	724	44
^{97}Zr	74	98	508	5
^{95}Nb	766	99	None	
^{99}Mo	739	12	141	91
^{99m}Tc	141	87	None	
^{103}Ru	497	91	610	6
^{106}Ru	622	10	1050	2
^{127}Sb	686	35	784	15
^{129}Sb	814	48	915	21
^{129m}Te	696	3	730	0.7
^{131m}Te	773	38	852	21
^{132}Te	228	88	28	58
^{131}I	364	81	284	6
^{132}I	668	99	773	76
^{134}I	847	96	884	66
^{135}I	1131	22	1260	29
^{134}Cs	605	98	796	84
^{136}Cs	818	100	1048	80
^{137}Cs	661	85	32	5
^{140}La	487	43	1596	96
^{141}Ce	145	48	36	13
^{143}Ce	293	43	57	12
^{144}Ce	133	11	36	7
^{143}Pr	None		None	
^{147}Nd	531	13	91	28
^{239}Np	106	23	228	11

11.4 Estimate of Sample Load Capacity

These estimates of sample load capacity are predicated on having four operational germanium detectors. Also assumed are 20 minutes counting time plus 5 minutes data recording for each sample. These estimates are for a single 12 hour shift

Number of Ge detectors	Measurements/hour	Hours/shift	Total Samples
4	2	12	120

The above estimates also allow for counting periods taken up with background counts, general quality assurance and other quality control measures (about 10 minutes per hour per detector).

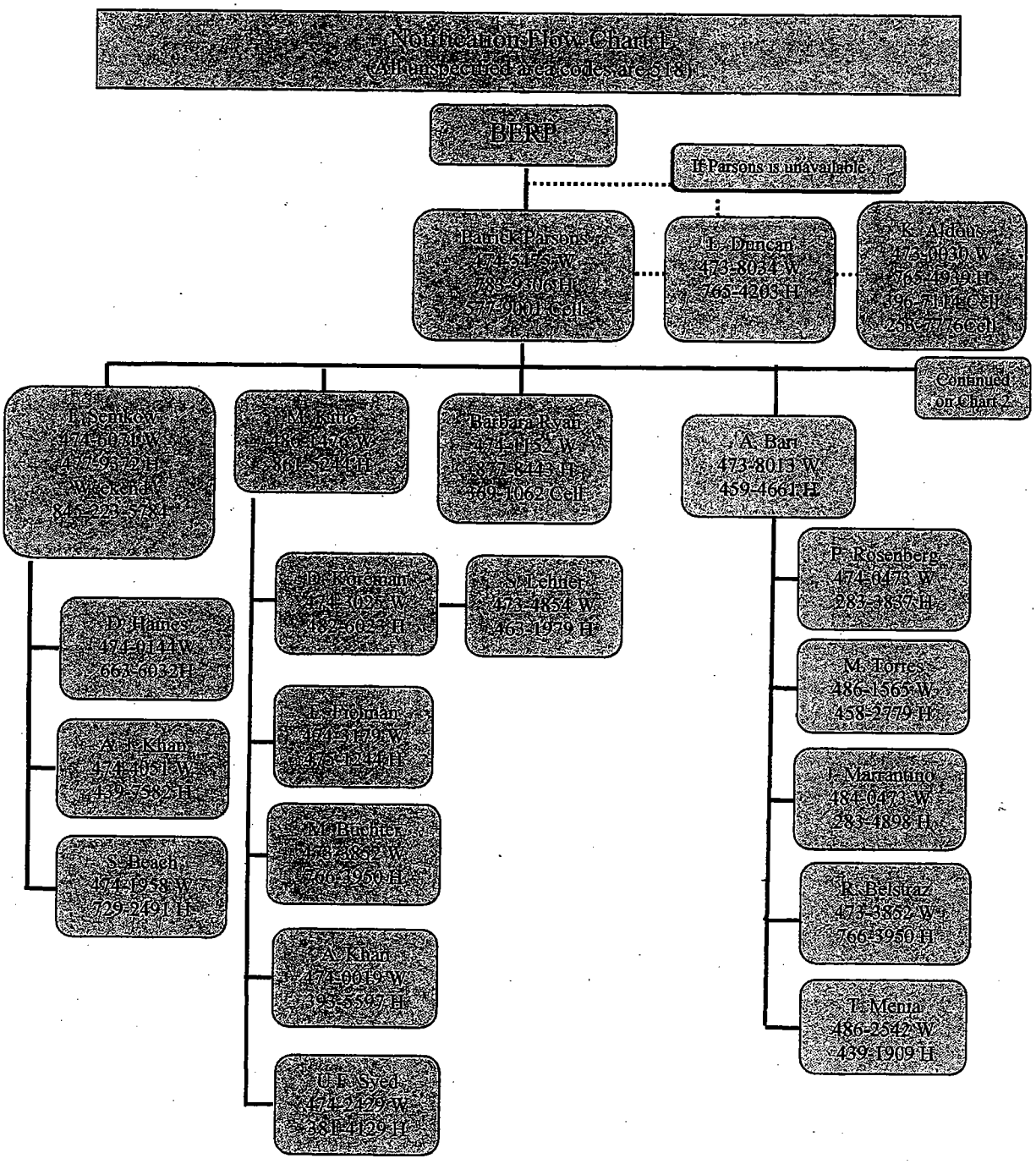
At the time of the emergency, the shift supervisor will provide the ECC with an updated sample load capacity based on the number of detectors in service at that time.

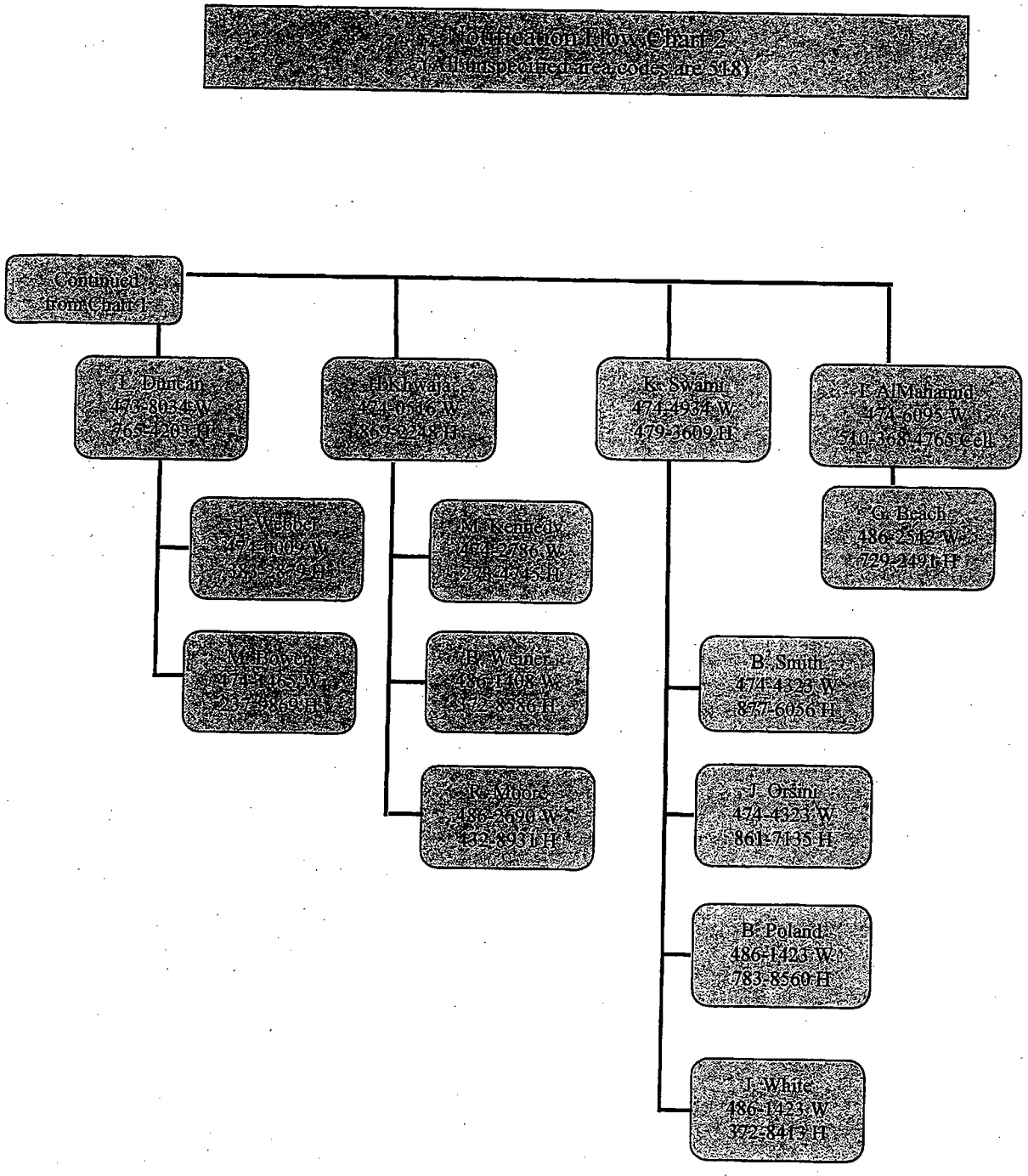
Also to be provided on a continuing basis will be the turn-around time per sample, which will vary with time depending on numbers and types of sample delivered at any period of time, as well as varying according to the number of detectors in service.

11.5 Estimate of Turn-around Time

The turn-around time for gamma analysis can be expected to be four (4) hours.

LABORATORY PROCEDURES – APPENDICES





NEP-10 SHIFT STAFF ASSIGNMENT RECORD

PLEASE PRINT LEGIBLY

Date _____ Shift _____ **Red Team, Yellow Team, Green Team**

Shift Supervisor **P. Parsons**

Sample Receipt & Pre-Accessioning

Section Supervisor **L. Duncan (RSO)**

1. **L. Duncan (RSO)**
2. **M. Bowen (RSO)**
3. **M. Buchter**
4. **J. Orsini**
5. **B. Poland** (Photo copies) (Yellow/Green Interface)
6. **A. Khan** (Survey Meter)
7. **B. Smith** (Yellow/Green Interface)

Accessioning

Section Supervisor **I. Almahamid**

1. **R. Belstraz (Accessioning)**
2. **P. Rosenberg/G. Beach (Accessioning)**
3. **Umme-Farzanas (NaI Detector)**
4. **E. Fielman (Documentation)(1hr 1st batch)**
5. **J. Webber (Distributor)**
6. **T. Menia (Documentation)(1hr 1st batch)**
7. _____

Sample Prep (Low-Level Lab)

Section Supervisor **A. Bari**

1. **J. Marrantino**
2. H. Khwaja
3. **J. White**
4. **B.Weiner**
5. **M. Mirza**

Sample Prep (High-Level Lab)

Section Supervisor **A. Bari/I. Almahamid**

1. **M. Torres**
2. **R. Moore**
3. **K. Swami**
4. P. Rosenberg

Counting

Section Supervisor **T. Semkow/A.J. Khan**

1. **D. Haines**
2. **A. J. Khan**
3. **S. Beach**
4. _____

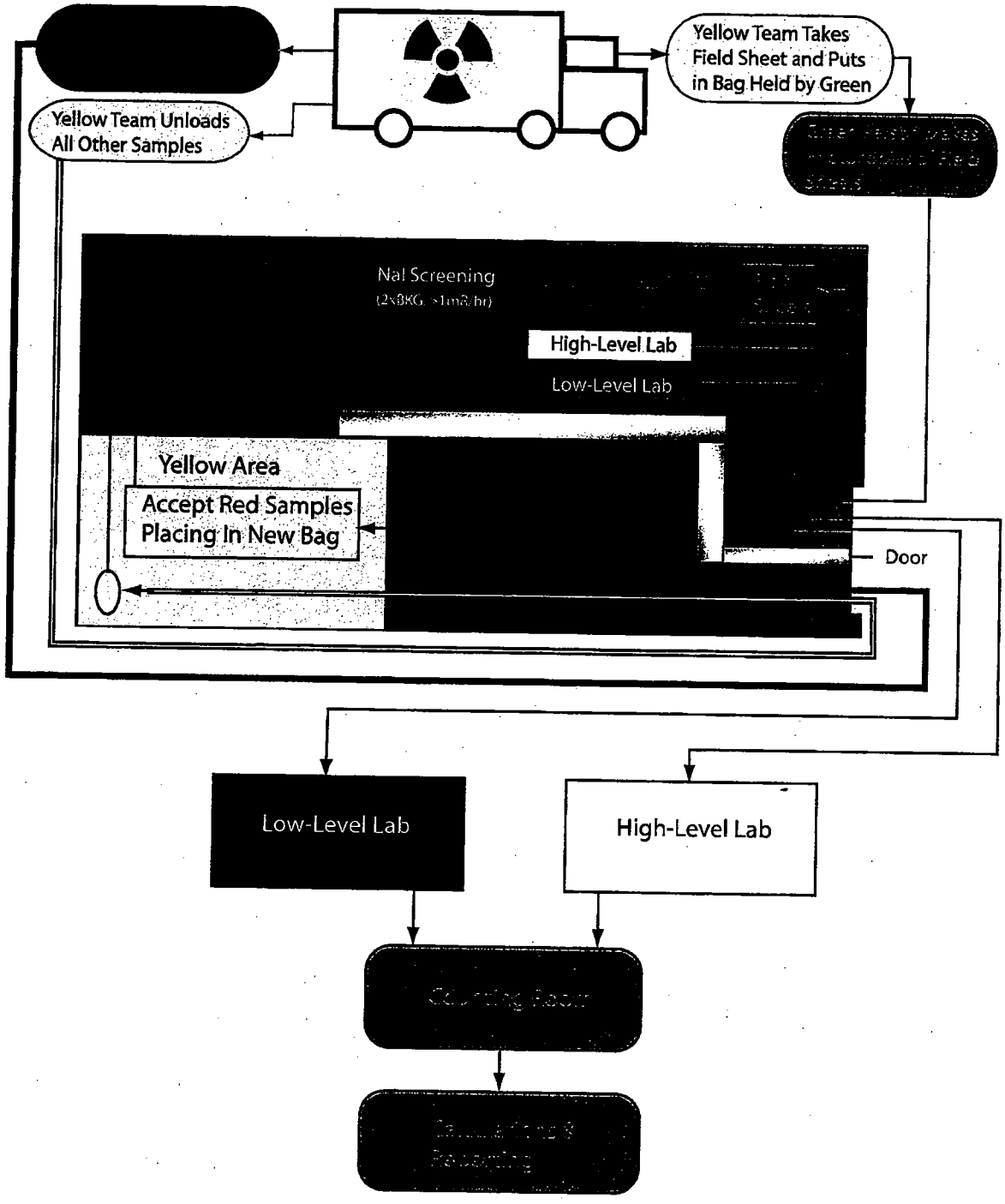
Calculation/Reporting

Section Supervisor **M. Kitto**

1. **E. Fielman**
2. **T. Menia**
3. **D. Koreman (Reporting)**
4. _____

Name	Work Phone	Home Phone
Kenneth Aldous	474-7161	765-1849 396-7114 Cell 253-7776 Cell
Ilham Almahamid	474-6095	510-368-4765 Cell
Abdul Bari	473-8013	459-4661
Gretchen Beach	486-2542	729-2491
Shaun Beach	474-1958	729-2491
Ronald Belstraz	473-0835	399-6037
Martin Buchter	473-3852	766-3950
Michael Bowen	474-1465	237-9869
Laurie Duncan	473-8034	765-4203
Eileen Fielman	474-3179	475-1244
Douglas Haines	474-0144	663-6032
Matthew Kennedy	474-2786	273-4745
Abdul J. Khan	474-4051	439-7582
Adil Khan	474-0019	393-5597
Haider Khwaja	474-0516	869-2248
Mike Kitto	486-1476	861-5244
Darleen Koreman	474-3025	482-6023
Shirley Lehner	473-4854	463-1979
Joseph Marrantino	474-0473	283-4898
Traci Menia	473-0725	439-1909
Roger Moore	486-2690	432-8931
John Orsini	474-4323	861-7135
P. Parsons	474-7161	783-9306 577-9001 Cell
Bruce Poland	486-1423	783-8560
Peter Rosenberg	474-0473	283-3837
Barbara Ryan	474-1152	877-8443 369-1062 Cell
Thomas Semkow	474-6071	477-9372 (845)-223-5784 Weekends (845)-518-2515 Cell
Robert Smith	474-4323	877-6056
Kamal Swami	474-4934	479-3609
Umme-Farzana Syed	474-2429	381-4129
Miguel Torres	486-1565	458-2779
James Webber	474-0009	875-9081
Brian Weiner	486-1408	372-8586
Jean White	486-1423	372-8413

Receiving and Accessioning Flow Chart



NEP-1 NOTIFICATION RECORD

Date_____ Caller

PLEASE PRINT LEGIBLY

Name	Called by	Time Reached	Comments
P. Parsons	BERP		
K. Aldous			
I. Almahamid	Parsons		
A. Bari	Parsons		
R. Beltraz	Bari		
G. Beach	Almahamid		
M. Buchter	Kitto		
M. Bowen	Duncan		
L. Duncan	Brown		
V. Dutkiewicz	Semkow		
E. Fielman	Kitto		
D. Haines	Semkow		
M. Kennedy	Khwaja		
A. Khan	Kitto		
A. J. Khan	Semkow		
H. Khwaja	Parsons		
M. Kitto	Parsons		
D. Koreman	Kitto		
S. Lehner	Koreman		
J. Marrantino	Bari		
T. Menia	Bari		
R. Moore	Yoshinari		
J. Orsini	Smith		
	Semkow		
B. Poland	Swami		
P. Rosenberg			
B. Ryan	Parsons		
T. Semkow	Parsons		
R. Smith	Bari		
K. Swami	Parsons		
M. Torres	Bari		
J. Webber	Duncan		
B. Weiner	Khwaja		
J. White	Swami		

NEP-3 RADIATION SURVEY RECORD

PLEASE PRINT LEGIBLY

Date	Surveyed Person or Area	Reading (mR/hr)

NEP-4 TELEPHONE LOG

Date	Time	Incoming call from	Outgoing call to	Message

NEP-5 FAX LOG

PLEASE PRINT LEGIBLY

Date	Time	FAX from	FAX to	FAX File #

NEP-6 COURIER LOG

PLEASE PRINT LEGIBLY

Date	Time	Courier	Destination

NEP-7 EMERGENCY SUPPLY AUDIT

Date _____
Room _____
Audited by _____

PLEASE PRINT LEGIBLY

Item	Available	
	Yes	No
Durasorb Plastic-backed Absorbent Pads	___	___
Plastic Trays, 14" X 18"	___	___
Disposable Gloves	___	___
Plastic Bags, assorted sizes	___	___
Paper Towels	___	___
Wipers, cotton	___	___
Isoclean	___	___
Permanent Markers	___	___
Radioactive Label Tape	___	___
Red Pre-apply Labels	___	___
Yellow Pre-apply Labels	___	___
Green Pre-apply Labels	___	___
White Computer Labels pre-printed with LOW-LEVEL LAB	___	___
White Computer Labels pre-printed with HIGH-LEVEL LAB	___	___
Zip-lock Bags, 9" X 12"	___	___
Emergency Log Forms (NEP-1 through –10; DOH-4148)	___	___
Marinelli Containers, disposable, 1.4 L and 0.5 L, with snap-on lids	___	___
Widemouth Jars, disposable, 250 mL	___	___
Plastic Bottles, Disposable, 2 oz (50 mL geometry)	___	___
Plastic Knives and Spoons, Disposable	___	___
Glassine Envelopes	___	___
Wooden Tongue Blades	___	___
Mixing Rods, Disposable	___	___
Dust Masks	___	___

NEP-8 EMERGENCY CART AUDIT

Date _____
Room _____
Audited by _____ ***PLEASE PRINT LEGIBLY***

Equipment:	**Present and Operational**	
	Yes	**No**
NaI Detector, 3" X 3"		
HV Power Supply		
Preamplifier/Amplifier/Discriminator, Counter/Timer, Cables		
Lead Bricks and Steel Plates for Shielding		
GM Meter, Ludlum Model 3		

Supplies:	**Available**		**Supplies**	**Available**	
	Yes	**No**		**Yes**	**No**
Duosorb Plastic-backed Absorbent Pads			Flashlight with Batteries		
Plastic Trays			Screwdriver		
Disposable Gloves			Red Pre-apply Labels		
Plastic Bags, assorted sizes			Yellow Pre-apply Labels		
Paper Towels			Green Pre-apply Labels		
Wipers, cotton			Red, Yellow, and Green Badges		
Isoclean or equivalent			Roll of Red Tape		
Permanent Markers and Pens			Roll of Yellow Tape		
Post-it Notes			Roll of Green Tape		
Note pad (for making signs etc.)					
Radioactive Label Tape					
Lab Coats					
Lead Apron					
Dust Masks					
Rubber Shoe Covers					
White Computer Labels printed with "PRIORITY"					
White Computer Labels printed with "LOW –LEVEL LAB"					
White Computer Labels printed with "HIGH-LEVEL LAB"					
White Computer Labels printed with "2x BKG"					
White Computer Labels printed with ">1 mR/hR"					

NEP-9 EMERGENCY SAMPLE LOG

PLEASE PRINT LEGIBLY

Field ID	Lab ID	TYPE	Priority	RCPT D/T	ACCESS D/T	LLL D/T	HLL D/T	CNT D/T	CALC D/T
				/	/	/	/	/	/
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				/	/	/	/	/	/

IPEC00201715

NEP-10 SHIFT STAFF ASSIGNMENT RECORD

PLEASE PRINT LEGIBLY

Date _____ Shift _____

Shift Supervisor _____

Sample Receipt

Section Supervisor _____
1. _____
2. _____
3. _____
4. _____

Accessioning

Section Supervisor _____
1. _____
2. _____
3. _____
4. _____

Sample Prep (Low-Level Lab)

Section Supervisor _____
1. _____
2. _____
3. _____
4. _____

Sample Prep (High-Level Lab)

Section Supervisor _____
1. _____
2. _____
3. _____
4. _____

Counting

Section Supervisor _____
1. _____
2. _____
3. _____
4. _____

Calculation/Reporting

Section Supervisor _____
1. _____
2. _____
3. _____
4. _____

NEP-11 E-MAIL LOG

PLEASE PRINT LEGIBLY

Date	Time	e-mail from	e-mail to	e-mail address

NEW YORK STATE DEPARTMENT OF HEALTH
Wadsworth Center
Albany, NY 12201-0509

Chain of Custody Record

Instructions: This form must be completed for any sample which might be used in enforcement proceedings or litigation. **Transporting Samples:** During transport of the sample from sampling site to the laboratory, the chain of custody must be unbroken. Generally this will require the sample be delivered by the sample collector or his designated representative who will sign for the receipt, integrity and transfer of the sample during shipment. If integrity of the sample is questionable, describe problem on the reverse side of this form.

					☐ Water ☐ Air ☐ Soil ☐ Other
					☐ Water ☐ Air ☐ Soil ☐ Other
					☐ Water ☐ Air ☐ Soil ☐ Other
					☐ Water ☐ Air ☐ Soil ☐ Other
					☐ Water ☐ Air ☐ Soil ☐ Other
					☐ Water ☐ Air ☐ Soil ☐ Other
					☐ Water ☐ Air ☐ Soil ☐ Other
					☐ Water ☐ Air ☐ Soil ☐ Other

	Name	Affiliation	Date	Time
1 a. Sample container prepared by			/ /	
b. Sample container prepared by			/ /	
2. Received by			/ /	
3. Received by			/ /	
4. Sample Collected by			/ /	
5. Sample Received by			/ /	
6. Sample Received by			/ /	
7. Sample Received by			/ /	
8. Sample Received by			/ /	
9. Sample Received by			/ /	
10. Sample Received at Lab by			/ /	
11. Sample Accessioned by			/ /	

DOH-3349 (5/95)

IPEC00201719

NYSDOH/DEDP/INC – Isotopic Gamma and Radioiodine Data Sheet

New York State Department of Health/Division of Environmental Disease Prevention/Inorganic and Nuclear Chemistry Laboratory

Sample Data:
Analyst ____

Sample Number

_____

Requested Analysis

Germanium (Ge) Count
- ☐ Isotopic Gamma
- ☐ ^{125}Iodine
- ☐ ^{125,129}Iodine (x-ray)
- ☐ ^{241}Americium

Sodium Iodide (NaI) Count
- ☐ Isotopic Gamma
- ☐ ^{125}Iodine (in vivo)
- ☐ ^{125}Iodine (well resin)
- ☐ ^{131}Iodine (βγ coincidence)

Nuclides

_____

Common

Sample Type _____

Sample Site/Description _____

Water/Milk

Start Date/Time _____

Stop Date/Time _____

Air

Start Date/Time _____

Start Meter Reading _____ ft^3

Stop Date/Time _____

Stop Meter Reading _____ ft^3

Sample Volume _____ ft^3

Other

Fallout Area _____ m^2

Precipitation Volume _____ L

pH<2

☐ Field Date _____

☐ Labs

Accessioning Use Only

Data Processing Data: Analyst ____

Radioiodine

quantity analyzed | qu | ac | aliquot factor | mg PdI^2 | precipitate weight | collection date and time (M M D D Y Y Y Y h h m m)

Chemistry date (MMDDYYYY)

Data Processing Use Only

Counting Room Data: Analyst ____

Counting Room Information (MMDDYY@HH:mm/spectrum #/count time)

Counting Room Use Only

Requested Counting Parameters:

Requested Detector
- ☐ Default
- ☐ Specific_____
- ☐ **RECOUNT**

Please put details in the "Comments" section on page 2.

Requested Parameters
- ☐ Default see posted values
- ☐ Specific complete following fields

Duration _____ min

Repetitions _____

Separation (DD:HH:mm) _____

Chemistry Data: Analyst ____

Common

Samples

Date Started _____

Aliquot Factor _____

Quantity Analyzed _____

Geometry _____

Marinelli Number _____

Radioiodine (PdI_2) Samples

Filter + Precipitate _____ mg

Filter _____ mg

Precipitate _____ mg

Carrier Number _____

Carrier Volume _____ mL

I^- Concentration _____ mg/mL

I^- Added _____ mg

Natural I^- _____ mg

Chemical Recovery Formula

Recovery see formula _____ mg

*Dry Weight Equivalent = aliquot X (dry weight/ashed weight)

Isotopic Gamma Solid

Total Wet _____ g

Total Dry _____ g

Dry Analyzed _____ g

Sample + Container _____ g

Container _____ g

Sample _____ g

^{241}Am Sample Preparation

Wet Sample + Dish _____ g

-- Dish _____ g

Wet Sample Weight _____ g

Dry Sample + Dish _____ g

-- Dish _____ g

Dry Sample Weight _____ g

Ashed Sample + Dish _____ g

-- Dish _____ g

Ashed Sample Weight _____ g

Aliquot + Container _____ g

Container _____ g

Sample Aliquot _____ g

Quantity Analyzed* _____ g

DOH-4148 (12/01)

IPEC00201720

NYSDOH/DEDP/INC – Isotopic Gamma and Radioiodine Data Sheet

New York State Department of Health/Division of Environmental Disease Prevention/Inorganic and Nuclear Chemistry Laboratory

Comments:

Sample Labels:

Quantity Units Codes (qu):

1 = liter
2 = milliliter
3 = kilogram
4= gram
5 = meter^2/day
6 = meter^3
7 = sample

Activity Units Codes (ac):

0 = pCi
1 = dpm
2 = cpm
3 = nCi
4 = mg
6 = µCi

QC Data:

Spike Solution # _____

Spike Solution Volume _____mL

Spike Solution Date _____

Sample + Spike Activity _____

Amount of Analyte _____

DOH (12/01)

Attachment B

Agency Non-Capital Contract or Non-Personal Service Expenditures

I hereby certify that the following items of expenditure are critical to protect public health and/or public safety or that such expenditures involve Federal reimbursement of at least 75 percent.

_____

Agency Head Signature