

C-E Power Systems
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release IAE

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NIS/79/608



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U.S. NUCLEAR REG.
NUCLEAR DIVISION

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February 13, 1979

Mr. W. T. Crow
Section Leader, Uranium Fuel Fabrication Section
Fuel Processing and Fabrication Branch
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Crow:

Enclosed is Revision 1 to the C-E Hematite Emergency Plan. Modifications were made in accordance with questions and comments discussed during our November 17, 1978 meeting. Changes are denoted by an asterisk in the right margin of the revised pages.

Very truly yours,

COMBUSTION ENGINEERING, INC.

H. E. Eskridge
Supervisor, Nuclear Licensing,
Safety and Accountability

/wg
Enclosure

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3. SCOPE AND APPLICABILITY

This emergency plan applies to Combustion Engineering, Inc.'s low enriched oxide conversion plant and related facilities at Hematite, Missouri.

While most accidents are of minimal consequence, a few can be expected to be serious. Routine, established programs, such as those conducted by Nuclear and Industrial Safety, will normally be able to cope with the minor incidents following standard operating procedures. For the other extreme, detailed emergency plans will be needed to cope with the serious accident.

Therefore, the following plan has been established in accordance with the elements listed in Section IV of Appendix E to 10 CFR Part 50, to provide the functions necessary to cope with any emergency that may occur at C-E Hematite.

Procedures for implementing provisions of the Hematite Emergency Plan for minor emergencies are contained within facility operating radiological control and industrial security procedures. The Hematite Emergency Procedures Manual contains procedures for dealing with emergencies having a potential for more serious consequences. These procedures supercede all normal routine operating, radiological control and security procedures. *

Letters of agreement with offsite agencies from which emergency assistance may be required are included in Appendix A to this plan. Barnes' Hospital procedures for handling patients who are contaminated with radioactive materials are included in Appendix B. Due to the distances involved, the Hematite Emergency Plan does not interface with other C-E Power System plans. *

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4.2 Emergency Alert

This class involves specific situations that can be recognized as creating a hazard potential that was previously nonexistent or latent. The situation may not yet have caused damage to the facility or harm to personnel and does not necessarily require an immediate change in facility operating status. Inherently, however, this is a situation in which time is available to take precautionary and constructive steps to prevent an accident and to mitigate the consequences should it occur. An Emergency Alert situation may be the result of either man-made or natural phenomena and can reasonably be expected to occur during the life of the plant.

Emergency Alert conditions imply a rapid transition to a state of readiness by the facility personnel and possibly by off-site emergency support organizations, the possible cessation of certain routine functions or activities within the facility that are not immediately essential, and possible precautionary actions that a specific situation may require.

Example of situations which fall in the emergency alert classification are:

- Bomb threats
- Civil disturbances
- Tornado warning or sighting
- Earthquake tremor or warning of seismic activity
- Forest fire
- Release of toxic or noxious gas nearby which could affect the site

The Emergency Director is responsible for determining when an emergency alert condition exists. Note that no situation associated with in-plant events involving radioactive materials has been identified as belonging in the emergency alert classification.

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4.3 Plant Emergency

This class includes accidents within the plant requiring staff emergency organization response. The initial assessment of situations in this class should indicate that it is unlikely that an offsite hazard will be created. However, substantial modification of plant operating status is a highly probable corrective action if it has not already taken place by automatic protective systems. This class is normally associated with a judgment that the emergency situation can be corrected and controlled by the facility staff.

Protective evacuations or isolation of certain plant areas may be necessary. This class of emergency can also reasonably be expected to occur during the life of the plant.

Accidents which fall into this class are those accidents analyzed in the Environmental Impact Information as events that are predicted to have insufficient consequences outside the plant to warrant taking protective measures.

Criteria for declaring Plant Emergencies should be based on (1) the recognition of an immediate need to implement in-plant emergency measures to protect or provide aid to affected persons in the facility or to mitigate the consequences of damage to plant equipment; (2) a positive observation that radiation monitors do not indicate the possibility of a criticality; (3) the recognition by personnel in the area involved that the situation is beyond their capability to resolve.

The non-nuclear alarm may be sounded by any person cognizant of the situation. Declaring and classifying the emergency is the responsibility of the Emergency Director. *

4.3 Plant Emergency (continued)

Examples of plant emergencies are:

Major process leak or spill (toxic or radioactive)

Fire (not controllable by personnel in the immediate vicinity)

Explosion contained within building

The Emergency Director may request that offsite agencies which may be required to respond to a particular emergency assume an alert condition until the emergency is terminated. For example, the Hematite Fire Department would be requested to stand by in case of a fire that is not easily extinguishable.

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Notification of C-E management and appropriate offsite agencies to alert them to the nature and extent of a plant emergency is to be made in accordance with directions contained in the Hematite Emergency Procedures Manual.

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4.4 Site Emergency

Emergency situations more severe than plant emergencies are not expected to occur during the life of a plant because of design features and other measures taken to guard against their occurrence.

Nevertheless, it is necessary and prudent to make provisions for a class that involves an uncontrolled release of radioactive materials or chemicals into the site environs, outside the fenced manufacturing area. Notification of offsite emergency organizations will be made as necessary. Protective actions include evacuation of all facility areas other than the emergency control center. Associated assessment actions include appropriate provisions for monitoring the environment. *

A site emergency is declared by (1) automatic sounding of the nuclear (criticality) alarm or (2) sounding of the non-nuclear alarm. The non-nuclear alarm may be sounded by any person cognizant of the situation. Declaring and classifying the emergency is the responsibility of the Emergency Director. *

Examples of site emergencies are:

- Criticality accident
- Major UF₆ release
- Major fire or explosion
- Major anhydrous ammonia release

4.5 General Emergency

Accidents that have the potential for serious radiological consequences to the public health and safety have been analyzed previously and were found not to be credible for the C-E Hematite facility (NRC Environmental Impact Appraisal, March 1977).

Offsite impact of the spectrum of accidents analyzed in the Environmental Impact Appraisal is shown in the following table: *

<u>Accident</u>	<u>Classification</u>	<u>Offsite Impact</u>
Injured employee	personnel emergency	none
Contaminated employee	personnel emergency	none
Train derailment	emergency alert	none (from plant)
Process leak or spill	plant emergency	none
Fire	plant emergency	none
Massive UF ₆ release	site emergency	Site boundary concentration: 30% of 8-hr. TLV 4% of single exposure TLV
Criticality	site emergency	Site boundary dose: submersion-0.5 Rem thyroid - 1.5 Rem

5. ORGANIZATIONAL CONTROL OF EMERGENCIES

The formal organization of C-E Hematite contains support groups which, in addition to normal functions during routine operations, can provide support to any or all facilities at Hematite during an emergency.

5.1 Normal Plant Operations

Each operation at C-E Hematite is staffed with experienced operating personnel. These personnel are well qualified to recognize conditions that may result in an accident and are capable of instituting remedial procedures. If these remedial actions would be insufficient to deal with a situation, the employees have been trained to make emergency notifications and to perform those emergency functions that provide the maximum immediate control over most situations. These staffs are also trained to evacuate the facility involved, if necessary.

The Production Superintendent has overall responsibility for the facility in the event of an emergency. He has delegated this responsibility to the shift foremen on the evening and night shifts. Trained Fire Brigade members, First Aid Team Members and Health Physics Technicians are present onsite for each production shift. A call-in-list is used by security on weekends and holidays to obtain emergency organization personnel as required in the event of an emergency situation. *

The responsibility and authority of the Emergency Director and other members of the emergency organization are specified in the Emergency Procedures Manual. If management personnel are recalled to the site during an emergency, the highest ranking person assumes control of his emergency function. *

5.2 Onsite Emergency Organization

At such time as the Hematite Emergency Plan is put into effect, all aspects of the emergency situation will be coordinated within the scope of the Hematite emergency organization (see Figure 5-1).

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Responsibilities of each position or group are shown below:

5.2.1 Emergency Director

- a. Activate Emergency Control Center in the tile barn emergency room, or establish an alternate control point from which activities can be directed.
- b. Determine status and necessity for shutdown of plant systems.
- c. Direct, coordinate, and evaluate actions to be taken by functioning emergency teams.

5.2.2 Fact Finding Committee

Members to serve on this committee will be selected by the Director depending on the nature of the emergency. The Chairman of the committee shall be an individual who is not a member of the immediate response teams.

- a. Communicate with the Emergency Director and others to obtain facts for determining the cause and effect of the emergency.
- b. Interview personnel who witnessed the incident or those who can contribute information leading to cause and effect.
- c. Review and examine all evidences (photographs, recoverable materials, etc.) that may be considered pertinent and informative for evaluation purposes.
- d. Keep records and prepare a written report for the Plant Manager.

5.2 Onsite Emergency Organization (continued)

5.2.3 Radiological and Safety Advisor

- a. Accumulate and evaluate known data to determine the extent of the emergency.
- b. Establish a liaison between the Director and a direct source of available information.
- c. Establish policies regarding the emergency plan of action for controlling the incident.
- d. Shall be responsible for collecting and disseminating information pertaining to the emergency to outside agencies.
- e. Normally be the sole contact with news media.
- f. Maintain a close liaison with the Plant Manager regarding emergency activity progress.
- g. Inform and consult with the Fact Finding Committee.
- h. Review public releases and notices and obtain approvals as specified in the Emergency Procedures Manual. *

5.2.4 Supervisors

- a. Each supervisor is responsible for proper implementation of the Site Emergency Plan.
- b. Shall assure himself that personnel under his supervision are familiar with the location and use of emergency equipment.
- c. Shall assure personnel familiarization with the Emergency Plan and procedures.
- d. Shall account for their personnel during an emergency, including visitors and contractor personnel in their area. *

5.4 Coordination with Participating Government Agencies

As previously stated, analysis of the postulated C-E Hematite accident spectrum shows that there is no credible accident with significant offsite consequences.

A list of cognizant government agencies and current telephone numbers is maintained, however, and they will be contacted should an emergency arise involving a consideration within their jurisdiction. The contact would normally be in the form of notification although a request for emergency assistance would be made as needed. These agencies include: *

U.S. Nuclear Regulatory Commission, Region III - Glen Ellyn, Illinois
Missouri Department of Public Safety, Disaster Planning and Operations
Office - Jefferson City

Missouri Division of Health, Bureau of Radiological Health -
Jefferson City

Missouri Department of Natural Resources - Jefferson City,
St. Louis

U.S. Environmental Protection Agency, Region 7 - Kansas City

Missouri Highway Patrol - Creve Coeur

U.S. Federal Bureau of Investigation - St. Louis

The above agencies are listed, with their area of interest, in the Emergency Procedures Manual. In the event of a plant emergency, only local agencies would be contacted (as discussed in Section 5.3). In the event of a site emergency, all the agencies would be contacted. *

6.2 Emergency Alert

The responsibility for declaring an emergency alert rests with the Emergency Director. The general criteria for declaring an emergency alert are as follows:

1. Bomb threats
2. Actual or warning of impending civil disturbance
3. Tornado warning or sighting
4. Earthquake tremor or warning of seismic activity
5. Forest fire warning or sighting
6. Sighting or report of release of toxic or noxious gas nearby which could affect the site

The Emergency Director then assesses the situation and makes a decision as to whether to evacuate to the designated assembly area by manually activating the non-nuclear alarm, or to instruct personnel to remain inside plant buildings by telephone and direct voice contact. At this time the plant will be secured, processes and equipment shut down and utilities shut off as deemed necessary by the Emergency Director. Contact would be made with offsite agencies as necessary.

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The emergency alert is terminated by the Emergency Director when the threatening situation has passed.

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6.3 Plant Emergency

A plant emergency is declared by manual activation of the non-nuclear alarm by any personnel cognizant of the emergency situation. The criteria for declaring a plant emergency are described in Section 4. Plant emergency situations include:

Major process leak in UF₆ to UO₂ conversion line

Fire not easily extinguishable by personnel in the immediate vicinity

Break in combustibile gas line

Explosion contained within building

Any other situation which results in immediate danger to plant personnel

Upon sounding of the alarm, personnel other than production area monitors immediately evacuate to the designated non-nuclear emergency assembly area. Production area monitors monitor or shut down process equipment and evacuate their area when secured or otherwise instructed. The following onsite emergency teams are then called upon as appropriate by the Emergency Director. *

First Aid Team

Fire Brigade

Radiological Survey Monitoring

Guard Force

Utilities and Emergency Repair

The Emergency Director in accordance with procedures contained in the Emergency Procedures Manual issues directions for care of any injured personnel, combating the specific problem and preventing unauthorized entry to the affected area. He then determines the need for additional assistance from offsite support groups and initiates call-in (e.g. fire department) by telephone. Back up communication for calling in outside assistance consists of an independent telephone in the Emergency Control Center and a citizens' band radio. *

6.4 Site Emergency

The Site Emergency can be implemented in several ways:

- Sounding of the nuclear alarm (intermittent horn).
- Sounding of the non-nuclear alarm (loud, continuously ringing bell).
- By any personnel cognizant of an actual or impending emergency which affects the C-E Hematite Site.

Examples of site emergencies are:

- Criticality accident
- Major UF₆ release
- Major fire or explosion
- Major anhydrous ammonia release

The non-nuclear alarm is usually sounded to designate a plant emergency. At the discretion of the Emergency Director, a site emergency may be declared in accordance with the criteria discussed in Section 4.4. At this time personnel are instructed to further evacuate to either the parking lot or the Emergency Assembly Area in the tile barn. The emergency actions are then directed and any necessary offsite notifications made from the Emergency Control Center.

In the case of the sounding of the nuclear alarm, all personnel evacuate immediately to the Emergency Assembly Area in the tile barn. Upon assembly at the barn, supervisors determine that all personnel under their cognizance have been evacuated and are accounted for, including their visitors and outside contractors.

Those present in the assembly area are questioned to determine if any unusual occurrences were observed and a survey team, consisting of at least two persons knowledgeable in the use of instruments, are instructed to prepare for re-entry. The emergency procedures contain appropriate instructions to minimize re-entry team exposure should a second criticality occur. *

6.4 Site Emergency (continued)

First aid is provided for any individuals injured during the evacuation and all identification badges are checked for indium foil activation.

When the report of the re-entry team is received, the incident is considered confirmed if radiation levels in excess of 5 mr/hr are encountered.

At this point, a NIS representative is dispatched to the site boundary downwind of the plant to monitor the exposure rate. The maximum offsite thyroid dose is estimated from these readings as specified in the detailed procedures.

The Emergency Director assures that the following preplanned actions are initiated:

- Arrange for treatment of injured or exposed personnel.

- Arrange for decontamination of personnel.

- Determine radiation level in assembly area. Decide need to relocate.

- Collect film badges and record indium foil readings.

- Instruct health physics to initiate sampling of airborne contamination.

- Start action to obtain assistance:

 - Ambulance

 - Hillsboro Sheriff

 - Barnes Hospital (radiation exposure)

 - C-E Management list. Request first individual contacted to inform the NRC and other persons on management notification list.

- Direct survey team to establish 100 mr/hr boundary line.

6.4 Site Emergency (continued)

Based on information from survey team, initiate action to shut down the plant.

Obtain other assistance and make notifications of other offsite agencies as required.

Exposures during subsequent re-entry operations will be limited. Specific instructions, based on actual equipment or process involved will be issued to minimize the possibility of causing additional criticality excursions. *

Allowed exposure for any person shall not exceed 12.5 rems. Under unusual circumstances, exposures may be permitted to a maximum of 25 rems.

Time-of-stay during re-entry shall be limited. Such time-of-stay will commence upon penetrating beyond the 100 mr/hr boundary and terminate upon recrossing it while exiting..

No personnel are allowed to re-enter the affected plant areas unless authorized by the Emergency Director.

Prior to startup after a site emergency, the plant will be returned to a safe condition. Spills will be cleaned up and no excessive radiation or contamination levels will be present. *

Radiological and non-radiological monitoring will be conducted as appropriate in case of a non-criticality site emergency. *

7. EMERGENCY FACILITIES AND EQUIPMENT

This section identifies, describes briefly, and gives locations of items to be maintained for emergency use at C-E Hematite.

7.1 Emergency Control Center

The emergency control center is located within the tile barn west of the fenced manufacturing area. This direction is normally upwind from the manufacturing area. Therefore, an alternate offsite location is not considered necessary.

7.2 Communications Systems

Communications during an emergency may be by the following methods:

Normal plant telephone system

Separate emergency telephone line

2-way radios

Voice and hand signals (effective in many cases due to small size of plant)

All the above communication methods may be used at the Emergency Control Center. *

7.3 Assessment Facilities

The following monitoring systems are used to initiate emergency measures as well as those used for continuing assessment:

7.3.1 Onsite Systems and Equipment

Windspeed and direction - remote readout is in NIS office, but estimate may be obtained visually from emergency control center.

7.4 Protective Facilities and Equipment

The emergency assembly area in the tile barn, located west of the fenced manufacturing area, is of adequate size to accommodate the entire plant staff. It is not in the prevailing wind direction and its distance and construction provide sufficient shielding in the event of a criticality accident.

Located in the emergency control and assembly area are emergency equipment and supplies, including

- Radiation survey instruments
- Respirators
- Protective Clothing
- Personnel dosimeters
- First Aid Supplies
- 2-way Radios
- Decontamination supplies
- Environmental Sampling Supplies

For plant emergencies of a localized nature, there are three other emergency supply stations strategically located in the manufacturing areas. The supplies located in the tile barn would be relied upon in the event of a site emergency.

Appendix E shows a listing of emergency equipment in the various plant areas and the emergency control center. *

8.1 Organizational Preparedness (continued)

The training and personnel safety program is continued with on the job training supplemented by regularly scheduled meetings conducted by line supervision and specialists in the subjects covered. Personnel protective equipment, industrial safety and accident prevention emergency procedures and other safety topics are included. Foremen receive a formal course in radiation safety, criticality control emergency plans and procedures. Sufficient knowledge to enable them to carry out their training functions is determined by testing. All operating personnel receive a re-training course in criticality control, radiation safety and emergency procedures on an annual basis. Additional training is provided in monthly safety meetings and in specialized training in Fire Fighting and first aid. All training is documented. *

8.1.2 Drills and Exercises

Semi-annual site emergency evacuation drills are conducted to test promptness of response, adequacy of procedures, emergency equipment and the overall effectiveness of the emergency plan. At least one of the drills will involve participation by offsite agencies to test as a minimum the communication links and notification procedures.

All drills are documented and critiqued by the NIS group to evaluate the effectiveness of the plan and to correct weak areas through feedback with emphasis on practical training.

8.1.3 Emergency Planning Coordinator

The NLS&A Supervisor serves as the Emergency Planning Coordinator. His responsibility includes the coordination of offsite and onsite emergency planning efforts.

8.2 Review and Updating of the Plan and Procedures

An annual review of the emergency plan is performed by the Emergency Planning Coordinator for the purpose of updating and improving procedures. Results of training and drills as well as changes on site or in the environs are incorporated into this review. The annual review is documented. *

All written agreements are reviewed and updated if necessary at least every two years.

8.3 Emergency Equipment and Supplies

Both the nuclear and non-nuclear alarm systems are tested weekly to insure their proper operation. Testing is documented. *

Nuclear and Industrial Safety is responsible for routine inspection and testing of all equipment and supplies at all emergency stations and other reserve equipment, and for maintenance and servicing, or obtaining servicing, for all emergency equipment. NIS also procures or initiates procurement, of all supplies of emergency equipment and other miscellaneous supplies necessary to cope with foreseeable emergency situations. Inspections and testing are documented. *

9. RECOVERY

The Emergency Director will assign such personnel as necessary to restore or have restored all equipment and/or services to a safe operating condition upon termination of the emergency. Any spills will be cleaned up and no excessive radiation levels will be present when operations are restarted. Deficiencies identified in the investigation of the incident shall be resolved prior to resumption of operations. *