April 12, 2000

Mr. S. E. Scace - Director
Nuclear Oversight and Regulatory Affairs
c/o Mr. David A. Smith
Northeast Nuclear Energy Company
P. O. Box 128
Waterford, CT 06385-0128

SUBJECT: SITE-SPECIFIC WORKSHEETS FOR USE IN THE NUCLEAR REGULATORY COMMISSION'S SIGNIFICANCE DETERMINATION PROCESS (TAC NO. MA6544)

Dear Mr. Scace:

The purpose of this letter is to provide you with one of the key implementation tools to be used by the Nuclear Regulatory Commission (NRC) in the revised reactor oversight process, which is currently expected to be implemented at Millstone Nuclear Power Station, Unit 3, in April 2000. Included in the enclosed Risk-Informed Inspection Notebook are the Significance Determination Process (SDP) worksheets that inspectors will be using to risk-characterize inspection findings. The SDP is discussed in more detail below.

On January 8, 1999, the NRC staff described to the Commission plans and recommendations to improve the reactor oversight process in SECY-99-007, "Recommendations for Reactor Oversight Process Improvements." SECY-99-007 is available on the NRC's web site at www.nrc.gov/NRC/COMMISSION/SECYS/index.html. The new process, developed with stakeholder involvement, is designed around a risk-informed framework, which is intended to focus both the NRC's and licensee's attention and resources on those issues of more risk significance.

The performance assessment portion of the new process involves the use of both licensee-submitted performance indicator data and inspection findings that have been appropriately categorized based on their risk significance. In order to properly categorize an inspection finding, the NRC has developed the SDP. This process was described to the Commission in SECY-99-007A, "Recommendations for Reactor Oversight Process Improvements (Follow-up to SECY-99-007)," dated March 22, 1999, also available at the same NRC web site noted above.

The SDP for power operations involves evaluating an inspection finding's impact on the plant's capability to limit the frequency of initiating events; ensure the availability, reliability, and capability of mitigating systems; and ensure the integrity of the fuel cladding, reactor coolant system, and containment barriers. As described in SECY-99-007A, the SDP involves the use of three tables: Table 1 is the estimated likelihood for initiating event occurrence during the degraded period, Table 2 describes how the significance is determined based on remaining mitigation system capabilities, and Table 3 provides the bases for the failure probabilities associated with the remaining mitigation equipment and strategies.

As a result of the recently concluded Pilot Plant review effort, the NRC has determined that site-specific risk data is needed in order to provide a repeatable determination of the significance of an issue. Therefore, the NRC has contracted with Brookhaven National Lab (BNL) to develop site-specific worksheets to be used in the SDP review. These enclosed worksheets were developed based on your Individual Plant Examination (IPE) submittals that were requested by Generic Letter 88-20. The NRC plans to use this site-specific information in evaluating the significance of issues identified at your facility when the revised reactor oversight process is implemented industry wide. It is recognized that the IPE utilized during this effort may not contain current information. Therefore, the NRC or its contractor expects to conduct a site visit after April 2, 2000, to discuss with your staff any changes that may be appropriate. Specific dates for the site visit have not been determined, but will be communicated to you in the near future. In addition, the NRC is not requesting a written response or comments on the enclosed worksheets developed by BNL.

We will coordinate our efforts through your licensing or risk organizations as appropriate. If you have any questions, please contact me at 301-415-1484.

Sincerely,

/RA/

Victor Nerses, Sr. Project Manager, Section 2
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-423

Enclosure: As Stated

cc w/encl: See next page

mitigation system capabilities, and Table 3 provides the bases for the failure probabilities associated with the remaining mitigation equipment and strategies.

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We will coordinate our efforts through your licensing or risk organizations as appropriate. If you have any questions, please contact me at 301-415-1484.

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RISK-INFORMED INSPECTION NOTEBOOK FOR

MILLSTONE NUCLEAR POWER STATION

UNIT 3

PWR, WESTINGHOUSE, FOUR-LOOP PLANT WITH SUB-ATMOSPHERIC CONTAINMENT

Prepared by

Brookhaven National Laboratory
Department of Advanced Technology

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NOTICE

This notebook was developed for the NRC's inspection teams to support risk-informed inspections. The activities involved in these inspections are discussed in "Reactor Oversight Process Improvement," SECY-99-007A, March 1999. The user of this notebook is assumed to be an inspector with an extensive understanding of plant-specific design features and operation. Therefore, the notebook is not a stand-alone document, and may not be suitable for use by non-specialists. This notebook will be periodically updated with new or replacement pages incorporating additional information on this plant. Technical errors in, and recommended updates to, this document should be brought to the attention of the following person:

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ABSTRACT

This notebook contains summary information to support the Significance Determination Process (SDP) in risk-informed inspections for the Millstone Nuclear Power Station Unit 3.

SDP worksheets support the significance determination process in risk-informed inspections and are intended to be used by the NRC's inspectors in identifying the significance of their findings, i.e., in screening risk-significant findings, consistent with Phase-2 screening in SECY-99-007A. To support the SDP, additional information is given in an Initiators and System Dependency table, and as simplified event-trees, called SDP event-trees, developed in preparing the SDP worksheets.

The information contained herein is based on the licensee's IPE submittal. The information is revised based on IPE updates or other licensee or review comments providing updated information and/or additional details.

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FIGURES

TABLES

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1. INFORMATION SUPPORTING SIGNIFICANCE DETERMINATION PROCESS (SDP)

SECY-99-007A (NRC, March 1999) describes the process for making a Phase-2 evaluation of the inspection findings. In Phase 2, the first step is to identify the pertinent core damage scenarios that require further evaluation based on the specifics of the inspection findings. To aid in this process, this notebook provides the following information:

1. Initiator and System Dependency Table
2. Significance Determination Process (SDP) Worksheets
3. SDP Event Trees

The initiator and system dependency table shows the major dependencies between front-line- and support-systems, and identifies their involvement in different types of initiators. The information in this table identifies the most risk-significant front-line- and support-systems; it is not an exhaustive nor comprehensive compilation of the dependency matrix as known in Probabilistic Risk Assessments (PRAs). For pressurized water reactors (PWRs), the support systems for Reactor Coolant Pump (RCP) seals are explicitly denoted to assure that the inspection findings on them are properly accounted for. This table is used to identify the SDP worksheets to be evaluated, corresponding to the inspection's findings on systems and components.

To evaluate the impact of the inspection's finding on the core-damage scenarios, the SDP worksheets are developed and provided. They contain two parts. The first part identifies the functions, the systems, or combinations thereof that can perform mitigating functions, the number of trains in each system, and the number of trains required (success criteria) for each class of initiators. The second part of the SDP worksheet contains the core-damage accident sequences associated with each initiator class; these sequences are based on SDP event trees. In the parenthesis next to each of the sequence the corresponding event tree branch number(s) representing the sequence is included. Multiple branch numbers indicate that the different accident sequences identified by the event tree are merged into one through the boolean reduction. The classes of initiators that are considered in this notebook are 1) Transients, 2) Small Loss of Coolant Accident (LOCA), 3) Stuck-open Power Operated Relief valve (PORV), 4) Medium LOCA, 5) Large LOCA, 6) Loss of Offsite Power (LOOP), 7) Steam Generator Tube Rupture (SGTR), and 8) Anticipated Transients Without Scram (ATWS). Main Steam Line Break (MSLB) events are included separately if they are treated as such in the licensee's Individual Plant Examination (IPE) submittal.

Following the SDP worksheets, the SDP event trees corresponding to each of the worksheets are presented. The SDP event trees are simplified event trees developed to define the accident sequences identified in the SDP worksheets.

The following items were considered in establishing the SDP event trees and the core-damage sequences in the SDP worksheets:

1. Event trees and sequences were developed such that the worksheet contains all the major accident sequences identified by the plant-specific IPEs. In cases where a plant-specific feature introduced a sequence that is not fully captured by our existing set of initiators and event trees, then a separate worksheet is included.

2. The event trees and sequences for each plant took into account the IPE models and event trees for all similar plants. Any major deviations in one plant from similar plants typically are noted at the end of the worksheet.

3. The event trees and the sequences were designed to capture core-damage scenarios, without including containment-failure probabilities and consequences. Therefore, branches of event trees that are only for the purpose of a Level II PRA analysis are not considered. The resulting sequences are merged using Boolean logic.

4. The simplified event-trees focus on classes of initiators, as defined above. In so doing, many separate event trees in the IPEs often are represented by a single tree. For example, some IPEs define four classes of LOCAs rather than the three classes considered here. The sizes of LOCAs for which high-pressure injection is not required are some times divided into two classes, the only difference between them being the need for reactor scram in the smaller break size. Some IPEs also may define several classes of transients, depending on the initiator's impact on the systems. Such differentiations generally are not considered in the SDP worksheets unless they could not be accounted for by the Initiator and System Dependency table.

5. Major operator actions during accident scenarios are assigned as high stress operator action or operator action using simple, standard criteria among a class of plants. This approach resulted in the designation of some operator actions as high-stress ones (as opposed to normal), even though the PRA may have assumed a (routine) operator action; hence, they have been assigned an error probability less than 5E-2 in the IPE. In such cases, a note is given at the end of the worksheet.

The three sections that follow include the initiators and dependency table, SDP worksheets, and the SDP event-trees for the Millstone Nuclear Power Station Unit 3.

1.1 INITIATORS AND SYSTEM DEPENDENCY

Table 1 provides the list of the systems included in the SDP worksheets, the major components in the systems, and the support system dependencies. The system involvements in different initiating events are noted in the last column.

Table 1. Initiators and System Dependency for Millstone Unit 3

Affected Systems	Major Components	Support Systems	Initiating Event Scenarios
Reactor Coolant Pumps (RCPs) (1)	Pumps and pump seals	RCP cooling is provided by RPCCW, and 1/2 Charging pumps.	LOOP, Transient, RCP seal LOCA
PORVs	Two PORVs and PORV Block Valves	125 V-DC, AC Power (PORV Block Valves)	All except LLOCA, and MLOCA
Main Feed Water (MFW)	MFW Pumps	4.16 KV AC, 125 V-DC, TPCCW	Transient. SLOCA. SORV, LOOP
Condensate Pump	Pumps	4.16 kV AC, 125 V-DC, SW, TPCCW	Transient, SLOCA, SORV, LOOP
Emergency Safety Features Actuation System (ESFAS)	Analog and digital circuitry	125 V-DC, Vital Instrument Buses	ALL except ATWS
Containment Recirculation Spray (CS) System	Pumps	AC, 125 V-DC, ESFAS	All
Quench Spray (QS)	Pumps	AC, 125 V-DC, ESFAS	All except ATWS
AFWs	Two MDPs	4.16 KV AC, 125 V-DC, ESFAS	All except MLOCA and LLOCA
	One TDP	125 V-DC, IA, Main Steam, ESFAS	
High Pressure Safety Injection (HPSI)	Two SI Pumps and Two Charging pumps	4.16 kV AC, 125 V-DC, ESFAS	All except LLOCA, RCP Seal LOCA
Low Pressure Safety Injection (LPSI)	Pumps P1A, P1B	4.16 kV EAC, 125 V-DC, ESFAS, SW	All including RCP Seal LOCA
Reactor Plant Component Cooling Water (RPCCW) System	Pumps and Heat Exchangers	4.16 kV AC, 125 V-DC, SW	RCP Seal LOCA, SGTR
AC Power	4.16 kV Buses 34C and 34D	125 V-DC	All

Table 1 (Continued)

Affected Systems	Major Components	Support Systems	Initiating Event Scenarios
Emergency Diesel Generator (EDG)[3]	Two EDG;	125 V-DC, SW	LOOP
125 V-DC	125 V-DC 1 to 4; 4 Batteries and Battery Chargers	4.16 kV EAC	All
Service Water (SW) System	Two Trains each with one in-service and one standby pump	AC, 125 V-DC	All

Notes:

(1) Loss of RPCCW system will lead to degradation of RCP lube oil cooling and is alarmed in the control room. It is not directly modeled in the MIL3 IPE.

(2) Loss of Turbine Plant Component Cooling Water (TPCCW) System leads to loss of instrument air, eventual turbine trip, and eventual trip of a number of condensate pumps. TPCCW is needed for the recovery of the MFW system.

(3) The turbine-driven AFW pump is designed with three parallel steam admission valves which will all fail open on a loss of air pressure and thus starting the pump without a direct ESF command. The PORVs and ECCS are totally independent of IA. The loss of IA will lead to a loss of main feedwater or partial loss of main feedwater transient due to consequential failure of feedwater regulating valves.

The plant internal event CDF is 5.52E-5/yr; Internal Flooding CDF is 8.50E-7/yr.

1.2 SDP WORKSHEETS

This section presents the SDP worksheets to be used in the Phase 2 evaluation of the inspection findings for the Millstone Unit 3 Nuclear Plant. The SDP worksheets are presented for the following initiating event categories:

1. Transients
2. Small LOCA
3. Stuck-open PORV
4. Medium LOCA
5. Large LOCA
6. LOOP
7. Steam Generator Tube Rupture (SGTR)
8. Main Steam Line Break (MSLB)
9. Anticipated Transients Without Scram (ATWS)

Table 2.1 SDP Worksheet for Millstone Unit 3 —— Transients

Estimated Frequency (Table 1 Row) __________	Exposure Time __________	Table 1 Result (circle): A B C D E F G H	
Safety Functions Needed:	***Full* Creditable Mitigation Capability for Each Safety Function:**		
Power Conversion System (PCS)	1 / 3 Main Feedwater (MFW) trains and 1/ 3 Condensate pump trains (operator action)		
Secondary Heat Removal (AFW)	1 / 2 MDAFW trains (one multi-train system) or one TDAFW train (one ASD train)		
Early Inventory, High Pressure Injection (EIHP)	1 / 4 HPSI (Charging or SI) pumps (one multi-train system).		
Primary Heat Removal, Feed/Bleed (FB)	1/ 2 PORVs and block valves open for Feed/Bleed (high stress operator action)(1)		
High Pressure Recirculation (HPR) (3)	1 / 2 CRS pumps to 1/ 4 HPSI pumps(Operator action)		

Circle Affected Functions	**Recovery of Failed Train**	***Remaining Mitigation Capability Rating for Each Affected Sequence***	**Sequence Color**
1 TRANS - AFW - PCS - HPR (4)			
2 TRANS - AFW - PCS - FB (5)			
3 TRANS - AFW - PCS - EIHP (6)			

Identify any operator recovery actions that are credited to directly restore the degraded equipment or initiating event:

If operator actions are required to credit placing mitigation equipment in service or for recovery actions, such credit should be given only if the following criteria are met: 1) sufficient time is available to implement these actions, 2) environmental conditions allow access where needed, 3) procedures exist, 4) training is conducted on the existing procedures under conditions similar to the scenario assumed, and 5) any equipment needed to complete these actions is available and ready for use.

Notes:

(1) The human error probability (HEP) assessed in the IPE for establishing bleed and feed cooling is approximately 0.1.

Table 2.2 SDP Worksheet for Millstone Unit 3 —— Small LOCA

Estimated Frequency (Table 1 Row) __________ Exposure Time __________ Table 1 Result (circle): A B C D E F G H

Safety Functions Needed:	***Full* Creditable Mitigation Capability for Each Safety Function:**
Early Inventory, HP Injection (EIHP)	1 / 4 (Charging or SI) pumps (one multi-train system).
Secondary Heat Removal (AFW)	1 / 2 MDAFW trains (one multi-train system) or one TDAFW train (one ASD train)
Primary Depressurization (PDEP)	Operator depressurizes RCS (operator action)
Feed and Bleed (FB)	1 / 2 PORVs and block valves open for Feed/Bleed (high stress operator action)(1)
Power Conversion System (PCS)	Recovery of MFW (Operator action)
High Pressure Recirculation (HPR)	1 / 2 CRS pumps with 1 / 4 HPSI pumps (Operator action)

Circle Affected Functions	**Recovery of Failed Train**	***Remaining Mitigation Capability Rating for Each Affected Sequence***	**Sequence Color**
1 SLOCA - PDEP -HPR (3,6,8,12,15)			
2 SLOCA - AFW - PCS - PDEP (9)			
3 SLOCA - AFW - PCS - FB (10)			
4 SLOCA - EIHP - PDEP (13)			
5 SLOCA - EIHP - AFW - FB (16)			

Identify any operator recovery actions that are credited to directly restore the degraded equipment or initiating event:

If operator actions are required to credit placing mitigation equipment in service or for recovery actions, such credit should be given only if the following criteria are met: 1) sufficient time is available to implement these actions, 2) environmental conditions allow access where needed, 3) procedures exist, 4) training is conducted on the existing procedures under conditions similar to the scenario assumed, and 5) any equipment needed to complete these actions is available and ready for use.

Notes:

(1) The human error probability (HEP) assessed in the IPE for establishing bleed and feed cooling is approximately 0.1.

Table 2.3 SDP Worksheet for Millstone Unit 3 —— Stuck Open PORV (SORV)

Estimated Frequency (Table 1 Row) __________ Exposure Time __________ Table 1 Result (circle): A B C D E F G H

Safety Functions Needed:	***Full* Creditable Mitigation Capability for Each Safety Function:**
Early Inventory, HP Injection (EIHP)	1 / 4 Charging or SI pumps (one multi-train system).
Isolation of Small LOCA (BLK)	The closure of the block valve associated with stuck open PORV (recovery action)
Secondary Heat Removal (AFW)	1 / 2 MDAFW trains (one multi-train system) or one TDAFW train (one ASD train)
Primary Depressurization (PDEP)	Operator depressurizes RCS (operator action)
Primary Bleed (FB)	1 / 2 PORVs and block valves open for Feed/Bleed (operator action[1]
Power Conversion System (PCS)	Recovery of MFW (Operator action)
High Pressure Recirculation (HPR)	1 /2 CRS pumps to 1/4 HPSI(Charging or SI) pumps (Operator action)

Circle Affected Functions	**Recovery of Failed Train**	***Remaining Mitigation Capability Rating for Each Affected Sequence***	**Sequence Color**
1 SORV - BLK - PDEP - HPR (3,6,8,12,15)			
2 SORV - BLK - AFW - PCS - PDEP (9)			
3 SORV - BLK - AFW - PCS -FB (10)			
4 SORV - BLK - EIHP - PDEP (13)			
5 SORV - BLK -EIHP - AFW - FB (16)			

Identify any operator recovery actions that are credited to directly restore the degraded equipment or initiating event:

If operator actions are required to credit placing mitigation equipment in service or for recovery actions, such credit should be given only if the following criteria are met: 1) sufficient time is available to implement these actions, 2) environmental conditions allow access where needed, 3) procedures exist, 4) training is conducted on the existing procedures under conditions similar to the scenario assumed, and 5) any equipment needed to complete these actions is available and ready for use.

Table 2.4 SDP Worksheet for Millstone Unit 3 —— Medium LOCA

Estimated Frequency (Table 1 Row) __________ Exposure Time __________ Table 1 Result (circle): A B C D E F G H

Safety Functions Needed:	***Full* Creditable Mitigation Capability for Each Safety Function:**
Early Inventory, Accumulators (EIAC)	3/ 4 accumulators (one train)
Early Inventory, HP Injection (EIHP)	1/ 4 (Charging or SI) pumps (one multi-train system).
Auxiliary Feed Water (AFW)	1/ 2 MD AFW pump trains (one multi-train system) or 1/1 TD AFW train (one ASD train)
Low Pressure Injection (LPI)	Secondary depressurization and use of 1/ 2 LPI pumps (Operator action)
High pressure Recirculation (HPR)	1/ 2 CRS pumps to 1/4 HPSI pumps (Operator action)

Circle Affected Functions	**Recovery of Failed Train**	***Remaining Mitigation Capability Rating for Each Affected Sequence***	**Sequence Color**
1 MLOCA - HPR (2,4)			
2. MLOCA - EIHP - LPI (5)			
3. MLOCA - EIAC (6)			

Identify any operator recovery actions that are credited to directly restore the degraded equipment or initiating event:

If operator actions are required to credit placing mitigation equipment in service or for recovery actions, such credit should be given only if the following criteria are met: 1) sufficient time is available to implement these actions, 2) environmental conditions allow access where needed, 3) procedures exist, 4) training is conducted on the existing procedures under conditions similar to the scenario assumed, and 5) any equipment needed to complete these actions is available and ready for use.

Notes:

(1) The third charging pump is not credited since it must be manually aligned.

(2) Failure of RHR due to inadequate cooling is not considered credible due to the short mission time of 3 hrs required of the LPSI system.

Table 2.5 SDP Worksheet for Millstone Unit 3 —— Large LOCA

Estimated Frequency (Table 1 Row) __________ Exposure Time __________ Table 1 Result (circle): A B C D E F G H

Safety Functions Needed:	***Full* Creditable Mitigation Capability for Each Safety Function:**
Early Inventory, Accumulators (EIAC)	3/3 Accumulators (One Train)
Early Inventory, LP Injection (EILP)	1/2 LPSI pump trains (One multi-train system)
Early Inventory, HP Injection (EIHP)	2/4 Charging or SI pumps (One multi-train system)
Low Pressure Recirculation (LPR)	1/2 CRS pumps to 2/4 charging or SI pumps (operator action)

Circle Affected Functions	**Recovery of Failed Train**	***Remaining Mitigation Capability Rating for Each Affected Sequence***	**Sequence Color**
1 LLOCA - LPR (2,4)			
2 LLOCA - EILP - EIHP (5)			
3 LLOCA - EIAC (6)			

Identify any operator recovery actions that are credited to directly restore the degraded equipment or initiating event:

If operator actions are required to credit placing mitigation equipment in service or for recovery actions, such credit should be given only if the following criteria are met: 1) sufficient time is available to implement these actions, 2) environmental conditions allow access where needed, 3) procedures exist, 4) training is conducted on the existing procedures under conditions similar to the scenario assumed, and 5) any equipment needed to complete these actions is available and ready for use.

Notes:

(1) The third charging pump is not credited since it must be manually aligned.

(2) Failure of RHR due to inadequate cooling is not considered credible due to the short mission time of 3 hrs required of the LPSI system.

Table 2.6 SDP Worksheet for Millstone Unit 3 —— LOOP

Estimated Frequency (Table 1 Row) __________ Exposure Time __________ Table 1 Result (circle): A B C D E F G H

Safety Functions Needed:	***Full* Creditable Mitigation Capability for Each Safety Function:**
Emergency AC Power (EAC)	1 / 2 Emergency Diesel Generators (one multi-train system)
Turbine-driven AFW pump (TDAFW)	1 / 1 TDP trains of AFW (one ASD train)(1)
Secondary Heat Removal (AFW)	1 / 2 MDAFW trains (one multi-train system) or one TDAFW train (one diverse train)(1)
Recovery of AC Power in < 2 hrs (REC2)	SBO procedures implemented (operator action under high stress)(2)
Recovery of AC Power in < 6 hrs (REC6)	SBO procedures implemented (operator action)(2, 3)
Early Inventory, HP Injection (EIHP)	1 / 4 Charging or SI pumps (one multi-train system)
Primary Heat Removal (FB)	Operator uses RCS pressurizer 1 / 2 PORVs and block valves (operator action)(4)
High Pressure Recirculation (HPR)	1 / 2 CRS pumps to 1/4 Charging or SI pumps (operator action)

Circle Affected Functions	**Recovery of Failed Train**	***Remaining Mitigation Capability Rating for Each Affected Sequence***	**Sequence Color**
1 LOOP - AFW - HPR (3)			
2 LOOP - AFW - FB (4)			
3 LOOP - AFW - EIHP (5)			
4 LOOP - EAC - HPR (7,11) (AC recovered)			

5 LOOP - EAC - EIHP (8,13) (AC recovered)			
6 LOOP - EAC - REC6 (9)			
7 LOOP - EAC - TDAFW - FB (12) (AC recovered)			
8 LOOP - EAC - TDAFW - REC2 (14)			

Identify any operator recovery actions that are credited to directly restore the degraded equipment or initiating event:

If operator actions are required to credit placing mitigation equipment in service or for recovery actions, such credit should be given only if the following criteria are met: 1) sufficient time is available to implement these actions, 2) environmental conditions allow access where needed, 3) procedures exist, 4) training is conducted on the existing procedures under conditions similar to the scenario assumed, and 5) any equipment needed to complete these actions is available and ready for use.

Notes:

(1) In IPE, the HEP for failure to recover offsite power in 2 hour is 0.6, and failure to recover offsite power in 6 hrs is estimated as 2.6E-3.

(2) In this model it is assumed that in an SBO situation, an RCP seal LOCA may occur with subsequent core damage at about 6 hours. The station batteries also deplete at 6 hr.

Table 2.7 SDP Worksheet for Millstone Unit 3 —— SGTR

Estimated Frequency (Table 1 Row) __________ Exposure Time __________ Table 1 Result (circle): A B C D E F G H

Safety Functions Needed:	***Full*** **Creditable Mitigation Capability for Each Safety Function:**
Secondary Heat Removal (AFW)	1 / 2 MDPs of AFW (one multi-train system) or 1 / 1 TDP of AFW (one ASD Train)
Early Inventory, HP Injection (EIHP)	1 / 4 Charging or SI pumps (one multi-train system)
Pressure Equalization (EQ)	Operator isolates the ruptured SG and depressurizes RCS to less than setpoint of relief valves of SG (operator action under high stress)[(1)]
Feed-and-Bleed (FB)	Operator uses RCS pressurizer PORV and block valves (1 / 2) (operator action)[(2)]
Power Conversion System (PCS)	Operator recovery of feedwater (Operator action)
High Pressure Recirculation (HPR)	1/ 2 CRS pumps to 1/4 Charging or SI pumps (operator action)

Circle Affected Functions	**Recovery of Failed Train**	***Remaining Mitigation Capability Rating for Each Affected Sequence***	**Sequence Color**
1 SGTR - AFW - HPR (4)			
2 SGTR - AFW - PCS - FB (5)			
3 SGTR - EIHP - EQ (7,9)			
4 SGTR - EIHP - AFW - PCS (10)			

Identify any operator recovery actions that are credited to directly restore the degraded equipment or initiating event:

If operator actions are required to credit placing mitigation equipment in service or for recovery actions, such credit should be given only if the following criteria are met: 1) sufficient time is available to implement these actions, 2) environmental conditions allow access where needed, 3) procedures exist, 4) training is conducted on the existing procedures under conditions similar to the scenario assumed, and 5) any equipment needed to complete these actions is available and ready for use.

Table 2.8 SDP Worksheet for Millstone Unit 3 —— MSLB

Estimated Frequency (Table 1 Row) __________ Exposure Time __________ Table 1 Result (circle): A B C D E F G H

Safety Functions Needed:	***Full* Creditable Mitigation Capability for Each Safety Function:**
Secondary Heat Removal (AFW)	1 / 2 MDPs of AFW (one multi-train system) or 1 / 1 TDP of AFW (one ASD Train)
Early Inventory, HP Injection (EIHP)	1 / 4 Charging or SI pumps (one multi-train system)
SG Isolation (ISO)	Operator isolates all feedwater and steam flow to the SG associated with steam line break (operator action)
Feed-and-Bleed (FB)	Operator uses RCS pressurizer PORV and block valves (1 / 2) (operator action)[(2)]
High Pressure Recirculation (HPR)	1/ 2 CRS pumps to 1/4 Charging or SI pumps (Operator action)

Circle Affected Functions	**Recovery of Failed Train**	***Remaining Mitigation Capability Rating for Each Affected Sequence***	**Sequence Color**
1 MSLB - AFW - HPR (3)			
2 MSLB - AFW - FB (4)			
3 MSLB - ISO - HPR (6)			
4 MSLB - ISO - FB (7)			
5 MSLB - EIHP - AFW (9)			

6 MSLB - ISO - EIHP (10)			
Identify any operator recovery actions that are credited to directly restore the degraded equipment or initiating event: If operator actions are required to credit placing mitigation equipment in service or for recovery actions, such credit should be given only if the following criteria are met: 1) sufficient time is available to implement these actions, 2) environmental conditions allow access where needed, 3) procedures exist, 4) training is conducted on the existing procedures under conditions similar to the scenario assumed, and 5) any equipment needed to complete these actions is available and ready for use.			

Table 2.9 SDP Worksheet for Millstone Unit 3 —— ATWS

Estimated Frequency (Table 1 Row) __________ Exposure Time __________ Table 1 Result (circle): A B C D E F G H

Safety Functions Needed:	**Full Creditable Mitigation Capability for Each Safety Function:**
Emergency Boration (HPI)	Operator conducts emergency boration using 1 / 4 Charging or SI pumps (high stress operator action)
Turbine trip (TTP)	Operator trips the turbine (one train)
Primary Relief (PPR)	3 / 3 SRVs with 2/2 PORVs open (one train)
Secondary Heat Removal (AFW)	2 / 2 MDPs of AFW (one train) or 1 / 1 TDP of AFW (one ASD Train)
High Pressure Recirculation (HPR)	1/ 2 CRS pumps to 1/4 Charging or SI pumps (Operator action)

Circle Affected Functions	**Recovery of Failed Train**	***Remaining Mitigation Capability Rating for Each Affected Sequence***	**Sequence Color**
1 ATWS - HPI (2,5,7,9)			
2 ATWS - AFW - HPR (4,7,10)			
3 ATWS - TTP- AFW - PPR (11)			

Identify any operator recovery actions that are credited to directly restore the degraded equipment or initiating event:

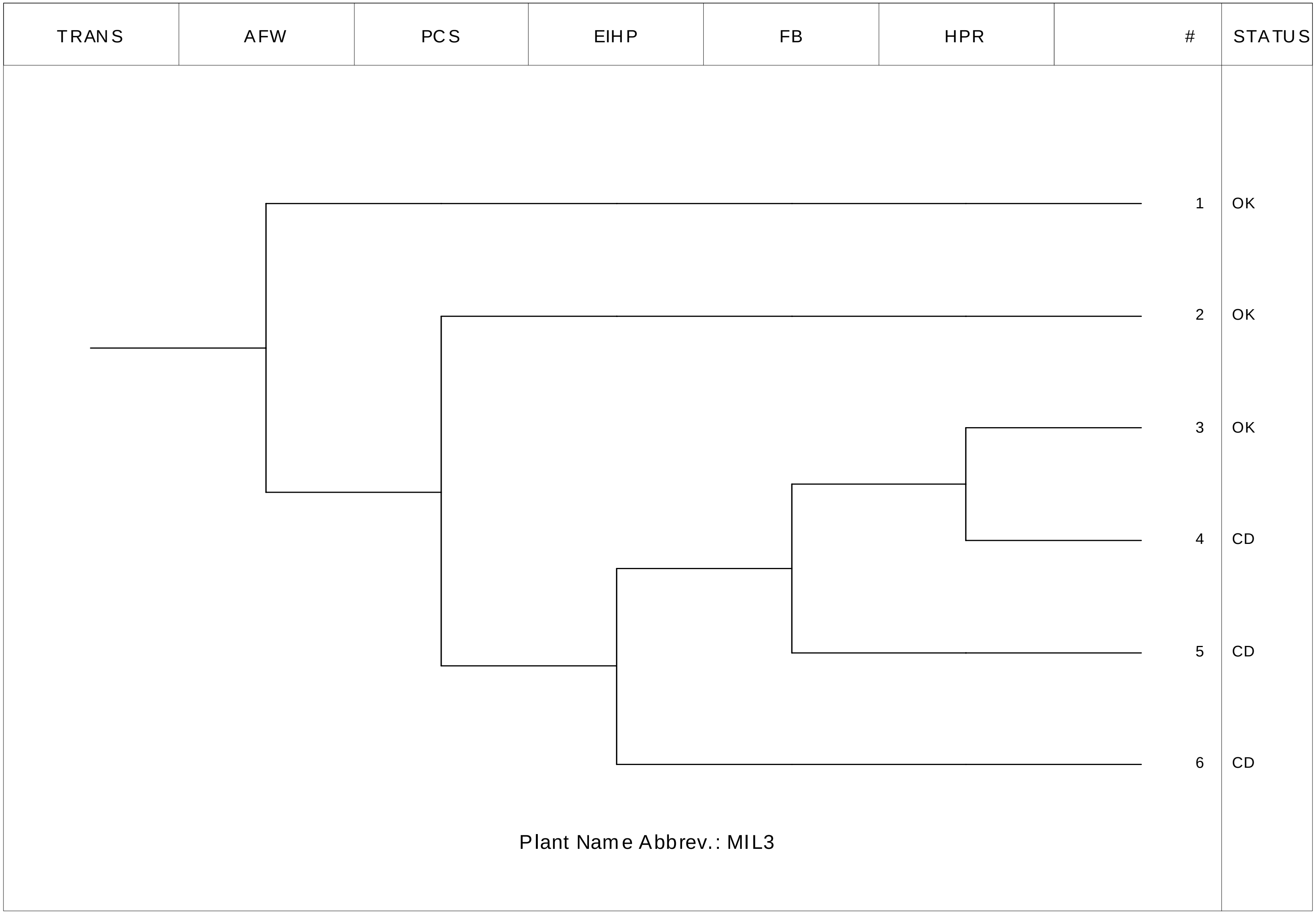
If operator actions are required to credit placing mitigation equipment in service or for recovery actions, such credit should be given only if the following criteria are met: 1) sufficient time is available to implement these actions, 2) environmental conditions allow access where needed, 3) procedures exist, 4) training is conducted on the existing procedures under conditions similar to the scenario assumed, and 5) any equipment needed to complete these actions is available and ready for use.

1.3 SDP Event Trees

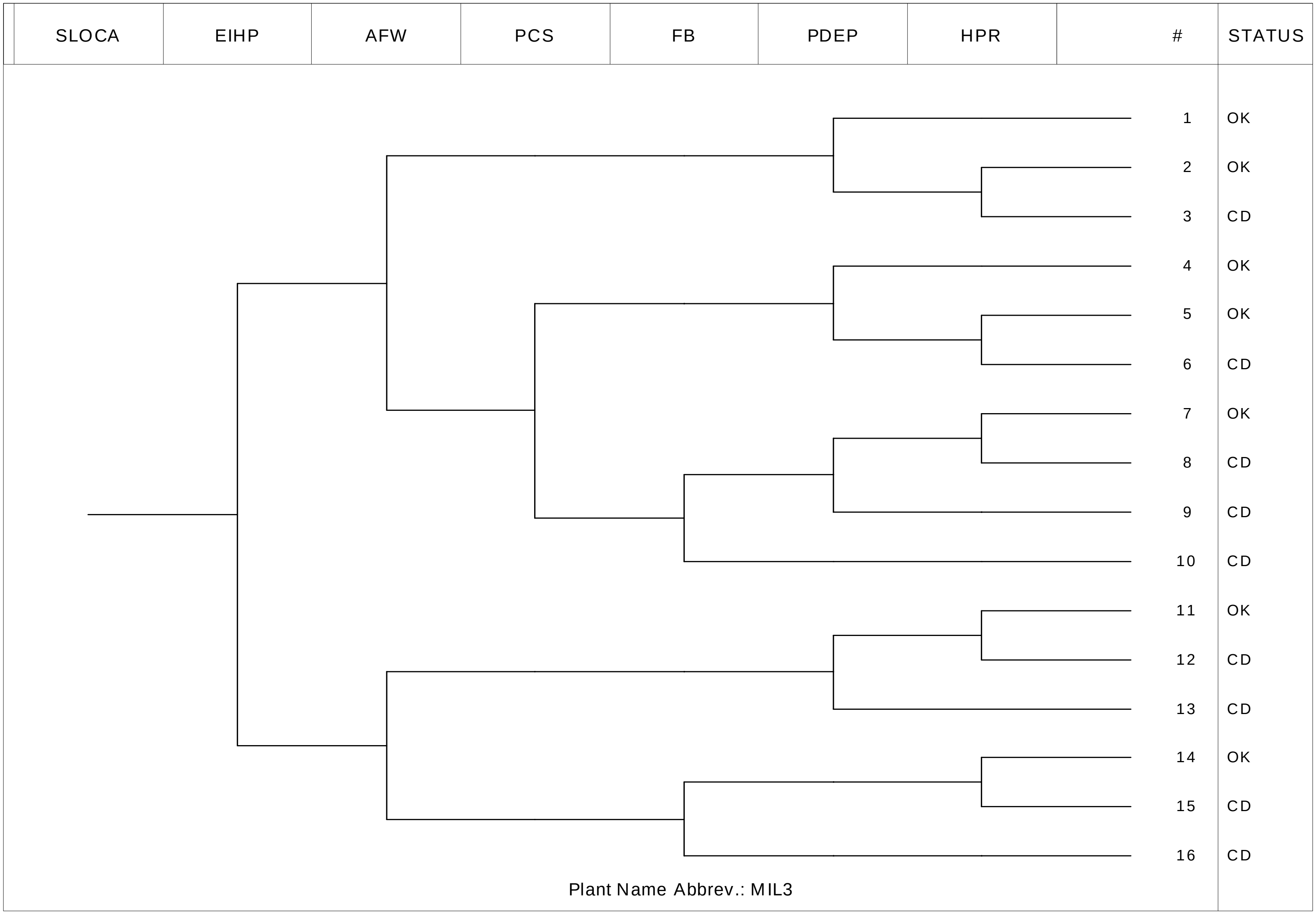
This section provides the simplified event trees called SDP event trees used to define the accident sequences identified in the SDP worksheets in the previous section. An event tree for the stuck-open PORV is not included since it is similar to the small LOCA event tree. The event tree headings are defined in the corresponding SDP worksheets.

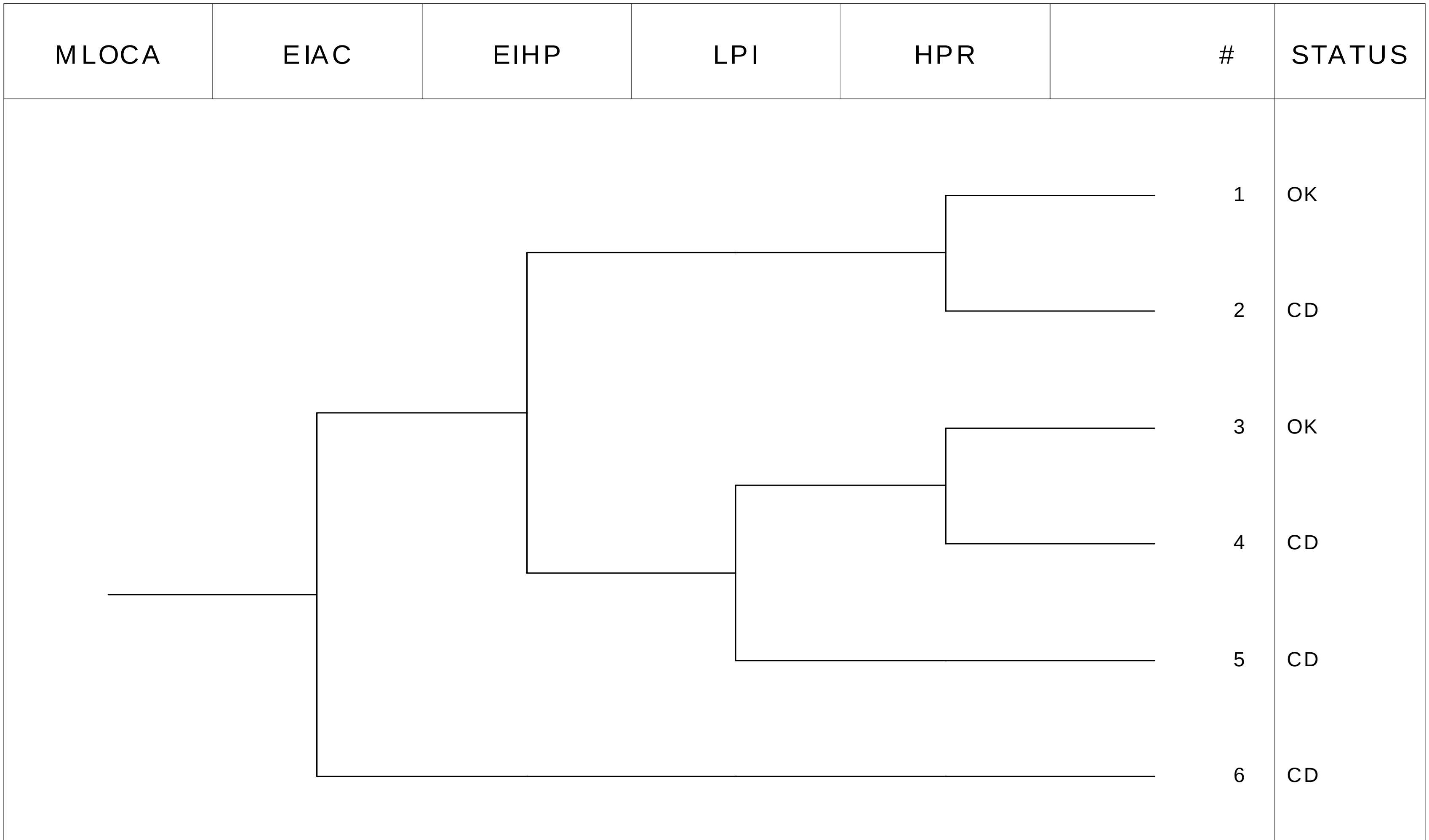
The following event trees are included:

1. Transients
2. Small LOCA
3. Medium LOCA
4. Large LOCA
5. LOOP
6. Steam Generator Tube Rupture (SGTR)
7. Main Steam Line Break (MSLB)
8. Anticipated Transients Without Scram (ATWS)

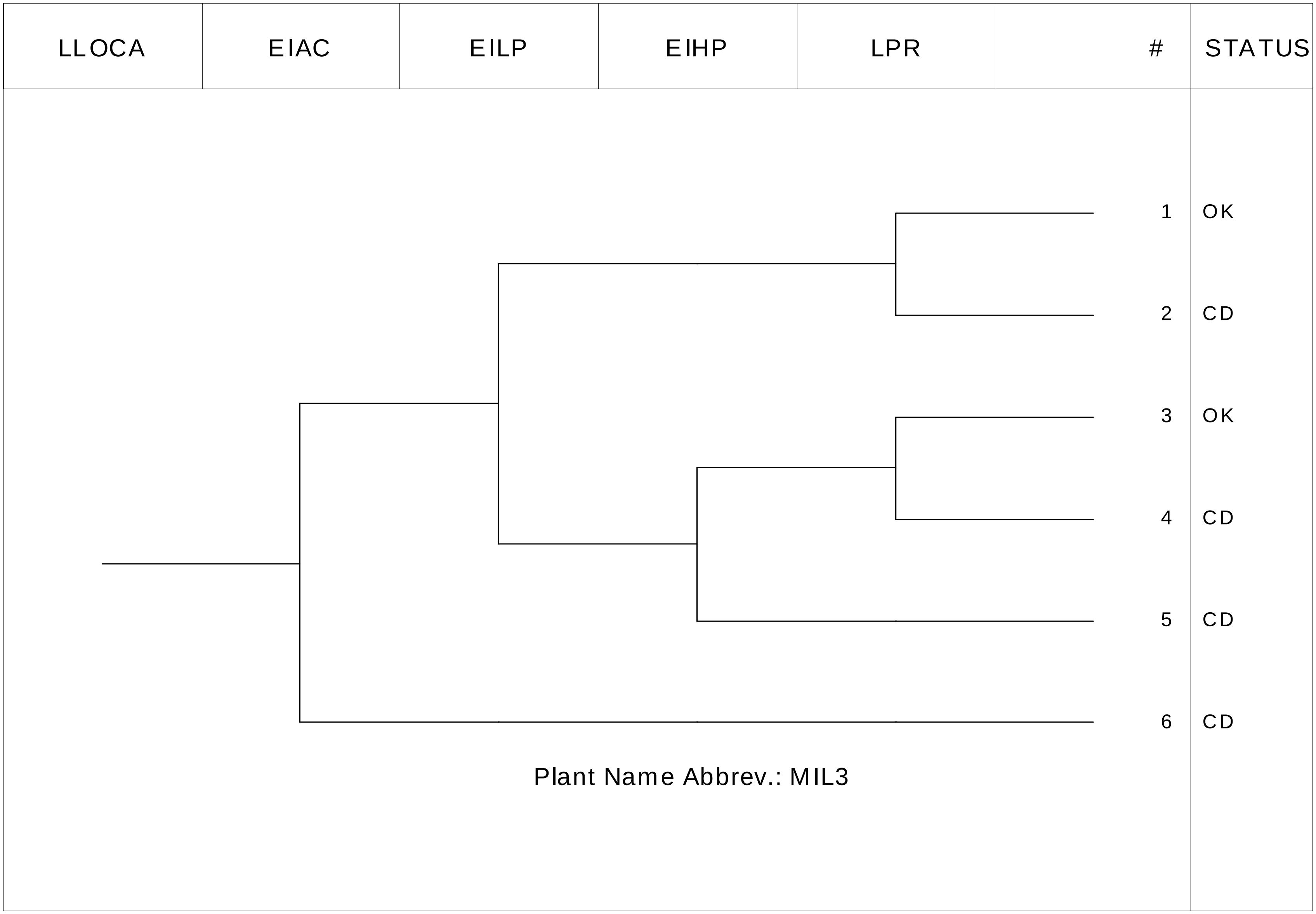


Plant Name Abbrev.: MIL3

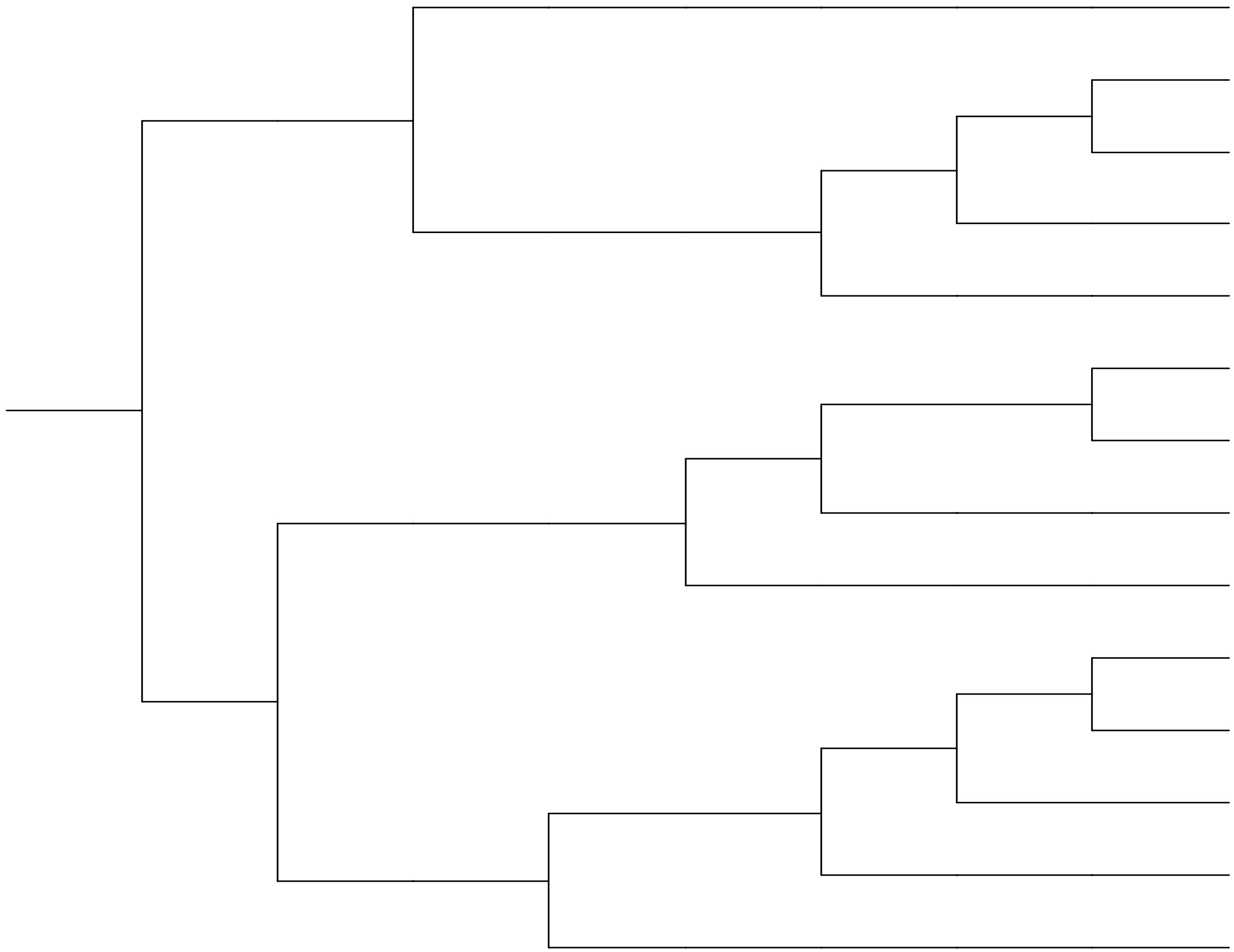

SLOCA
EIHP
AFW
PCS
FB
PDEP
HPR
#
STATUS
1 OK
2 OK
3 CD
4 OK
5 OK
6 CD
7 OK
8 CD
9 CD
10 CD
11 OK
12 CD
13 CD
14 OK
15 CD
16 CD
Plant Name Abbrev.: MIL3



Plant Name Abbrev.: MIL3

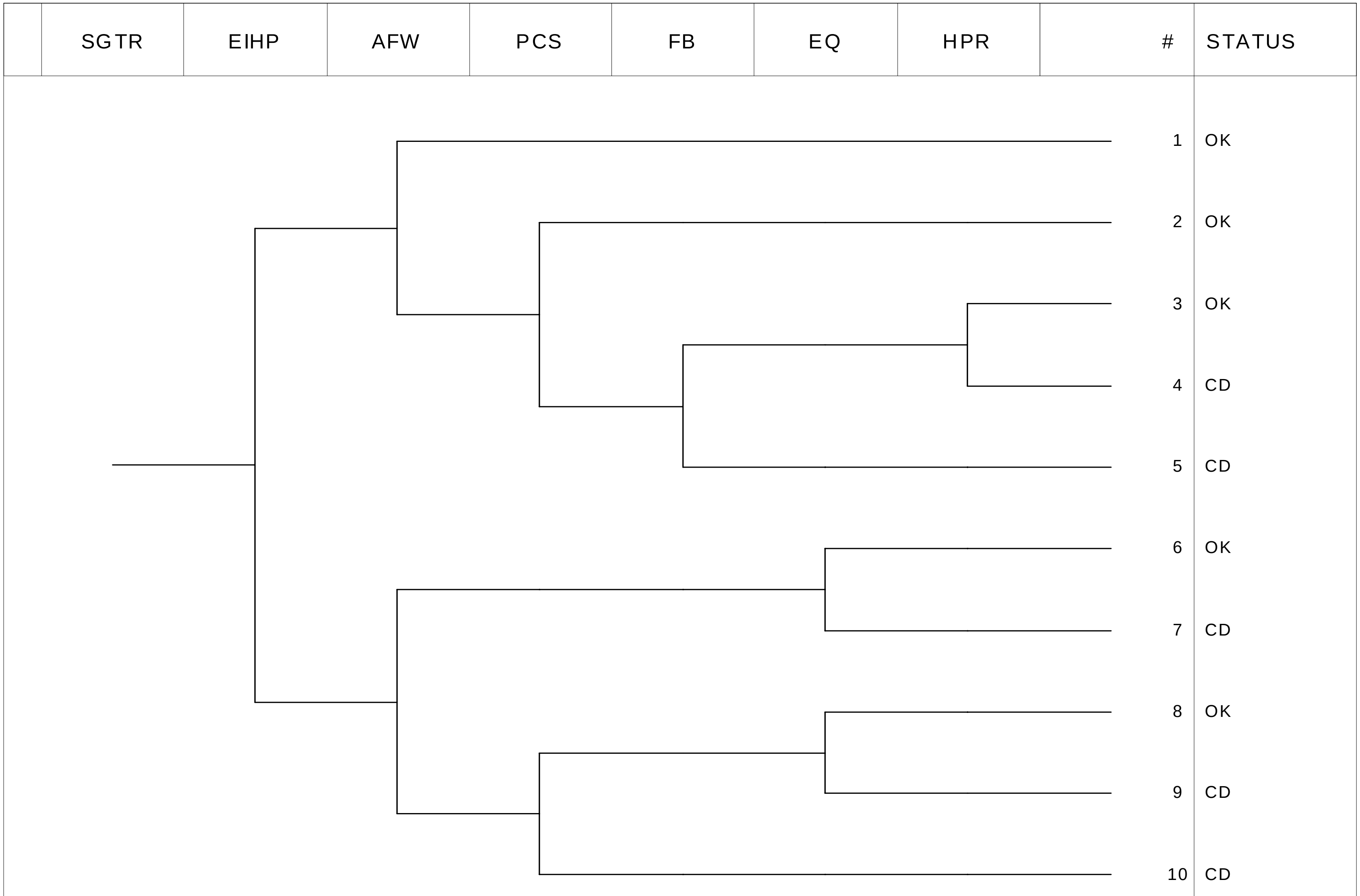

LLOCA
EIAC
EILP
EIHP
LPR
#
STATUS
1 OK
2 CD
3 OK
4 CD
5 CD
6 CD
Plant Name Abbrev.: MIL3

	LOOP	EAC	TDAFW	AFW	REC2	REC6	EIHP	FB	HPR	#	STATUS



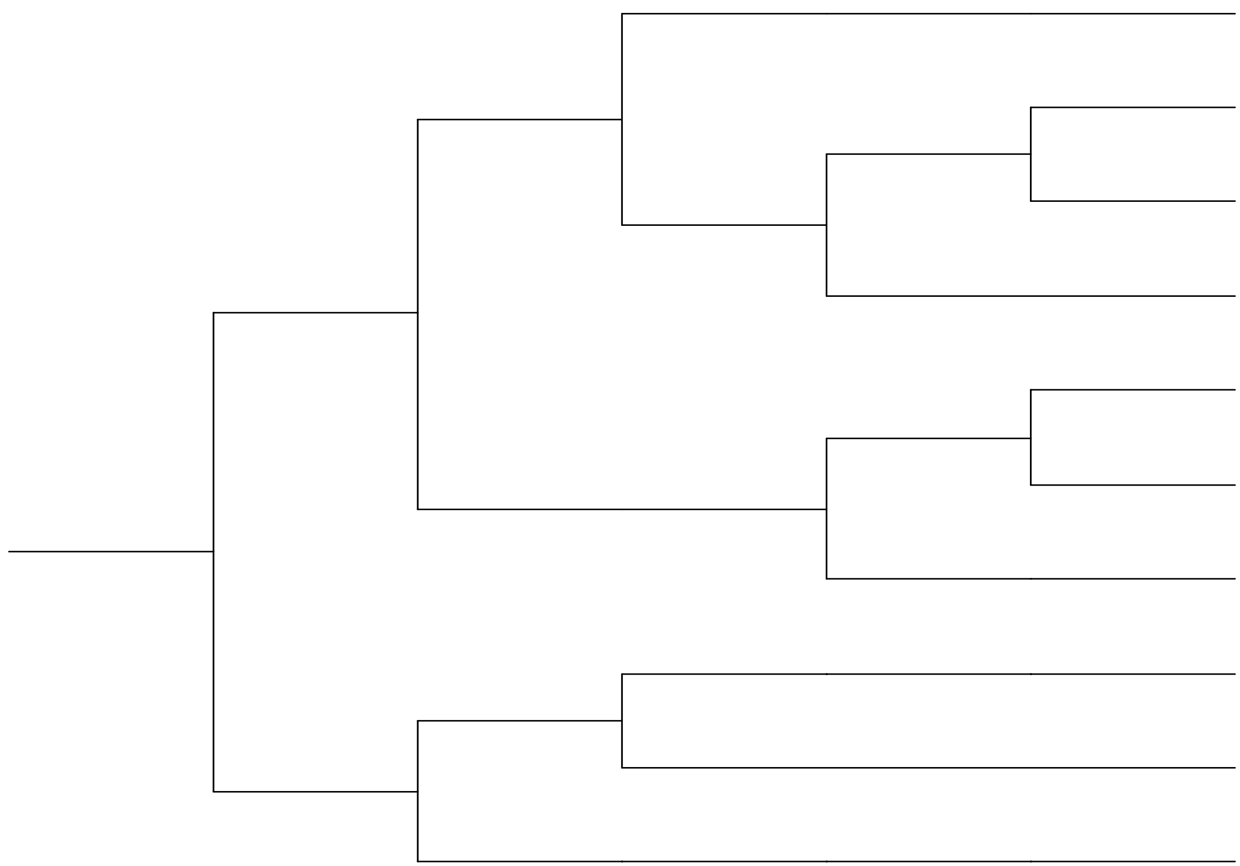
#	STATUS
1	OK
2	OK
3	CD
4	CD
5	CD
6	OK
7	CD
8	CD
9	CD
10	OK
11	CD
12	CD
13	CD
14	CD

Plant Name Abbrev.: MIL3



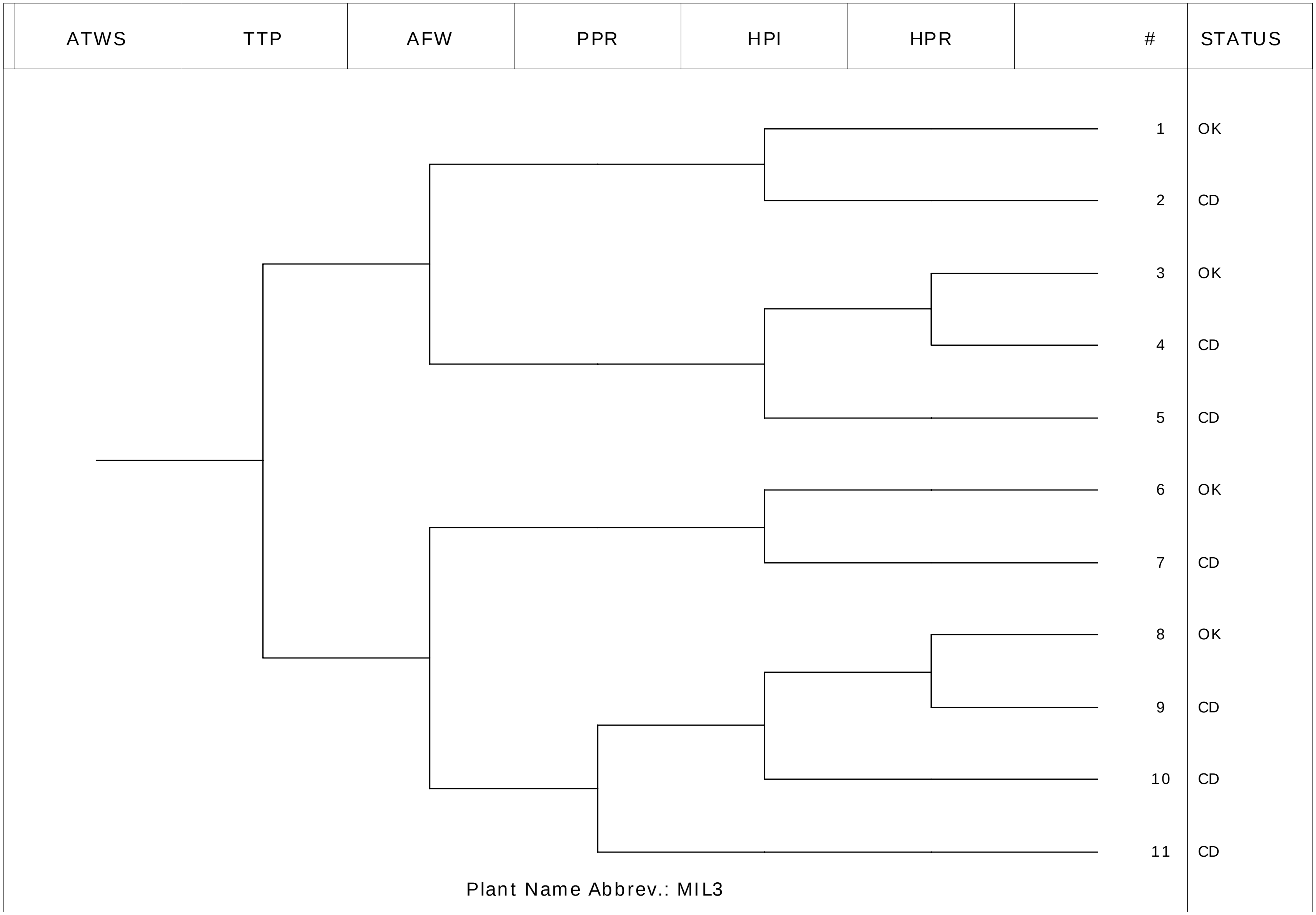
Plant Name Abbrev.: MIL3

	MSLB	EIHP	ISO	AFW	FB	HPR	#	STATUS



#	STATUS
1	OK
2	OK
3	CD
4	CD
5	OK
6	CD
7	CD
8	OK
9	CD
10	CD

Plant Name Abbrev.: MIL3


ATWS
TTP
AFW
PPR
HPI
HPR
#
STATUS
1 OK
2 CD
3 OK
4 CD
5 CD
6 OK
7 CD
8 OK
9 CD
10 CD
11 CD
Plant Name Abbrev.: MIL3

2. RESOLUTION AND DISPOSITION OF COMMENTS

This section documents the comments received on the material included in this report and their resolution. This section is blank until comments are received and are addressed.

REFERENCES

1. NRC SECY-99-007A, Recommendations for Reactor Oversight Process Improvements (Follow-up to SECY-99-007), March 22, 1999.

2. Northeast Utilities Service Co., "Millstone Unit 3 Individual Plant Examination for Severe Accident Vulnerabilities Report," August 1990.