DRAFT

U.S. Nuclear Regulatory Commis

Contingency Plan for the Year 2000 Iss
in the Nuclear Industry

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ATTACHMENT

I. INTRODUCTION

The NRC is pursuing a comprehensive program for dealing with potential Year 2000 (Y2K) issues. We have been and will continue working with our licensees to ensure that potential Y2K issues have been identified and rectified and to ensure that our own computer-based systems will continue to function properly as we pass from 1999 into 2000. However, because of the nature of the Y2K issue, it is not possible to be 100 percent certain that all potential problems be corrected. For this reason, the NRC established a task force to develop contingency plans for ensuring that public health and safety and the environment will continue to be protected, even if unforeseen Y2K issues occur.

In a statement she made on June 12, 1998, to the Senate Special Committee on the Y2K technology problem, Chairman Jackson said that the NRC recognizes the potential importance of a broader focus that helps to ensure that potential concerns with electric system reliability are identified and resolved." To this end, the task force also explored contingency planning options for responding to regulatory and licensing issues that may result from Y2K problems.

II. BACKGROUND

Y2K-induced events are events that arise from a date-related problem experienced by a software system, a software application, or a digital device at a key transition date when the system, application, or device does not perform its intended function. December 31, 1999, to January 1, 2000, and February 28, 2000, to February 29, 2000 are examples of rollover dates. The nuclear utility industry is engaged in Y2K readiness programs at nuclear power plant (NPP) facilities to seek out and correct Y2K issues that have any potential to affect facility operations. Despite these efforts, there is some risk of Y2K-induced events. Effective Y2K contingency planning sets up a process for reducing such associated risks. The next section describes how the Y2K issue could affect facilities and other entities regulated by the NRC.

III. PROBLEM STATEMENT

A. RE

1. Comm ar Power P

The electricity produ delivery sys two of the more important elements of the North American e ial infrast e, must remain dependable during the transition to Y2 Every l element of infrastructure depends on the availability of an interconne d, reliable sup cal power. There is no doubt that cascading or even localized outages of generato mission facilities could have serious short- and long-term c sequences. Continue peration of NPPs during the transition plays a major role in mai ning reliable electrical we supply systems.

T sure continued safe op ation of NPPs during the Y2K transition, the NRC is engaged in c ehensive evaluation licensee Y2K readiness. On May 11, 1998, the NRC sent Generic 8-01 to all opera al NPP licensees, requiring them to take a number of steps to potential Y2 sues at their facilities. In addition, NRC is auditing a dozen NPPs section by geographic location, type of design, and age of the plant) to

evaluate the effectiveness of measures those NPP licensees are taking to identify and correct Y2K issues at their facilities. NRC will use the results of these audits to determine if further regulatory action is required. By July 1, 1999, all NPP licensees must confirm in writing that their plants are or will be Y2K ready by the year 2000 with regard to conformance with the terms and conditions of their license. All licensees have responded that they are implementing prog for Y2K readiness based upon industry guidance (Reference B.1) for Y2K readiness. In has also prepared guidance (Reference B.2) to help NPP utilities develop continge plans.

Internal Facility Risks

The Y2K readiness program implemented by each NPP utility is inten to identi and fix software-based items that could degrade, impair, or prevent operabili f nity. Safety-related instrumentation and control systems that perform safety functi s do not present a Y2K issue because, in the vast majority of NPPs, these syste g hardwired and therefore do not rely on software that may be subject to the Y2K is e. w cases in which such systems are computer based, the software does not h e date- tions that may be affected by the Y2K issue. However, there remains some risk that p still be subject to a Y2K-induced event that has an effect on facility op tions. Examp internal facility risks at NPPs are computer-based control syst dwater cont e control, and generator voltage regulator control; plant proc ntrol rod po n information system; security computer system; and are ulation systems. Contingency plans should identify failure modes and tigation st h ri s. Y2K contingency planning should also consider the pote al that the 2K iss entially affect many such systems and components.

External Risks

Even if the internal facility risks are smal ere are stil ernal risks consider. External risks arise from conditions, circumstances, o ents that a ond th rect control of facility management. The task force ide d ectrical gri unications concerns as the significant e l risk conside ese and oth s are discussed further in Section D.

As part of its planning, t attempt to identify those NPPs that may be most vulnerable to Y2 otential vu ll be determined on the basis of the information given i d response 01 and input from the Y2K program audits and other sources each perm e staff to be better prepared to address potential Y2K i es at t lar plants in its contingency planning efforts.

2. Research and Trainin ors

Res ch and training/test rea or licensees have also established programs to evaluate and co t Y2K deficiencies. Ma research reactors will be shut down on January 1, 2000, as the in tions operating them (e ., universities and laboratories) will be closed for the holiday. H r, these reactors ofte have passive safety features and low power levels, which ensure l potential offsite nsequences. In addition, the staff concluded that any research in operation anuary 1, 2000, could be readily shut down manually using emergency

procedures and existing shutdown systems, even if their operational systems should experience a Y2K issue.

B. MATERIALS LICENSEES

The Y2K issue may affect NRC's materials licensees in many different ways. For exam computer software that is used to calculate therapeutic dose or to account radioacti may not recognize the turn of the century; this could lead to incorrectly c ated doses o exposure times for medical treatment planning. Other examples of soft e that may be are security control, radiation monitoring, technical specification surve nce testing, an accumulated burn-up programs. Also, equipment that licensees have rchased m contain computer software susceptible to the Y2K issue. The problem could r not on in computer software or data acquired from external sources, but also in programs by licensees or consultants. In an effort to inform materials licensees of the Y2K issu issued three information notices (References A.3, A.4, and A.5) and one generic lett e A.2).

1. Medical Licensees

By interviewing licensees and manufacturers, the staff found that devices containi material (high-dose-rate and teletherapy units) appear to be Y ant. Manufa some dose calibrators have found them not Y2K complian tment plann systems are not Y2K compliant. NRC is working with th S. Foo Administration (FDA) to determine if there are any health and safety oblems as medical devices that use byproduct material.

2. Manufacturers

NRC interviewed a large manufacturer of pharmace cal products. At the time of the interview, the manufacturer did not belie hat the Y2K sue would ect health and safety. The dose calibrators used at the manufa uring facilit Y2K co liant. The manufacturer believes that the Y2K issue will no ffe product qua y of the measured activity.

3. Irra

NRC has inte igenics, a rates 12 large irradiator facilities. Sterigenics' staff believes tha o health a oblems related to the Y2K issue. The interlock systems a ovement diators used at its facilities are not controlled by computers. NM a large m cturer of irradiators for more information.

4. Fuel ycle Facilities

NRC h conducted interview el cycle facilities regarding the Y2K issue. All fuel cycle facili s have been inspected K concerns. The primary Y2K concern for fuel cycle facilities is rsion/theft of special nu ear material.

A eric letter (Reference .2) was sent to fuel cycle licensees and certificate holders ting (1) written co mation of implementation of their Year 2000 Readiness Program; (2) onfirmation th e facilities are Y2K ready and in compliance with the terms and f th se/certificate and NRC regulations; and (3) for facilities that are not Y2K

ready on or before December 31, 1998, a written response updating the status and schedule of the facilities' Year 2000 Readiness Program. Every fuel facility has sent written confirmation of implementation of their Year 2000 Readiness program.

Risks for Fuel Facilities

The Y2K readiness program implemented by each fuel facility is intended to identify and correct software, hardware, and embedded systems that could degrade, impair, or prevent operations of the facility. The primary Y2K concern for fuel cycle facilities is diversion or theft of special nuclear material. However, the risk of diversion/theft of special nuclear material is highly unlikely and poses no undo safeguards risk. In the unlikely event of a complete facility blackout, the GDPs would shut down to a safe condition. However, the restart of the GDPs could pose a slight risk to employees from a uranium hexafluoride (UF_6) release. A release of UF_6 in this scenario poses no risk to members of the public. Identification of Y2K problems with fuel facilities will be done after all the responses to the Generic Letter are received. There is no anticipated risk-significant concern for fuel cycle facilities.

Risks for Other Materials Licensees

For medical licensees, overexposure or underexposure of patients presents the greatest risk. Dose calibrators and some treatment planning systems have Y2K problems. However, due to the efforts of the manufacturers of dose calibrators and treatment planning systems, FDA, and the NRC, the risk to patients is considered to be low.

The risk of the Y2K issue affecting health and safety at manufacturers and distributors facilities is low. Most of the safety systems at these facilities are not computer controlled.

If it is determined that a device has a Y2K problem that affects health and safety, NMSS will use current procedures for notifying licensees of unsafe devices. Notification will be sent directly to the affected licensees through use of the License Tracking System.

3. INTERNATIONAL

It is highly probable that Canada and Mexico will experience similar problems as described above, which could have adverse affects on U.S. health and safety, just as Y2K issues in the United States could affect Canada and Mexico. For these reasons, NRC must review existing emergency notification procedures with those countries and coordinate Y2K-related contingency plans.

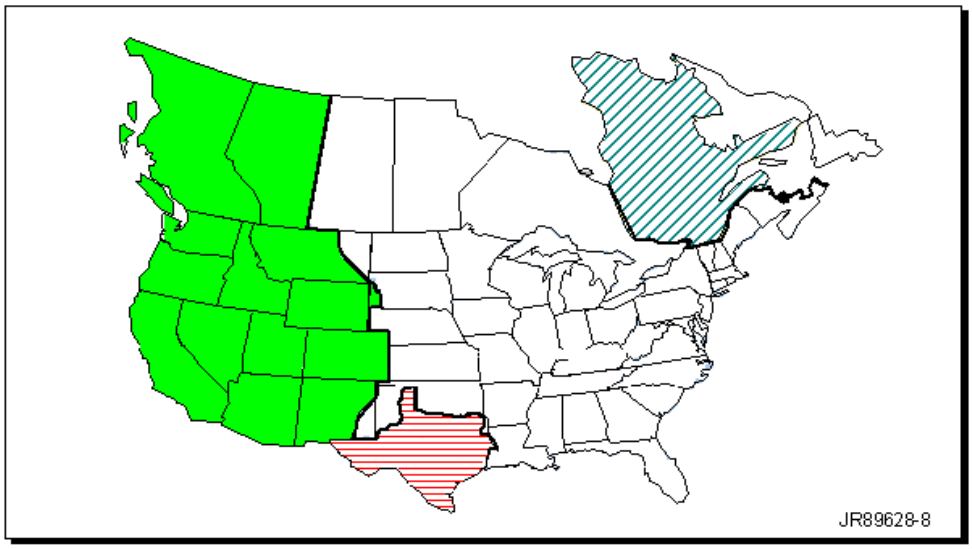
D. INFRASTRUCTURE

1. Electrical Grid Concerns

Potential electrical grid system problems that could arise as a result of a Y2K issue are loss of electric power, grid instability, voltage and frequency fluctuations, circuit breaker malfunctions, transformations, and loss of grid control systems. The North American Electric Reliability Council issued a report on September 17, 1998, that evaluated the anticipated impacts of Y2K

on electrical systems (Reference C.2). The initial findings of the report conclude that proper contingency planning on the part of electric utilities should alleviate widespread power outages. However, the report also conceded that the Y2K issue would result in increased risk of isolated, local outages.

One of the major concerns raised in the NERC report is the lack of information on Y2K [illegible] — about 25 percent of the electric utilities did not respond to the NERC [illegible] readiness su[illegible]. However, the report also indicates that all NPP Y2K programs are on s[illegible]dule to achiev[illegible] 2[illegible] ready status, largely owing to leadership from the Nuclear Energy Inst[illegible]e (NEI) in this area. Another major concern raised in the report is the dependency of electr[illegible] power g[illegible]eration,



transmission, and di[illegible]n telecomm[illegible] system. One reason for this concern is that these telecommuni[illegible]may be out[illegible] of the utility's control.

Interconnections

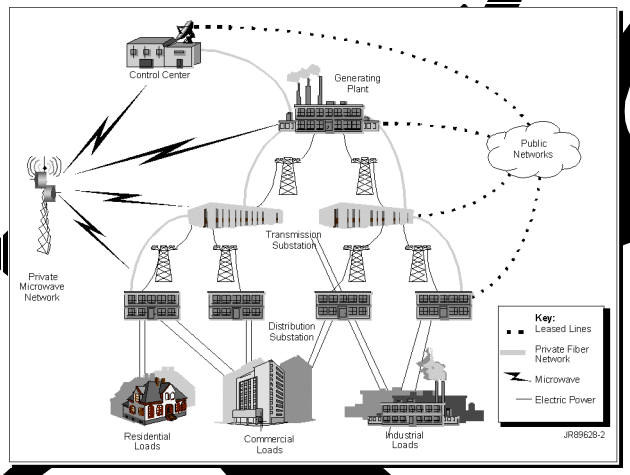
There are four large electric grid Interconnections in No[illegible] Ameri[illegible] in Figure 1. The largest Interco[illegible]ction is th[illegible]ction which covers the ea[illegible]rn two-thi[illegible]s of th[illegible]tes and much of Canada. [illegible]he Weste[illegible]nterconne[illegible]as connections into M[illegible]c[illegible] and cove[illegible] the western [illegible].S. and British Colu[illegible]a and Albe[illegible] Canada. T[illegible] Quebec Int[illegible]nnection (s[illegible]metimes incl[illegible]ed as part of the Eastern In[illegible]onnection) [illegible]rs the C[illegible]adian Province of Quebec a[illegible] the Texas I[illegible]n covers most of Texas. The [illegible]connection[illegible]y independent of each other, and [illegible]entially ac/dc/ac inter-ties that filter out most, but not [illegible]bances. A major disturbance within the I[illegible]on has the potential to cascade to the entire inte[illegible]. The North American Electric Reliability Counc[illegible]ERC) has identified the following four critical areas that pose the greatest direct threat to power [illegible]duction and delivery.

Power P[illegible]oduction

As [illegible]cussed previously, pow[illegible] plants (including fossil and nuclear) must be able to stay online d[illegible]g the Y2K transition pe[illegible]od to avoid major grid disturbances or outages. Newer plants with d[illegible] control systems ma[illegible]e the most vulnerable. The control and protection functions that the [illegible]control systems p[illegible]orm often utilize time-dependent algorithms, which can, if uncorrected, [illegible]intentiona[illegible]erator trips.

Energy Management Systems

Electric utility control centers monitor power system operations (including generating plan transmission and distribution systems, and customer loads), retain historical data, and allo the manual and automatic control of field equipment. The control center's e gy mana system includes supervisory control and data acquisition systems, automa eneration co systems, energy management applications and databases, and graphical r interfaces. Uncorrected Y2K issues in these systems could result in the loss of mo oring, dispa ing, and control functions. In addition, many energy management systems rel precise t e signals that may be provided by global positioning system (GPS) technology. GP unique and pressing problem: the clock used by this system will turn over to 0000 on Augu 9.



Telecommunications

As shown in Figure 2, the transmission and distribution of electrical power is highly dependent on microwave, telephone, and VHF radio communications. Telecommunications systems, in t[illegible], are highly dependent on the availability of electrical power. Section D contains a discussi[illegible] how Y2K issues are being addressed by the telecommunications industry.

Protection Systems

Many newer relay protection devices are digital and are vulnerable to [illegible]K issues. [illegible]he concern raised by NERC was the possibility of a common-mode failure in whi[illegible] relay of a particular model fail at once, causing a large number of coincident outages in tra[illegible]cilities.

2. Telecommunications

As discussed previously, reliable telecommunications service is crucial to the prod[illegible] delivery of power. The Regional Bell Operating Companies (R[illegible] such as Bell A[illegible] U.S. West, independent telephone companies, such as Alia[illegible]ons, and inte[illegible]change carriers (IXCs) , such as AT&T, MCI Worldcom, and S[illegible], have [illegible]in place to ensure that their telephone networks will be Y2K compliant. For exampl[illegible] A[illegible]mated approximately half a billion dollars to complete the [illegible]sessment, [illegible]vision, [illegible]of its voice, wireless, data, and government networks by Dec[illegible]ber 31, 19[illegible]. Major R[illegible] are participants in the National Year 2000 Telco Forum, a co[illegible]ium that h[illegible] contracted with Bellcore to conduct interoperability testing of data and [illegible]e network[illegible] In addition, both IXCs and RBOCs are in a partnership with the Alliance for [illegible]ecommunic[illegible]ns Industry [illegible]olutions (ATIS) to plan and conduct Y2K signaling interoperabi[illegible] tests. The[illegible]g, whi[illegible] being organized by the ATIS Network Testing Committe[illegible], involves a[illegible] network clock and ensuring that the sign[illegible]tween local[illegible] carriers (U.[illegible] Ameritech, and GTE) and IXCs (Sprint a[illegible] unaffecte[illegible]K transition.

Although it appe[illegible]communic[illegible]ders are taking the necessary steps to ensure continued reliable o[illegible] the public[illegible]network (PSN) through the Y2K transition, the task force iden[illegible]ing concer[illegible]

· Although we know t[illegible]ior telecommunications service providers are taking the necessary steps to add[illegible]al Y2K concerns, we know less information about the small local telephone c[illegible]es. Many NPPs and fuel cycle facilities are located in rural areas that are serviced by small telephone companies.

· Although many util[illegible]es have corporate communication networks that tie into the PSN "downstream" o[illegible]e local telephone company, some utilities appear to rely extensively on small lo[illegible]elephone company. The recently enacted Year 2000 Information and

Readiness Disclosure Act should help small local telephone companies get on the track of Y2K compliance.

· The PSN is so vast and complex that it is impractical to perform a rigorous quantitative reliability analysis. Despite the fact that recent studies conclude that the probability of a widespread outage is low, there have been two widespread outages within the last year caused by network signaling software problems. Both of these outages were attributed to a company that provides network signaling capability to small telephone companies.

NRC participates in a number of Government-wide emergency telecommunications initiatives. Most of these are administered through the National Communications System (NCS). An example of a technology currently in use by NRC is the Government Emergency Telecommunications System (GETS), which provides authenticated access and routing, and priority treatment in long-distance telephone networks. GETS presumes continued operation of public and Federal telephone networks during national emergencies when the volume of network traffic is expected to be very high. However, this system may not provide protection in the event of a major network outage.

NCS has been working closely with the NTC to ensure that emergency communications systems are included in the internetwork Y2K testing of the PSN. NCS is also in the initial stages of developing communication network alternatives in the event of a widespread PSN outage. These alternatives utilize high-frequency radio and dedicated leased lines. The NCS is exploring the option of becoming a node on the special NCS Y2K contingency network.

3. Flooding/Loss of Heat Sink

In the industry planning document (reference B.2), loss of heat sink was identified as an external event that NRC should consider in contingency planning purposes. This is a potential concern because systems used to control the flow of water released from a reservoir or hydroelectric dam often rely on computers or microcontrollers that are susceptible to the Y2K issue. Consequently, the staff examined the potential for a Y2K-induced loss of heat sink (or flooding) that could affect NRC-licensed nuclear plants that are on rivers or flood plains. The staff has consulted with the U.S. Army Corps of Engineers (USACE) regarding this issue and has learned that, although there are potential Y2K issues that could prevent the operation of these systems, there are no identified failure mechanisms that could result in a substantial increase or decrease in the amount of water released. In addition, there is a capability to manually operate the hydroelectric plants or, if necessary, the sluice gates in a manner that ensures that minimum downstream flows are maintained. However, another factor examined by the task force was the need for reliable communication between nuclear power plant operators and the USACE. For example, in January, ice jamming on the Missouri River can result in reduced river water levels. Typically when this occurs, NPP operators contact the USACE and ask them to increase downstream flows. However, because the chain of events that influences river water levels typically takes

place over a number of days, this scenario would only be a concern if there were a prolonged (i.e., at least several days) telecommunication outage. Since this is highly unlikely, the task force concluded that loss of heat sink was not a significant concern for NRC contingency planning purposes.

4. Consumables

Another concern raised by the task force was the potential that certain chemicals, diesel fuel o water, food, and other consumables may be difficult to obtain if the Y2 transition results in a breakdown of major infrastructures. As an example of this potential, truck en route to the Turkey Point Plant to deliver water in the aftermath of Hurricane And was diverted by local law enforcement officials for another use.

IV. COORDINATION

A. INDUSTRY

In the summer of 1998, under the oversight of the Nuclear (NEI), the ry formed a Contingency Planning Task Force to provide N utilitie cused approach" to Y2K contingency planning. The primary product of t task forc w ntingency plan guidance document entitled *NEI/NUSMG 98-07, Nuclear Utility ear 2 ss Contingency Planning*, dated August 1998. This ocument, which builds readiness programs already in place, presents guidance that can be us by plant operating staff to develop effective contingency plans for mitigating t otential un icipated effects of a Y2K issue. The guidance incorporates risks to safe plant ation resul from pote al Y2K issues into the existing emergency procedures and eme ncy respon anizati at each NPP. To a large extent, Y2K is e contingency pla ill be plant ill depend on the specific systems and dentified as the Y2K iss individual plant. However, two generic a deration fo cy planning identified in NEI/NUSMG 98-07 are (1) augmentatio (2) availa sumables (e.g., emergency diesel generator fuel oil and water chem chemicals).

The staff contacte g the need further coordination of nuclear industry Y2K contingency planning eff dicated that it does not plan additional coordination of licensee contingency planning use of the plant-specific nature of the issue. NEI stated that individual licensees will w e NRC as necessary in accordance with their existing emer ncy response procedur they experience plant operability concerns due to Y2K iss as they would for any u nticipated operating event. The staff has concluded that the ex g emergency response apability at the nuclear facilities, supplemented to address the Y2K i n accordance with N /NUSMG 98-07, provides the best approach to licensee contingency g for this issue.

Due to the variety of operations, materials licensees have had to develop individual Y2K remediation plans. From a small sample of materials and fuel cycle licensees, it appears that larger facilities are aware of the Y2K issue and are addressing the issue. The NRC Office of the Inspector General (OIG) conducted a survey that identified a lack of Y2K awareness amon radiation safety officers of Priority 3 licensees.

B. OTHER FEDERAL AGENCIES

1. NRC is a member of the Emergency Services Sector (ESS) W ing Group for Y2K, which is headed by the **Federal Emergency Management Ag y (FEMA)**. FEMA has been working closely with the private sector and with State an l go nments to ensure that emergency services and emergency response will n d by the Y2K transition. The Catastrophic Disaster Response Group, which in entatives of the 12 lead agencies of the Federal Response Plan, is working w roups on issues of emergency preparedness and allocation of resources. Although or the CDRG is narrower than that for the ESS Working Group, the activities are complimentary. The NRC is participating in monthly C tings on the . Based on a survey by FEMA of State emergency m tate Emerge Operation Center systems are Y2K compliant a ll be a disaster response. There is less information about the counties l of readin s, police and 911 centers.

2. The **Department of Energy (DOE)** i principal ederal agenc with oversight responsibility for Y2K issues in ele ity supply ems. The N C will coordinate with DOE on NRC/DOE contingency s.

3. NRC c tacted the **Feder y Regulat ion (FERC)** to find out if they were ering Y2K planning r issues or potential problems as h electricit tems. FERC is not developing such plans, but is relyi Y2K contin to address these issues.

4. The NRC is losely with **al Communication System (NCS)** to ensure that emer mmunica will not be affected by the Y2K transition. NRC is exploring f becoming a node on the special NCS Y2K contingency ne ork.

5. The NRC has consulte wi he **U.S. Army Corps of Engineers (USACE)** concerning the potential for Y2K lures that could affect river water levels and flows.

6. The NRC is coordi ting its activities regarding the international aspects of the contingency pla th FEMA, the **Department of State**, and the **Environmental tection ncy**.

7. The **National Interagency Fire Cache** can provide emergency telecommunications equipment support to the NRC, including HF radios and mobile satellite equipment. Use of such equipment would require advance placement at a licensed facility or placem within 24 hours after an incident.

8. The NRC has discussed the Y2K readiness of FTS2001 services w the **General Services Administration (GSA)**. GSA has assured NRC that t FTS2001 syst w be Y2K compliant.

9. NRC is coordinating activities regarding medical devices that t rodu t material with the **U.S. Food and Drug Administration (FDA).**

C. STATES

To facilitate Agreement State efforts to address the Y2K issue, a link to State Gov r 2000 Websites has been provided by NRC. NRC's website ide K resources, conferences, and other related information. The States hav Internet add of this site. The NRC will make every effort to share with States volving th Y2K issue and problems involving NRC materials licensee hat may al a tates or Agreement State licensees. NRC also requested th Agreement tates s formation about Agreement State materials licensees that h identified Y2K issu could affect NRC, other Agreement States, or their licensees.

D. INTERNATIONAL REGULAT BODIES D IAEA/N A

1. Multila al Coordination

Multilate ion takes p orm of information exchange and coordination at internationa as the Int tomic Energy Agency (IAEA) and the Nuclear Energy Agency (th organiza tablished programs to let IAEA member states exchange Y2K info n effort to nd remedy Y2K-related nuclear safety problems. The Off nal Progra will actively participate and monitor progress in these areas.

Interna nal Atomic Energy EA)

At 1998 General Confere , the IAEA adopted a U.S.-sponsored resolution (drafted by the N to make the IAEA a c ringhouse and central point of contact for IAEA member states to e nge information rega ng diagnostic and remediation actions being taken at NPPs, and at le and medical f ties that use radioactive materials, to make these facilities Y2K ready. tion also s Member States to share information with the IAEA regarding diagnostic

and corrective actions being planned or implemented by operating and regulatory organizations and emphasizes that Member States should have contingency plans in place at operating and regulatory organizations well before December 31, 1999, in order to handle potential problems that may arise at that time at those nuclear facilities.

In response, the IAEA has created a special project to address nuclear Y2K-related safe concerns and contingency planning for NPPs and research reactors, and plans to hold seve workshops starting in December 1998. The IAEA also recently sent a questionnaire to m states requesting information about their respective Y2K plans. The questionnaire was distribute to NRC technical offices and NRC will send the coordinated response to the IAEA.

The U.S. is also providing a cost-free expert to the IAEA to assist in the development of IAEA Y2K guidelines. This expert is Morgan Libby, who co-authored the NEI document "Nuclear Utility Year 2000 Readiness Contingency Planning." He will assist the IAEA in contingency planning.

Y2K issues were discussed in September 1998 at a special session of the International Conference on Topical Issues in Nuclear, Radiation, and Waste Safety in Vienna and at the August 1998 meeting of the VVER Regulators Group in Armenia.

At this time, NRC knows nothing about the IAEA contingency plan for the international emergency response system.

Nuclear Energy Agency (NEA)

In February 1998, the NEA sent a Y2K questionnaire to members of its Committee on Nuclear Regulatory Agencies (CNRA). A draft summary of the responses issued in May 1998 showed that all participating regulatory bodies were undertaking aggressive programs with licensees to identify and solve Y2K issues. In August 1998, the NEA established its work on an international e-mail notification system, enabling members to quickly and confidentially exchange Y2K information. The NEA plans to maintain the e-mail system after 2000 by setting up redundant computer and power supply systems. The CNRA members are Australia, Canada, Czech Republic, Finland, France, Germany, Hungary, Japan, Netherlands, South Korea, Spain, Sweden, Switzerland, United Kingdom, and United States.

The NEA is also organizing a Y2K workshop in February 1999 (co-sponsored by the IAEA), and the NRC has proposed that regulators from the former Soviet Union and Central and Eastern Europe be invited to attend.

European Union

The European Commission sponsored a meeting of eastern/western European nuclear regulators in June 1998, at which the Y2K topic was reviewed; attendees spoke about progress in their industry.

2. Bilateral Coordination

NRC's main focus of bilateral contingency planning efforts is on Canada and Mexico. The U.S. enjoys close bilateral ties with both countries and special emergency procedures are in place permitting rapid and redundant communications should an emergency arise. Contingency planning for these countries will involve, among other things, the examination of existing procedures and communications channels. It may also be necessary to coordinate with U.S. border States and Canadian and Mexican provinces.

Canada

The Atomic Energy Control Board (AECB) of Canada is addressing the Y2K issue in its NPPs and hopes to have all plants Y2K compliant by June 30, 1999. Informal contacts with AECB indicate that currently Canada has no plans to examine U.S.-Canadian emergency response procedures from a Y2K perspective. NRC will formally approach the AECB to discuss multilateral and bilateral aspects of Y2K contingency planning.

Mexico

The status or existence of Y2K contingency plans in Mexico is not known at the moment. When informally approached, the Mexicans requested a formal communication, and that is being prepared.

IAEA

NRC and IAEA coordinate communications for direct NRC-IAEA communications in case of a U.S. nuclear emergency.

Other Countries

Countries with which the U.S. has technical information exchange arrangements will be individually contacted by NRC on Y2K issues as part of the ongoing emergency preparedness information exchange. NRC will explore the possibility of using existing bilateral means of communications as redundant communications channels should the regular international emergency response system fail.

NRC will also encourage countries in earlier time zones, which will experience Y2K-related problems before the U.S. does, to relate information about Y2K issues to the NRC in the quickest manner to enable U.S. licensees to avoid common-cause failures. This effort will be

directed mainly at Far Eastern countries, such as Japan, South Korea, and Taiwan, which operate U.S.-style reactors, but could also include certain European countries. The time difference for these countries vs. EST or PST ranges from plus 12 to 15 hours (Far East) and 6 to 9 hours (Europe). It may also be possible to coordinate this activity with FEMA if a proposal by the Chairman of the U.S. Senate Committee on the Year 2000 to set up a Y2K "early warning" system is implemented.

Federal Agencies

NRC is coordinating with the emergency response centers of all Federal agencies involved in the international nuclear emergency notification and response system, such as the Departments of State and Energy, the Environmental Protection Agency, the Federal Emergency Management Agency, the National Security Council, and the President's Council on Year 2000 Conversion.

3. International Safeguards and Physical Protection

The IAEA has instituted a program to examine all its safeguards systems (computers and equipment) for Y2K compliance, and plans to have all systems that control Y2K compliant by the end of 1998. It will take longer to modify in-field equipment because much of the software was developed by outside suppliers and because some of the equipment is tied to plant processes. The IAEA is working to resolve these problems.

NRC has also asked NMSS to investigate the contingency plans of foreign countries with respect to physical protection and to raise the issue of Y2K in future visits to study physical protection.

V. CONTINGENCY PLAN

A. SCENARIO DEVELOPMENT

The task force considered a range of possible scenarios. At the lowest end of the spectrum is a situation in which nothing goes on abnormally during the transition from 1999 to 2000. At the opposite end of the spectrum, the task force hypothesized a worst-case scenario involving a widespread telecommunications outage, a complete loss of the North American power grid, and several major accidents at nuclear power stations (station blackout, loss of ultimate heat sink, loss of feedwater) in conjunction with significant challenges at many other plants (e.g., loss offsite power and feedwater transients). The task force decided that the most prudent course of action was to identify a "planning scenario" that falls somewhere between the two extremes. This planning scenario would encompass events that are beyond our current best estimate of likely consequences, but that would not allow the staff to respond to unforeseen possibilities. After careful consideration of the current understanding of Y2K readiness and risk, as described in Section III, the task force established the following planning assumptions:

- Y2K issues will lead to localized electrical grid disturbances and power outages within one or more interconnections. However, there will not be major regional or nationwide electric power outages.

- Local or regional telecommunications outages will occur, but there will not be a c[illegible] loss of the public switched network (PSN). Networks associated wi[illegible] Regional Operating Companies (RBOCs), major independent telephone co[illegible]ies, and interexchange carriers (IXCs) will remain functional.

- At least two NRC-licensed facilities will be affected directly o[illegible] directly b[illegible] Y2K issue that requires an NRC response (e.g., loss of offsite power).

- Y2K issues will affect at least one NPP outside of the United Sta[illegible]

- Unforeseen Y2K issues will place a dozen or more licensees i[illegible] situation[illegible] from a license condition or a technical specification.

B. INCIDENT RESPONSE

Response Mode

The task force determined that the backbone of t[illegible] contingen[illegible] plan shou[illegible]e agency's well-established and well-tested Incident Respons[illegible]n. On the[illegible]sis of the pl[illegible]ning scenario, the agency would enter Standby mode on New[illegible]ar's Eve 19[illegible]. In Standb[illegible] mode, the Operations Center technical teams are completely sta[illegible]d and a mem[illegible]r of the Ex[illegible]utive Team leads the agency's response. Ordinarily, the cong[illegible]sional and i[illegible]ntional l[illegible]son team positions are not filled during St[illegible]dby. However, a[illegible]sc[illegible]sed below, [illegible] recommends not only staffing the internati[illegible]ison team p[illegible] augmenting [illegible]. Attachment 1 provides a timeline o[illegible] Operations [illegible]ld be staffed for Standby.

Operations Cen[illegible]s

The NRC Operati[illegible] on three [illegible] interrelated systems to ensure the timely flow of information[illegible]aring an [illegible] the Emergency Telecommunications System (ETS), the Emergenc[illegible]Response Data S[illegible]S), and the Operations Center Information Management System[illegible]OCIMS). ETS is the[illegible]unications network that NRC relies on for voice and data comm[illegible]nication between the N[illegible]erations Center and the emergency response facilities (co[illegible]ol room, technical supp[illegible] center, emergency operations facility) associated with every NPP a[illegible]ajor fuel cycle facility. [illegible]RDS is a real-time data system that allows safety-related i[illegible]ation to be downloa[illegible]d from plant computers at all commercial NPPs. OCIMS is the [illegible] means of creati[illegible] storing, sending, and retrieving information in the Operations Center. [illegible]f these s[illegible]s are considered mission critical. The staff is very confident that by the

Office of Management and Budget (OMB) implementation milestone date of March 1999, these systems will be made Y2K compliant. Nonetheless, the staff has developed Y2K contingency plans for each of these systems. The contingency plans assume that electric power, telecommunications, and building support systems are available.

Although a widespread communications outage that affected both the Regional Bell Operating Company (Bell Atlantic) and the FTS2000 network is considered extremely unlikely, the NRC is exploring the option of becoming a node on an emergency communications network being planned by the National Communication System in preparation for potential Y2K issues. This network may allow NRC to communicate with many of its licensees even if there is a regional telecommunications outage that affected the Washington, D.C. metropolitan area.

A localized outage (e.g., a problem at a central office) would be much less likely to affect NRC communications with its power plant and fuel cycle licensees. This is because the NRC Emergency Telecommunications Systems (ETS) is designed to remain functional despite a single fault or failure, barring a fire in the telephone cable room or some other common failure. The trunk groups from the NRC private branch exchange (PBX) are routed through physically separate add/drop multiplexers (ADMs) in the telephone room where they are added to the Synchronous Optical Network (SONET). For added reliability, one of the trunks is routed to a different central office (CO) than the others. Because SONET is "self healing" it should not be vulnerable to a single fiber cut. A limited number of Washington Interagency Telephone System (WITS) lines are also provided in the Operations Center in the event of a complete PBX failure. One of the trunks is dedicated to outgoing calls on the FTS2000 network. The FTS2000 network, the largest private telephone network in the world, is essentially independent of the public switched network. Currently, dedicated lines are run to each NPP site from the closest FTS2000 point of presence. However, because the direct access line (DAL) circuits are often run parallel with commercial services (and are, therefore, susceptible to common-mode failure mechanisms), an alternate means has been established to reach each control room via microwave link through the load dispatcher.

The Operations Center has a dedicated emergency power system, including a dedicated emergency diesel generator and several uninterruptible power supplies, and a dedicated heating, ventilation, and cooling system. The Facilities Branch within the NRC Office of Administration is working with the vendors of support systems (environmental management and control system, tenant chilled and condenser water systems, air handling units, emergency power systems) to ensure that Y2K compliance meets the OMB-scheduled date of March 1999.
In addition, because a regional telecommunications or electric grid outage is a possibility, the staff recommends one additional contingency measure: a back-up operations center. The staff recommends that the Region IV Incident Response Center (IRC) be staffed with a small cadre of responders. Region IV was selected for several reasons:

- Region IV is the only regional office that is not in the Eastern Interconnection. A major grid outage in the Eastern Interconnection could affect Headquarters and Regions I, II, and III.

- Region IV is the only regional office that has telecommunications systems compa[rable] those at Headquarters. It was for this reason that the back-up to the [Head]quart[ers] Automatic Notification System was placed in Region IV.

- Region IV is one time zone removed from Headquarters and m[ay] be in a better position t[o] respond to major problems on the East Coast that affected He[ad]quarters.

Staffing

Because NRC's response to an incident at a NPP requires a different ty[pe] of [re]sponse than an incident at a fuel cycle facility, the response procedures are oriented [to] a partic[ular] facility. For example, if an event occurs at a reactor, the Reactor Safety Team and a Prote[ctive] Measures Team with specialty in reactor safety are called to the Operation[s] Center. However, [to] respond to the Y2K planning scenario, a scaled-down multi[-]team of respond[ers] as described in Attachment 1, is recommended. The total [nu]mber of [Region] IV responders, approximately 40, represents about half of the numbe[r] who would [ty]pically participate in a full-participation exercise. It is currently envisioned tha[t] the Region[al] IRC [will] be staffed with approximately 20 responders, which corresponds [to] the curre[nt] number of [pos]itions on the Region IV incident response roster. In their b[ack]up capacit[y], however, th[ey] would not be expected to carry out all of the responsibili[ties] of the head[quarters] team. On the other hand, if the problems encountered during the Y2K tr[ansi]tion are mo[re] significant t[han] anticipated in the planning scenario, then Region IV could [pro]vide addit[ional] respon[se] support. The task force also recommends th[at] a resident inspe[ctor] be on site durin[g] the [tra]nsition.

Information Brokers

This specialized response team would not only respond to any Y2K-related problems at NRC-licensed facilities, but would also serve as a broker of safety-significant Y2K information th could affect our licensees. Ideally, any Y2K problems that may begin to appear in Japan and other nations that are on the front end of the International Date Line co be comm to NRC through IAEA. The response teams could then rapidly evaluate information f applicability to NRC licensees and communicate this information via fax hone, or comp er (Internet). The task force also discussed the possibility that NRC cou elay informatio related to Y2K problems experienced by facilities in the Eastern time zone, p ded that l nsees volunteered this information as soon as possible and did not rely on th g a threshold established by the 10 CFR 50.72 reporting requirements. Although, it that licensees could take corrective actions on the basis of this information (indeed, it rudent to take short-term actions without thoroughly analyzing the problem), it m s in implementing contingency measures. This information-brokering ac ty is fur d in the timeline provided as Attachment 2.

In developing the "early warning" scenario permitted by ti es, the task made several assumptions concerning the nature of the Y issue. First, the Y2K issue is not limited to the transition th occurs at m ber 1, 1999. Other significant dates, including September 9, 199 (9/9/99) an Febru (a leap day), are discussed in Attachment 3. However, the tas group con ded that t rollover is the most significant operating date. This assump ns consiste with the pr itization of transition date by groups such as the North America ctric Relia ty Council.

Second, Y2K issues that originate with midnight, D ber 31, 99, rollover may not be apparent at tha ime. For examp rol circuit et for any date after 1999 may not exhibit th re until a d ced on this his may not occur for days, weeks, o r the trans The task force assumed that the greatest probability of failure, parti actor safet ould occur shortly (seconds, minutes, hours) after the transition da uch short p mes are involved with these systems. The general probability ould decre e passage of time, and risk factors involving simultaneous failu volving in ucture beyond the plant's control would also decrease. In case, th recommends that the greatest emphasis be placed on facilities l ated in the time z h local midnight is occurring.

Third some Y2K issues involv g ety systems may show up quickly enough and clearly enough to positively identified. Th information could be passed along to units containing similar s ms in sufficient time to e some positive action. The likelihood of such an event occurring a e usefulness of furth distributing such information are clearly debatable. Nevertheless, the n for early warn due to time zone differences appears to warrant consideration in tingency s.

C. REGULATORY RESPONSE

As discussed in Section III, the nuclear industry is pursuing a program to identify and remediate Y2K problems that could affect facility operations. The program will incorporate effective contingency planning for reducing the risks associated with unanticipated Y2K-induced events. Despite these activities, there remains some risk that software-based systems, components, or equipment will still be subject to Y2K-induced events at key rollover dates that affect facility operations. These risks are primarily external to the plant and are of particular concern with regard to electric grid availability (loss of offsite power). If such events were to occur, to continue to operate the nuclear plant safely generating electrical power during the transitional period, the plant licensee may have to (1) take actions that depart from a license condition or a technical specification and (2) seek immediate approval from the NRC for the departure from a license condition or technical specification. These actions may be in the best interest of maintaining public health and safety during the Y2K transition period.

The task force recognizes that the nexus between maintaining adequate electric power and public health and safety is less clear and less direct than that traditionally been associated with NRC's statutory requirements under the Atomic Energy Act. However, because the potential impact of the Year 2000 problem is so widespread, the task force believes that failure to provide electricity to customers at this critical time may have adverse public health and safety consequences.

The potential for adverse impact on public health and safety results primarily from the fact that an unreliable grid can adversely affect NPP safety. An unreliable grid may result in a loss of offsite power at a NPP. A loss of offsite power requires NPPs to rely on their onsite sources of emergency power. Exclusive reliance on emergency power increases the overall plant risk from other, possibly Y2K-related, problems at the plant. In fact, probabilistic risk assessments generally identify the loss of both onsite and offsite ac power, referred to as station blackout, as a risk that constitutes a large portion of the total plant risk.

In addition, failure of the electric grid may also have an impact on public health and safety in a broader sense. For example, in mid-July 1995, a heat wave struck the upper Midwest and contributed to hundreds of fatalities in the Milwaukee and Chicago areas. Many of the fatalities were directly attributable to the heat, and involved people without access to air conditioning. A loss of the grid during this period would have likely resulted in an increased number of fatalities. In situations like this, grid reliability has a direct relationship to public health and safety.

In an effort to help ensure reliable power to the electric grid during the transitional period of the Y2K rollover date, as an important aspect of the protection of public health and safety in the sense discussed above, the task force recommends the following:

- The NRC examine whether the use of 10 CFR 50.54(x) by licensees in these circumstances may be appropriate.

- or -

- The NRC develop a revised enforcement discretion policy specifying the Y2K transition period with specific guidance on those circumstances under which continued plant operation would be permitted and no significant safety concerns results.

- The NRC will provide support staff consisting of projects and management personnel in the Operations Center to assist licensees in making prompt operability determinations during this transition period.

The NRC has determined that if the agency were to address Y2K problems affecting operability within the existing regulatory framework and procedures, continued safe operation of the facility could be unnecessarily adversely impacted, thereby potentially resulting in a greater impact on public health and safety by forcing an unnecessary shutdown. NRC application for relief from a technical specification or license condition under current procedures for notification of enforcement discretion would be too cumbersome and unworkable to allow for prompt action if the licensee determines that continued safe plant operation is possible. Consequently, a 10 CFR 50.54(x)-type relief or a revised enforcement discretion policy will be considered.

The above options are currently under review and a final determination of the appropriate approach to address this issue will be made after consideration of stakeholder input.

VI. REFERENCES

A. [illegible]

1. [illegible] - NRC Generic Letter 98-01: Year 2000 Readiness of Computer Systems at Nuclear Power Plants.

2. June 22, 1998 - Generic Letter 98-03: NMSS Licensees' and Certificate Holders' Year 2000 Readiness Programs.

3. December 24, 1996 - NRC Information Notice 96-70: Year 2000 Effect on Computer System Software.

4. August 6, 1997 - NRC Information Notice 97-61: U.S. Department of Health and Human Services Letter to Medical Device Manufacturers on the Year 2000 Problem.

5. August 12, 1998 - NRC Information Notice 98-30: Effect of the Year 2000 Computer Problem on Material and Fuel Cycle Licensees and Certificate Holders.

B. INDUSTRY GUIDANCE DOCUMENTS

1. October 1997 - Nuclear Energy Institute and Nuclear Utility Software Management Group Report NEI/NUSMG 97-07: Nuclear Utility Year 2000 Readiness.

2. August 1998 - Nuclear Energy Institute and Nuclear Utility Software Management Group Report NEI/NUSMG 98-07: Nuclear Utility Year 2000 Readiness Contingency Planning.

C. OTHER RELEVANT DOCUMENTS

1. March 1997 - National Security Telecommunications Advisory Committee Information Assurance Task Force: Electric Power Risk Assessment.

2. September 17, 1998 - North American Electric Reliability Council: Preparing the Electric Power Systems of North America for the Transition to the Year 2000, A Status Report and Work Plan.

3. August 13, 1998 - Nuclear Regulatory Commission: Year 2000 Readiness Audit Plan (for NRC staff review of select nuclear power plants).

4. September 8, 1998 - North American Electric Reliability Council: Year 2000 Contingency Plan Preparation Guidelines (Draft).

5. September 1997 - United States General Accounting Office (GAO): GAO/AIMD-10.1.14, "Year 2000 Computing Crisis: An Assessment Guide."

6. August 1998 - United States General Accounting Office (GAO): GAO/AIMD-10.1.19, "Year 2000 Computing Crisis: Business Continuity and Contingency Planning."

HEADQUARTERS MULTIDISCIPLINARY TEAM OF RESPONDERS

Executive Team Member (Lead overall response effort)
ET Chronology Officer
Status Summary Officer

Reactor Safety Team
Director
Communicators (2)
Reactor Systems Analyst (Reactor Safety Team)
Electrical/I&C Specialists (2)
Foreign Reactor Experts (2)

Protective Measures Team
Director
Communicators (2)
State Interface
Emergency Planning Specialist
Dose Assessment Analysts

Liaison Team
State Liaison
Federal Liaisons (2)
International Liaisons (2)
Public Affairs (2)
Intelli[illegible]ce Community L[illegible]n

O[illegible]pport Tea[illegible]
Coor[illegible]
Word Pr[illegible]erator
Electronic M[illegible]r
Courier/E[illegible]
Auto[illegible]ic Notific[illegible] Operator

[illegible]formation Technolog[illegible]
Telecommunications S[illegible]ist
Operation Center Info[illegible]ation Management System Contractor
Facility Support Co[illegible]ctor (TECOM)

Headquarters O[illegible]ations Officers (2–3)

[illegible]ordination Team (2–3)

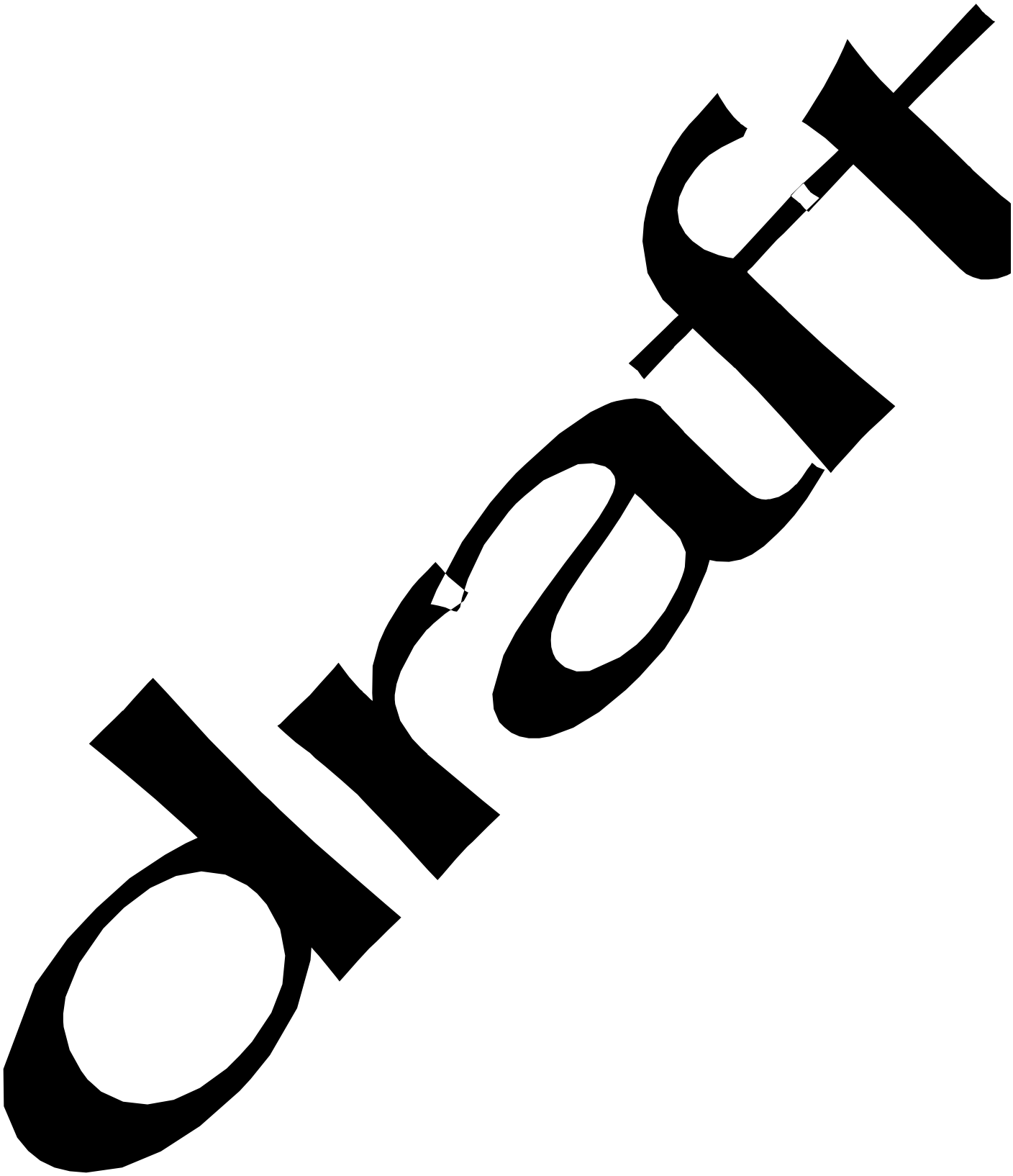
Regulatory Response Team
Project Director
Enforcement Specialist
OGC Representative

ATTACHMENT 1

REGION IV BACKUP TEAM OF RESPONDERS

1. Base Team Manager
2. Base Team Secretary
3. Director of Site Operations
4. Dose Assessor
5. Emergency Notification System Communicator (Base Team)
6. Emergency Response Coordinator/Manager
7. Emergency Response Data System Operator (Base Te
8. Environmental Dose Assessment Coordinator
9. Government Liaison Coordinator/Manager
10. Health Physics Network Communica (Base Tea
11. Health Physics Specialist
12. Monit g & Analysis C r - FRMA
13. P sures Coo nager
14. Public A inator
15. Radiation or
16. R tor Safety Coor ger
17. Reactor Safety Operat s ordinator
18. Reactor Systems Sp alist
19. Resource mana NRC Field Office Coordinator
20. ecurity Coordinator (Position Under Review)

21. Status Summary Communicator (Position Under Review)



TIMELINE FOR OPERATIONS CENTER STAFFING FOR STANDBY MODE

Day	Time	Response Level
12/31/99	1100	Relatively small cache of communicators, fore[illegible]reactor experts, electrical/I&C experts, and NRC representati[illegible]s will assemble in the Operations Center in preparation for calls fr[illegible]IAEA and [illegible]er foreign regulatory bodies. Any reported Y2[illegible]lated plant system problems, grid problems, or widespread tele[illegible]tion outages will be evaluated for relevancy and communic[illegible]licensees.
12/31/99	2300	Agency enters Standby response mode. Ope[illegible]tion[illegible]staffed with specialized response staff plus represe[illegible]tatives fro[illegible]C, and NRR Projects to respond to emergency licensing isst[illegible].
01/01/00	0000	Y2K transition begins.
01/01/00	0015	Operations Center communi[illegible]ors condu[illegible]ecks" all NPPs and fuel cycle facilit[illegible]s in EST zo[illegible]e. A[illegible]lems are reported to licensees.
01/01/00	0115	Operations Center [illegible]ommunicator[illegible]conduct "ph[illegible]e checks" of all NPPs and fuel c[illegible]acilities in[illegible]ST zone. A[illegible]Y2K problems are reported to lic[illegible]es.
01/01/00	[illegible]0215	Operati[illegible]Ce[illegible]er commun[illegible]ct "phone checks" of all NPP[illegible]ycle facilitie[illegible]zone. Any Y2K problems are report[illegible]es.
01/01/00	[illegible]	Operations [illegible]municators conduct "phone checks" of all [illegible]Ps and fuel [illegible]es in PST zone. Any Y2K problems are [illegible]d to licens[illegible].
01/01/00	0600	[illegible]e Team member would decide when the response org[illegible]ld stand down from Standby or if events warrant esca[illegible]NRC response to Initial Activation. Provided that there are [illegible]ma[illegible]or Y2K-related problems, the NRC would continue to mo[illegible]or for a couple of days with a small cadre of Y2K experts.

CRITICAL DATES

(From "Circles of Risk" by Jay Golter and Paloma Hawry)

January 1, 2000, is not the only date in the near future that may disrupt data-processing s
Other dates that could cause disruptions are the following:

January 1, 1999, One-Year-Look-Ahead Date Into Next Century

Many computer programs process data by looking forward on ar and c iting dates back from that point. If such systems have two-digit date pro at e not corrected in time, they may begin to malfunction or fail at the start of 199

August 22, 1999, GPS Rollover

The Global Positioning System (GPS) is a constellation of 24 low-orbiting continuously signal data that can be used to determine t location of a on the surface of the earth. The data are also used to establish exact time of day for transaction logging. The clocks this sys he time a the number of weeks since the launch of the syst in 1980. this counter will overflow and return to 0000 (a would hap n on th of a car that traveled 1 million miles). At that point s e systems equipmen that use the GPS signals may malfunction. Among the lnerable dev es are some ellular telephones, devices that track the location of fr shipment and some na gational equipment. However, many manufacturers o h devices h built thei oducts to handle the rollover period correctly.

September (9/9/99)

A co mming de nter 9999 as a signal that a stack of data had reached i s signal ma have been programmed on date fields, with the result th 9/9/99 will ecial and unintended meaning in a program. Althoug 1/1/2000 p ems appears to be much greater than that of 9/9/9 roblems, s ld be checked for each.

Febru 29, 2000 (Uncomm Year)

The year 2000 is divis e by four and is a leap year. However, years divisible by 100 are not leap years (1900 as not one) unless they are divisible by 400 (2400 will be another leap year). Some grammers did not know about the hundred-year rule when they wrote their origi codes, and those programs will run fine in 2000. Some programmers abou hundred-year rule, but not about the four-hundred-year rule, and their e likely to fail.

December 31, 2000 (366th Day of Uncommon Leap Year)

Some programs operate by counting the days in the year. If the writers of these programs were unaware of the uncommon-leap-year situation, their systems may not fail until December 31, 2000, the (unexpected) 366th day of the year.