Silent Sirens:

Report of Native Americans for a Clean Environment's Investigation Into the Ineffectiveness of Emergency Planning and Federal Oversight to Prevent or Protect the Public From the November 17, 1992 Accident at the Sequoyah Fuels Uranium Processing Facility in Gore, Oklahoma

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TABLE OF CONTENTS

Silent Sirens:

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Introduction

On November 17, 1992, an accident occurred at the Sequoyah Fuels Corporation ("SFC") uranium processing facility in Gore, Oklahoma, resulting in the release of a large cloud of toxic nitrogen dioxide ("NO2") gas which left the plant and injured numerous individuals offsite. The following report documents the investigation conducted by Native Americans for a Clean Environment ("NACE")[1] into the circumstances of the accident, the adequacy of SFC's emergency response to the accident, and the sufficiency of regulatory oversight provided by the Nuclear Regulatory Commission ("NRC") and the Environmental Protection Agency ("EPA").

As a result of its investigation, NACE has determined that the November 17th accident had precursors that were ignored; that SFC's response to the accident was grossly inadequate, deceitful and dangerous; that SFC violated numerous license requirements as well as the company's previous commitments to Congress and the NRC to protect public health and safety during an accident; that NRC's evaluation of SFC's response was inaccurate, incomplete, and careless; and that NRC's enforcement action against SFC was little more than a slap on the wrist. Moreover, there is substantial evidence which indicates that the accident was even more serious, and SFC's response even more chaotic, than depicted by the NRC. Finally, the NRC was not the only agency which abdicated its responsibility for safety at the Sequoyah Fuels facility: the EPA refused to provide qualified medical personnel to assess the health effects of the accident, even though it had access to those personnel. For these reasons, NACE seeks independent inquiries by the Inspectors General of the NRC and the EPA into the reasons that governmental oversight failed to prevent this foreseeable accident, or to ensure that the public was protected once the accident had occurred.

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1 Native Americans for a Clean Environment ("NACE") is an Indian-controlled and staffed citizens' environmental organization, based in Tahlequah, Oklahoma. Its purpose is to educate Indian people and the general public about environmental issues bearing on their well-being, with emphasis on the nuclear industry. NACE's approximately 700 members live in the United States, Canada, Guatemala, and Brazil. One hundred Indian Tribes, including 13 tribes in eastern Oklahoma, are represented in NACE's membership, which is also open to non-Indians. Many of NACE's members live in the immediate vicinity of the SFC plant, some within only a few miles.

History of Nuclear Accidents and Importance of Emergency Planning

One of the lessons learned from the chaotic and unplanned emergency response to the 1979 Three Mile Island nuclear power plant accident was that emergency planning needed to be substantially improved in order to protect public health and safety. Thus, following the TMI accident, the NRC substantially strengthened its emergency planning requirements for nuclear power plants. In addition, the NRC issued proposed emergency planning regulations for major fuel fabrication plants and other materials licensees for which accidents were found to pose significant risks to the public. 46 Fed. Reg. 29,712 (June 3, 1981). While this rulemaking was pending, SFC and some other materials facilities were ordered to submit emergency plans, also known as "contingency plans."

In 1986, a uranium hexaflouride ("UF6") tank exploded at SFC, killing one worker, and exposing 31 other workers to caustic hydrofluoric acid fumes.[2] The toxic plume of hydrofluoric acid that was generated by the explosion also left the site and contaminated neighboring ranches and members of the public who were travelling on nearby highways.

The 1986 accident led both to an internal NRC investigation and a Congressional inquiry which exposed the gross inadequacy of SFC's level of emergency preparedness, NRC emergency planning regulations, and the ability of federal safety and environmental agencies to coordinate for the purpose of responding to chemical and radioactive accidents at nuclear materials facilities such as SFC. See House Committee on Government Operations, NRC's Regulation of Fuel Cycle Facilities: A Paper Tiger, H.R. Rep. No. 167, 100th Cong., 1st Sess. (1987) (hereinafter ("Paper Tiger Report"). Attachment 1. The Paper Tiger Report demanded that NRC strengthen and issue in final form the emergency planning regulations for materials facilities that had been proposed in 1981.[3] SFC's president and a host of NRC officials were called before the Committee on Government Operations to discuss in detail the causes of the accident and what measures were needed to ensure that such an accident would never recur. SFC also made explicit and detailed commitments for reforms to the NRC Commissioners, including a "new program" with "offsite sirens to provide timely warning of any emergency to nearby residents." Transcript of Commission Meeting at 53, Statement by J.G. Randolph (March 13, 1986) (emphasis added). Attachment 2. See also Safety Evaluation Report by the Division of Fuel Cycle and Material Safety Related to the Authorization to Resume Operations for the Sequoyah Fuels Corporation UF6 Facility, Gore, Oklahoma, Docket Number 40-8027, License Number SUB-1010, Appendix B, Status of Commitments Made By SFC to NRC on March 13, 1986 (October 14, 1986) (hereinafter "SER"). Attachment 3. These commitments were accepted by the NRC as sufficient assurances to justify restarting the plant.

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2 NUREG/CR-5566, PNL-7328, Evaluation of Health Effects on Sequoyah Fuels Corporation Workers from Accidental Exposure to Uranium Hexafluoride at iii (USNRC, May, 1990).

3 These regulations finally were issued in 1989. 54 Fed. Reg. 14,051 (April 7, 1989).

The November 17th Accident

Almost seven years later, on November 17, 1992, another accident involving a large release of toxic gas occurred at the SFC plant. Improper mixing of uranium "yellowcake" and nitric acid caused an exothermic chemical reaction, which generated a large plume of toxic NO2 gas. The plume left the plant and travelled toward the nearby town of Gore, injuring workers and offsite individuals in its course. According to a report prepared for the NRC by the University of Oklahoma Health Sciences Center, six SFC workers were treated for such complaints as sore throats, coughing, shortness of breath, congestion, chest tightness, nausea and vomiting, and eye irritation. Mitchell and Coleman, Report: Release of Nitrogen Dioxide, Sequoyah Fuels, Gore, Oklahoma, 11/17/92, at 7; submitted to NRC by letter from Mitchell and Coleman to L.J. Callan, NRC (December 11, 1992) (hereinafter "Mitchell and Coleman Report"). Attachment 4. One individual was treated with oxygen for coughing and shortness of breath. Id. Twenty one workers from a tree farm near the SFC plant were examined for respiratory complaints, irritation of mucous membranes, nausea and vomiting, blistering mouths, and corneal abrasions. Id. at 5. Two of these individuals were hospitalized. Id. at 8-9. The attending physician estimated that 70-80% of the 21 injured offsite individuals had objective symptoms consistent with exposure to nitrogen dioxide. Id. at 6.

The NRC conducted several inspections following the November 17th accident, and identified numerous deficiencies in SFC's emergency response. See Inspection Report 92-30 (December 18, 1992) (Attachment 5); Inspection Report 92-31 (January 21, 1993) (Attachment 6); and Inspection Report 92-32 (January 29, 1993) (Attachment 7). The agency issued an enforcement order on March 25, 1993, citing only five regulatory violations for which it fined SFC just $18,000. EA 93-010 (March 25, 1993) (Attachment 8). The violations cited by NRC in EA 93-010 were: failure to adhere to written procedures for operation of yellowcake digesters; failure to seal control room; entry of contaminated areas by employees without respiratory protection; failure to account adequately for personnel; and failure to sound the onsite air horn.

NACE's Investigation Into November 17th Accident

Because of the serious nature of the November 17th accident, its impact on the surrounding community, and the many obvious deficiencies in SFC's emergency response, NACE closely followed the NRC's investigations and enforcement actions with respect to the accident, and also conducted its own investigation. NACE reviewed the NRC's inspection reports and enforcement orders, and SFC correspondence with NRC regarding the accident. NACE director Lance Hughes and Cherokee citizen Ed Henshaw, an adjacent neighbor of the SFC plant, also attended an enforcement conference regarding the accident on March 2, 1993. Following the enforcement conference, NACE and Mr. Henshaw discussed their concerns regarding the NRC's evaluation of the November 17th accident in a meeting with the NRC staff. NACE also obtained internal NRC and EPA documents through Freedom of Information Act requests, and interviewed various offsite officials who participated in the emergency response.

As discussed below, NACE's investigation revealed that SFC's emergency response was inadequate to protect the public on virtually every level, and that the NRC was ineffectual in requiring SFC to maintain a safe plant, in regulating SFC's preparedness for an accident, or enforcing the law after the accident revealed that SFC had violated many of the emergency planning requirements in its license and placed public safety in serious jeopardy through its ineptitude. The occurrence of the November 17th accident, the failure of SFC's emergency response, and the gross inadequacy of NRC's oversight to prevent it, are all the more appalling in light of the intensive reforms and NRC oversight that SFC has allegedly undergone during the years following the 1986 accident. In addition to the extensive reforms following the 1986 accident, SFC also studied and overhauled much of its management structure, environmental programs, and operating procedures following a 1991 enforcement action in which SFC was shut down for over six months for "significant weaknesses" in its health and safety and environmental programs. EA 91-067, Order for Modification of License and Demand for Information at 27 (October 3, 1991). As a result of this enforcement action, for significant periods over the last several years, SFC has been monitored around the clock by NRC inspectors and independent management experts, and the NRC has kept it on a list of "troubled" nuclear facilities requiring special oversight. Given this intensive degree of scrutiny and reform, the November 17th accident never should have occurred; nor should SFC have bungled its emergency response so completely. Indeed, the agency's ineffectiveness in ensuring safety at SFC is highlighted by the fact that only a month before the accident, six NRC inspectors spent ten days evaluating the sufficiency of SFC's reforms following the 1991 shutdown, and found SFC adequate in such areas as worker training, air monitoring, and respiratory protection -- all subjects in which the November 17th accident proved SFC to be seriously deficient. See Inspection Report 92-28 (December 11, 1992).

Both SFC and the NRC have discussed the technical causes for the November 17th accident; but neither of them addresses the fundamental question of how and why such intensive scrutiny and reform failed to prevent the November 17th accident and SFC's chaotic and inept response. NACE believes this is an extremely important issue that should be investigated and addressed by an entity that is independent of the NRC and therefore may make a more objective assessment of the NRC's repeated failures to exact a safe performance from SFC. The fact that the SFC plant is now closed and slated for decommissioning does not diminish the importance of such an inquiry: the occurrence and response to the November 17th accident reflect a collapse of the NRC's regulatory process which must be addressed if the public is to have confidence in the NRC's ability to regulate any nuclear facility. Moreover, SFC is still pursuing contracts for the use of the facility, and may seek to reopen it at some future time. Finally, members of the public whose safety was put at risk by the accident, are entitled to an accounting as to how and why SFC and the federal government failed to meet their responsibility to protect them.

ANALYSIS

I. NRC's Evaluation of Technical Breakdown Inadequate

Although not mentioned in the NRC's evaluations, the November 17th accident was the second documented incident in five years in which a large volume of NO2 gas was accidentally released from the SFC plant. On April 3, 1987, after receiving a complaint from Ed Henshaw, who lives next to the SFC plant, the NRC determined that processing of yellowcake feed material with nitric acid "produced a large amount of gas, which overwhelmed the exhaust/scrubber system."[4] Inspection Report 87-05, Appendix at 3 (June 5, 1987) (Attachment 9); Memorandum from W. Scott Pennington, IMUF, to George H. Bidinger, IMUF, re: Event Trend Analysis for the Uranium Hexafluoride (UF6) Conversion Facilities at 5 (August 13, 1990) (Attachment 10). In addition, the inspection report discusses the occurrence of other previous releases of NO2 gas on a recurrent basis. In 1987, guards at the south gate of the plant reported that they had "smelled these gases on other occasions." Inspection Report 87-05, Appendix at 3.

Despite this history of similar problems, in investigating the 1992 accident, the NRC inspectors failed to investigate the link between these incidents in their inspection reports. For instance, the NRC did not determine whether the 1987 accident, like the November 17th accident, also resulted from the mixing of yellowcake and nitric acid in the wrong order; and if so, what, if anything, was done to correct this problem. Nor did it determine whether large amounts of NO2 were released from the plant on a routine basis. The inspectors also apparently failed to interview the current Manager of Engineering Support at SFC, Larry Tharp, who had been the UO3 Area Manager at the time of the 1987 accident, and was interviewed by NRC inspectors following that accident. See Inspection Report 87-05, Appendix at 2. Moreover, at the March 3, 1993, enforcement conference, the NRC acknowledged the potential relationship between the 1987 and 1992 incidents, but refused NACE's request to discuss the matter or to conduct a further investigation into the similarities between the events.

SFC's history of NO2 releases suggests that SFC and the NRC had ample warnings about and could have taken actions to prevent the 1992 accident had they acted appropriately more than five years earlier. In 1987, the NRC should have, at a minimum, investigated whether SFC's exhaust/scrubber system was sufficient to handle these recurrent releases of NO2 fumes, and it conceivably should have required modification of the system at that time. Indeed, after the November 17th accident, NRC inspectors found that "the eductor in the fume scrubber system had been eroded and that there was no question it had been impaired prior to the event." Inspection Report 92-31, Appendix at 9. It thus appears that the ex-

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4 The NRC concluded that Oklahoma state opacity limits were not exceeded by the release, but only because "the release was not observed." Inspection Report 87-05, Appendix at 3.

haust/scrubber system's inability to handle the November 17th release may have been caused in part by the unchecked deterioration of the system, also a possible cause of the excessive release in 1987. Thus, the NRC also failed to address the question of whether enforcement action should have been taken against SFC for allowing its scrubber to deteriorate prior to the 1992 accident.

II. Emergency Planning Breakdown

In conducting its review, NACE found that that SFC's emergency response to the November 17th accident was a fiasco, which broke down on virtually every level: SFC failed to provide any offsite siren warning because the accident was misclassified, essential communication equipment failed, worker protection equipment was inaccessible, workers were untrained and thus failed to take adequate safety precautions, accountability for the safety of workers broke down, offsite monitoring was poorly done, and SFC falsely told the public that no injuries were caused by the accident. Equally disturbing, however, was the inaccuracy and incompleteness of the NRC Staff's review of SFC's emergency response.

A. NRC Inspectors Unaware of Revisions to Contingency Plan

A serious problem with the NRC's oversight of emergency planning at nuclear materials plants such as SFC are clearly demonstrated by the fact that NRC inspectors were not even aware of the current version of SFC's Contingency Plan when they evaluated SFC's response to the November 17th accident. Such a major mistake by the NRC not only reflected a careless disregard toward emergency planning, but also resulted in ineffective regulatory oversight, because as a consequence the NRC failed to correctly identify significant deficiencies in SFC's emergency response. Thus, in Inspection Report 92-30, the NRC Augmented Inspection Team ("AIT") referred to "Revision 5, dated December 1988," as the "current version" of SFC's Contingency Plan -- against which the AIT presumably assessed the adequacy of SFC's emergency response. Appendix at 7. The AIT noted the existence of one revision, issued November 10, 1992, but apparently was unaware that this constituted the eleventh revision to the Contingency Plan, which had undergone five other revisions since Revision 5 was issued in 1988.[5] Id. At the time of the accident, the current ver-

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5 See Revision 6, submitted by letter from Scott P. Knight to Leland C. Rouse (May 10, 1989), approved in Safety Evaluation Report (July 21, 1989); Revision 7, submitted by letter from Scott P. Knight to Leland C. Rouse (December 11, 1989), approved by letter from Charles J. Haughney to Scott P. Knight (April 13, 1989); Revision 8, submitted by letter from Lee R. Lacey to Charles J. Haughney (June 15, 1990), approved by letter from Charles J. Haughney to Lee R. Lacey (August 22, 1990); Revision 9, submitted by letter from Lee R. Lacey to Charles J. Haughney (September 7, 1990), approved by letter from Charles J. Haughney to Lee R. Lacey (September 24, 1990); Revision 10, submitted by letter from Lee R. Lacey to Charles J. Haughney (April 8, 1991), approved by letter from Charles J. Haughney to Lee R. Lacey (May 2, 1991).

A copy of the Contingency Plan, incorporating all of its revisions through Rev. 10, is appended to this report as Attachment 11. The date and number of the latest revision to each page of the Plan appear in the bottom right hand corner of the page.

sion of the Contingency Plan was Revision 10 (April 1991). When Mr. Hughes raised this error in his March 2, 1993, meeting with the NRC inspectors, he was given the absurd explanation that Revision 5 was referred to "generically" in the inspection report. Upon further questioning, the Staff either would not or could not identify the current revision of the Contingency Plan.

As a result of this error, the AIT failed to even notice, let alone cite a violation for, SFC's failure to follow the required protocol with respect to assignments of responsibility for execution of the Contingency Plan. In particular, John Ellis, who at that time was Senior Vice President of SFC (he is now the President of SFC), and who is designated by section 4.2.1 of Revision 10 of the Contingency Plan[6] as the primary individual responsible for relieving the Senior Shift Supervisor and taking over as Onsite Emergency Director during an emergency, improperly left the site during the accident. See Inspection Report 92-30, Appendix at 9-10 (two senior Vice Presidents left the site between 9:00 and 9:15 a.m.); Draft Event Description, Sequence of Events at 3 (November 20, 1992) (Senior Vice President John Ellis arrived at Gore Mayor's office at 9:20).[7]

Even worse, it also appears that Mr. Ellis was not trained in his emergency planning responsibilities. According to NRC official Linda Kasner, one of the two Vice Presidents who left the site during the accident had not received emergency response training. Statement by Linda Kasner to Lance Hughes at March 2, 1993, enforcement conference. Since the other Vice President, Ron Adkisson, had been employed at the SFC plant for many years, and presumably had received training during that time, we believe she must have been referring to Mr. Ellis, the Senior Vice President, who joined SFC in the spring of 1992. Clearly, if SFC failed to provide training to Mr. Ellis, who was designated by the Contingency Plan as the the primary Emergency Response Director, this would be a serious violation that should have been cited by the NRC. See discussion in section II.H, below. Yet, no mention was made of this lapse.[8]

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6 Chapter 4 of Revision 10 of the Contingency Plan is appended to this report as Attachment 12.

7 The Draft Event Description is not attributed to any author; nor does it state whether it originated with NRC or SFC. NRC provided it to NACE in response to a Freedom of Information Act request on May 14, 1993. We have since received another copy of the Draft Event Description from EPA, as Attachment C to FY-93-0476, On-Site Monitoring Report for Sequoyah Fuels Corporation, Gore, Sequoyah County, Oklahoma (December 30, 1992) (hereinafter "EPA Report"). The EPA Report, which is appended as Attachment 13 to this report, was prepared by Ecology and Environment, Inc., for EPA. The EPA's copy of the Draft Event Description has a separate cover page which describes the document as "NRC Recommendations." Thus, it appears to have been written by the NRC.

8 We note that the AIT reported that it reviewed "Training Exams," but the inspection report does not indicate whether this review included such matters as the identity of exam takers and the actual exam results. Inspection Report 92-30, Attachment D at 2.

The AIT also failed to note that Health and Safety Manager Scott Munson, who was one of the other three alternate Onsite Emergency Directors designated under Rev. 10 of the Contingency Plan, apparently was also absent from the plant. See Draft Event Description, Sequence of Events, at 3 (At 9:33, Scott Munson called "on radio" and spoke to Robert Jones, who had entered the plant at 9:20.)

The absence of two out of four alternate emergency response directors during the accident should have been a matter of serious concern to the NRC. Moreover, if these either of these individuals left intentionally during the accident, their departure should have been cited as a serious deficiency in the emergency response. However -- probably because the NRC was judging SFC's emergency response against the outdated Rev. 5 of the Contingency Plan, which identified seven alternate emergency response directors[9] -- the NRC's inspection reports make no mention of these problems.

In addition, the apparent confusion of the NRC Staff regarding which version of the Contingency Plan was applicable raises the troubling question of whether offsite authorities were using an incorrect and outdated version of the "Offsite Emergency Management Plan," which is the offsite companion to the Contingency Plan; as well as whether they were trained to implement the correct version of the plan. In fact, it appears from NACE's investigation that at least one offsite governmental agency, the Sequoyah County Sheriff's Office, was using an outdated plan. On Friday, March 13, 1992, NACE director Lance Hughes telephoned NRC Region IV and asked NRC inspector G.M. Vasquez if the NRC knew whether offsite officials were using the correct revision to SFC's offsite emergency plan during the November 17th accident. Mr. Vasquez replied that he was not aware of what plan the offsite officials were using.

NACE subsequently attempted to determine whether the Sequoyah County Sheriff's Office, which has a central role in offsite emergency communications under the Contingency Plan, was using a current version of the Offsite Emergency Plan during the accident.[10] NACE members visited the Sequoyah County Sheriff's office and spoke to a secretary there, who stated that on March 17, 1993, SFC official Gary Barrett went to the Sequoyah County Sheriff's Office and, without the permission of the Sheriff, removed Controlled Copy # SC5001 of the Off-Site Emergency Management Plan, stating that it was outdated. A new plan was provided in its place. The secretary also stated that in-person removal and delivery of emergency plans was unusual, as this is usually done through the mail. The Sheriff subsequently retrieved Controlled Copy # SC5001 from SFC.

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9 Chapter 4 of Revision 5 to the Contingency Plan is appended to this report as Attachment 14.

10 NACE also visited the Vian Police Department and found that the Offsite Emergency Plan and its revisions were kept in a cardboard box, and that the revisions had not been incorporated into the plan, or even organized.

This sequence of events raises questions as to whether Sequoyah County used an outdated version of the Offsite Emergency Management Plan during the November 17th accident, and whether SFC learned from the NRC that NACE had raised a question about the matter and attempted to conceal the problem. If indeed Sequoyah County used the wrong version of the plan, and if indeed SFC later attempted to hide that fact based on information provided to it by the NRC, such behavior would again call into question both SFC's actions and the integrity of the NRC's inspection and oversight of emergency planning.

B. Accident Misclassified by SFC and NRC, No Offsite Siren Sounded

Unquestionably, the gravest regulatory violation and threat to public safety in SFC's faulty emergency response to the November 17th accident was its failure to warn the public by activating its offsite alarm system or to provide the public with any other warning as the plume of NO_2 moved off the SFC site and towards the town of Gore. As a result, individuals who might have taken shelter from the NO_2 plume had they been warned, were exposed to and injured by the toxic gas. See Inspection Report 92-30, Appendix at 17-20; Mitchell and Coleman Report.

However, the NRC found no fault whatsoever with SFC's failure to activate the public warning sirens. As confirmed by NRC officials during the meeting which followed the March 2 enforcement conference, this is because the NRC believed the accident did not reach a level more serious than a "Site Area Emergency" -- the second most serious accident classification -- for which activation of the offsite alarm was not required under the Contingency Plan.[11] As discussed below, this view is utterly inconsistent with the Contingency Plan's emergency classification scheme and the philosophy of conservatism which underlies it. From the moment that SFC officials realized that the plume was dangerous and could or was about to leave the site, the accident should have been classified as the most serious of the four emergency levels, a General Emergency, for which immediate sounding of the siren system was required by the Contingency Plan. Moreover, for unexplained reasons, the NRC failed to address evidence that the control room was evacuated during the accident -- an event that under SFC's Contingency Plan would have required immediate declaration of a General Emergency and sounding of the public warning sirens. Finally, it is inexcusable that the emergency classification system set forth in the Contingency Plan was not superseded years

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11 The SFC Contingency Plan provides for classification of the severity of an emergency under a four-tier scheme. The least serious accident is an Unusual Event, followed by Alert, Site Area, and General Emergency, which is the most severe type of accident. In Inspection Report 92-32, the NRC faulted SFC for classifying the accident as an Unusual Event rather than an Alert at the outset, and failing to upgrade the classification to Site Area Emergency in a timely way. Id. at 12. However, the misclassification and untimely upgrade ultimately were not cited as violations in the enforcement action taken by NRC against SFC. See Notice of Violation, EA 93-010.

ago by an improved emergency classification system, submitted in 1990 by SFC but as yet unapproved by NRC, which would have streamlined emergency classification and placed more emphasis on public notification.

1. **SFC and NRC should have classified the accident as a General Emergency.**

A General Emergency, the most severe accident classification, is defined in section 3.2.4 of SFC's Contingency Plan as follows:

> Events are in process or have occurred which involve an actual or imminent major release of hazardous materials. Release can be reasonably expected to represent a threat to the public health and safety for areas beyond the site boundary.

In contrast, a Site Area Emergency, a less severe accident classification, is described by the Contingency Plan as follows:

> Events are in process or have occurred which involve actual or likely major failures of plant functions needed for protection of the public. Offsite releases are not expected to represent a threat to public health and safety.

Section 3.2.2 (emphasis in original). There was no basis for SFC's classification of the November 17th accident as a Site Area Emergency -- or for NRC's acceptance of that classification. To the contrary, SFC had ample indications that the NO2 fumes would "represent a threat to public health and safety," and that therefore a General Emergency should be declared. The fumes that escaped the digester into the Main Process Building were voluminous and concentrated enough to require the evacuation of the west side of the building (Inspection Report 92-30, Appendix at 13); and SFC had no reason to presume that the Main Process Building would contain these fumes. In fact, as early as 9:00 a.m., SFC's environmental manager realized that the the plume was "travelling off-site," and between 9:00 and 9:10, three individuals -- an environmental engineer and two Vice Presidents -- left the plant "to determine the plume characteristics and the threat to the general public." Id. at 9-10. It is important to note that SFC did not know the precise chemical/nuclear content or concentration of the plume -- including whether the plume contained radioactive material -- until after the plume left the site.[12] Thus, SFC used its own ignorance as an excuse not to take protective action, rather than taking protective action to compensate for its ignorance.

While the NO2 plume's potentially toxic effects to the public may not have been known for sure, given the knowledge that SFC did have, it should have declared a General Emergency,

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12 See Inspection Report 92-30, Appendix at 10: SFC did not check fenceline samplers for uranium content until after the accident was over.

for which the offsite sirens must be sounded. Instead, SFC chose to remain silent and wait to see whether in fact the fumes would be harmful. As a result, over 20 offsite individuals needlessly were exposed to the fumes, and a significant portion of those people were injured. SFC's disregard for public safety is all the more egregious in light of the fact that the Webbers Falls elementary school is less than two miles from the plant, and lies in the general direction that the plume traveled. NACE was informed by Shirley Worley, a Webbers Falls resident, that the kindergarten class was outside on the playground during the accident, and a neighbor's child came home early from school with a complaint of irritated breathing.[13] (Notably, this school is closer to the SFC plant than the Carlile School, which was purchased by SFC and closed because of its proximity to the plant.)

The lessons so painfully learned after the 1986 accident at SFC seem to have been ignored or forgotten by both SFC and the NRC. In evaluating that accident, the NRC had found that "The most important characteristic of the accidents discussed [i.e., chemical releases] is that there is likely to be little or no warning time before releases start;" thus, "[q]uick decisions and prompt actions are necessary." NUREG-1140, A Regulatory Analysis on Emergency Preparedness for Fuel Cycle and Other Radioactive Material Licensees at 101 (1988). Hence, in such a short time frame, licensees do not have the luxury of watching an accident develop for an extended period while they ponder appropriate protective actions, but must act conservatively to protect the public before fast-moving accidents cause injury. As is typical of a chemical accident, the November 17th accident unfolded very quickly, and the plume reached the town of Gore within twenty minutes of SFC's realization that the NO2 cloud had escaped the digester.[14] SFC did not have time to wait for results from the engineer and two Vice Presidents who were out chasing the plume -- it would reach the town before they did. In order to protect public health and safety, SFC needed to act prudently and quickly to alert the affected public, before it was too late for them to take any protective action. Instead, it chose to leave the alarms silent. NACE submits that if SFC's choice, as concurred in by NRC, was valid, then contingency plans for any materials facility are not worth the paper they are written on to the members of the public who are supposed to be protected by them.

In failing to declare a General Emergency and sound the public siren system during the November 17 accident, SFC not only violated the terms of its own Contingency Plan and the principle of conservatism which underlies it, but it also made a sham of public commitments made by SFC in the wake of the 1986 accident, "to provide timely warning of <u>any</u> emergency to nearby residents, and to instruct residents in the proper emergency responses." Letter from J.G. Randolph, President, SFC, to Robert Martin, Region IV, NRC, at 6 (May 7, 1986)

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13 NACE later attempted to contact Ms. Worley to identify the child who was allegedly injured, but could not reach her.

14 As noted in Inspection Report 92-30, Appendix at 8, the wind was blowing at 10 mph and gusting at 25 mph.

(emphasis added). Attachment 15. No such warning was given to any nearby residents on November 17, even as SFC officials watched a chemical plume leave the site and blow toward SFC's neighbors, and even as two SFC vice-presidents followed the plume in their cars. Even individuals who telephoned the plant to ask for emergency instructions were told nothing. Majorie Hicks, who lives across the road from the SFC plant, called SFC during the accident to ask for an explanation and instructions, and was told someone would call her back immediately. No one called back until the next day.

2. Control Room appears to have been evacuated

The NRC also appears to have ignored additional, significant evidence that the November 17th accident was misclassified because the control room may have been evacuated during the accident. Evacuation of the control room is an event which SFC's own Contingency Plan identifies as an example of a General Emergency, for which offsite sirens must be sounded. See section 3.2.4. While Inspection Report 92-30 asserts that the control room was occupied by the onsite emergency director during the accident, (Appendix at 8; see also Inspection Report 92-32 at 9-10), other accounts contradict or undermine this assertion.

NACE has received, through a Freedom of Information Act request, two unattributed and untitled documents which describe the events of the November 17 accident. The first document, dated November 17, 1992, appears to be a contemporaneous SFC account of contacts between SFC and NRC during the accident. See Attachment 16 to this report. This document states that an SFC employee reported to the NRC at 9:20 a.m. that "the control room and both the UF6 and DUF4 facilities had been evacuated." Id. at 1.

The second document is the Draft Event Description, apparently an NRC document. See footnote 7, above. A section of the Draft Event Description entitled "Sequence of Events" reports that at 9:10, "L. Silverstein brought radios down from Control Room to Onsite Emergency Response Organization in the lunch room."[15] Id. at 2. It also reports that at 9:20, "Larry Silverstein brought additional radio's (sic) down from Control Room." Id. at 3. Thus, it appears from this document that during the accident, the Emergency Response Center was moved to the lunch room -- and was not in the control room as reported in Inspection Reports 92-30 and 92-32.

That the control room was evacuated would also be consistent with the facts that the control room was contaminated with NO2 gas and that there was insufficient breathing apparatus in

15 We assume that L. Silverstein is Laurence J. Silverstein, who was identified as Manager, Maintenance and Engineering, in a recent license amendment application by SFC. See text of proposed license amendment at 11-17, attached to letter from SFC to NRC (June 19, 1992). Under SFC's Contingency Plan, the Manager, Maintenance and Engineering, is an alternate for the position of Emergency Response Director. See Contingency Plan, Rev. 10, section 4.2.1.

the control room.[16] Under such conditions, it would have been extremely difficult for SFC emergency response personnel to have remained in the control room throughout the accident. In light of this evidence, and the significance of control room evacuation in classifying the November 17th accident, NACE requests an independent investigation to determine whether the control room was, in fact, evacuated.

3. 1990 Changes to Emergency Classification System Still Unapproved

The NRC has never approved proposed changes to SFC's Emergency Classification System which would have significantly improved SFC's handling of its response to the November 17th accident. On March 30, 1990, five months before its 1985 license was to expire, SFC submitted an Emergency Plan in compliance with 1989 Commission amendments to its emergency planning regulations for materials facilities. Letter from Scott P. Knight, SFC, to Charles J. Haughney, re: Emergency Plan Submittal for NRC Approval, and License SUB-1010 Amendment Application. As characterized by SFC, the Emergency Plan constituted a "major revision to the existing Sequoyah Facility Contingency Plan." Letter from Lee R. Lacey, Vice President for Regulatory Affairs, SFC, to Frank Thornton, Chief, Vian Police Department (July 2, 1991). Attachment 17.

One of the major changes included in the Emergency Plan was an entirely different emergency classification scheme. Unlike the Contingency Plan, which had four tiers of emergency classes, the Emergency Plan proposed only two: Alert and Site Area Emergency. This classification scheme is a significant improvement over the Contingency Plan's classification scheme, to the extent that it clearly incorporates a conservative approach to the implementation of protective measures. If an event "has led or <u>could</u> <u>lead</u> to a release of radioactive or other hazardous material that <u>could</u> require a response by an offsite response organization to protect persons offsite," a Site Area Emergency must be declared and offsite sirens must be activated immediately. Emergency Plan, sections 3.3.1, 3.3.3 (March 30, 1990) (emphasis added).[17]

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16 During the accident, "only two SCBA units were located in the control room for the four individuals needed there during the event." Inspection Report 92-30, Appendix at 15. The nearby motor control center #3, where other SCBA's were located, was "engulfed in the plume and could not be reached." <u>Id</u>. In order to provide sufficient respiratory equipment for the control room staff, operators had to "retrieve the needed equipment from the DUF4 building and from the north guard house," resulting in "a delay in providing needed safety equipment to the control room staff." <u>Id</u>.

17 This classification scheme remains the same in subsequent revisions to the Emergency Plan which were submitted to NRC by SFC on May 18, 1990, July 20, 1990, and June 2, 1992.

Three years after its submission, however, the Emergency Plan has yet to be reviewed or approved by the NRC.[18] In fact, during the almost three years that the license renewal proceeding has been pending before the Atomic Safety and Licensing Board, the Emergency Plan was never even placed in the official hearing file, which is required to include the license renewal application, amendments to the application, and relevant correspondence. 10 C.F.R. 1231(b). Now it appears that the Emergency Plan will never be reviewed, as the NRC has approved SFC's withdrawal of the Plan based on its announced intention to decommission the plant.[19]

The Emergency Plan was a casualty of the NRC's extreme delay in reviewing any part of the license renewal application for SFC, which has languished before the agency since the summer of 1990. This delay makes a mockery of Congress' admonition to NRC, following the tragic 1986 accident, to require licensees to "submit license renewal applications far enough in advance of the expiration date of the license to allow NRC sufficient time to adequately review the renewal application before the license expires." Paper Tiger Report at 37. The NRC has never imposed any such requirement, with the consequence that licensees who submit license renewal applications a month before their licenses expire are allowed to operate for years under outdated licenses while their applications are pending. In this case, the absurd and unacceptable result was that over a three year period a "major revision" to SFC's emergency plan sat unreviewed before the NRC for years, while SFC continued to operate. As a result of the NRC's delay, emergency planning improvements which could have resulted in better protection of the public during the November 17th accident, were never implemented.

C. Failure to Seal Control Room

SFC's Contingency Plan designates the control room as the Emergency Response Center, from which emergency actions are to be directed during an accident. Section 6.1. SFC's license requires that the SFC control room must be sealed, so that it is protected from toxic fumes. See EA 93-010, Notice of Violation and Proposed Imposition of Civil Penalty at 1. However, during the November 17 accident, the control room was not sealed. As a result,

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18 During the three years of its pendency, the Emergency Plan has been revised and updated three times, on May 18, 1990, July 20, 1990, and June 2, 1992. See Letter from John D. Richardson, SFC, to John W.N. Hickey, NRC, re: License No. SUB-1010; Docket No. 40-8027, Sequoyah Fuels Corporation Revised Emergency Plan -- Submittal for Approval (June 2, 1992).

19 Letter from Charles W. Emeigh, NRC, to John Dietrich, SFC, re: Emergency Plan Withdrawal (TAC NO L21692) May 27, 1993). Attachment 18. SFC withdrew the Emergency Plan without any consultation of local officials, who had spent two years reviewing the Emergency Plan and its revisions, and preparing to implement it.

> contaminated air was recirculated into the control room from outside the main process building and from the process areas through an air intake and recirculation plenum that was not sealed from potentially contaminated process areas.

EA 93-010, Notice of Violation and Proposed Imposition of Civil Penalty at 2. As a result of SFC's failure to seal the control room, several operators were injured and required medical treatment. Inspection Report 92-30, Appendix at 16.

The NRC cited SFC's failure to seal the control room as a violation of SFC's license. EA 93-010 at 2. However, this matter is far more serious than simply a license violation, because it involves the abrogation of commitments made by SFC in the wake of the 1986 accident, and reflects the NRC's own failure to ensure that it had and could maintain an adequate basis for its own 1986 finding that the control room was sealed. Among the "commitments" made by SFC to Congress and the Commission in the wake of the 1986 accident was the promise that "Openings between the process area and the Control Room have been sealed to prevent entry of external contamination." SER, Appendix B at 9. The NRC placed its own imprimatur on this assertion in the SER, which supported restart based on the alleged fulfillment of SFC's pledges. Id., SER text at 30.

SFC's and the NRC's 1986 commitment to Congress has all the more hollow a ring in light of the fact that on at least one occasion before the November 17 accident, contaminant leaks to the control room gave SFC and the NRC a warning that, in fact, the control room was not properly sealed. On June 27, 1992 -- six months before the November 17 accident -- fluorine gas "leaked from the cell room to the outdoors and through the air condition system intake to the control room." Inspection Report 92-16, Appendix B at 4 (August 5, 1992) (Attachment 19). Moreover, this apparently was not the first such episode: according to the NRC, SFC's failure to correct the cause of the fluorine leak was "a particular concern because the operations staff had been aware of other gaseous releases that were first detected in the control room." EA 93-010 at 2 (emphasis added).

The leakage of NO2 gas into the control room again on November 17 raises fundamental questions about the integrity of both SFC's alleged commitments to safety, and the NRC's own safety findings and oversight of licensee operations. SFC's 1986 commitment seems to have been an empty one, and the NRC appears not to have confirmed its basis, despite having issued the SER. In addition, the NRC appears to have again ignored its oversight responsibility, in failing to cite the June 27 flourine leak as a violation and follow it up, or to take regulatory action regarding the other leaks to the control room which apparently have occurred since 1986. Indeed, to ignore such repeated indications that the integrity of the control room -- from which both accident control and emergency response measures must be directed -- cannot be maintained, shows a frighteningly reckless disregard for the agency's responsibility to protect the public's health and safety. NACE therefore requests a full investigation into the original basis for the 1986 SER's finding that the control was sealed, and the manner in which the NRC addressed -- or failed to address -- subsequent indications that it was not, in fact, sealed.

D. Questions Regarding Notification of Offsite Public

1. Conflicting Accounts Regarding Notification of Offsite Authorities

The SFC Contingency Plan provides that SFC is to make the initial notification of a Site Area Emergency to offsite authorities through the Sequoyah County Sheriff's Office dispatcher, who then contacts "other local offsite agencies." Section 5.1.3. This notification procedure is important, because it alerts offsite authorities that they should stand by and be prepared to take emergency action should it be required.

However, despite the fact that the November 17th accident had offsite effects, making offsite notification an important part of SFC's emergency response, the NRC completely failed to evaluate or discuss whether the Contingency Plan's notification procedures were followed. Moreover, there are indications that these procedures were not followed on November 17th.

The various records of the November 17 accident provide incomplete and conflicting information as to whether or not the Sequoyah County Sheriff's Office dispatcher -- who is the central offsite official responsible for receiving emergency notifications from SFC and relaying them to other offsite agencies -- was notified. Handwritten notes on a form from SFC's Contingency Plan Implementing Procedures ("CPIP's"), provided to NACE by NRC through the Freedom of Information Act, indicate that an SFC official contacted Sequoyah County Sheriff's Office dispatcher Rich Crutchfield at 9:30 a.m. on November 17, 1993. Attachment 20. However, the Sheriff's Office dispatcher's log for November 17, 1992, which records every incoming call to the dispatcher, contains no record of any contact by SFC on the morning of November 17. Attachment 21. Yet another conflicting account is provided in the copy of the Off-site Emergency Management Plan, Sequoyah Uranium Conversion Facility, Gore, Oklahoma, Rev. 1, Controlled Copy # SC5001 (June 1, 1989), which was in the Sequoyah County Sheriff's Office on November 17, 1992.[20] Attachment 5. Appendix B of the Offsite Emergency Plan, which sets forth procedures for the Sequoyah County Sheriff's Office, contains handwritten notes indicating that the Sheriff's Office received an initial notification message from SFC at 9:20 a.m. on November 17. Id. at B-1. Attachment 22. Oddly, the times are not written in military notation, as is the custom of the Sequoyah County dispatcher and all law enforcement personnel (i.e., 9:20 a.m. typically would be written as 0920); thus raising the question of who made the time notations, when they were made, and for what purpose.

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20 As discussed above in Section II.A, SFC removed Controlled Copy # SC5001 from the Sequoyah County Sheriff's Office on March 17, 1993, but the Sheriff subsequently retrieved it.

Given the important role of notification of offsite officials in an emergency response, we believe it is essential for the NRC to investigate the discrepancies in the various accounts regarding SFC's notification (or lack thereof) of the Sequoyah County Sheriff's Office, and to provide the public with an explanation of what notification did or did not take place. The investigation should also inquire why the NRC found it acceptable for two vice presidents of SFC to leave the SFC site and drive to the town of Gore for the purposes of providing offsite notification to the Mayor of Gore, without evaluating whether SFC also followed the notification procedures described in the Contingency Plan, which surely would have provided for more rapid notification of offsite agencies.

2. Offsite Authorities Unable to Contact SFC

One of the locations where SFC took air samples during the November 17th accident was the Gore Quik-Stop, a convenience store. A woman at the Quik-Stop called the Gore Police Department to find out if something had happened at the plant, and was told that the Police Department didn't know, and had been trying unsuccessfully to contact the SFC plant. This communication failure is not discussed in any of the NRC's inspection reports.

E. Sequoyah Fuels Misrepresented Accident's Impacts to the Public and to Hospital Where Injured Individual Had Sought Medical Care.

In addition to notifying the public of the accident as it was occurring, SFC was responsible to keep the public and area medical institutions informed of the nature of the accident and the risk that it posed. It was particularly important to disseminate accurate information regarding the injuries that had been caused by the accident, in order to alert the public to potential health problems that could result from exposure to the NO2 plume. However, in its communications with the press following the accident, SFC denied that any injuries had occurred. Moreover, a local hospital emergency room turned away an injured tree farm worker, based on the false statement by SFC that his exposure to the NO2 gas was nothing to be concerned about. Thus, SFC falsely and dangerous misrepresented the actual and potential injuries caused by the NO2 plume -- without any censure from the NRC.

1. SFC's false statements to the press

A full day after the accident occurred, SFC representative Pam Bennett falsely told press representatives that the accident caused "no injuries." Gas Fumes Under Investigation by NRC, Sequoyah County Times (November 19, 1992); Sakelaris, Fumes Escape from Sequoyah Fuels, Muskogee Phoenix (November 18, 1992). (These articles are included in Attachment E to the EPA Report.) In fact, SFC was well aware that numerous individuals had been injured by the plume: the Mitchell and Coleman Report stated that the SFC nurse saw four employees and two contract employees following the accident. Id. at 7. Complaints from these employees included sore throats, congestion, chest tightness, nausea and vomiting, and eye irritation. Id. One individual was treated with oxygen for coughing and shortness of breath. Id. Workers from the nearby tree nursery reported blistering in their mouths, bleeding external auditory canal, and severe headaches. Id. at 8. Not only did SFC fail to report this information to the public, but Ms. Bennett "emphasized" the lack of injuries in her statement to the press. Gas Fumes Under Investigation by NRC, Sequoyah County Times (November 19, 1992). This statement was made a full day after the accident occurred, when SFC undoubtedly had information about the onsite and offsite injuries well in hand. Without explanation, the NRC completely failed to cite SFC for misinforming the public regarding the injuries caused by the NO2 plume.

In addition to suppressing information about the injuries caused by the NO2, SFC barely attempted to follow up on the injuries to its own employees. SFC told the NRC that the employees it was able to contact after a week were "asymptomatic" -- but an unspecified number of injured employees were not contacted, on the excuse that they were "on vacation" or "furloughed." Inspection Report 92-30, Appendix at 17. Again, the NRC did not cite SFC for failing to follow up on these individuals.

2. Hospital refused to treat injured individual based on false information provided by SFC.

Rick Williams, a worker at the tree farm across the river from the SFC plant, informed NACE that he was exposed to the NO2 plume during the November 17th accident. Shortly after the accident, he went to the emergency room at the Sequoyah Memorial Hospital in Sallisaw, to seek treatment for burning nose and eyes and itching skin. The Sequoyah Memorial Hospital has signed a letter of agreement to "provide care for both conventional and radiation injuries" resulting from SFC activities. Letter from Ruth Ann Roark, Administrator, Sequoyah Memorial Hospital, to Reau Graves, President, SFC (August 8, 1990). Attachment 23.

When Mr. Williams told the emergency room receptionist of his symptoms, she called SFC, and then told Mr. Williams that SFC confirmed that there had been a release, but that it was nothing to be concerned about and he should go home. Mr. Williams told NACE that on November 19, still suffering symptoms from the accident, he consulted a county-employed physician, Dr. Max Yancy, who also treated other offsite injured individuals. See also Mitchell and Coleman Report; EPA Report, Attachment F: Copy of Logbook # 1 (Pages 1-13) at 7 (November 17-20, 1993).

Thus, Mr. Williams was refused treatment for his injuries from a hospital that had specifically agreed to provide such services, and whose staff allegedly had been trained by SFC to treat the types of injuries which could occur at the SFC plant. See Letter from James J. Sheppard, SFC, to Robert D. Martin, NRC (May 26, 1992). Attachment 24. Moreover, the hospital's refusal to treat Mr. Williams was based on statements made to the hospital staff by SFC, thus raising the question of whether SFC's "training" of the hospital staff involved an unwritten agreement to substitute SFC's judgment (issued over the telephone) for the independent judgment of the hospital staff regarding the type of care required for accident victims.

The experience of Mr. Williams is chilling testimony to SFC's reckless disregard for the safety of the public. Not only did SFC fail to protect Mr. Williams by sounding a siren that would have warned him to take shelter or evacuate in advance of the arrival of the NO2 plume, but it later misled local hospital officials into refusing prompt treatment to Mr. Williams after he was injured by the toxic gas.

Moreover, the NRC apparently was aware of Mr. Williams' situation; yet, it took no action in response. According to notes prepared by Jim Hardin, a consultant to EPA who visited the SFC site shortly after the accident, "Linda Kasner asked [SFC physician] Dr. Anderson if he knew anything about a nursery worker, Rick Williams, who was allegedly turned away from the Sallisaw Emergency Room after an Emergency Room employee called Sequoyah Fuels." EPA Report, Attachment F, Copy of Logbook # 1 (Pages 1-13) at 7 (November 19-20, 1993). The NRC inspection reports say nothing about the egregious treatment of Mr. Williams, and its implications for the integrity of emergency protection measures for accidents at the SFC facility.

F. Poor Monitoring of Airborne Contaminants

Monitoring of NO2 and uranium releases was an important part of SFC's response to the November 17 accident, because it was needed to assess the health risk posed by the NO2 plume. In evaluating the adequacy of offsite monitoring during the accident, the AIT concluded that SFC's monitoring efforts "appear to have been reasonable." Inspection Report 92-30, Appendix at 26. Id. Thus, no violations were cited in EA 93-010 with respect to offsite monitoring.

However, the AIT's description of the manner and location in which offsite monitoring was conducted raises significant questions regarding its adequacy, and suggests that SFC's sampling data was highly suspect. For instance, the AIT gives the following account of SFC's initial effort to monitor the plume offsite:

> Noting that the plume was travelling offsite, approximately 10 minutes after the event began and before the declaration of a site area emergency, the manager, environmental, and an environmental engineer took NO2 Drager tubes from the emergency kit at the south gatehouse, left the site, and drove to the town of Gore. They reported seeing a slight yellowish haze about 200 yards wide and 100-200 yards above the ground. They drove in front of the plume, as best they could determine, and took air measurements using the NO2 Drager tubes. The Drager tube measurements showed no detectable NO2, and the two individuals stated that they had not been able to smell or taste NO2.

Inspection Report 92-30, Appendix at 10. Apparently, the SFC officials did not go directly to the plume to measure concentrations inside it, but drove "in front of it." This suggests that SFC had an opportunity to measure the plume but chose to measure in advance of the plume.

Similar questions are raised about the AIT's account of SFC's second attempt to monitor the plume:

> Between 9:10 and 9:15 a.m., two Sequoyah Fuels senior health and safety technicians were dispatched to Gore to measure air concentrations. They reported that the plume was visible from Highway 64 on the way to Gore and that it appeared to be above the ground. The plume was not visible to them in Gore, but they estimated its location and obtained air samples, presumably near the plume centerline. The technicians took a 5-minute high volume air sample for uranium analysis and a Drager tube sample for NO2 at three locations: near the Gore High School, at a convenience store near the intersection of Highways 100 and 64, and at the intersection of River Road and Highway 64. None of the samples indicated detectable NO2 or uranium.

Again, the technicians apparently did not measure the plume on the way to Gore, where it was visibile to them -- and where it was concentrated enough to damage the health of several individuals working at a tree farm close to the plant. Also, there is no explanation of where the technicians considereds the plume's "centerline" to be, or why the Gore High School was chosen as a sampling site, since it is on the far north side of town, and not in the expected path of the plume.

Moreover, the reliability of <u>any</u> offsite monitoring data gathered by SFC during the November 17 accident was undermined by SFC's poor documentation methods. As the AIT reported,

> The licensee's documentation of surveys and air concentration measurements was weak, in that some technicians had not documented surveys as they occurred. As a result, the times that air samples had been taken were estimated only to within 10 minutes, sampling locations were not well known until the technicians were reinterviewed, and calculated results required clarification.

In light of these deficiencies, SFC's monitoring data is highly suspect -- yet, the NRC expresses no opinion about its accuracy. Moreover, despite the fact that these deficiencies may have rendered SFC's offsite monitoring program ineffective, the NRC cites no license violations.

NACE also questions the basis for the AIT's conclusion that no measurable uranium was released offsite during the accident, based on readings from a fenceline air sampler and "roof vent samples." Inspection Report 92-30, Appendix at 10-11. First, the AIT reports that after the release ended, SFC analyzed an air sample from a fenceline air sampler which was "believed" to have been in the plume pathway. Inspection Report 92-30, Appendix at 10. This sample "indicated 4 percent of the maximum permissible concentration (MPC) for uranium effluents to unrestricted areas." Id. Given the high visibility of the plume as it left the SFC site, the question of whether this sampling location was in fact in the plume pathway should have and could have been answered. Yet, the NRC made no attempt to determine whether SFC's supposition was accurate.

Second, the AIT discusses the results of "roof vent samples," but fails to describe the number, location, or relationship of these roof vents to the digester. In addition, the NRC fails to mention the existence of any stack samples taken during the accident, which surely would have been an important source of information regarding the amount of uranium that was released from the plant during the accident. NACE questions why so little information is provided in the NRC's inspection reports regarding SFC's measurements of this extremely dangerous contaminant.

G. Deficient equipment for onsite communications and emergency notification

The November 17th accident revealed that equipment used for emergency communications and notification at the SFC plant was in a shocking state of disrepair and disarray. The condition of this equipment once again makes a mockery of the 1986 review, in which the NRC gave its blessing to the adequacy of SFC's communications and notification system to prevent another disaster. See SER at 30.

SFC's communication and notification equipment is described in grandiose detail in the Contingency Plan. For emergency communications, the Plan provides for an "Operator-Control Room FM radio communications system," consisting of "a base station in the Control Room and portable, two-way sets carried by operators." Section 6.3.1. For onsite emergency notification, the Contingency Plan provides for a "facility public address system" and "air horn signal system" that are used "to alert employees and direct them away from hazardous areas." The air horn signal "alerts personnel to an emergency condition. Then information is passed over the public address system concerning protective actions and evacuation routes. Activation of the air horn signal system also automatically shuts down the ventilation supply fans for the administration, laboratory, and change room areas, and the Control Room." Section 6.3.1.

The November 17th accident revealed a different reality:

1. Defective communications equipment

Clearly, the onsite communications equipment is important to an emergency response, for the purpose of keeping the Emergency Response Director informed of accident conditions outside the Emergency Response Center. SFC's Contingency Plan requires that this equipment be operable, and it must be "operationally checked" on a monthly basis if it is not in regular use. Contingency Plan, sections 6.3.1, 6.3.3. SFC's communication capability failed critically when, during the November 17th accident, "problems encountered with radio communications" delayed the Emergency Response Director's receipt of the critical message that the NO2 plume "was moving out of the main process building and threatening to move offsite." Inspection Report 92-30, Appendix at 8. Rather than being conveyed by radio, this information was brought to the Emergency Response Director, in person, by the safety engineer. Despite the serious safety implications of this breakdown, the failure of the radio was not cited as a violation by the NRC; nor did the NRC make any attempt to evaluate the effect of the radio's failure on the adequacy and timeliness of SFC's emergency response.

2. Broken and inadequate notification equipment

With respect to deficiencies in SFC's onsite emergency notification system, the NRC cited SFC for failing to activate its air horn signal system upon declaration of an Unusual Event. EA 93-010, Notice of Violation and Proposed Imposition of Civil Penalty at 2. However, EA 93-010 fails to discuss the full safety significance of the silent air horn; and it fails to cite SFC for the incomplete coverage of the site by the public address system, which put a large number of plant workers at risk.

First, as stated in Section 6.3.1 of the Contingency Plan, activation of the air horn would have automatically shut down the ventilation system for the administration, laboratory, and change room areas, and the Control Room. According to the AIT, at least two of these areas -- the women's change room and the control room -- were occupied during the accident.[21] See Inspection Report 92-30, Appendix at 8, 14. If, by virtue of SFC's failure to activate the air horn, these ventilation systems were still operating during the accident, the occupants of the control room and women's change room were put at serious and unnecessary risk by SFC's noncompliance. Yet, the NRC inspection reports completely fail to address this issue.

Second, for a large portion of the SFC site, the public address system was either broken or nonexistent. The public address system in the DUF4 facility was "inoperable" because of "hardware failure." Inspection Report 92-31, Appendix at 10. Moreover, there was no public address system at the centrifuge building; thus employees working at the nearby raffinate

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21 As discussed at page 12, above, however, it appears that the control room may have been evacuated.

pond area were "unaware" that an accident had been declared, until they were contacted by radio fifteen minutes later. Inspection Report 92-30, Appendix at 14. As the NRC concluded, "Had the wind been more easterly, this group of employees might have been exposed to the plume without proper warning."[22] Id.

Thus, not only did SFC fail to sound the air horn that would have warned SFC employees of the existence of a hazard, but a large part of the site had no functioning public address system that could provide emergency instructions to employees. As a result, for the raffinate ponds and the DUF4 building, SFC's Onsite Emergency Notification System was nonexistent, and the lives and health of SFC employees were jeopardized. Yet, aside from faulting SFC for failing to sound the air horn, the NRC did not cite SFC for any other deficiency in its public address system.

H. Unavailable Safety Equipment

Critical emergency equipment was inaccessible during the November 17th accident, raising basic questions not only about SFC's adherence to its Contingency Plan, but also about the stringency of NRC's oversight of emergency planning during licensing of SFC and other materials facilities. This precise issue was addressed and allegedly resolved by SFC to the satisfaction of Congress and the Commission in the 1986 restart decision -- yet six years later, the same problem persisted.

The Congressional inquiry into the the 1986 accident at SFC found that during the uranium hexafluoride ("UF6") release,

> protective equipment was not immediately available for the plant employees. This equipment had been stored in the middle of the plant production area and was engulfed in UF6 fumes. Consequently, a protective source of oxygen wasn't available for either employees attempting to control the UF6 release or those in immediate need of medical assistance.

Paper Tiger Report at 29. An NRC "Lessons Learned" report also recommended that:

> Locations of emergency equipment and kits should be reviewed by the NRC and licensees so that in the event of an emergency in a given facility location,

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22 As discussed previously, SFC did not even attempt to activate the offsite sirens during the November 17th accident. However, even if it had tried to activate the offsite sirens, these components have repeatedly malfunctioned or failed entirely during testing. SFC has reported that in April of 1992, the mechanism for automatic activation of the offsite sirens failed; and that in April of 1993, the offsite sirens failed entirely, due to a computer malfunction. See letter from John D. Richardson, SFC, to NRC (April 23, 1992) (Attachment 25); letter from John S. Dietrich, SFC, to NRC (May 3, 1993) (Attachment 26).

or inaccessibility of a large portion of the facility, access to adequate emergency equipment and facilities, including emergency decontamination facilities, can be assured. Equipment caches should be in multiple locations.

NUREG-1198, "Release of UF6 From a Ruptured Model 48Y Cylinder At Sequoyah Fuels Corporation Facility: Lessons Learned Report" (NRC: June 1986). SFC purportedly adopted this recommendation; thus, in preparing the 1986 SER, which approved restart of the plant following the accident, the NRC found that emergency equipment "is located in numerous locations within the facility, both the North and South Guard Stations and in the offsite training center." SER, Appendix A at 7.

Given the high level of attention paid to this issue by Congress, NRC, and SFC following the 1986 accident, it would have been reasonable to expect SFC to have sufficient and accessible safety equipment during the November 17th accident. However, this was not the case.

SFC's Contingency Plan designates the Control Room as the Emergency Response Center. Although the Contingency Plan lists at least five people who may have access to the Control Room during an accident (Contingency Plan, Section 6.1.1), and the AIT found that four people were "needed' there during the November 17th accident (Inspection Report 92-30, Appendix at 15), the Control Room had only two Self-Contained Breathing Apparatus ("SCBA") units. All four of the individuals in the Control Room needed SCBAs because the Control Room "filled quickly with gas." Id. Thus, additional units had to be retrieved from the DUF4 building and the north guard house, some distance away. Id. This "resulted in a delay in providing needed safety equipment to the control room staff." Id. Clearly, the control room should have had at least four SCBAs for the emergency response personnel who were needed there. Yet, SFC's license, as approved by the NRC, permitted it to have only two SCBA units.

To make matters worse, as SCBA's were being taken to the training center to be refilled "it was discovered that the cascade refill system was disabled." EPA Report, Attachment C at 10.

Moreover, SFC located some SCBAs and other emergency equipment in a storage room at motor control center # 3, in the middle of the production area. The NRC had recently amended SFC's license to permit SFC to move the SCBAs to the process area -- in direct contradiction of the Congressional finding that this was an unsafe practice.[23] Inspection Report 92-30, Appendix at 12. Predictably, motor control center # 3 was "engulfed in the

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23 See Safety Evaluation Report, Amendment Application dated September 24, 1992, re: Radiological Contingency Plan (RCP). Attachment 27. In approving this amendment, the NRC explicitly found that it would not "reduce the response effectiveness of the Plan." Id.

plume" during the accident. As a result, SCBAs at that location were inaccessible, and SFC technicians

> had access to very little equipment for assessing air concentrations and contamination levels, for posting areas, and for performing other essential tasks. Further, since the in-plant health and safety office was filled with NO2, technicians could not reach equipment in that location until the building atmosphere had cleared. The location of the emergency equipment storage room and of emergency equipment hindered the licensee's ability to respond to this emergency.

Id. at 12-13. Luckily for SFC, not all of the SCBAs had been moved, however, and some units were still stored in the DUF4 building. Had these SCBAs been moved to the motor control center, they too would have been completely inaccessible, because that area was filled with NO2 gas. Id.

Thus, the NRC either ignored or forgot the explicit lessons of the 1986 accident when it permitted SFC to move its emergency equipment to the middle of the process area, and apparently had no system of accountability to ensure that the lessons would not be forgotten.

I. Deficiencies in employee training and exercises, especially with respect to nonradiological hazards

1. Inadequate Emergency Training

SFC's professed commitment to improve worker training and ensure that employees could respond appropriately to nonradiological acidents -- another hallmark of the followup to the 1986 accident -- was also proven to be a sham by the November 17th accident. Among the recommendations resulting from the Committee on Government Operations's investigation into the 1986 accident at SFC, were that fuel cycle facility emergency response plans should adequately address "nonradiological hazards." Paper Tiger Report at 37. The Committee also recommended that the emergency plans should require "employee training" in the plans, and "periodic emergency drills and exercises involving offsite emergency personnel and nearby residents. . . ." Id. at 37. In response to these criticisms, SFC announced that it was "greatly expanding" its "program of community information and training, " and committed "to include local residents, police, and response agencies in periodic training programs." SER, Appendix B at 5-6. In the 1986 SER approving restart, the NRC found that SFC had "increased" its training requirements to "properly implement and maintain the Contingency Plan." SER at 31. See Section 7.2 of the Contingency Plan, which provides for initial and annual "refresher" emergency response training of SFC workers.

As with so many other elements of the Contingency Plan, the reality in 1992 contrasted grimly with the commitment to emergency planning described in the 1986 SER. As discussed above in section II.A, apparently the primary individual responsible for assuming the position of Emergency Response Director during an accident -- the Senior Vice President -- had not received emergency response training when the accident occurred.

Moreover, the lack of training was pervasive throughout the SFC staff. After the November 17th accident,

> most contract health and safety technicians stated that they were uncomfortable with their level of knowledge of the Sequoyah Fuels contingency plan and felt unprepared to respond to a chemical release. Some stated they had not read the plan or its implementing procedures.
>
> * * *
>
> Although the senior health and safety technicians who had been employed for several years felt confident in responding to the event, newer employees expressed concern about the training in the emergency response program. Several technicians expressed a concern that drills did not adequately prepare the staff. The technicians stated that drills were often similar . . . .

Inspection Report 92-30, Appendix at 13.

Indeed, the AIT's inspection report regarding the November 17th accident is rife with examples of poorly trained employees and their disastrous effect on safety during the emergency response:

-- A health and safety technician directed individuals leaving the plant to reenter the main process building so they could monitor themselves on change room contamination monitors before leaving the building. The contamination monitors were in the women's change room, which is adjacent to the digestion area, where the release occurred. NRC found a "lack of sensitivity by the health and safety technician to the potential chemical hazards present at the time." Inspection Report 92-30, Appendix at 14.

-- "One individual remained in the main process building, near the digestion area and the nitric oxide scrubber area, throughout the event without respiratory equipment." Id.

-- Two health and safety technicians entered visibly hazy rooms without respirators, and simply held their breaths while they collected air samples. Inspection Report 92-30, Appendix at 11. Several health and safety technicians also "entered areas of the plant, where airborne concentrations were not known, with no respiratory protection." Id., Appendix at 12.

-- The AIT found that "initial air concentration measurements were erroneously low," because health and safety technicians did not realize that the fumes were NO2, and instead measured for nitric acid. For instance, one room that was measured at 2 ppm for nitric acid was later found to have 60 ppm NO2. Id., Appendix at 11-12. Respiratory protection is required for concentrations above 1 ppm NO2; and a concentration of 50 ppm "is considered immediately dangerous to life or health." Id. Clearly, this mistake could have been significant to SFC's initial misclassification of the accident as an "unusual event," the least serious level.

Although the AIT found an apparent "training weakness" in "not adequately preparing health and safety technicians to assess the hazard of nonradiological releases," SFC was never cited for any regulatory or license violations with respect to inadequate training. NACE seeks an explanation as to why this important area of emergency preparedness, in which SFC was so clearly deficient, was ignored in the NRC's enforcement action.

2. Nonexistent hospital training raises questions about offsite training in general

In investigating the 1986 accident, the NRC found that "[n]either the company, NRC, nor offsite emergency personnel were adequately trained in the [contingency] plan's procedures." Paper Tiger Report at 13. The NRC, endorsed by the House Committee on Government Operations, recommended that offsite emergency response organizations be offered training, and should also be included in periodic drills and exercises. Id. In response to these criticisms, SFC announced that it was "greatly expanding" its "program of community information and training, " and committed "to include local residents, police, and response agencies in periodic training programs." SER, Appendix B at 5-6. Section 7.2 of the Contingency Plan provides that initial instruction and annual retraining will be offered to offsite response groups, including "personnel at offsite medical facilities."

Given the potential importance of offsite medical care in the event of an accident at SFC, NACE investigated the status of training at the Sparks Regional Medical Center in Fort Smith Arkansas, which is the largest medical facility in the area of the SFC plant. According to a 1990 letter of agreement between Sparks and SFC, Sparks is available to provide "emergency services" for "both conventional and radiation injuries" that may be incurred by SFC employees or the general public. Letter from Peter K. Leer, Sparks Regional Medical Center, to Reau Graves, Jr., SFC (March 22, 1990). Attachment 28. Mr. Leer's letter also states the hospital's understanding that "continued annual training of our personnel for the treatment of contaminated patients will be provided by Sequoyah Fuels Corporation." Id. (emphasis added)

Mr. Leer's letter clearly creates the impression that training has been conducted on an annual basis for Sparks employees for some period of time. However, in a conversation with NACE director Lance Hughes on May 12, 1993, Mr. Leer stated that training has not been provided by SFC since 1986, when hospital representatives received some training shortly after the January 1986 accident.

The discrepancy between the contents of Mr. Leer's letter and the virtually complete lack of training for Sparks employees raises questions not only about the capacity of this major medical facility to handle an emergency at SFC, but whether misrepresentations have been made about other aspects of offsite training for the various state and local institutions that SFC's Contingency Plan relies on during an accident affecting the offsite public.

J. Inadequate Offsite Exercises

In the Paper Tiger Report, the Committee on Government Operations recommended "periodic emergency drills and exercises involving offsite emergency personnel and nearby residents, as well as headquarters and regional officials from NRC." Id. at 37. According to the 1986 SER approving restart, SFC would "test, develop, and maintain" emergency response skills through periodic drills and annual exercises. SER at 31. SFC's Contingency Plan provides for biennial exercises, in which "SFC will cooperate with offsite response groups should they desire to participate." Section 7.3.

On December 9, 1992, NACE director Lance Hughes wrote to James L. Milhoan, Director of NRC Region IV, to inquire, among other things, about the date of the last offsite emergency planning exercise at SFC. Later that month, the NRC replied that it did not know when the exercise was, or who participated in it. Letter from L.J. Callan, NRC, to Lance Hughes, NACE, Attachment at 2 (December 30, 1992). Attachment 29. Contrary to the 1987 Congressional finding that the NRC should participate in such exercises, the NRC stated that it "does not normally monitor or participate in emergency exercises at fuel cycle facilities." Id. Two months later, at the enforcement conference on March 2, 1993, NRC officials were still unable to provide the date of the last exercise.

Thus, in spite of the occurrence of the November 17th accident, and its effects on the offsite public, the NRC failed to make any inquiry into whether SFC and offsite officials had undergone a proper emergency planning exercise. Rather than take an active role in the oversight of offsite emergency planning and participating in the exercises, as was urged by the Paper Tiger Report, the NRC has gone to the opposite extreme, showing little interest in whether exercises occur at all.

SFC, for its own part, made the outrageous request that it should be exempted from the next biennial exercise, on the ground that, "in essence," it had "satisfied the intent of the biennial exercise requirement when facility personnel responded to the November 17, 1992 chemical release." Letter from John S. Dietrich, SFC, to Elinor G. Adensam, NRC (March 30, 1993). Attachment 30. The well-established "intent" of an emergency excercise is to demonstrate that the licensee is capable and prepared to take all necessary actions to provide reasonable protection to its employees and the public during an accident. SFC's response to the November 17th accident demonstrated an abysmal lack of such capability and preparedness on virtually every level. To suggest that it could be used to satisfy the biennial exercise requirement is absurd on its face -- to the contrary, the accident demonstrated that SFC's Contingency Plan and implementing procedures must be overhauled <u>and</u> exercised <u>before</u> it could ever be allowed to operate again.

III. U.S. Environmental Protection Agency Failed to Provide Assistance Following the Accident.

The NRC is not the only federal agency which failed to fulfill its responsibilities to safeguard the public during the November 17th accident and its aftermath. The EPA Emergency Response Center, whose purposes include the provision of medical support and health assessments for accidents involving chemical releases, provided virtually no support following the November 17th accident. Moreover, EPA was both ill-informed and cavalier in the manner in which it responded to the accident. Ironically, the Paper Tiger Report had faulted the NRC for failing to contact EPA after the 1986 accident. Id. at 32. When the NRC did attempt to obtain assistance from EPA after the 1992 accident, EPA was not responsive.

As part of NACE's investigation, NACE director Lance Hughes spoke to several EPA officials who either had responsibilities or were knowledgeable about EPA's response to the November 17th accident. In a May, 1993, conversation that included Charlie Gazda, Chief, Emergency Response Branch, and his associate, Jim Mullien, Mr. Gazda stated that the NRC notified EPA Region VI of the release on November 17, and then called within the next hour to inform EPA that people, including offsite individuals, had been exposed to NO_2 gas. NRC asked EPA to provide medical assistance to verify whether the symptoms being reported were consistent with NO_2 exposure. EPA replied that it could not, because it did not have a pathologist on staff, or anyone with medical expertise.

According to Mr. Gazda, almost an hour later, NRC headquarters and NRC Region IV held a conference call with EPA headquarters and EPA Region VI, to again request assistance from EPA. EPA responded again that it did not have staff with the credentials necessary to examine the injured individuals, and that in any event there was no reason to become involved in the emergency response, since the release had already been secured.

Two days later, on November 19, EPA sent a private consultant to Gore to investigate the accident and interview individuals who claimed to be injured. However, the consultant disclaimed any qualifications to make "diagnostic decisions." EPA Report, Attachment F: Copy of Logbook # 1 (Pages 1-13) at 3. He also refused to answer questions from the community at a public meeting regarding the accident, on the ground that he was not a government official.

Mr. Gazda also informed Mr. Hughes that the EPA staff had discarded their notes from the November 17th accident, because they considered the accident to be of little consequence. In defense of this view, Mr. Gazda or another individual said that no offsite individuals had been exposed. When questioned by Mr. Hughes, the EPA officials claimed to be unaware of the medical report prepared by Mitchell and Coleman regarding the treatment of offsite injured individuals. Moreover, the findings of the Mitchell and Coleman that at least 15 of the 21 offsite individuals who were examined had sustained injuries consistent with NO2 exposure, were not mentioned in the consultant's report to EPA regarding the accident. See EPA Report.

On June 24, 1993, Mr. Hughes discussed with Lynda Carroll, Acting Assistant Regional Administrator for Management, the substance of his telephone conference with Mr. Gazda, et al. Ms. Carroll informed Mr. Hughes that EPA Region VI has a regional toxicologist on staff, and that it also has a Memorandum of Understanding with the Agency for Toxics Substance Disease Registry to provide their services to EPA. Thus, there appears to be no basis for EPA's claim, on November 17th, that it lacked the resources to examine individuals injured in the SFC accident. Ms. Carroll also stated that the EPA employees should not have discarded their notes from the accident.

Thus, it appears that in responding to the accident, EPA was at best disorganized and ill-informed, and at worst cavalier about it responsibilities and the potential consequences of the accident. NACE therefore requests an independent investigation into why the EPA claimed to be unable to respond with medical diagnostic assistance; why EPA apparently failed to follow up on the limited inquiry it did undertake into the health effects of the accident; and why EPA officials destroyed their notes after the accident.

CONCLUSION

NACE's investigation into the circumstances of the November 17th accident, SFC's emergency response, and the NRC's oversight of SFC, has revealed that SFC and the NRC have fundamentally failed to protect public safety. This failure is all the more disturbing in light of its repetitive nature: since 1986, SFC and the NRC have followed a pattern of accidents followed by reforms, commitments, and increased NRC oversight -- followed by the very same types of accidents or safety problems which SFC and the NRC had promised the public would not happen again. Moreover, despite the investigations, hand-wringing, and reforms to emergency planning which followed the 1986 accident at SFC, it appears that the NRC still does not give importance or attention to emergency planning for materials facilities.[24] EPA, the importance of whose role was noted after the 1986 accident, also failed to provide urgently needed technical support in the aftermath of the accident.

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24 We note that a recent proposal by NRC to overhaul and reform weaknesses in its regulatory program for materials licensees gives scant attention -- less than a page of discussion -- to the issue of emergency planning. See NUREG-1324, Proposed Method for Regulating Major Materials Licensees (NRC: February 1992).

The safety of SFC neighbors was put at serious risk by the November 17th accident, and may be put at risk again. Moreover, not only is the safety of SFC's neighbors jeopardized by the cycle of regulatory failure demonstrated above, but neighbors of any nuclear materials facility have reason to doubt the NRC's effectiveness or commitment to ensure that the facility near them is safe. In order to ensure that the reasons for SFC's failed emergency response and the NRC's ineffectiveness in regulating SFC are understood and corrected, both for SFC and all materials licensees, the Inspectors General of the NRC and the EPA should undertake an independent and thorough investigation into the November 17th accident and the responses made by SFC and the NRC.

September 28, 1993

LIST OF ATTACHMENTS

1 Committee on Government Operations, NRC's Regulation of Fuel Cycle Facilities: A Paper Tiger, H.R. Rep. No. 167, 100th Cong., 1st Sess. (1987)

2 Excerpt from Transcript of Commission Meeting (pp. 52-53) (March 13, 1986)

3 Safety Evaluation Report by the Division of Fuel Cycle and Material Safety Related to the Authorization to Resume Operations for the Sequoyah Fuels Corporation UF6 Facility, Gore, Oklahoma, Docket Number 40-8027, License Number SUB-1010 (October 14, 1986)

4 Mitchell and Coleman, Report: Release of Nitrogen Dioxide, Sequoyah Fuels, Gore, Oklahoma, 11/17/92; submitted to NRC by letter from Mitchell and Coleman to L.J. Callan, NRC (December 11, 1992)

5 Inspection Report 92-30 (December 18, 1992)

6 Inspection Report 92-31 (January 21, 1993)

7 Inspection Report 92-32 (January 29, 1993)

8 EA 93-010 (March 25, 1993)

9 Inspection Report 87-05 (June 5, 1987)

10 Memorandum from W. Scott Pennington, IMUF, to George H. Bidinger, IMUF, re: Event Trend Analysis for the Uranium Hexafluoride (UF6) Conversion Facilities (August 13, 1990): Excerpts: Memorandum and report, pages 5-8.

11 SFC Contingency Plan, including revisions through Revision 10 (April 1991)

12 Letter from Lee R. Lacey to Charles J. Haughney, enclosing Revision 10 to SFC Contingency Plan (April 8, 1991); Excerpt from Revision 10: Chapter 4 of Contingency Plan

13 FY-93-0476, On-Site Monitoring Report for Sequoyah Fuels Corporation, Gore, Sequoyah County, Oklahoma (December 30, 1992)

14 Letter from Scott P. Knight, SFC, to Leland C. Rouse, NRC, enclosing Revision 5 to SFC Contingency Plan (December 21, 1988); Excerpt from Revision 5: Chapter 4 of Contingency Plan

15 Letter from J.G. Randolph, President, SFC, to Robert Martin, Region IV, NRC (May 7, 1986)

16 Contemporaneous account of contacts between SFC and NRC during the November 17, 1992 accident (November 17, 1992)

17 Letter from Lee R. Lacey, SFC, to Frank Thornton, Chief, Vian Police Department (July 2, 1991).

18 Letter from Charles W. Emeigh, NRC, to John Dietrich, SFC, re: Emergency Plan Withdrawal (TAC NO L21692) May 27, 1993

19 Excerpts from Inspection Report 92-16 (August 5, 1992): Enclosure Letter, Appendix A, and Appendix B, pages 1-5

20 Handwritten notes on a form from SFC's Contingency Plan Implementing Procedures (undated)

21 Sequoyah County Sheriff's Office dispatcher's log for November 17, 1992

22 Appendix B, Off-site Emergency Management Plan, Sequoyah Uranium Conversion Facility, Gore, Oklahoma, Rev. 1, Controlled Copy # SC5001 (June 1, 1989)

23 Letter from Ruth Ann Roark, Administrator, Sequoyah Memorial Hospital, to Reau Graves, President, SFC (August 8, 1990)

24 Letter from James J. Sheppard, SFC, to Robert D. Martin, NRC (May 26, 1992)

25 Letter from John D. Richardson, SFC, to NRC (April 23, 1992)

26 Letter from John S. Dietrich, SFC, to NRC (May 3, 1993)

27 Safety Evaluation Report, Amendment Application dated September 24, 1992, re: Radiological Contingency Plan (RCP)

28 Letter from Peter K. Leer, Vice President, Corporate Services, to Reau Graves, Jr., President, SFC (March 22, 1990)

29 Letter from L.J. Callan, NRC, to Lance Hughes, NACE (December 30, 1992)

30 Letter from John S. Dietrich, SFC, to Elinor G. Adensam, NRC (March 30, 1993)

TABLE OF CONTENTS

Union Calendar No. 96

100th Congress, 1st Session - - - - - - - - - - - House Report 100-167

Attachment 1

NRC'S REGULATION OF FUEL CYCLE FACILITIES: A PAPER TIGER

EIGHTH REPORT

BY THE

COMMITTEE ON GOVERNMENT OPERATIONS

JUNE 18, 1987.—Committed to the Committee of the Whole House on the State of the Union and ordered to be printed

U.S. GOVERNMENT PRINTING OFFICE

74-103 WASHINGTON : 1987

Attachment 1

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LETTER OF TRANSMITTAL

HOUSE OF REPRESENTATIVES,
Washington, DC, June 18, 1987.

Hon. JIM WRIGHT,
Speaker of the House of Representatives,
Washington, DC.

DEAR MR. SPEAKER: By direction of the Committee on Government Operations, I submit herewith the committee's eighth report to the 100th Congress. The committee's report is based on a study made by its Environment, Energy, and Natural Resources Subcommittee.

JACK BROOKS, *Chairman.*

OCT 14 1986

Safety Evaluation Report

By The

Division of Fuel Cycle and Material Safety

Related to the

Authorization to Resume Operations

for the

Sequoyah Fuels Corporation

UF_6 Conversion Facility

Gore, Oklahoma

Docket Number 40-8027

License Number SUB-1010

8611110133

Attachment 3

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

October 24, 1986

John H. Frye, III
Administrative Judge
Atomic Safety and Licensing
Board Panel
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

In the Matter of
SEQUOYAH FUELS CORP.
(Sequoyah UF_6 to UF_4 Facility)
Docket No. 40-8027-MLA; ASLBP No. 85-513-03-ML

Dear Judge Frye:

In the report which the NRC staff is preparing regarding the implications of the January 4, 1986 Sequoyah Fuels Facility accident for licensing of the proposed UF_6 to UF_4 facility, the Staff intends to rely mainly on the Safety Evaluation Report By The Division of Fuel Cycle and Material Safety Related To The Authorization To Resume Operations For The Sequoyah Fuels Corporation UF_6 Conversion Facility, dated October 14, 1986. A copy of that document is enclosed. The Staff may also rely upon the Order Modifying License, dated October 2, 1986, which was provided to you and the parties by letter dated October 7, 1986, and Sequoyah Fuels Corporation (Gore, Oklahoma Facility), Director's Decision Under 10 C.F.R. 2.206, DD-86-13, dated October 15, 1986. A copy of the Director's Decision is also enclosed. [Included with this document are a letter to petitioner Citizen's Action for a Safe Environment (CASE) and the notice of issuance of the decision submitted to the Federal Register for publication. Similar covering letters were sent to the other petitioners.]

Sincerely,

Stephen H. Lewis

Stephen H. Lewis
Senior Supervisory Trial Attorney

Enclosures: As stated

cc w/enclosures: Service List

8611040157

OCT 14 1986

TABLE OF CONTENTS

restricted area accessible from U.S. Highway 10, just north of Interstate Highway 40. Figure 1 shows the geographical location of the plant site, which is bounded by the Illinois and Arkansas Rivers on the west, U.S. Highway 64 on the north, Interstate Highway 40 on the south, and the eastern section line of Section 22 (approximately 2 miles east of the Arkansas River) on the east.

Source Material License No. SUB-1010, authorizing storage only of uranium ore concentrates, was originally issued October 14, 1969. The license was revised on February 20, 1970, to authorize use of the material for production of UF_6 and was renewed on October 7, 1977. The license was last renewed on September 20, 1985, with an expiration date of September 30, 1990. The license has been amended three times to modify the submittal dates for certain reports and to incorporate a new vegetation monitoring program.

B. Event Chronology

On January 3, 1986, an empty Model 48Y cylinder was moved from storage to the south drain bay and filling with liquid UF_6 was started. Filling of the cylinder was continued into the midnight shift of January 4, when the shift chemical operator observed that no additional weight (UF_6) could be added to the cylinder, and an investigation was made. The weight indication for the cylinder was found to be in error due to improper placement of the cylinder and scale cart on the weighing scales. During the remainder of the shift, material was evacuated from the cylinder without the use of heat. During the day shift of January 4, the day shift chemical operator concluded that additional material could not be drawn off and, with the approval of his supervisor, placed the cylinder in a steam chest for reheating in violation of SFC procedures. Approximately 2 hours after heating was started, the cylinder was ruptured by hydraulic pressure caused by the expansion of UF_6. A detailed chronology of the events surrounding the rupture of the UF_6 cylinder may be found in NUREG-1179, "Rupture of Model 48Y UF_6 Cylinder and Release of Uranium Hexafluoride."

C. License Actions

By letter dated January 9, 1986, SFC committed not to restart the UF_6 conversion process at the Sequoyah Facility without the concurrence of the NRC. This commitment was confirmed by NRC Region IV by a Confirmation of Action Letter dated January 17, 1986.

By letter dated January 17, 1986, SFC requested authorization from the NRC to receive uranium ore concentrates (yellowcake) at the facility. This request was clarified on January 31, 1986, to include only the yellowcake that was in transit at the time of the incident. This request was authorized on February 3, 1986.

I. INTRODUCTION

On Saturday, January 4, 1986, at about 11:30 a.m., a Model 48Y cylinder filled with uranium hexafluoride (UF_6) ruptured while it was being heated in a steam chest at the Sequoyah Fuels Corporation's (SFC) Sequoyah Facility near Gore, Oklahoma. The rupture resulted in a massive release of UF_6, lasting for a period of about 40 minutes.

As a result of the accident, one employee died as a result of exposure to hydrogen fluoride, a hydrolysis product of UF_6. Several other employees were injured by the fumes, but none apparently seriously. A total of about 130 offsite individuals were screened for uranium contamination by urine bioassay. An analysis of the potential health effects from the accident was presented in NUREG-1189, "Assessment of the Public Health Impact From the Accidental Release of UF_6 at the Sequoyah Fuels Corporation Facility at Gore, Oklahoma." Much of the facility complex and some offsite areas to the south were contaminated with fluoride and uranium.

Sequoyah Fuels Corporation agreed not to restart the production of UF_6 until authorization was received from the NRC. By letter dated May 7, 1986, Sequoyah Fuels Corporation requested authorization to resume the conversion of uranium ore concentrates to UF_6 at the Sequoyah Facility. The purpose of this Safety Evaluation Report is to document the NRC staff's evaluation of the modifications to equipment, management, training procedures and operations that have been made since the time of the accident. The purpose of these modifications was to prevent similar or other accidents from happening at the Sequoyah Facility in the future. This evaluation is a part of the NRC staff's basis for a decision on SFC's restart request.

II. CHRONOLOGY OF EVENTS AND ACTIONS

A. License History

Materials License No. SUB-1010 authorizes possession and use of source material for the purpose of refining uranium from uranium ore concentrates and converting this uranium to UF_6 for use in Department of Energy enrichment plants and for foreign markets. Refinement and conversion is accomplished by purification using solvent extraction, denitration to uranium trioxide (UO_3), reduction to uranium dioxide (UO_2), hydrofluorination to uranium tetrafluoride (UF_4), and fluorination to produce the UF_6 product.

The Sequoyah Facility is located 2½ miles southeast of Gore, Oklahoma. It is about 40 miles west of Fort Smith, Arkansas, and 150 miles east of Oklahoma City, Oklahoma. Operations are conducted within a fenced

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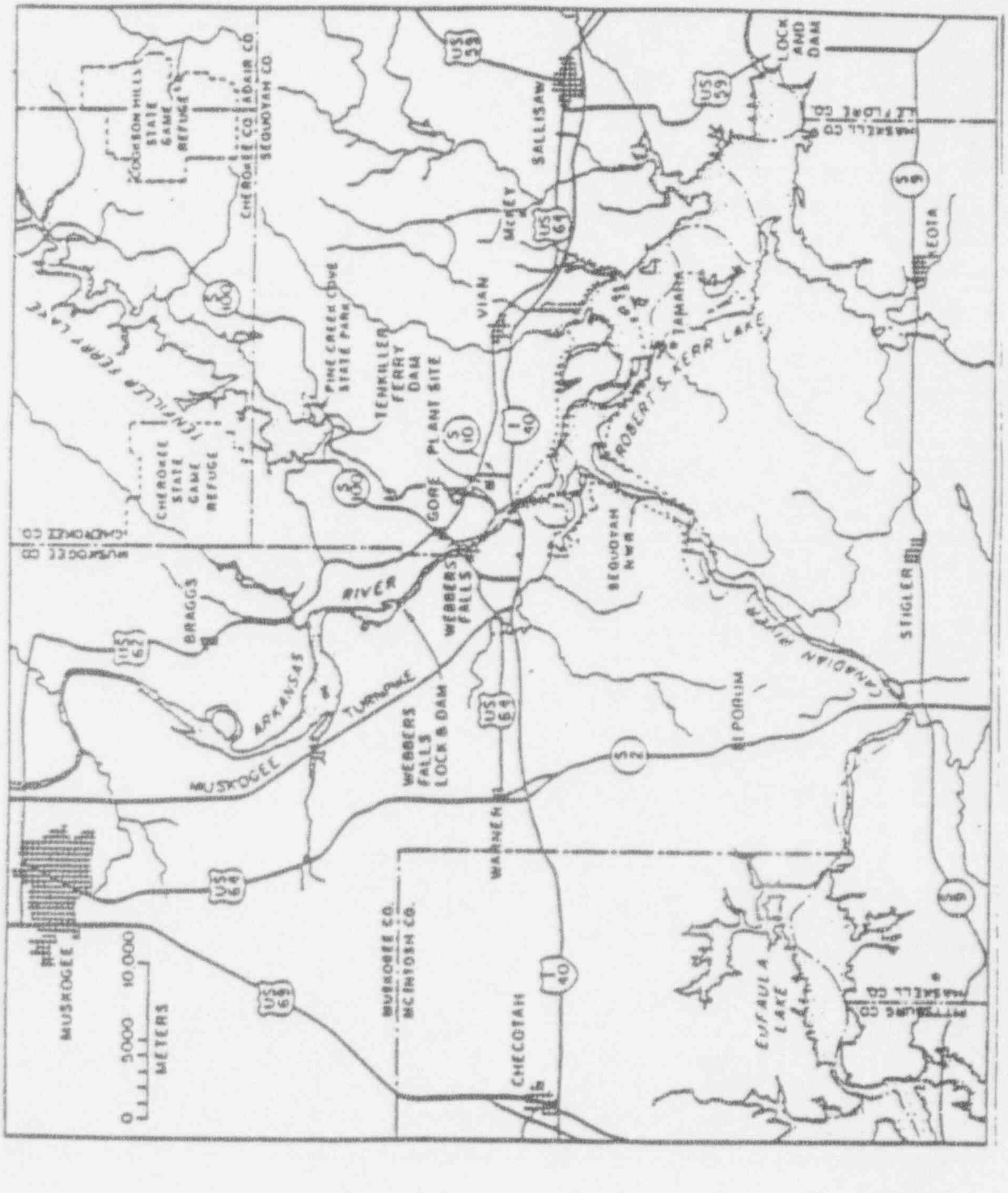
FIGURE 1

GEOGRAPHICAL LOCATION OF SEQUOYAH FUELS CORPORATION FACILITY



Sequoyah Fuels Corporation requested the return to normal operations in three phases. Phase I, requested on February 24, 1986, consisted of authorization to receive, sample, and store yellowcake at the Sequoyah Facility. Phase II, requested by two different letters each dated February 26, 1986, consisted of authorization to ship UF_6 cylinders already in inventory and to return empty uranium slurry trailers and drums to uranium producers for reuse. Phase III, requested on May 7, 1986, constitutes the request to resume UF_6 production operations at the facility and remove the commitment specified in the Confirmation of Action Letter. The NRC authorized the activities described in Phases I and II on April 23, 1986. ?

A number of activities not related to the production of UF_6 have also been authorized by the NRC. These activities included operation of uranium recovery equipment to process water from the emergency basin as part of the facility decontamination efforts and the transfer of liquids from temporary storage areas to other storage areas onsite to prevent potential overflow problems. The NRC also authorized the draining of all UF_6 from cold traps and piping for purposes of determining the amount of UF_6 that may have been in the cylinder at the time of rupture and to allow SFC to modify the cylinder filling area to eliminate design deficiencies that contributed to the incident. Activities authorized by Materials License No. SUB-1010 that are not related to the production of UF_6, such as the raffinate fertilizer program, were not affected by the Confirmation of Action Letter and have continued in operation. On August 22, 1986, the NRC authorized SFC to carry out limited system cleanup operation of the yellowcake digestion tanks, solvent extraction, uranyl nitrate solution evaporator, and uranyl nitrate hexahydrate boildown tanks.

D. NRC Reviews and Studies

Following the incident, the NRC initiated a number of investigations and reviews to determine the cause of the event, the effects of the event, and the efficiency and adequacy of the response made to the event. On March 14, 1986, the NRC testified before the Subcommittee on Environment, Energy, and Natural Resources of the U. S. House of Representatives. During that testimony, the NRC indicated six areas in which actions would be taken to provide an understanding of what happened during the accident and to assure the public health and safety in the future. These were:

1. A determination of the causes of the accident.

2. An assessment of the safety of UF_6 containers for transport under existing rules.

3. An assessment of public health impacts resulting from the accident.

4. An examination of the regulatory roles of agencies that have regulatory authority over plants such as the Sequoyah Facility.

5. Identification of issues that must be resolved before resumption of plant operations.

6. An analysis of lessons learned from the accident and NRC's response to the accident.

These actions have now been completed. Reports dealing with items 1, 3, and 6 are published as NUREG-1179, Vol. 1, "Rupture of Model 48Y UF_6 Cylinder and Release of Uranium Hexafluoride"; NUREG-1179, Vol. 2, "Rupture of Model 48Y Cylinder and Release of Uranium Hexafluoride" (Cylinder Overfill, March 12-13, 1986, and Investigation of a Failed UF_6 Shipping Container); NUREG-1189 (2 Volumes), "Assessment of the Public Health Impact From the Accidental Release of UF_6 at the Sequoyah Fuels Corporation Facility at Gore, Oklahoma"; and NUREG-1198, "Release of UF_6 From a Ruptured Model 48Y Cylinder at Sequoyah Fuels Corporation Facility: Lessons-Learned Report."

A number of recommendations for the Sequoyah Facility's operation and license were made in these reports, and these recommendations were forwarded to SFC and have been incorporated into this review. The staff's proposed actions related to the recommendations given in NUREG-1198 for NRC licensees were published in August 1986. A summary of the changes made by SFC that are responsive to the recommendations in NUREG-1198 is enclosed as Appendix A.

By letter dated January 14, 1986, the NRC requested that the Department of Transportation (DOT) examine the degree of safety provided by the current practices of shipment of UF_6 as LSA materials. The DOT responded to the NRC request by letter dated March 6, 1986. The DOT found that "The design and construction requirements for UF_6 packaging specified in ORO-651 and ANSI N14.1-1982 are considered adequate to provide an acceptable level of safety in transportation." DOT also indicated that it will prepare amendments to 49 CFR Part 173 to incorporate explicitly the ANSI N14.1-1982 criteria. A proposed rule was published by DOT in the Federal Register on April 11, 1986 (51 FR 12529).

By memorandum dated May 15, 1986, the Office of Inspection and Enforcement forwarded to the Executive Director for Operations a report entitled "A Review of Federal and State Responsibilities for Regulating Health and Safety Hazards at NRC-Licensed Uranium Fuel Fabrication and Conversion Plants."

E. Licensee Reviews and Studies

Following the January 4, 1986, accident, Sequoyah Fuels Corporation initiated studies by independent consultant groups not associated with SFC of process safety, operational safety, and emergency planning. These studies provided the basis for some of the physical and organizational modifications made by SFC in support of the request to resume operations. The NRC was provided with copies of these studies on April 4, 1986. A summary of the actions taken in response to the recommendations made in each report was provided to the NRC as part of the additional information submitted on June 25, 1986. The summary includes the SFC response to the recommendations and the date for completion of implementation at the Sequoyah Facility. The staff has evaluated the results of these studies as they are reflected in new equipment, procedures, training, personnel, and license commitments, and the position of the staff in each of these areas is described in subsequent sections of this Safety Evaluation Report.

F. Restart Review History

As part of its review and decision process regarding SFC's request to resume operations, the staff has completed actions in the areas of inspection, public meetings, and a Commission briefing.

On February 10-14, 1986, the NRC conducted a multi-office team inspection of the Sequoyah Facility. The findings of this inspection are documented in Inspection Report 040-08027/86-02. SFC responded to the findings in this report by letter dated May 28, 1986. An inspection to determine the status of actions described by SFC was conducted during the week of June 9 - 13, 1986. Other federal and state agencies, including the EPA, OSHA, Department of Interior, and the Oklahoma Department of Radiological Health participated in this inspection.

On March 13, 1986, Sequoyah Fuels Corporation appeared before the Commission during a briefing conducted by the NRC staff. During their presentation, SFC made a number of statements regarding changes and modifications to be made at the facility. A summary of these statements and the changes which were made to fulfill these statements is enclosed as Appendix B. On March 14, 1986, Sequoyah Fuels Corporation testified before the Subcommittee on Environment, Energy, and Natural Resources of the U. S. House of Representatives. The presentation made to the Subcommittee was essentially identical to that made to the NRC.

On July 8 and 9, 1986, the NRC conducted public meetings in the Brooks-Cawhorn Gymnasium in Gore, Oklahoma. As stated in the Federal Register notice published on June 24, 1986 (51 FR 23014), the purpose of the meetings was to "solicit information from members of the public about issues which they would like to have the NRC consider during its review of the proposal from Sequoyah Fuels Corporation to restart UF_6 production." The meetings were attended by approximately 650 individuals, and approximately 160 oral and 60 written statements were received. Further statements were received after the meetings. The record of the meetings, including the transcript, written statements, and attendance register, was completed in August 1986 and placed in the Public Document Room and Local Public Document Room. The issues and questions raised during the meetings were addressed as a part of the staff review, and the staff analysis and response to these statements are enclosed as Appendix C.

Initial review of the SFC request to resume operations dated May 7, 1986, resulted in a request for additional information from the NRC to SFC on May 23, 1986. SFC responded on June 25, 1986, with additional information and proposed changes to the License Conditions Section of Materials License No. SUB-1010. Further changes to the License Conditions Section were submitted on August 20, 1986, containing pages dated August 20, 1986, and September 3, 1986, containing pages dated September 3, 1986, which reflected additional NRC staff comments and concerns.

By letter dated May 27, 1986, SFC submitted a major revision of its Radiological Contingency Plan for NRC review and approval. The staff review identified several areas in which additional material was required to meet the requirements of the 1981 Order (46 FR 12566) which requires a Radiological Contingency Plan for the Sequoyah Facility. Changes to the Radiological Contingency Plan in response to comments made by the NRC, EPA, and FEMA were submitted on August 20, 1986. The staff findings on the Contingency Plan are contained in Section VI of this Safety Evaluation Report.

During the review, the NRC staff met with SFC representatives on numerous occasions in Oklahoma City and Gore, Oklahoma, and in Silver Spring, Maryland.

During the week of July 28 - August 1, 1986, a further inspection of the facility was conducted to determine the status of commitments made by the licensee. The scope of the inspection included items identified by previous inspections, emergency contingency plans, and the physical changes made by the licensee to the facility. Representatives of EPA and FEMA participated in the review of the Radiological Contingency Plan. The findings of this inspection are documented in Inspection Report No. 040-08027/86-08.

III. FACILITY MODIFICATIONS

A. Process Systems

An analysis of the hazards associated with the current design and operation of the Sequoyah Facility was conducted by DuPont Hazards Management Consultants for Sequoyah Fuels Corporation. As a result of this review, a number of recommendations, both long- and short-term, were made to improve the safety of process operations. These recommendations included inspection of tanks and piping support structures, institution of a program to improve maintenance and the documentation of improvements made, and the locking and tagging of certain valves and devices that could compromise the function of relief systems.

In response to these recommendations, SFC has inspected the process chemical tanks and the piping support structures and provided additional controls for critical valves and systems. In association with representatives from EPA, the staff has reviewed and inspected the actions taken and the process systems in general. In addition, the EPA conducted an inspection of process chemical storage and handling. No deficiencies were noted by the EPA representative.

SFC has instituted a new maintenance management system which includes computer scheduling of routine maintenance and provides an ability to assess if modifications to the existing plant structure are required to handle recurring maintenance problems. Although this area was not identified as a contributory cause of the incident, the staff believes that the implementation of an improved tracking and scheduling system for maintenance is appropriate and should improve the overall condition and safety of the facility.

B. Cylinder Filling

The cylinder filling area and, in particular, the weighing scales used during filling, were a major contributor to the cylinder rupture accident on January 4, 1986. In response to the accident, SFC has undertaken extensive modifications of this area to reduce the likelihood of a similar type of incident occurring in the future.

The physical changes that have been made in the cylinder filling area include the following:

1. Remodeling of the cylinder filling manifold to provide additional room for either 10- or 14-ton cylinders to be centered on the weighing scale platform.

2. Installation of a photoelectric switch to confirm proper cylinder cart positioning on the weighing scale platform. An interlock between the switch and the UF_6 filling valves prohibits filling if the cylinder cart is improperly positioned.

3. Installation of load cells to replace the mechanical weight determination for the weighing scale platform.

4. Installation of load cell scales in the cylinder cart to provide an independent means of determining the weight of UF_6 loaded into the cylinder.

5. Provision in each scale for a total scale capacity of 50,000 lbs in 5 lb increments. Readouts for the scales are provided at the filling station control panel and the control room. Hard copy capability for scale readout is provided in the accountability scale room.

6. Installation of automatic UF_6 filling valves interlocked with the output of both weighing scales to provide automatic termination of filling upon reaching a set value. The interlock is designed to terminate filling when either scale exceeds the preset weight, which prevents a low scale reading from allowing excess material to be loaded. In practice, this system will serve as a backup to the procedural requirement for manual termination of filling at a weight below the fill limit for the cylinder.

7. Automatic UF_6 filling valves are designed to fail to a safe (open or closed depending upon their function) position upon loss of power.

8. Construction of a room for the filling station to prevent the spread of contamination in the event of a UF_6 release during filling operations. The room does not interfere with the loading or unloading of cylinders from the filling station area. Readouts for the weighing scales are located outside of the containment room, as are the controls for some of the valves used in filling cylinders.

9. Installation of automatic UF_6 release detectors (smoke detector) in the cylinder filling room. When the detector is activated, an audible alarm is sounded in the cylinder filling room, and a visual alarm given in the control room.

10. Installation of a sampling manifold on the fill line from the cold traps to permit sampling during cylinder filling.

To further reduce the probability of an overfilling event, other changes have also been implemented in the filling station area which are procedural or administrative in nature. These changes include the following:

1. A specific license commitment to check the accuracy of filling scales after any scale maintenance or cleaning or if a weight discrepancy between the two scales is suspected (Chapter 6, page I.6-3).

2. A specific license commitment to use the accountability scale in the event that there is a deviation from expected weights of one of the two filling scales (Chapter 6, page I.6-3).

3. The revised cylinder filling procedure provides that the tare weight for each cylinder to be filled be verified on the cylinder filling scales prior to filling. The revised procedure also provides for determining the "heel" in each cylinder. Cylinders with a "heel" in excess of 100 pounds must be removed and cleaned prior to filling. This procedure provides a check of scale operation each time a cylinder filling is started.

The staff finds that the physical changes made in the cylinder filling area are responsive to the recommendations made by the NRC and independent consultant groups. During the inspection conducted on July 28 - August 1, 1986, the staff confirmed that these changes had been made. The use of two separate scales for measuring the amount of UF_6 in the cylinder provides a reasonable assurance that a malfunction of a scale will not, in itself, result in the overfilling of a cylinder. The use of interlocks with the scale cart position switch and weigh scales reduces the dependence that must be placed on operators to assure correct weighing and filling. The institution of procedural checks on the function of weighing scales will reduce the likelihood of an overfilling event caused by scale errors, such as occurred on March 12-13, 1986, during the special cold trap draindown.

During the investigation following the accident, the staff could not verify that the cylinder weights, which were recorded on the cylinder status sheets, reflected the actual weight of the cylinder. Sequoyah Fuels Corporation, as part of the modifications to the scales in the cylinder filling area, has installed a printout capability for the scale readouts. This capability allows the actual scale reading to be printed without the potential for error caused by an operator recording the value from the scale readout. The staff believes that the actual scale reading should be available in the records for each cylinder. The staff, therefore, recommends that the following condition be added to the license to require SFC to produce and keep a record of the actual cylinder weight as measured by the electronic scales in the cylinder filling area.

23. The licensee shall use the printout capability of the cylinder filling scales to produce a record of final cylinder weight prior to removal of the cylinder from the cylinder filling area. This record shall be attached to the cylinder status sheet for the cylinder and shall be made part of the permanent record for that cylinder at the facility.

Condition No. 11 of Materials License No. SUB-1010, as renewed September 20, 1985, required the submission of an analysis by SFC of the handling and hazards of cylinders containing liquid UF_6. The reports required by this condition were submitted by letter dated April 20, 1986. The analysis was predicated upon changes which were made in the facility as a result of the January 4, 1986, incident. SFC has concluded that the movement of cylinders containing liquid UF_6 by forklift, as is currently being done at the facility, is not a significant contributor to the accident potential probability. Based upon observations at the site, the NRC staff is in general agreement with this conclusion. The steps taken by SFC to permit sampling of UF_6 during filling will also reduce the number of movements made with the cylinder hot (containing liquid UF_6) to one under normal circumstances.

The staff determined that the rupture of a filled cylinder containing liquid UF_6 was the most serious type of accident that could occur at a facility of this type and that could have offsite consequences. The staff believes that the health and safety of employees, members of the public, and the environment would be improved by reducing the probability of a UF_6 cylinder rupture and by being prepared to reduce the consequences if the event does occur. The mitigative measures taken by SFC during the January 4, 1986, incident resulted in the onsite capture of approximately 63 percent of the uranium contents of the cylinder. SFC has undertaken and completed changes in both equipment and procedures to reduce the probability of the recurrence of a cylinder rupture. The staff finds that the reasonable steps to reduce the probability of another accident have been made.

Sequoyah Fuels Corporation has designed a seal mechanism to transfer safe valves on UF_6 cylinders. The staff agrees that cylinders should be "tamper safed". Accordingly, the staff recommends that the following condition be added to the license to require the implementation of a system to tamper safe the valves of cylinders to prevent the introduction of materials into cylinders without the specific approval and knowledge of management.

24. The licensee shall implement a method to "tamper safe" UF_6 cylinder valves. UF_6 cylinders shall be "tamper safed" on or before October 1, 1988.

C. Steam Chest Operation

The January 4, 1986, incident occurred because a cylinder containing UF_6 in excess of the normal limits for filling, specified in ORO-651, was heated in a steam chest without knowledge of the actual amount of material in the cylinder or provision for pressure measurement, venting, and automatic termination of heating while in the steam chest. Heating the cylinder was a violation of Sequoyah Fuels Corporation Procedure N280-1, which specifically prohibited the heating of overfilled cylinders.

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In response to these deficiencies, SFC is modifying the operation of the steam chests, modified the procedures for heating in steam chests, and is investigating the use of autoclaves versus steam chests in terms of providing an additional margin of safety. The steam chests have been modified by providing pressure-sensing instrumentation for the cylinder to be heated. The pressure sensor will be interlocked with the steam heat system to automatically terminate heating and provide both local and control room alarms. SFC has specifically committed that filled UF_6 cylinders shall not be heated in steam chests unless the over-pressure sensor and steam interlock shutoff system is operable (Chapter 6, License Conditions, page I.6-2). A drain line from the steam chests to the cold traps will also be provided to allow removal of UF_6 from the cylinder during heating. During the inspection conducted on July 28 - August 1, 1986, the pressure sensor and interlocks had not been installed. Thus, the above SFC commitment means that no cylinders will be heated until this equipment is installed and is operational.

The installation of an inline sampling manifold system in the cylinder filling area should reduce substantially the number of cylinders that must be heated at the Sequoyah Facility. Previously, heating of cylinders was required to obtain a sample for analysis. This analysis will, in the future, be done from samples taken during filling. Despite this improvement, there will be instances in which cylinders will have to be heated. In most cases, if heating of cylinders is required, it will be because of contaminants which result in the product not meeting DOE specifications. The UF_6 would then be withdrawn from the cylinder and returned to the process system.

In the very unlikely event of a cylinder containing UF_6 in excess of the amounts specified in the SFC filling procedures, SFC has specifically committed (Chapter 6, License Conditions, page I.6-3) to a special case-by-case analysis and approval by management before heating. An example is the cylinder involved in the March 12-13 overfilling event which occurred before the new scales had been installed. This cylinder is currently being stored onsite and contains approximately 100 pounds more than the allowable limit for cylinders in transport.

The steam chests used at the Sequoyah Facility limit, by physical design, the maximum temperature to which a cylinder can be heated to approximately 212°F. The limits specified in ORO-651 and ANSI N14.1-1982 are based upon a temperature of 250°F, a 5 percent safety margin, and the minimum volume of the cylinder type. The reduction in actual temperature attained to approximately 212°F means that additional UF_6 could be present without violating the 5 percent safety margin. The NRC staff has analyzed this situation and has determined that, for Models 48X and 48Y cylinders, an excess of 500 pounds would not compromise the 5 percent safety margins (Memo W. H. Lake to W. T. Crow, July 31, 1986). To clarify the weights at which special review and procedures are necessary for heating, and to prevent the heating of cylinders in which the safety margin could be compromised, the staff recommends that the following condition be added to the license:

25. The special case-by-case analysis required by Chapter 6, License Conditions, Item 16, page I.6-3, shall be required for any cylinder containing UF_6 in excess of the weight limits specified by ORO-651. If the weight of UF_6 in the cylinder exceeds the limits specified by ORO-651 by more than 500 pounds, heating of the cylinder shall not be allowed without the specific approval of the NRC. The above condition shall be applicable only to Models 48X, 48Y, or equivalent cylinders. Heating of other cylinder types containing UF_6 in excess of the ORO-651 limits shall not be permitted without the specific approval of the NRC.

The acceptability of the conditions for heating cylinders is predicated upon the assumption that the amount (weight) of UF_6 in the cylinder is accurately known. Therefore, the staff recommends that the following condition be added to the license:

26. The licensee shall, prior to heating any cylinder containing UF_6, verify the amount of UF_6 in the cylinder using the accountability scale. A printout of the weight shall be attached to the cylinder status sheet.

SFC has committed to performing an assessment of the relative safety provided by steam chests and autoclaves. The NRC will have a contractor expert in the operation of steam chests and autoclaves review the report and provide an independent assessment of its conclusions.

IV. ADMINISTRATIVE MODIFICATIONS

A. Organization and Administration

Since the January 4, 1986, accident, Sequoyah Fuels Corporation has made a number of changes in organization, personnel, and education and experience requirements. Figure 2 shows the new organizational structure for SFC.

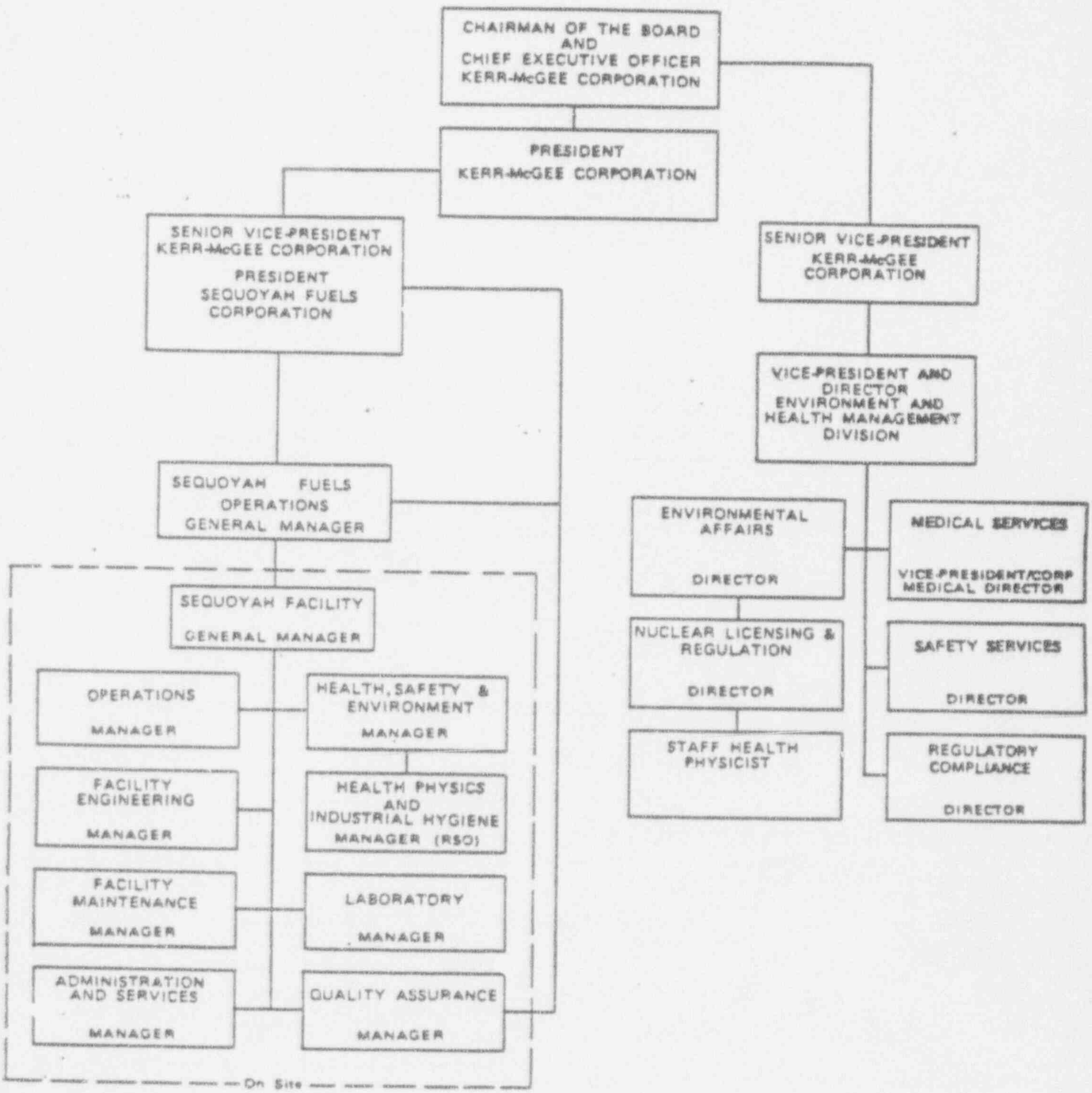
1. Organization

As a result of the reorganization, several new positions were created at the facility. The following is a summary of the facility's upper management positions and their organizational responsibilities.

The General Manager, Sequoyah Facility, is responsible for the facility's overall safe, efficient operation and the control of all materials. This position is responsible for the ultimate approval of operating procedures and facility modifications.

FIGURE 2

SEQUOYAH FUELS CORPORATION - ORGANIZATIONAL CHART



The Manager, Quality Assurance, reports to the General Manager, Sequoyah Facility, and also has the authority to discuss items under his control directly with the General Manager, Sequoyah Fuels Operations, and the President, Sequoyah Fuels Corporation. The position is responsible for the development and implementation of the quality assurance plan and procedures.

The Manager, Health, Safety, and Environment, reports to the General Manager, Sequoyah Facility, and is responsible for the programs and procedures in the areas of safety, industrial hygiene, health physics, and environmental oversight. The incumbent is also the designated Contingency Plan Coordinator for the Sequoyah Facility and is responsible for the development and implementation of the facility's Contingency Plan and the Contingency Plan Implementing Procedures. It is the responsibility of this position to ensure that all facility employees and members of response organizations receive initial and continuing training.

The Manager, Health Physics and Industrial Hygiene, reports to the Manager, Health, Safety, and Environment and is the Radiation Safety Officer for the facility. The position is responsible for the implementation of the industrial hygiene and health physics program and the direct supervision of the Health and Safety Technicians.

The Manager of Operations reports to the General Manager, Sequoyah Facility, and is responsible for all operational activities and operating procedures.

The Manager, Facility Engineering, reports to the General Manager, Sequoyah Facility, and is responsible for engineering services, including process and design modifications.

The Manager, Administration and Services, reports to the General Manager, Sequoyah Facility, and is responsible for administrative services. These services include labor relations, procedure development, security, procurement, and training. This position is responsible for the development and maintenance of the facility training center and the facility training program.

The Manager, Facility Maintenance, reports to the General Manager, Sequoyah Facility, and is responsible for all maintenance and surveillance activities and the development of related procedures.

The Manager, Facility Laboratory, reports to the General Manager, Sequoyah Facility, and is responsible for the facility's radiological and non-radiological laboratory and the development and maintenance of procedures related to analytical analysis work.

In light of the January 4, 1986, accident, and the findings of NRC's investigations, the staff concludes that the new organizational structure provides a clear and adequate designation of responsibilities within the facility and covers all of the areas required to administer the operations.

2. Education and Experience Requirements

The education and experience requirements for the key management positions in Sequoyah Fuels Corporation are committed to in the license (Chapter 2, Section 2.5, beginning with page I.2-9) as follows:

The General Manager, Sequoyah Facility, shall have demonstrated, through progressively more responsible management positions, the ability to manage complex technical and administrative programs similar to those found in a chemical processing plant or other type nuclear fuel cycle facilities. The individual shall hold a degree in science or engineering and have at least 5 years of supervisory or management experience.

The Manager, Health, Safety, and Environment, shall hold a degree in science or engineering and have at least 5 years experience in areas such as environmental and radiation monitoring, radiation protection, health physics, emergency preparedness, and regulatory compliance programs. He shall have demonstrated a proficiency to conduct specified radiation and health safety programs.

The Manager, Health Physics and Industrial Hygiene, shall hold a degree in science or engineering and have at least 3 years experience in radiation monitoring and personnel exposure evaluation or shall have a high school diploma with 7 years of managerial and technical experience in radiation monitoring and personnel exposure evaluation. He shall have demonstrated proficiency to: 1) conduct specified radiation safety programs, 2) recognize potential radiation safety problem areas in the operations, and 3) advise operation supervision on radiation protection matters. He shall be capable of directing the surveillance activities of Health and Safety Technicians.

The Environmental Engineer shall hold a degree in science or engineering or have a high school diploma with 4 years of technical experience. The individual shall have demonstrated proficiency to: 1) formulate and conduct specified non-radiological environmental monitoring programs, and 2) recognize potential environmental problem areas.

The Manager of Facility Engineering shall hold a degree in science or engineering with 5 years experience in chemical or nuclear materials processing or chemical materials handling. The individual shall have 3 years experience in a supervisory position.

The Manager of Operations shall hold a degree in science or engineering with 5 years experience in the operation of a chemical or nuclear materials processing plant with at least 3 years of management experience. He shall have demonstrated proficiency in identifying process changes which require health physics and safety analysis.

The Area Managers shall hold a degree in science or engineering with 3 years experience in chemical processing, process engineering, or project engineering and handling of uranium materials. They shall have demonstrated experience in a project, engineering, or managerial activity.

The Area Superintendents shall hold a degree in science or engineering or have a high school diploma with 5 years experience in a chemical processing plant and have a thorough knowledge of the development of operational procedures.

The Shift Supervisors shall hold a degree in science or engineering or have a high school diploma with 5 years experience in a chemical processing plant. The individual shall be thoroughly familiar with the uranium production activities and have a thorough knowledge of the approved operating procedures.

no H.S.

The Manager, Administration and Services, shall hold a degree in science or business administration and have at least 3 years experience in various administrative functions such as labor relations, procurement, computer services and training. He shall have demonstrated proficiency in directing administrative activities in those functional areas.

The Manager, Facility Maintenance, shall hold a degree in science or engineering with 5 years experience in maintenance/operation of a chemical or nuclear materials processing plant with at least 3 years of management experience. He shall have demonstrated proficiency in identifying maintenance and surveillance activities which require health physics and safety analysis.

The Manager, Facility Laboratory, shall hold a degree in science with 5 years experience in the analytical laboratory including radiochemistry and quality control techniques. The individual shall have experience in a supervisory position.

The Manager, Quality Assurance, shall hold a degree in science or engineering with 3 years experience in a chemical or nuclear materials processing plant. He shall have demonstrated managerial proficiency in identifying potential problem areas involving operations and maintenance activities.

no H.S.

The Director, Nuclear Licensing and Regulation (Environment and Health Management Division of Kerr-McGee Corporation), shall hold a degree in science or engineering and shall have at least 5 years experience in matters related to radiation protection. The individual shall be thoroughly familiar with NRC license requirements, NRC and EPA regulations, and regulations of other agencies having oversight responsibilities for activities conducted at the Sequoyah Facility. He shall be capable of providing authoritative advice and counsel in matters related to NRC licensing and procedures and regulations.

The General Manager, Sequoyah Fuels Operations, Sequoyah Fuels Corporation, shall hold a degree in science or engineering and have at least 5 years experience in chemical plant processing with at least 3 years management experience in chemical or nuclear materials manufacturing facilities. The individual shall have demonstrated the proficiency to perform significant portions of required management activities.

The staff has reviewed these requirements and believes that the requirements are appropriate for the positions to be filled with the exception of the Manager, Quality Assurance. The staff believes that further requirements are necessary because of the importance of the position. The staff, therefore, recommends that the following condition be added to the license:

27. The Manager, Quality Assurance, shall hold a degree in science or engineering with 5 years of experience in a chemical or nuclear materials processing plant with 3 years of management experience in programs having quality assurance responsibilities.

3. Personnel

Since the time when Materials License No. SUB-1010 was renewed in September 1985, a number of personnel changes have been made in the management structure of SFC. These changes include the President, Sequoyah Fuels Corporation; the General Manager, Sequoyah Fuels Operations; and the General Manager, Sequoyah Facility; as well as the individuals occupying the new positions which have been created at the facility. The staff has reviewed the qualifications of these individuals against the education and experience requirements of the license and determined that each position in the organization is filled by an individual who meets the requirements for that position.

B. Procedures

Sequoyah Fuels Corporation has provided a specific commitment (Chapter 2, License Conditions, Section 2.7.1, page I.2-13) to establish, maintain, and adhere to written operating procedures for all operations and safety-related activities involving source or hazardous materials. This section also includes a commitment to conduct and document training on procedures prior to the implementation of the procedure.

In the time period since the January 4, 1986, accident, SFC has reviewed and revised its procedures to ensure that the pertinent and necessary information is included and that the procedures are up to date. Process parameter sheets, which are now included as a part of the operating procedures, provide information on temperatures, alarm and interlock set points, and actions to be taken. The procedures also provide warnings for certain process steps and the reason for the warning.

During inspections, the staff examined a selection of the revised procedures for the facility. The staff has also reviewed the process by which procedures will be reviewed, revised, and approved. A specific commitment (Chapter 2, License Conditions, Section 2.7.1, page I.2-13), to review and revise as appropriate the facility's procedures at least every 18 months or whenever necessary to reflect changes in the facility operation has been included to ensure that procedures are kept up to date. The staff's review has determined that the procedures have been revised, and the staff believes that these procedures are appropriate to define the actions necessary to operate the facility safely.

C. Training

The lack of appropriate training was identified as a contributor to the January 4, 1986, accident. Since the accident, SFC has modified and expanded its training program to increase employee knowledge and awareness of process equipment, job requirements, safety information, and emergency response actions. As a part of this program, SFC has established a new offsite training center in which classroom training is provided to employees.

The new SFC training program consists of two separate components. The first of these is classroom training, in which the general safety and process information is given. All employees are provided training in areas such as plant operations, health physics, safety and hazard communication, respiratory protection, and emergency and general procedures. SFC has committed (Chapter 2, License Conditions, Section 2.6, page I.2-13) to conduct annual refresher training for all employees. The refresher training shall include the types of information presented in the initial general training and emphasize the need for strict adherence to procedures, regulatory requirements, and license conditions. It is the NRC staff's understanding that the annual refresher training shall be formal classroom training separate from, and in addition to, the monthly safety meetings conducted to enhance awareness of facility safety.

In addition to the general training provided to all employees, formal classroom training in specific process operations shall be provided to ensure that those employees handling source material have received the training necessary to perform their jobs. The lesson material is based primarily upon the plant operating procedures and focuses upon the safe and efficient operation of the process and equipment. This training will include specific instructions on the safe handling of process chemicals. Records of attendance and test results shall be maintained in the facility training file.

The adherence of personnel to procedures is the key factor in the safe and efficient operation of the facility. Training in the facility procedures and continued training and knowledge of changes to the procedures is also essential if operations are to be conducted in a safe manner in the future. The staff, therefore, recommends that the following condition be added to the license to provide a measure of assurance that procedures will be followed and the employees' knowledge of current procedures kept up to date.

28. The licensee shall ensure that each employee receives and understands the information necessary to safely perform his function. Each employee shall sign a statement indicating the receipt of training and committing to following corporate policy and procedures. Supervisory personnel shall document that all employees under their supervision are aware of and understand changes made in procedures affecting the performance of their job function.

The second component of the training program is on-the-job training to demonstrate that the operator is thoroughly familiar with the procedures and equipment and that the operator can safely operate that equipment on a daily basis. This component of the training program includes process walk-throughs and documentation of individual performance in the required tasks.

SFC has provided a commitment (Chapter 6, License Conditions, page 6-4) which states that an employee shall not be allowed to carryout process operational duties unless he has completed the proper training and has passed the required tests on the training material. Further, the employee shall work under the direct supervision of the Shift Supervisor until the on-the-job training and module certification are completed. The receipt and satisfactory completion of all training requirements are documented (Chapter 2, License Conditions, Section 2.6, page I.2-11).

The staff believes that the certification of employees to perform their work is an important step towards ensuring that operations will be conducted in accordance with proper procedures. Certification should include not only a demonstration that the operation can be performed, but also a demonstration of the knowledge necessary to perform the operation safely, even under potentially adverse conditions. The staff, therefore, recommends that the following condition be added to the license to require the presence and participation of management in the areas of health and safety and training in the certification process.

29. The Manager, Health, Safety, and Environment, and the Manager, Administration and Services, or their designated representatives, shall certify that each employee's on-the-job training and module certification has been adequate and that the employee is competent and qualified to perform his or her responsibilities.

Annual instruction for all employees shall be provided on the Radiological Contingency Plan (Chapter 2, License Conditions, Section 2.6, page I.2-13). The extent of the training will be dependent upon the individual's job function and emergency response responsibilities.

The staff has reviewed the actions taken by SFC in the area of training and has determined that significant improvements have been made. During the inspection conducted on July 28 - August 1, 1986, the staff determined that the licensee's commitment to retrain all employees had been completed. The staff concludes that the new training program commitments are appropriate for the continued knowledge of employees to perform their duties and respond to emergency situations.

D. Health Physics and Industrial Hygiene

Following the January 4, 1986, accident, the NRC headed an interagency ad hoc task group to assess the health impacts of the accident on the employees and local population. The task group included representatives from NRC, EPA, Department of Agriculture, Department of Health and Human Services, Oak Ridge National Laboratory, Lawrence Livermore National Laboratory, and the University of Rochester. A report of the findings and recommendations of this ad hoc task group was published by the NRC as NUREG-1189. One of the recommendations of the report was that a followup study of the employees exposed during the incident be conducted. SFC has indicated its commitment to perform such a study. The staff believes that this continued effort is both appropriate and important in light of the high levels of soluble uranium compounds to which these employees were exposed. The staff, therefore, recommends that the following condition be added to the license to incorporate the commitments made by SFC and ensure the proper follow-up of employees and the availability of the results to those who may have an interest:

30. The licensee shall provide a comprehensive monitoring program for those employees exposed to uranium during the January 4, 1986, incident. At a minimum, the monitoring program shall consist of the following:

    a. Semimonthly quantitative urine uranium bioassay.

    b. Semimonthly urinanalysis for physiologic parameters including specific gravity, pH, protein, ketones, blood, and nitrate presence. A microscopic examination of the urine for the presence of formed elements such as casts and cells shall also be performed.

    c. Semiannual pulmonary function testing.

    d. Annual routine physical examinations.

    A report of the findings of this study, including pertinent data allowing an independent analysis of results, shall be submitted to the NRC on or before July 1, 1988.

Sequoyah Fuels Corporation has requested a modification of the commitment for radiation detection instruments that will be available. The request is to delete the requirement for a 0-25R/hr instrument. The staff finds the request acceptable because there are no sources of radiation present or anticipated at the facility that could result in radiation fields in excess of the 5R/hr level for which an instrument is available.

Supervisory control of the health physics, industrial hygiene, and environmental monitoring programs has been increased at the Sequoyah Facility with the addition of a new position, Manager, Health, Safety, and Environment. The Manager, Industrial Hygiene and Health Physics, reports to this individual and remains the RSO for the facility. The results of this change should improve control over the health and safety programs of the facility through a more clearly defined responsibility for each individual and an overall greater level of supervisory control.

E. Quality Assurance

SFC is developing a new Facility Quality Assurance Plan and implementing procedures to assure that all operations and safety-related activities are performed in accordance with facility procedures. To oversee and implement this program, a new position at the Sequoyah Facility, Manager, Quality Assurance, was created.

The quality assurance program includes requirements for all activities affecting the safety-related functions of structures, systems, and components (including design, procurement, fabrication, handling, shipping, storage, cleaning, erecting, installing, inspecting, testing, operating, maintaining, repairing, and modifying requirements). The program also has the responsibility for assuring that the training of personnel performing activities affecting quality has been conducted.

The quality assurance program is also designed to provide a system by which the licensee can determine if its activities are being conducted in accordance with its own procedures, requirements, and license conditions. Prior to the January 4, 1986, incident, such a "self policing" effort was not a separate and explicit function. The staff believes that this function is crucial for proper operation of the facility. The provision for a quality assurance program appears to meet the staff concern that the licensee have in place a mechanism to assure that operations are being properly conducted.

Sequoyah Fuels Corporation has provided a commitment (Chapter 2, License Conditions, Section 2.8, page I.2-17) to conduct periodic audits of operations and safety-related activities to verify compliance with corporate policies, procedures, license conditions, and federal regulations. SFC has indicated that a specific frequency and schedule for the audits has deliberately not been established so that areas within the facility will not have the opportunity to prepare. This approach is similar to the NRC inspection approach to review the activities of its licensees. However, the staff believes that a minimum frequency for audits should be established to ensure that all areas are examined. The staff, therefore, recommends that the following condition be added to the license to establish the minimum frequency for Quality Assurance Program audits:

31. The minimum frequency established by the licensee for audits of operations and safety-related activities that are a part of the ongoing Quality Assurance Program shall not exceed every 12 months. A report of the areas audited shall be made quarterly to the General Manager, Sequoyah Facility.

Audit findings shall be documented with copies of the report forwarded to the General Manager, Sequoyah Facility; the General Manager, Sequoyah Fuels Operations; and the President, Sequoyah Fuels Corporation. The General Manager, Sequoyah Facility, shall respond in writing to all audit findings stating the corrective action to be taken. Followup actions, including reaudits of deficient areas, shall be performed where indicated.

One area in which timely and continuing reviews are critical is the surveillance of alarms and devices important to safety and the confinement of radioactive material. A surveillance program for these devices is outlined in SFC's procedures and includes periodic checks and calibrations of devices and alarms such as rupture disks, smoke detectors, and pressure-sensing equipment. A specific commitment for the program is contained in the license (Chapter 2, License Conditions, Section 2.7.5, page I.2-16). The commitment provides that the frequency for checking the devices and alarms will be commensurate with the safety function they perform. The commitment does not, however, provide a minimum frequency for the surveillance program. The staff, therefore, recommends that the following condition be added to the license to ensure that the minimum frequency for surveillance is established and does not exceed annually:

32. The licensee shall establish a minimum surveillance frequency, commensurate with the safety function and not to exceed every 12 months, for each device covered in the maintenance surveillance program described in Chapter 2, License Conditions, Section 2.7.5, page 2-16.

The staff believes that the quality assurance program to be implemented by SFC is adequate and appropriate to assure the quality, appropriateness, and correctness of work performed at the facility.

F. Access Control

For the purpose of preventing exposure to radioactive materials and the spread of contamination, access at the Sequoyah Facility is controlled with three distinct areas of increasing control. The first is the "Protected Area," which comprises the fenced areas of the facility. Access to this area is through guarded gates. Within the protected area are several "Restricted Areas," in which source materials are processed or stored. Access to the Restricted Areas requires protective clothing such as coveralls and shoe covers, hard hats, and safety glasses. For Restricted Areas in which source materials are only being stored, shoe covers and coveralls are not required if surface contamination levels are less than 500 dpm/100 cm^2. If contamination is detectable on skin or clothing, individuals are not permitted to exit the restricted areas without the specific approval of the RSO.

Several areas within the restricted areas are designated as "Controlled Access Areas". These comprise the areas in which processing of source material is being performed and a significant potential for contamination exists. Access to the Controlled Access Areas requires an additional change of protective clothing (shoe covers) to prevent the spread of contamination to other areas of the facility.

During the inspection conducted on February 10-14, 1986, a violation was noted for failure to have the required security system operational as committed to in the license. SFC has indicated that a new electronic security system is to be installed at the facility. SFC has also committed to the use of an additional watchman to increase surveillance of the Protected Area if the electronic security system is inoperable for more than 16 hours. The staff finds these commitments to be acceptable to prevent members of the public from coming in contact with source materials stored or processed on the site.

G. Records

Sequoyah Fuels Corporation has committed to maintaining records, including documentation of training activities, in accordance with applicable regulations (Chapter 2, License Conditions, Section 2.10). The staff believes that documentation should be maintained for a minimum of 5 years irrespective of whether the documents are covered by regulation. The staff, therefore, recommends that the following condition be added to the license to assure that documentation is maintained by the licensee and is available for inspection by the NRC:

33. The licensee shall maintain all documentation, records, and tests required as a part of this license for a minimum of 5 years or longer if the regulations so require.

H. Conclusions

Upon completion of its review, the staff concludes that Sequoyah Fuels Corporation has established and committed to an organization and administration for the Sequoyah Facility which should be sufficient to oversee the operations performed at the facility and assure that those operations are conducted in a manner which protects the health and safety of employees, members of the public, and the environment. The institution of an internal audit program, under the direction of the Manager, Quality Assurance, adds to the staff's confidence that operations at the facility will be performed using appropriate standards.

V. ENVIRONMENTAL PROTECTION

During the public meeting held in Gore, Oklahoma, on July 8 and 9, 1986, a number of issues were raised about the effluents from the facility and the environmental impacts of the January 4, 1986, accident. The staff responses to the issues raised during the public meetings are contained in Appendix C of this report. As part of the documentation supporting the September 1985 renewal of Source Materials License No. SUB-1010, the staff prepared an Environmental Assessment which described in detail the environmental impacts of the facility. A Finding Of No Significant Impact was published on September 13, 1985 (50 FR 37450), for the Sequoyah Facility. Since the renewal, operations at the facility have not changed significantly, and the staff assessment of environmental impacts remains valid.

During the time the facility has not operated, SFC has installed on the main stack new scrubber equipment to reduce the emissions of HF. As a result of this new equipment, it is likely that the emissions of uranium will also be decreased.

As a result of the concerns of the citizens in Sequoyah County regarding the operation of the facility in relation to potential adverse environmental and health effects associated with air emissions and the method of disposal of waste materials generated during operations, the Commissioner of Health, Oklahoma State Department of Health, established a special monitoring program for the facility. The results of this monitoring program were documented in a report dated November 1985. The report states that the special monitoring indicated no adverse impacts on surface water, ground water, or air as a result of the operation of the facility. Specific findings included:

1. Air monitoring for both radioactive and non-radioactive pollutants in the vicinity of the facility showed no indication that state or federal air emission standards are being approached or exceeded as a result of air emissions from the facility.

2. Surface and ground water data collected show that all water sources monitored for radioactivity were well within the standards established by the Oklahoma State Department of Health Radiation Protection Regulations, the Oklahoma Drinking Water Regulations, and Oklahoma's Water Quality Standards. Levels of radioactivity in the Arkansas River downstream of the facility and in private water wells and ponds were well below all radiation standards and were in the range of what would be expected as natural background radiation levels.

As a part of the inspection effort undertaken by NRC after the January 4, 1986, accident, the NRC invited the participation of other federal and state agencies, such as the Environmental Protection Agency and Oklahoma State Department of Health, to accompany and participate in inspections of the Sequoyah Facility for their areas of interest and expertise. These agencies did participate in the inspection held June 9 - 13, 1986, and did not find violations related to their areas of interest and jurisdiction. EPA also conducted a separate inspection for compliance with National Pollutant Discharge Elimination System (NPDES) permit requirements during the week of June 16-20, 1986.

One issue that was raised during the review of SFC's request to resume operations was the timeliness of notifying the NRC of violations to the EPA NPDES permit. Enforcement actions related to NPDES violations are the responsibility of the EPA. However, the NRC is charged under NEPA with certain actions related to environmental quality. The staff believes that notification of violations is appropriate to maintain NRC cognizance of activities affecting the environment surrounding the Sequoyah Facility. Therefore, the staff recommends that the following condition be added to the license to provide for timely reporting of events to the NRC:

34. The licensee shall inform the NRC Region IV Office in writing of any violation of the National Pollutant Discharge Elimination System (NPDES) permit or changes in the permit, within 10 days of the determination of the event.

VI. RADIOLOGICAL CONTINGENCY PLAN

By letter dated May 27, 1986, Sequoyah Fuels Corporation submitted for NRC review and approval a major revision of the Radiological Contingency Plan for the Sequoyah Facility. This revision established actions related to both onsite and offsite responses to incidents that might occur at the facility. Some of these actions go well beyond the scope of the 1981 "Order to Modify Licenses to Incorporate New or Upgraded Radiological Contingency Plans," 46 FR 12566, that required the Sequoyah Facility to have and implement a Radiological Contingency Plan.

As part of its review of the revised Radiological Contingency Plan, NRC provided copies of the Plan to the EPA, FEMA, and State of Oklahoma. The reviews of these agencies were coordinated with the NRC review, and EPA and FEMA representatives accompanied NRC during its inspection of July 28 - August 1, 1986, to examine the response capabilities and commitments of SFC.

The Radiological Contingency Plan follows the format in NUREG-0762, "Standard Format and Content for Radiological Contingency Plans for Fuel Cycle and Materials Facilities." The Plan includes descriptions of the engineered-safety systems and emergency response systems available at the facility. The Contingency Plan, Contingency Plan Implementing Procedures, and related emergency procedures are reviewed and updated annually by the Manager, Health, Safety, and Environment and whenever changes occur in processes, organization, or other factors affecting response capability. An independent annual audit of the Contingency Plan and Contingency Plan Implementing Procedures is performed by Kerr-McGee Corporation personnel under the direction of the Director, Regulatory Compliance.

A. Onsite Contingency Plan

1. General

The Plan consists of those elements necessary to detect, mitigate, and correct onsite events which are in the process or have occurred and indicate a potential degradation of the level of safety at the facility. Engineered-safety systems, such as the safety shutdown circuit (Q circuit) and solvent extraction building fire detection and suppression system, are a primary means of detecting and mitigating events. They are located throughout the process systems, including the UF_6 drain station. Safety systems that are not directly associated with the process system are also provided, including emergency power, fire protection, confinement, and vehtilation.

Once an event has been detected, two response organizations are activated. The Onsite Response Organization, which consists of the site employees who are assigned as responders, is directed by the Onsite Emergency Director. The Onsite Emergency Director is responsible for providing the initial assessment of the emergency situation, taking appropriate mitigating actions, activating the Contingency Plan, and notifying the appropriate personnel and offsite agencies. Once the Plan is fully activated, the Onsite Response Organization includes the following coordinators and their groups: Operations; Hazards Assessment and Control; Damage Control and Repair; Technical Support; Administration and Security; Assembly and Support; Emergency Communication; and Emergency Teams.

The Offsite Response Organization is comprised of key individuals from the Oklahoma City corporate headquarters. These individuals travel to the site and man the Offsite Response Center. Offsite response actions remain under the control of the Onsite Response Organization until the Offsite Response Organization has arrived. The Offsite Emergency Director heads the Offsite Response Organization and is responsible for coordinating the overall corporate response for the event. The function of the Offsite Response Organization is to perform offsite environmental and hazard monitoring and assessment; provide technical, administrative, and logistical support to the onsite response effort; and provide communications and liaison with corporate management, offsite agencies, offsite response groups, and the media.

2. Event Classification

The Sequoyah Fuels Contingency Plan is based on four levels of emergency classification. These classifications determine the type and level of assessment and mitigative and corrective actions to be taken by the Onsite and Offsite Response Organizations.

(a) Unusual Event

An Unusual Event is declared when an event, such as uncontained radioactive material from a digestion tank overflow or a small fire outside the process area, is in process or has occurred which indicates a potential degradation of the level of plant safety. No release of radioactive or hazardous materials is expected beyond the site controlled boundaries. The Onsite Response Organization is activated and augmented as needed. The situation is assessed and response measures are taken to mitigate the event.

(b) Alert

An Alert is declared when an event, such as a significant UF_6 release from a pigtail rupture, is in process or has occurred which involves actual or substantial degradation of plant safety. Releases of radioactive or hazardous materials may be significant onsite but are not expected to be significant to the health and safety of the offsite public. Offsite agencies and the corporate response organization are notified of the Alert and the reason for the Alert. The Onsite Response Organization and Onsite Response Centers are activated by the Onsite Emergency Director. The situation is assessed, and onsite response measures are taken to mitigate the event. The onsite monitoring teams are dispatched as directed. Periodic plant status updates and meteorological assessments, including hazard assessments for actual releases, are given to offsite agencies.

(c) Site Area Emergency

A Site Area Emergency is declared when an event, such as a retention basin failure with an uncontrolled liquid release offsite or a breach of security with an imminent loss of physical control of the facility, is in process or has occurred which involves an actual or likely major failure of plant functions needed for the protection of the public. Offsite releases of radioactive or hazardous materials are not expected to represent a threat to public health and safety. The offsite authorities are notified of the status of the facility. The onsite management and corporate response organization are notified of the situation. Both the Onsite and Offsite Response Organizations are activated, as well as all response centers. The condition of the plant is assessed and response measures are taken. The onsite and offsite monitoring teams are dispatched. Periodic plant status updates and meteorological assessments, including hazard assessments for actual releases, are given to offsite agencies. The onsite response effort is augmented by the availability of the senior technical and management staff for onsite consultation.

(d) General Emergency

A General Emergency is declared when an event, such as the rupture of cold trap with a substantial portion of the UF_6 being released or the evacuation of the Control Room and/or site, is in process or has occurred which involves an actual or imminent major release of radioactive or hazardous materials. The release can be reasonably expected to represent a threat to the health and safety of the offsite public. The offsite authorities are notified of the status of the facility. The Onsite Emergency Director activates the offsite alarm system to warn the public. The onsite management and corporate response organization are notified of the situation. Both the Onsite and Offsite Response Organizations are activated as well as all response centers. The condition of the plant is assessed and response measures are taken. The onsite and offsite monitoring teams are dispatched. Periodic plant status updates and release and hazard assessments based upon available plant condition and foreseeable contingencies will be given to offsite authorities. The onsite response effort is augmented by the availability of the senior technical and management staff for onsite consultation. The public will be kept informed of the situation through the offsite agencies. Sequoyah Fuels will provide consultation to offsite agencies as needed.

3. Response Capabilities

The Sequoyah Facility has provided designated facilities, equipment, supplies, and communication capabilities for emergency use as outlined in NUREG-0762.

(a) Response Centers

The Control Room, which is located on the second floor of the Process Building, is the initial control center for directing the onsite response effort to an event. For emergency conditions, the Control Room is equipped with communication and notification equipment, including the following systems: onsite FM and Police radios, onsite public announcement, telephones (commercial, dedicated, and automatic), onsite airhorn warning, and offsite siren warning. The Control Room is sealed to inhibit entry of external contamination from the process area. Should the Control Room become contaminated, SCBA equipment is provided with backup air bottles to allow for limited occupancy or an orderly transition to another location.

The Onsite Emergency Center, which is located adjacent to the Control Room, becomes the principal onsite center for direction and control of the onsite response effort. From the Onsite Emergency Center, the Onsite Emergency Director and coordinators provide support to personnel in the Control Room and direct the assessment and mitigating actions taken by onsite responders.

Sequoyah Fuels can augment their onsite response capability by activating the Offsite Response Center which is located in the Carlile Training Center about 1 mile east of the facility. The Carlile Training Center normally serves as an employee training facility but, when activated, it becomes the Offsite Response Center and is manned by the Offsite Response Organization.

(b) Emergency Equipment

Portable monitoring equipment and supplies are maintained at various locations onsite and offsite. The First Aid Room, North and South Guard Houses, and Carlile Training Center have emergency equipment kits that include: survey instruments, Self-Contained Breathing Apparatus (SCBA), anti-contamination clothing, and fire extinguishers. The Safety Equipment Room contains fire fighting equipment and suits for severe HF conditions. For escape under emergency conditions, 5-minute emergency escape respirators ar located in the administrative, process, and cylinder handling areas.

(c) Medical Facilities

Standard first aid supplies are found at each emergency equipment cache. The principal location for treating injured personnel is the First Aid Room which is stocked with first aid and HF treatment supplies, oxygen resuscitation equipment, decontamination supplies, and radiation detection and air sampling equipment. An ambulance containing medical equipment and supplies, a SCBA, and anti-contamination clothing are maintained onsite for conveyance of injured personnel to offsite medical facilities.

4. Training, Drills, and Exercises

The training requirements for Sequoyah Fuels personnel have been increased to properly implement and maintain the Contingency Plan. All employees shall receive formal general employee training which includes instructions on the Contingency Plan, Contingency Plan Implementing Procedures, emergency procedures, and use of the 5-minute emergency escape respirators. Those employees, including corporate personnel, who are assigned as responders, shall receive further training in the Contingency Plan areas for which they are responsible. Retraining shall be conducted annually for all employees, including corporate response personnel. Responders, who are required to use SCBA's, shall be respirator-trained and -qualified.

Periodic drills shall be conducted to test, develop, and maintain the skills of emergency response personnel. Communication drills shall be held monthly. Fire drills shall be conducted three times per year. A medical emergency drill, involving a contaminated victim, and a radiological monitoring drill shall be held annually. Onsite hazard control and assessment drills for liquid and airborne releases shall be conducted semiannually.

An annual exercise shall be conducted to maintain the proficiency of all the onsite responders and measure the capability of the Contingency Plan. Corporate response personnel shall take part in the annual exercise every 5 years. The annual exercise shall be a formal, detailed scenario using observation and control personnel. A post-exercise critique shall be held to identify deficiencies. Individuals shall be assigned responsibility for actions necessary to remove identified deficiencies.

B. Offsite Contingency Planning

Sequoyah Fuels has incorporated commitments in the Contingency Plan to offsite emergency preparedness which are beyond the requirements of the 1981 "Order to Modify Licenses to Incorporate New or Upgraded Radiological Contingency Plans," 46 FR 12566, and the "Standard Format and Content for Radiological Contingency Plans for Fuel Cycle and Materials Facilities," NUREG-0762. These commitments include emergency notification of local residents, communications with local authorities, and training of the offsite public and responders.

1. Notification and Communication

A public emergency warning system has been installed and was tested on June 7, 1986. The system included three sirens audible up to 3 miles from the plant for outdoor warning. Residences within 2 miles of the plant are connected to an automatic emergency telephone system for indoor warning. When activated from the Sequoyah Fuels Control Room, the system shall provide a recorded emergency warning and instruction message to residents. Permanent signs have been installed at key boat launch/public access areas to advise the non-resident public of the meaning of the emergency sirens, the proper response, and the monthly siren test schedule.

Sequoyah Fuels has acquired an emergency broadcast agreement with a local AM-FM radio station which shall provide public service announcements for the monthly siren tests. For emergencies, the station shall provide initial emergency information and updates to the public.

A police radio has been installed at the plant to allow interactive communication with police response agencies during an emergency. The police radio is also a backup to the dedicated telephone line to the Sequoyah County sheriff's dispatch office. The telephone will be used as the initial means of an emergency notification.

2. Training and Exercises

On May 1, 1986, local officials and the media attended a briefing and training meeting conducted by Sequoyah Fuels

Corporation on the Offsite Emergency Management Plan. This plan includes a description of the public warning system, implementation of emergency communications, education of the public in proper response actions, and response by cooperating offsite response agencies. On May 7-8, 1986, three public meetings for local residents were held by Sequoyah Fuels Corporation to describe the Offsite Emergency Management Plan and public warning system. On August 5 and 6, 1986, Muskogee and Sequoyah County Civil Defenses, respectively, adopted and incorporated, as part of their county civil defense plan, the Offsite Emergency Management Plan for the Sequoyah Uranium Conversion Facility at Gore, Oklahoma, dated August 1, 1986.

The Sequoyah County Sheriff's Office, Sequoyah Memorial Hospital, and Sparks Regional Medical Center have submitted letters of agreement stating their cooperation and commitment as elements of the offsite emergency response effort. The offsite response groups, including local law enforcement agencies, shall be offered training (as a minimum, annually) in the Contingency Plan areas which would affect their ability to respond to an emergency. Sequoyah Fuels shall cooperate with offsite response groups should they desire to participate in the 5-year exercise conducted with both onsite and offsite corporate personnel. Medical personnel at Sequoyah Memorial Hospital and Sparks Regional Medical Center shall receive annual offsite medical support personnel training.

C. Conclusions

Upon completion of its review of the revised Radiological Contingency Plan, the staff finds that Sequoyah Fuels Corporation has established an adequate mechanism for responding to potential emergency situations at the Sequoyah Facility. The staff finds that the Radiological Contingency Plan meets the requirements of the "Order to Modify Licenses to Incorporate New or Upgraded Radiological Contingency Plans," 46 FR 12566, and the "Standard Format and Content for Radiological Contingency Plans for Fuel Cycle and Materials Facilities," NUREG-0762.

In the area of offsite contingency planning, the staff has reviewed the Radiological Contingency Plan in cooperation with EPA and FEMA. The staff finds that the Plan exceeds the requirements of 46 FR 12566, and that the Plan is suitable to alert offsite residents of an imminent or actual release to unrestricted areas and the proper response to be taken.

As a part of revising the Radiological Contingency Plan, SFC prepared revised and updated Contingency Plan Implementing Procedures. These procedures contain the details of the response capability and specify the actions to be taken to each event. It is the staff's position that the Contingency Plan Implementing Procedures, while not establishing the response criteria to be used by SFC, do delineate information which, under certain circumstances, could be changed to decrease the response effectiveness of the Radiological Contingency Plan. The staff, therefore, recommends that the NRC receive a summary of the types of changes made to the Contingency Plan Implementing Procedures.

The staff, therefore, recommends that the revised Radiological Contingency Plan dated August 1986, transmitted by letter dated August 20, 1986, be incorporated into the license. Accordingly, the staff recommends that License Condition No. 22 be revised to read as follows:

22. The licensee shall implement, maintain, and execute the response measures of its Radiological Contingency Plan submitted to the Commission on August 20, 1986. The licensee shall also maintain Contingency Plan Implementing Procedures for its Radiological Contingency Plan as necessary to implement the Plan. The licensee shall make no change in its Radiological Contingency Plan or Contingency Plan Implementing Procedures that would decrease the response effectiveness of the Plan without prior NRC approval as evidenced by a license amendment. The licensee may make changes to its Radiological Contingency Plan and Contingency Plan Implementing Procedures without prior NRC approval if the changes do not decrease the response effectiveness of the Plan. The licensee shall maintain records of changes that are made to the Radiological Contingency Plan and Contingency Plan Implementing Procedures that are made without prior NRC approval for a period of 2 years from the date of the change. The licensee shall furnish the Chief, Uranium Fuel Licensing Branch, Division of Fuel Cycle and Material Safety, NMSS, U.S. Nuclear Regulatory Commission, Washington, DC 20555, and the appropriate NRC Regional Office specified in Appendix D of 10 CFR Part 20, a report containing a description of each change to the Radiological Contingency Plan and a summary of the types of changes made to the Contingency Plan Implementing Procedures within 6 months after the change is made.

VII. CONCLUSIONS AND RECOMMENDATIONS

Upon completion of the safety review of Sequoyah Fuels Corporation's request to resume production of UF_6, the changes made at the facility since the time of the January 4, 1986, accident, and the additional information submitted by SFC documenting and committing to the changes that have been made, the staff has concluded that the actions committed to in the Confirmation of Action Letter have been completed. The staff, therefore, concludes that the resumption of production of UF_6, incorporating the commitments made by SFC and subject to the additional conditions developed by the Uranium Fuel Licensing Branch, will fulfill the technical requirements of 10 CFR Part 40.32.

The NRC staff feels that the commitments provided and actions taken by SFC address all of its technical, equipment, and management program concerns subject to the conditions recommended in this SER, which were incorporated into Source Material License No. SUB-1010 by Order dated October 2, 1986.

The staff has coordinated the review and decision regarding restart with EPA, OSHA, FEMA, and the State of Oklahoma. These agencies have no objection to the NRC action to permit SFC to resume operations.

By Order dated October 2, 1986, Source Material License No. SUB-1010 was amended (Amendment No. 4) to incorporate the conditions recommended in this SER, as well as, conditions relating to independent oversight of plant operations that were also found to be necessary to provide reasonable assurance that the licensee will be in compliance with NRC requirements if the facility is permitted to resume operations. The Order which modified the license did not authorize resumption of operations. The license conditions recommended in this SER, which were incorporated into the license by the Order, are as follows:

9. Authorized Use: For use in accordance with the statements, representations, and conditions contained in Chapters 1 through 8 of the license renewal application dated August 23, 1985, as supplemented with revised pages dated August 20 and September 3, 1986.

22. The licensee shall implement, maintain, and execute the response measures of its Radiological Contingency Plan submitted to the Commission on August 20, 1986. The licensee shall also maintain Contingency Plan Implementing Procedures for its Radiological Contingency Plan as necessary to implement the Plan. The licensee shall make no change in its Radiological Contingency Plan or Contingency Plan Implementing Procedures that would decrease the response effectiveness of the Plan without prior NRC approval as evidenced by a license amendment. The licensee may make changes to its Radiological Contingency Plan and Contingency Plan Implementing Procedures without prior NRC approval if the changes do not decrease the response effectiveness of the Plan. The licensee shall maintain records of changes that are made to the Radiological Contingency Plan and Contingency Plan Implementing Procedures that are made without prior NRC approval for a period of 2 years from the date of the change. The licensee shall furnish the Chief, Uranium Fuel Licensing Branch, Division of Fuel Cycle and Material Safety, NMSS, U.S. Nuclear Regulatory Commission, Washington, DC 20555, and the appropriate NRC Regional Office specified in Appendix D of 10 CFR Part 20, a report containing a description of each change to the Radiological Contingency Plan and a summary of the types of changes made to the Contingency Plan Implementing Procedures within 6 months after the change is made.

The staff also recommends that the following additional conditions be added to the license:

23. The licensee shall use the printout capability of the cylinder filling scales to produce a record of final cylinder weight prior to removal of the cylinder from the cylinder filling area. This record shall be attached to the cylinder status sheet for the cylinder and shall be made part of the permanent record for that cylinder at the facility.

24. The licensee shall implement a method to "tamper safe" UF_6 cylinder valves. UF_6 cylinders shall be "tamper safed" on or before October 1, 1988.

25. The special case-by-case analysis required by Chapter 6, License Conditions, Item 16, page I.6-3, shall be required for any cylinder containing UF_6 in excess of the weight limits specified by ORO-651. If the weight of UF_6 in the cylinder exceeds the limits specified by ORO-651 by more than 500 pounds, heating of the cylinder shall not be allowed without the specific approval of the NRC. The above condition shall be applicable only to Models 48X, 48Y, or equivalent cylinders. Heating of other cylinder types containing UF_6 in excess of the ORO-651 limits shall not be permitted without the specific approval of the NRC.

26. The licensee shall, prior to heating any cylinder containing UF_6, verify the amount of UF_6 in the cylinder using the accountability scale. A printout of the weight shall be attached to the cylinder status sheet.

27. The Manager, Quality Assurance, shall hold a degree in science or engineering with 5 years of experience in a chemical or nuclear materials processing plant with 3 years of management experience in programs having quality assurance responsibilities.

28. The licensee shall ensure that each employee receives and understands the information necessary to safely perform his function. Each employee shall sign a statement indicating the receipt of training and committing to following corporate policy and procedures. Supervisory personnel shall document that all employees under their supervision are aware of and understand changes made in procedures affecting the performance of their job function.

29. The Manager, Health, Safety, and Environment, and the Manager, Administration and Services, or their designated representatives, shall certify that each employee's on-the-job training and module certification has been adequate and that the employee is competent and qualified to perform his or her responsibilities.

30. The licensee shall provide a comprehensive monitoring program for those employees exposed to uranium during the January 4, 1986, incident. At a minimum, the monitoring program shall consist of the following:

    a. Semimonthly quantitative urine uranium bioassay.

    b. Semimonthly urinanalysis for physiologic parameters including specific gravity, pH, protein, ketones, blood, and nitrate presence. A microscopic examination of the urine for the presence of formed elements such as casts and cells shall also be performed.

    c. Semiannual pulmonary function testing.

    d. Annual routine physical examinations.

    A report of the findings of this study, including pertinent data allowing an independent analysis of results, shall be submitted to the NRC on or before July 1, 1988.

31. The minimum frequency established by the licensee for audits of operations and safety-related activities that are a part of the ongoing Quality Assurance Program shall not exceed every 12 months. A report of the areas audited shall be made quarterly to the General Manager, Sequoyah Facility.

32. The licensee shall establish a minimum surveillance frequency, commensurate with the safety function and not to exceed every 12 months, for each device covered in the maintenance surveillance program described in Chapter 2, License Conditions, Section 2.7.5, page 2-16.

33 The licensee shall maintain all documentation, records, and tests required as a part of this license for a minimum of 5 years or longer if the regulations so require.

34. The licensee shall inform the NRC Region IV Office in writing of any violation of the National Pollutant Discharge Elimination System (NPDES) permit or changes in the permit, within 10 days of the determination of the event.

Original Signed by

Donald A. Cool, Ph.D.
Uranium Process Licensing Section
Uranium Fuel Licensing Branch
Division of Fuel Cycle and
Material Safety, NMSS

Approved by: W. T. Crow
W. T. Crow, Section Leader

APPENDIX A

RESPONSE TO RECOMMENDATIONS MADE IN NUREG-1198

On February 20, 1986, the Acting Executive Director for Operations formed a Lessons Learned Group to prepare a report based on experience gained from the January 4, 1986, Sequoyah accident. The observations and recommendations of the Lessons Learned Group were published in NUREG-1198, "Release of UF_6 From A Ruptured Model 48Y Cylinder At Sequoyah Fuels Corporation Facility: Lessons Learned Report," June 1986. The following is a summary of the recommendations made in NUREG-1198 which relate to the Sequoyah Facility and the steps taken by Sequoyah Fuels Corporation that address these recommendations. The NRC staff has, during its inspections of Sequoyah Fuels Corporation, determined that the actions described have taken place.

Section 2.1 Recommendation #1

Pressure-sensing instrumentation should be connected to UF_6 cylinders and cold traps any time heat is applied to them. Heat should not be applied to UF_6 cylinders or cold traps unless there is verification that a vent path is open to the associated pressure-sensing instrumentation. The pressure-sensing instrumentation should provide both alarm and visual display functions.

Response

Sequoyah Fuels Corporation is providing pressure-sensing instrumentation on a steam chest for cylinders being heated. The pressure sensor will provide both local and control room alarms. Chapter 6 of the license conditions provides a requirement that UF_6 cylinders will not be heated in steam chests unless the pressure-sensing instrumentation is operable. Instrumentation of this type is already present on the cold traps.

Section 2.1 Recommendation #2

Provisions should be made for overpressure relief or automatic heat termination upon overpressurization any time heat is applied to UF_6 cylinders or cold traps.

Response

The pressure-sensing instrumentation being installed on a steam chest at the Sequoyah Facility will be interlocked with the steam heating system to automatically terminate heating (see previous response). The cold traps used at the Sequoyah Facility relieve to a dump tank equipped with a rupture disk to safeguard against overpressure consequences.

Section 2.1 Recommendation #3

The use of autoclaves for heating UF_6 cylinders should be evaluated in terms of providing an additional margin of safety.

Response

Sequoyah Fuels is currently performing this evaluation. The NRC staff will have an independent contractor expert in the operation of steam chests and autoclaves review the report when it is submitted and provide an independent assessment of its conclusions.

Section 2.2 Recommendation #1

At least two separate means should be utilized for determining the quantity of UF_6 loaded into cylinders or cold traps before applying heat to them. "Real time" quantification methods are preferred, such as load cells, mechanical scales, or flow integration. Alarms should be associated with the quantification methods.

Response

Sequoyah Fuels Corporation has installed, as a part of the modifications made to the cylinder filling area, electronic load cells in the cylinder carts as well as the weighing platform scale. These load cells, coupled with the platform scale, provide two independent means of determining the weight of the cylinder. The scales are interlocked to the UF_6 filling valves to provide alarm capability and automatic termination of filling when the preset weight is attained.

As a part of the original design for the Sequoyah Facility, load cells were installed to determine the quantity of UF_6 in the cold traps. These scales were not effective due to the interference of process lines and cold trap supports. SFC is currently investigating methods to modify the cold traps so that the load cells function in the proper manner. Input to the cold traps is currently controlled by the process production rate and input time for each cold trap.

Section 2.2 Recommendation #2

Licensees should be required to establish maximum fill limits for cylinders and cold traps based on suitable standards.

Response

Maximum fill limits for cylinders have been developed and incorporated into the Sequoyah Facility operating procedures. The cylinder filling procedures establish a maximum fill limit, based upon the criteria provided in ORO-651, above which heating cannot be done without special case-by-case analysis and approval. The NRC staff has incorporated, as a condition of the license, a limit above which heating of cylinders may only be performed with the approval of the NRC. Filling of the cold traps is limited by the physical and chemical properties of UF_6 condensation in the trap to approximately 50 percent of the capacity of the cold trap.

Section 2.3 Recommendation #1

Movement of filled, heated UF_6 cylinders should be minimized. The use of combination filling, weighing, heating, and sampling stations should be evaluated for the Sequoyah Facility.

Response

As part of the modifications made to the cylinder filling area, SFC has installed an in-line sampling system for UF_6 which is being loaded into cylinders. Operation of the in-line sampling system will eliminate the movement of heated cylinders to and from a steam chest for obtaining a sample. Under routine operations, cylinders containing liquid UF_6 will only require movement to the storage yard for cooling after their weight has been determined.

Section 2.4 Recommendation #1

Overfilled UF_6 cylinders or filled cylinders which are found to be defective should be evacuated without increasing cylinder internal pressure above atmospheric and preferably without application of heat.

Response

Sequoyah Fuels Corporation has provided for pressure-sensing equipment to be used when cylinders are heated. Pressures will be limited to a small fraction of the pressure required to rupture a cylinder. Sequoyah Fuels Corporation does not possess the equipment necessary to evacuate cylinders without heating. However, the instrumentation and administrative safeguards provided for the heating operation provide an appropriate level of safety for the process of removing UF_6 from a cylinder.

SFC has specifically committed to a special case-by-case analysis and approval by management for any cylinder heating performed for cylinders containing UF_6 in excess of the amounts specified by ORO-651 and ANSI N14.1-1982. The NRC staff has incorporated, as a condition of the license, a limit above which heating of cylinders may only be performed with the approval of the NRC.

Section 2.5 Recommendation #1

Instrumentation for detecting UF_6 releases should be utilized in areas of potential airborne UF_6 releases and in conjunction with steam heating to detect UF_6 released to the steam condensate.

Response

Sequoyah Fuels Corporation has provided UF_6 detectors (smoke detector) for the cylinder filling area as part of the overall modifications for this area.

Section 2.5 Recommendation #2

The instrumentation for detecting UF_6 releases should provide alarm and/or automatic protection functions (for example, containment, emergency ventilation, or effluent cleanup).

Response

The UF_6 detectors installed by Sequoyah Fuels Corporation have both visual and audible alarms

Section 3.1.1 Recommendation #1

The individuals responsible for development, maintenance, updates, and implementation of the Contingency Plan should be clearly identified at both the corporate and site levels.

Response

It has been the licensing staff's policy to have, as part of the license, an identification of responsible positions within the management of the licensee.

In the license (Chapter 2, License Conditions, Section 2.2, page 2-5), the Manager, Health, Safety, and Environment is responsible for the development and implementation of the Plan and implementing procedures. As the Contingency Plan Coordinator, this individual periodically reviews and updates the Plan and implementing procedures. The Sequoyah Facility Manager has final authority for onsite response matters and the General Manager, Sequoyah Fuels Operations, for corporate response matters (Chapter 2.2 of the License Conditions).

Section 3.1.1 Recommendation #2

Audits of Contingency Plan implementation shruld be conducted by individuals not having direct implementation .esponsibility; and the audits should include evaluation of the appropriateness of the Plan, procedures, facilities, equipment (including location of facilities and equipment), training, and periodic exercises in the spectrum of accidents or emergencies possible at the facility.

Response

The revised Sequoyah Contingency Plan is subject to quarterly audits directed by the Director, Regulatory Compliance of the Environmental and Health Management Division, Kerr-McGee Corporation. The Sequoyah Facility is audited to evaluate and verify adherence to the Contingency Plan and implementing procedures (Chapter 2, License Conditions, Section 2.2).

Section 3.1.2 Recommendation #1

A systematic training program should be established to familiarize all plant personnel with the general contents of the Contingency Plan and appropriate response actions. Specific training should be provided to individuals (both site and corporate) who might be assigned specific response functions and responsibilities.

Response

The current Sequoyah Facility training program is designed to train all facility personnel, members of the Onsite Contingency Response Organization, and corporate personnel with radiation and chemical safety, plant operations, the Contingency Plan, Emergency Procedures, and Contingency Plan Implementing Procedures. The extent of Contingency Plan training is dependent upon the job function and emergency response capabilities (Chapter 2, License Conditions, Section 2.6).

Section 3.1.2 Recommendation #2

Offsite organizations who might be requested to support an emergency response should be invited to attend training specific to the response expected.

Response

Sequoyah Fuels Corporation has, as part of the revision of its Contingency Plan, briefed and provided training to local officials, the media, and potential local response groups such as police, civil defense offices, the county health departments, and cooperating hospitals.

Section 3.1.3 Recommendation #1

Drills and exercises involving substantial staff response to a spectrum of simulated emergency situations should be conducted periodically. The simulated events should be based on prepared scenarios to demonstrate specific objectives, and they should be observed and critiqued by qualified personnel. Any deficiencies observed should be evaluated and responsibility for corrective action assigned and followed.

Response

The Sequoyah Facility Radiological Contingency Plan provides for periodic drills and exercises to test, develop, and maintain skills in emergency contingency response. Exercises will be formal, detailed scenarios using observation and control personnel. Post-exercise critiques will be conducted, deficiencies identified, and remedial action responsibility assigned. The Radiological Contingency Plan is incorporated as License Condition No. 22.

Section 3.1.3 Recommendation #2

Drills and exercises should periodically include the offsite organizations which might be called upon for support (local police, civil defense, health departments, etc.), as well as corporate personnel (see Section 3.3).

Response

The revised Sequoyah Fuels Contingency Plan requires a simulated emergency exercise for onsite personnel annually, and every 5 years an exercise will include offsite corporate personnel and other offsite response groups who desire to participate. An exercise that will include offsite response groups will be conducted within 6 months of the resumption of operations.

Section 3.1.4 Recommendation #1

Consider requiring a designated Emergency Operations Center (EOC) on site and an alternate EOC either off site or in another onsite location which is unlikely to be impacted by the incident. The EOC and alternate EOC should contain adequate communications capability and accommodations to provide for coordination of the onsite emergency response activities and notifications and coordination with offsite supporting organizations. The EOC or alternate EOC should be accessible 24 hours a day.

Response

Sequoyah Fuels has designated an onsite Emergency Operations Center which contains communications and accommodations for direction and control of the onsite emergency response effort. An offsite Emergency Operations Center has been acquired to support an onsite emergency response activity. Both centers are capable of providing notifications and coordination with offsite supporting organizations and are accessible 24 hours.

Section 3.1.4 Recommendation #2

Locations of emergency equipment and kits should be reviewed by the NRC and licensees so that in the event of an emergency in a given facility location, or inaccessibility of a large portion of the facility, access to adequate emergency equipment and facilities, including emergency decontamination facilities, can be assured. Equipment caches should be in multiple locations.

Response

The NRC has reviewed the locations of emergency equipment at the Sequoyah Facility. Emergency equipment is located in numerous locations within the facility, both the North and South Guard Stations and in the offsite training center.

Section 3.1.4 Recommendation #3

Consideration should be given to providing strategically placed "air capsule escape units" to allow workers to escape from portions of a facility in which there exists a potential for exposure to toxic fumes for more than a few moments.

Response

Sequoyah Fuels Corporation has installed air capsule escape units consisting of a full-head hood and 5-minute air supply bottle in numerous locations throughout the facility.

Section 3.1.4 Recommendation #4

The facility communications system should include a radio system compatible with local police or other offsite responder communications systems. In addition, the licensee should attempt to identify beforehand to local and state police, insofar as practical, offsite individuals who would be called on for support in the event of an emergency at the site. Radio communications with police officials during an emergency can resolve specific issues.

Response

Sequoyah Fuels Corporation has provided for radio communications with local police units as part of its revised Radiological Contingency Plan. Offsite organizations have been identified, briefed, and provided training as a part of the Plan.

Section 3.3.2.1 Recommendation #1

Personnel of local agencies that might be called upon to respond to emergencies should be given training (see Section 3.1.2, Training).

Response

The revised Sequoyah Contingency Plan calls for local offsite response agencies, including police departments, highway patrol, and health department personnel, to be instructed in the areas of the Plan which affect their ability to respond to an emergency when needed.

Section 3.3.3 Recommendation #1

Hospital staff who might reasonably be expected to deal with injuries from a major accident should be trained to deal with all aspects of the injuries. Radiological plans and their use in drills are desirable.

Response

Sequoyah Fuels Corporation's Radiological Contingency Plan has included medical support personnel in the training program. Hospital staff who might be expected to treat workers who are contaminated and/or have chemical injuries have been briefed.

Section 3.3.4 Recommendation #1

Radiological contingency planning should include site control plans and methods for implementing site access control. Local law enforcement groups that might be called on in an emergency should be trained (see Section 3.1.2).

Response

The Sequoyah Fuels Corporation Radiological Contingency Plan includes an Administration and Security Coordinator who is responsible for maintaining facility security and access control during and after an emergency. Local police departments can be called upon for security, access, and traffic control assistance and have been trained in the areas of the Radiological Contingency Plan which affect their ability to respond to an emergency.

APPENDIX B

STATUS OF COMMITMENTS MADE BY SFC TO NRC ON MARCH 13, 1986

On March 13, 1986, the President, Sequoyah Fuels Corporation, appeared before the Nuclear Regulatory Commission during a briefing conducted by the NRC staff. During his presentation, Mr. Randolph outlined a number of changes which Sequoyah Fuels Corporation would make at the Sequoyah Facility to improve the safety of the facility and assure that an accident, such as the cylinder rupture of January 4, 1986, would not be repeated. The following is a summary of the statements made by Mr. Randolph with references to the page and line numbers for the transcript of the Commission briefing and the actions which Sequoyah Fuels has taken at the facility in each of those areas.

On March 14, 1986, Sequoyah Fuels Corporation appeared before the Subcommittee on Environment, Energy, and Natural Resources of the U. S. House of Representatives. The commitments made during that appearance were the same as those made to the NRC on March 13, 1986.

1. <u>Transcript Page 49, Line 10</u>

   "The filling station will be remodeled to facilitate better handling of all sizes of cylinders."

   <u>Response</u>

   The platform for the cylinder filling area has been lowered and moved such that cylinders on the scale carts do not touch when the scale cart is in the center of the scale platform. The staff has observed the locations of both 10- and 14-ton cylinders in relation to surrounding objects and has verified that both types of cylinders can be accommodated easily.

2. <u>Transcript Page 49, Line 12</u>

   "The entire filling area will be isolated in a confinement room, with the operator's control panel located outside the room to prevent any leak that may occur during the filling process from threatening either the operator or other plant areas."

   <u>Response</u>

   A concrete block building has been constructed surrounding the filling station area. Access to the filling area is through an overhead door which can be rapidly closed. The readouts and controls for the scales and the filling valves are located outside of the building, with a view of the area provided by a large window. A UF_6 detector monitors for the presence of UF_6 within the filling station area.

3. Transcript Page 49, Line 17

"The filling scale, which was seriously implicated in the January 4th accident, is being converted from mechanical to a digital readout."

Response

The scale platform has been fitted with electronic load cell readout. In addition, a second set of load cells has been installed on the cylinder cart to provide an independent measurement of cylinder weight. The readout from the cylinders can be monitored at the filling station control panel and in the control room, with hard copy printout in the accountability scale room. The output of the scales is interlocked to the UF_6 filling valves to provide automatic termination of filling upon either scale reaching the preset weight.

4. Transcript Page 49, Line 24

"To provide back-up protection, the valves will also automatically close in the event of any power failure."

Response

The UF_6 filling valves are interlocked to the cylinder weighing scales and the scale platform and provide for automatic termination of filling. The valves are designed to fail to a safe position in the event of power failure.

5. Transcript Page 50, Line 2

"To prevent improper placement on the scale, which was an important cause of the January 4th accident, a safety switch will ensure that the cart is accurately positioned on the scale before filling can begin."

Response

A photoelectric switch has been installed to confirm proper cylinder cart positioning on the weighing scale platform. An interlock between the switch and the UF_6 filling valves prohibits filling if the cylinder cart is improperly positioned.

6. Transcript Page 50, Line 8

"The carts will have their own independent scales which will again provide duplicate read-outs to the operator and in the control room."

Response

A set of load cells has been installed on the cylinder cart to provide an independent measurement of cylinder weight. The readout from the scales can be monitored at the filling station control panel and the control room, with hard copy readout available in the accountability scale room. The output of the scale is interlocked to the UF_6 filling valves to provide automatic termination of filling upon exceeding the preset weight.

7. Transcript Page 51, Line 2

"The re-issued procedures will provide clear comprehensive and detailed instructions regarding every part of the facility."

Response

SFC has reviewed and revised all of its procedures to determine that all pertinent information is included and that the procedures are up to date. Process parameter sheets are included as a part of the operating procedures which provide information on temperatures, alarm and interlock set points, and actions to be taken. The procedures also provide warnings for certain process steps and the reason for the warning.

8. Transcript Page 51, Line 8

"Every employee is being carefully re-trained in his or her responsibilities, with appropriate testing to assure each employee's competence to perform those responsibilities safely."

Response

SFC has modified and expanded its training program to include classroom training covering general safety and process information and on-the-job training to demonstrate that the operator is thoroughly familiar with the procedures and equipment and that the operator can safely operate that equipment on a daily basis. The receipt and satisfactory completion of all training requirements is documented. The licensee's commitment to retrain all employees has been completed.

9. Transcript Page 51, Line 13

"To ensure the continuing familiarity of all employees with future safety and operating procedures, we are also instituting a permanent program of refresher training. A new training facility has been established in which employees will receive periodic refresher training, with appropriate testing and documentation."

Response

SFC has established a new offsite training center in which classroom training is provided to employees. Refresher training will be conducted on at least an annual basis for all employees.

10. Transcript Page 51, Line 21

"Fourth, we have adopted new measures to strengthen managerial oversight and quality assurance. Among other steps, we are raising overall staff qualifications, re-defining managerial responsibilities and adding new staff positions."

Response

SFC has made a number of changes in organization, personnel, and education and experience requirements. New positions have been created, including the Manager, Health, Safety, and Environment, and the Manager, Quality Assurance. SFC has developed a new Facility Quality Assurance Program to assure that all operations and safety-related activities are performed in accordance with facility procedures.

11. Transcript Page 52, Line 12

"Extensive document control systems are being adopted to support these efforts."

Response

SFC has established a document control system for operating procedures and training.

12. Transcript Page 52, Line 19

"With respect to onsite measures, we are evaluating changes and improvements in both our emergency communications facilities and our emergency protective equipment. We are also revising the plant's radiological contingency plan for submission to the commission for its review. The proposed revisions will reflect our equipment and procedural improvements, increase the plan's clarity, and enhance employee training and proper response actions."

Response

SFC has submitted for NRC review and approval a major revision of the Radiological Contingency Plan for the Sequoyah Facility. This revision established actions related to both onsite and offsite responses to incidents which might occur at the facility. The revised Radiological Contingency Plan includes improved communications systems within the facility and outside of the facility. To improve accessibility, emergency protective equipment has been located in additional areas of the facility. Training has been provided for both onsite and offsite individuals.

13. Transcript Page 53, Line 5

"The program will formalize and expand the steps included in our previous program to alert and instruct neighboring residents in the event of any emergency." (Refers to the emergency response program.)

Response

SFC has held meetings with the public to describe the warning systems and appropriate responses. SFC has installed warning sirens and an emergency telephone notification system. Local residents are to be included in the periodic training programs.

14. Transcript Page 53, Line 9

"The new program will, for example include offsite sirens to provide timely warning of any emergency to nearby residents. The sirens will be supplemented by an automatic telephone system that will contact and provide recorded safety instructions to local residents."

Response

Sirens have been installed to warn nearby residents within 3 to 4 miles of the plant. An emergency telephone system has been installed to call all residents within 2 miles of the facility.

15. Transcript Page 53, Line 14

"We are also installing a radio system to provide immediate communications with the police and other appropriate response agencies."

Response

SFC has provided for radio communication with local police units.

16. Transcript Page 53, Line 18

"In addition, we are greatly expanding our program of community information and training. In particular, nearby local residents, police, and response agencies will be included in periodic training programs regarding our new and existing emergency warning systems."

Response

SFC has committed to include local residents, police, and response agencies in periodic training programs. SFC held meetings to describe the warning systems and appropriate responses.

17. Transcript Page 54, Line 18

"We will continue to evaluate other long-term changes in the facility's management, operations, and equipment to determine if they can provide even greater guarantees of safety."

Response

Sequoyah Fuels has instituted a computerized maintenance system within the facility to identify scheduled maintenance and surveillance activities. One aspect of this new system will be used to identify areas within the facility which require frequent maintenance as a mechanism to upgrade the process equipment. SFC has indicated that it is also evaluating other changes to the facility on a long-term basis.

18. Transcript Page 55, Line 18

"...we are evaluating the benefits of replacing the facility's existing heat chests with autoclaves for heating and sampling."

Response

Sequoyah Fuels is currently performing this evaluation. The NRC staff will have an independent contractor expert in the operation of steam chests and autoclaves review the report when it is submitted and provide an independent assessment of its conclusions.

19. Transcript Page 55, Line 20

"We are also evaluating several methods to improve current procedures for transporting filled liquid cylinders within the plant."

Response

Operation of the newly installed inline sampling system will eliminate the movement of heated cylinders to and from a steam chest for obtaining a sample. Under routine operations, cylinders containing liquid UF_6 will only require movement to the storage yard for cooling after their weight has been determined.

20. Transcript Page 57, Line 21

"Every procedure, every block of instruction, will have an examination to ensure that the individual understood and has grasped the real essentials to ensure that we have safe operations."

Response

SFC has provided a commitment in Chapter 6 of the License Conditions which states that an employee shall not be allowed to carryout process operational duties unless he has completed the proper training and has passed the required tests on the training material.

21. Transcript Page 61, Line 23

"...exactly how much of this chemically highly toxic material escaped at the site. The inventory seems to be a question that is unresolved."

Response

SFC submitted its estimates of the amount of material released during the cylinder rupture accident by letter dated May 12, 1986, from J. C. Stauter to W. T. Crow.

22. Transcript Page 66, Line 25

"Well, he will -- initially to the General Manager at the plant with copies of his report coming to the staff and to me personally in Oklahoma City." (In reference to the company's resident inspector and to whom he reports.)

Response

SFC has established a new position, Manager, Quality Assurance, at the facility to act as the "company resident inspector". This individual reports to the General Manager, Sequoyah Facility, and has the organizational responsibility to send reports of his findings to the General Manager, Sequoyah Fuels Operations, and the President, Sequoyah Fuels Corporation.

23. Transcript Page 69, Line 7

"We will have perhaps a more secure or self-contained control room where we would expect to use it in the future."

Response

SFC has improved the integrity of the Control Room in the event of an emergency. Openings between the process area and the Control Room have been sealed to prevent entry of external contamination, automatic dampers have been installed to close the air supply ducts when smoke is detected at the inlet, and two sets of SCBA equipment have been provided for the protection of Control Room Operators.

APPENDIX C

RESPONSE TO STATEMENTS MADE DURING PUBLIC MEETINGS JULY 8 - 9, 1986

On July 8 and 9, 1986, the NRC conducted two public meetings in the Brooks-Cawhorn Gymnasium in Gore, Oklahoma, to allow local citizens and other individuals the opportunity to state their concerns or opinion on the restart of the Sequoyah Facility. The meetings were attended by approximately 650 individuals, and approximately 160 oral and 60 written statements were received. Further statements were received after the meetings. The record of the meetings, including the transcript, written statements, and attendance list, was published in August 1986 and placed in the Public Document Room and Local Public Document Room. The following is a summary and response to those statements.

1. <u>Crop Contamination</u>

   Comments were received regarding crop contamination. Concern was expressed on whether vegetables from home gardens were safe to eat and whether corn crops were contaminated as a result of the accident.

   <u>Response</u>

   NUREG-1189 stated that it was unlikely that crops that were not growing at the time of the incident would be contaminated with hazardous material. Because some of the samples collected offsite showed higher concentrations than expected, SFC has resurveyed the affected areas. The results of this survey are not yet available. Those areas not in the downwind direction of the plume after the accident should not exhibit elevated levels of U and F and, therefore, should be safe for consumption.

2. <u>Raffinate</u>

   A number of questions/comments were received on various aspects of the raffinate program. People questioned how the NRC could allow the use of an untreated solvent extraction fertilizer and allow a highly toxic poison to be dumped on the ground. People objected to the fertilizer program taking place near their homes. They wanted to know why a large acreage was used, why the raffinate cannot be put in the stream, why SFC is only allowed to spread the fertilizer on company-owned property, and why the material cannot be placed into the injection well. There was a question as to why the NRC turned over the jurisdiction for the injection well to the State and why the NRC violated a ASLB ruling in approving the injection well.

Response

The raffinate authorized for use in the fertilizer program is treated. The aqueous stream of the solvent extraction phase is treated with ammonia to reduce the heavy-metal content and is further treated with barium salts to reduce the concentration of Ra^{226}. Discharge of the treated raffinate to the river is not permitted because of the high-nitrogen concentration. The quantities of radionuclides in the treated raffinate are well below the maximum permissible concentrations (MPC) specified in 10 CFR 20, Appendix B, Table 2, for discharge to unrestricted areas. The average raffinate concentrations are 0.1 percent MPC for natural uranium and less than .01 percent MPC for Th-230. The Ra-226 content is below the 5 pCi/l standard set by the EPA for drinking water systems. SFC is limited to an average uranium concentration of 0.1 ml/l in the raffinate used in the fertilizer program. The actual uranium levels reported are in compliance with this limit. Some of the treated raffinate is used as a liquid fertilizer by spreading it over unused areas of the site and offsite land also owned by the licensee; however, there is no prohibition against using the raffinate on land other than that owned by SFC.

The ASLB had ruled on an earlier application for an injection well. At the time the application was granted, several facts had changed to make the application different from the previous request. When the ASLB ruled on the previous application to inject raffinate in a deep well, the raffinate under consideration was raw, untreated raffinate. The raffinate under consideration in the approved application was treated raffinate. Also, the Clean Water Act now allows deep well injection, and the State had jurisdiction for all underground injection well programs. The State issued a permit for the injection well, and SFC did inject some raffinate into the well. Data regarding the injection well can be obtained from the State of Oklahoma.

3. Air Emissions

Several commentors expressed a general concern about the chemical and radiological pollution emitted from the facility. One commentor was specifically concerned about an acid release in 1984, and others were concerned about acid emissions having etched windows. Some commentors were concerned about the performance of air monitors.

Response

The gaseous component of each phase of the UF_6 conversion process is filtered to remove particulates and/or scrubbed to remove acid or water vapors. Monitoring is performed to detect the presence of radioactive particulates and for the presence of fluoride. Non-radioactive effluents are under the control of the State of Oklahoma. A report prepared by the Oklahoma State Department of Health entitled "An Assessment of Potential

Environmental and Adverse Health Impacts Resulting from Operation of the Sequoyah Fuels Facility, Gore, Oklahoma" was published in October 1985. This report states that "Air monitoring for both radioactivity and non-radioactive pollutants in the vicinity of the facility showed no indication that state or federal air emission standards are being approached or exceeded as the result of air emissions from the facility." SFC has also installed new scrubber equipment on the main stack to further reduce emissions.

4. Wastes

Several commentors were concerned about the waste disposal practices of SFC. There were those who feared that the site would become a toxic waste dump when closed or might become a national waste disposal site. There was one specific question on what happened to the washdown water mentioned in NUREG-1189.

Response

SFC does not have a permanent disposal program for wastes. SFC is currently storing liquid wastes and sludges in lined ponds at the site. Because of NRC's concern about the ultimate disposition of the solid wastes, the NRC staff imposed a license condition on SFC that required them to submit a plan for the permanent disposal of all wastes generated by the facility. A hearing has been granted on the waste disposal issue, scheduled to take place after SFC submits their plan. The washdown water is currently being stored in an emergency pond and is being processed to remove the uranium.

5. Water Contamination

Many people expressed concern over SFC discharging their liquid effluent into the Arkansas River and felt that SFC should not be allowed to continue this practice. People wanted assurance that SFC was complying with the Clean Water Act and several inquired as to why SFC was operating without a NPDES permit. Some expressed concern over the possibility that offsite drinking water wells might be contaminated.

Response

As part of a study performed by the State of Oklahoma, surface and ground waters were monitored. All water sources tested were well within established standards as reported by the State of Oklahoma. In particular, levels of radioactivity in the Arkansas River downstream of the facility and in private wells and ponds were well below all radiation standards and were in the range of what would be expected as natural background radiation levels. SFC has a NPDES permit that sets limits for its discharge of waste water to the Illinois River. This permit was last issued by the EPA on December 23, 1982, and is effective until January 24, 1988. In addition, all discharges must meet the MPC levels for radioactivity specified in 10 CFR 20, Appendix B, Table 2, which sets maximum concentrations for radionuclides discharged to an unrestricted area. There are no limitations on the total amount discharged as long as the MPC values are not exceeded.

6. Ponds

There was concern expressed regarding leaking ponds. There was some fear that Pond 2 was leaking 'highly radioactive stuff' into the ground water.

Response

The pond identified as leaking is Pond 2. SFC has installed a number of ground water monitoring wells around the perimeter of the pond to determine the extent of the leakage. SFC has been required to decommission Pond 2 and is currently in the process of transferring the contents of the pond to a lined pond. The wet settled sludge in Pond 2 contains most of the radioactivity from the raffinate, and this material is essentially insoluble. Samples taken from the monitoring wells around the pond have not shown that radioactive materials are migrating to the environment. The samples have shown, however, that some non-radiological elements have migrated from the pond. All of the ponds, except Pond 2, are lined and have a leak detection system of french pipes. A spare pond is also required to conduct remedial action in case leakage is detected. In addition, SFC has monitoring wells to detect leakage and contamination of the ground water.

7. Security

One commentor felt SFC lacked adequate security and was a prime target for terrorist attack.

Response

SFC has indicated that a new electronic security system is to be installed at the facility. The UF_6 produced at the facility is not enriched and does not require NRC safeguards as noted in the Atomic Energy Act.

8. Inspections

Several commentors wanted assurance that regular inspection of SFC would be conducted and that these inspections would be thorough. One commentor wanted to know why SFC always knew about inspections in advance.

Response

Most NRC inspections are unannounced. The NRC conducts a regular unannounced inspection program for the facility and will continue to do so. Inspections after the accident, however, were sometimes announced for scheduling purposes. If SFC was aware of an inspection in advance of the inspectors arrival, the NRC is unaware as to how this information was obtained.

9. Emergency Planning/Warning System

There were several questions concerning the warning system, whether there was one, and if it was adequate to warn those who live very near the plant in time to take precautions. One commentor stated that the sirens could not be heard beyond 1/2 mile from the plant. There were questions on the type of accidents and associated responses covered in the Emergency Contingency Plan. The City Council of Vian requested that they be included in any warning system.

Response

SFC does have a new warning system. They have installed sirens designed to warn those within a 3-mile radius of the plant. SFC has also installed an emergency telephone notification system that is designed to call all residents within 2 miles of the plant and inform them of the appropriate actions they should take in the event of an accident at the facility.

The revised Radiological Contingency Plan covers a wide range of potential accidents at the facility, both radiological and non-radiological, chemical and physical. These potential accidents are classified into four categories of events, and the types of response to be made by SFC are identified. The EPA and FEMA assisted the NRC staff in its review of the SFC Radiological Contingency Plan and have indicated that their concerns have been resolved.

10. Safety

There were several commentors who felt that the SFC plant was run in an unsafe, careless manner and that workers were improperly trained. Some felt that only if the plant could be guaranteed absolutely safe should it be allowed to open.

Response

Since the time it was licensed in 1969, the NRC has conducted an inspection program at the Sequoyah Facility. The results of these inspections are documented in inspection reports. Following the accident, the NRC staff, as part of its inspection activities, determined that training was inadequate at the facility. The license will now contain additional commitments and requirements regarding training and operations at the facility. Future inspection activities will determine SFC compliance with it's license. SFC has provided a new position at the facility, Manager, Quality Assurance. One of the purposes for this position is to provide SFC with an internal audit and inspection program to determine that activities are being conducted in a proper manner.

11. Health

Several comments were received concerning possible health effects that may be caused by the operation of SFC. These included both specific cases and general comments on long-term effects of radiation and tolerance levels. There was some concern that the doctors in the area do not know what to look for in case of an accident. Specific concern on whether SFC operations had caused cancer-related deaths in individuals, if the operation could have caused viral meningitis (acid release), and if operations and/or the accident would effect the reproductive organs of exposed children as they grow to adulthood. There were two requests that a health survey be conducted in the surrounding counties because of a suspected elevation in leukemia and cancer cases.

Response

SFC includes local and regional medical support personnel in their training program. The hospital staff who might be expected to treat workers who are contaminated and/or have chemical injuries have been briefed by SFC and provided training and information. The potential for health effects from the accident is addressed as part of NUREG-1189, "Assessment of the Public Health Impact From the Accidental Release of UF_6 at the Sequoyah Fuels Corporation Facility at Gore, Oklahoma."

The State of Oklahoma, Department of Health, is the appropriate agency to address the health survey issues around the facility. A document prepared by the Oklahoma State Department of Health entitled "An Assessment of Potential Environmental and Adverse Health Impacts Resulting From Operation of the Sequoyah Fuels Facility, Gore, Oklahoma", October 1985, provides findings on suspected elevations in cancer incidence. This report states "Statistical analyses of the incidence of cancer-related death rates in Sequoyah County and counties contiguous to Sequoyah County have indicated that, based on critical limitations of data currently available to the OSDH, there was a statistically significant decrease in the rate of total cancer deaths in Adair County and no significantly different rates in the other counties for the time period 1978-1983 as compared with the expected number of cancer deaths from the age adjusted state rate."

12. NUREG-1189

National Water Center - 10 pages of comments

Response

These comments relate to the analysis conducted by federal and state agencies. An analysis of comments will be provided separately and placed in the Public Document Room and Local Public Document Room. The comments do not pertain directly to the NRC decision regarding restart of the Sequoyah Facility.

13. NUREG-1179

National Water Center - 5 pages of comments

Response

These comments relate to the investigation conducted by the NRC after the January 4, 1986, accident. An analysis of comments will be provided separately and placed in the Public Document Room and Local Public Document Room. The comments do not pertain directly to the NRC decision regarding restart of the Sequoyah Facility.

14. Pro Restart

Many commentors were in favor of restarting the SFC facility. Several commentors expressed a general request for restart stating no reasons. Many commentors felt the plant should be allowed to restart for economic reasons, that the plant provides a good economic base for the community. Some felt the plant was an asset to the community (not just economically). Many felt that the facility was operated in a safe manner (not just SFC employees) and that the SFC safety record was good. There were many who felt that while the accident was unfortunate, the plant should be allowed to restart immediately.

Response

No response necessary.

15. Decommissioning

Concern was expressed on whether the company would decontaminate the facility and who would be financially responsible.

Response

By letter dated October 27, 1978, Kerr-McGee Corporation made a commitment that funds will be made available for the decontamination (decommissioning) of the facility and grounds so that it could be released for unrestricted use. The decommissioning plan and commitment to make funds available were incorporated into SFC's license.

16. Transportation

One commentor expressed concern over the transportation of UF_6 cylinders and possible explosion of the cylinder during transport if involved in an accident.

Response

After the cylinders are filled with UF_6 in liquid form, the product is allowed to cool and solidify before shipment. The cylinders to be shipped are under a vacuum. Prior to shipment, the cylinders are inspected to ensure that they have been properly prepared for shipment and fully comply with applicable regulations governing interstate commerce. The vehicle trailers are specifically designed for attachment of the UF_6 cylinders to the chassis. These units are used exclusively for UF_6 shipments and return of empty cylinders. On the basis of past experience, the environmental impacts that will result from transportation operations or from infrequent transportation accidents involving UF_6 are minimal.

17. LPDR

One person felt that the LPDR (Local Public Docket Room) was being manipulated.

Response

The staff recently inspected the LPDR because of allegations that were received prior to the public meeting. The staff found that it was in good condition considering the fact that the LPDR is being maintained voluntarily by the local librarians and at no cost to the government. The staff found that all documents were present except for a few that had recently disappeared. The missing documents have been replaced.

18. Public Meeting

Several letters were received complaining about the manner in which the public meetings were conducted. The letters included complaints that the speakers were called out of order, some of the people were not called upon to speak, and only SFC employees were allowed to speak. Several complaints were received because SFC employees had received letters informing them of the meetings but no one else had received letters.

Response

Letters announcing the public meetings were sent to SFC employees because they were clearly identified as a group affected by the reopening. Not only are the employees in the greatest danger during accident conditions but their health and safety is more greatly impacted by day-to-day operations than any other identifiable group. Announcements concerning the public meetings were also placed in the local newspapers and in the 6/24/86 Federal Register (51 FR 23014).

At the July 8th public meeting, the majority of the registration cards listed only the name of the individual and a simple description such as "individual", "citizen", "resident", etc., and the NRC panel, after the start of the meeting, did not have the means of determining the affiliation of individuals. It became evident to the NRC panel that the majority of individuals or groups in favor of the reopening had signed up to speak before those individuals or groups opposing or questioning the reopening. The moderator of the panel then advanced in order of speaking some groups or individuals who could clearly be identified as not favoring restart or with environmental concerns. This was done only to provide better balance to the meeting.

The only individuals which were not called upon to speak were those whom the panel was informed were ceding their time to another speaker. At the end of the public meeting, the panel attempted to clear up any oversight by allowing all individuals an opportunity to speak.

19. Management

Some commentors expressed concern about SFC's and KM's management. They felt that the management was unqualified and inadequate. One question was raised as to whether all management met the minimum qualifications at the time of the license renewal.

Response

The NRC staff has reviewed the qualifications of those individuals who occupy positions described in the license and has determined that these individuals meet the stated minimum education and experience requirements. The question of management qualifications prior to the accident was addressed during the inspections conducted by NRC Region IV staff.

20. General-Miscellaneous

Comment

One commentor felt that the restart decision had already been made.

Response

The restart decision had not been made at the time of the public meetings. A decision on restart will not be made until all reviews are completed and all information considered.

Comment

Some claimed that SFC had operated without a NRC license.

Response

The facility has not been operated without a license. The license has been in continuous effect since it was initially issued in 1969.

Comment

Someone wanted to know why contaminated work areas were not posted.

Response

The issue of posting at the facility was part of the inspections conducted by NRC Region IV. A citation was issued as a result of these inspections.

Comment

Someone wanted to know why OSHA had never inspected the plant prior to the accident.

Response

OSHA is a separate government agency and does not come under the jurisdiction of the NRC. Therefore, it would be necessary to ask this question of OSHA.

Comment

Someone asked if SFC was currently operating.

Response

SFC was not operating the UF_6 conversion process at the time of the meetings. SFC has been authorized to receive, sample, and store yellowcake, to ship UF_6 cylinders already in inventory and to return empty uranium slurry trailers and drums to uranium producers for reuse. Other authorized activities include operation of uranium recovery equipment to process water from the emergency basin, transfer of liquids from temporary storage areas to other storage areas onsite, and the draining of all UF_6 from cold traps and piping. In addition, there were some programs that were not suspended because of the accident, such as the fertilizer program.

Comment

Someone wanted to know the toll free number for the NRC.

Response

Comments and questions from individuals can be transmitted to the NRC Regional Offices by telephone collect. The telephone number for Region IV in Arlington, Texas, is 817-860-8100.

Comment

Someone wanted to know why names were dropped from the hearing service list.

Response

The Official Service List dated June 27, 1986, erroneously omitted one party. This oversight was corrected by Memorandum and Order dated July 28, 1986.

Comment

Someone wanted to know if SFC falls under the EPA's community right-to-know and how jurisdiction was determined.

Response

The NRC staff believes that this facility would fall under EPA's jurisdiction in this area. Questions should be directed to the EPA.

Comment

Someone wanted to know why SFC does not have a current surface water appropriation contract with the Corps of Engineers.

Response

The Corps of Engineers is a separate agency, therefore, this question should be directed to them.

employee training and proper response actions.

With respect to offsite measures, we have retained a well-qualified outside consulting team to help us in close conjunction with local officials to develop an improved and expanded emergency response program. The program will formalize and expand the steps included in our previous program to alert and instruct neighboring residents in the event of any emergency.

The new program will, for example, include offsite sirens to provide timely warning of any emergency to nearby residents. The sirens will be supplemented by an automatic telephone system that will contact and provide recorded safety instructions to local residents.

We are also installing a radio system to provide immediate communications with the police and other appropriate response agencies. Radio communications will be supplemented by the new automatic telephone system.

In addition, we are greatly expanding our program of community information and training. In particular, nearby local residents, police, and response agencies will be included in periodic training programs regarding our new and existing emergency warning systems. We want our neighbors to share our confidence that every responsible step is being taken to protect their safety as well as that of our employees. We want them to know, as our employees will know, The new employees will enhance the plant's quality assurance program and provide a resident inspector. They will help ensure both the approved procedures are carefully followed and that future modifications of those procedures are properly implemented.

These and other steps will result in more detailed supervision of the plant's operations by all levels of management. They will strengthen communications between the plant and senior management in Oklahoma City, and increase the degree of oversight exercise by our independent corporate licensing and compliance staff.

Extensive document control systems are being adopted to support these efforts. Many of these managerial and quality assurance changes have already been instituted and others will follow as the facility's operations re-commence.

We are reevaluating and expanding the facility's emergency preparedness program. Our efforts include both onsite and offsite procedure measures.

With respect to onsite measures, we are evaluating changes and improvements in both our emergency communications facilities and our emergency protective equipment. We are also revising the plant's radiological contingency plan for submission to the Commission for its review. The proposed revisions will reflect our equipment and procedural improvements, increase the plan's clarity, and enhance

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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BRIEFING BY STAFF AND LICENSEE ON STATUS

OF KERR-MC GEE SEQUOYAH FUELS FACILITY

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Public Meeting

1717 H Street, N.W.

Room 1130

Washington, D.C.

March 13, 1986

The Commission met in public session, pursuant to notice, beginning at 10:00 a.m., the Honorable Nunzio J. Palladino, Chairman of the Commission, presiding.

COMMISSIONERS PRESENT:

Nunzio J. Palladino, Chairman

James K. Asselstine, Commissioner

Frederick M. Bernthal, Commissioner

Thomas M. Roberts, Commissioner

Lando W. Zech, Jr., Commissioner

CONTENTS

Union Calendar No. 96

100TH CONGRESS *1st Session*	HOUSE OF REPRESENTATIVES	REPORT 100-167

NRC'S REGULATION OF FUEL CYCLE FACILITIES: A PAPER TIGER

JUNE 18, 1987.—Committed to the Committee of the Whole House on the State of the Union and ordered to be printed

Mr. BROOKS, from the Committee on Government Operations, submitted the following

EIGHTH REPORT

BASED ON A STUDY BY THE ENVIRONMENT, ENERGY, AND NATURAL RESOURCES SUBCOMMITTEE

On June 16, 1987, the Committee on Government Operations approved and adopted a report entitled "NRC's Regulation of Fuel Cycle Facilities: A Paper Tiger." The chairman was directed to transmit a copy to the Speaker of the House.

I. INTRODUCTION

In January 1986 the Subcommittee on Environment, Energy, and Natural Resources began a review of the regulation of chemical hazards at commercial nuclear fuel cycle facilities by the Nuclear Regulatory Commission (NRC) and other Federal agencies.

The subcommittee review was prompted by an accident that occurred on January 4, 1986, at Sequoyah Fuels Corporation's uranium conversion plant near Gore, Oklahoma. The accident involved the rupture of a shipping cylinder and the release of more than 14 tons of uranium hexafluoride (UF_6), a substance which is extremely hazardous, because it is highly corrosive and chemically toxic as well as radioactive. One worker was killed, others were injured and more than 100 persons were sent to hospitals and doctors for treatment or observation.[1]

[1] NRC "Assessment of the Pubic Health Impact From the Accidental Release of UF_6 at the Sequoyah Fuels Corporation Facility at Gore, Okla.," NUREG—1189, Vol. II, March 1986 (hereinafter cited as "Health Effects Study"), at p. xv

74-103

The Sequoyah plant is licensed and regulated by the Nuclear Regulatory Commission.[2] Other Federal agencies—the Occupational Safety and Health Administration (OSHA), the Environmental Protection Agency (EPA), the Department of Transportation (DOT), and the Federal Emergency Management Agency (FEMA)—have regulatory or other authority over some aspects of the plant's operations.[3]

The subcommittee has oversight responsibility for both NRC and EPA. The accident raised serious questions about NRC's effectiveness in regulating chemical hazards at nuclear fuel cycle plants like Sequoyah. It also raised questions about whether the NRC, EPA, and other Federal agencies adequately coordinate their activities when chemical accidents occur at these facilities. Sequoyah is only one of about a dozen nuclear fuel cycle facilities that use large quantities of hazardous chemicals and, therefore, pose chemical as well as radioactive hazards.[4]

Since the 1979 accident at Three Mile Island, a great deal of attention has been focused on safety improvements and emergency response for nuclear power plants. Chemical plants have received increased scrutiny because of the disastrous chemical leak that occurred at the Union Carbide plant in Bhopal, India, in December 1984. But the Sequoyah accident raised the issue of whether adequate attention has been given to chemical hazards at nuclear plants in general, and to nuclear fuel cycle facilities in particular.

The subcommittee's exploration of these issues included a public hearing March 14, 1986.[5] The hearing focused on the Sequoyah accident but touched on other such accidents that have occurred at similar facilities since the 1960s.

The subcommittee was most concerned with:

The cause of the Sequoyah accident;

The operational conditions and procedures that existed at the time of the accident and the extent to which they contributed to the accident;

NRC's effectiveness in licensing and regulating the Sequoyah plant and similar facilities, and whether equal attention had been paid to chemical as to radiological hazards;

The adequacy of emergency responses to the accident by the licensee, NRC, and other Federal agencies;

The actions which had been taken by NRC to review Sequoyah's emergency preparedness plans;

The adequacy of cooperation and coordination between and among the various Federal agencies with regulatory responsibilities for this type of plant; and

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[2] NRC Source Material License No. SUB—1010; Issued, amended, and revised, February 1970, renewed October 1977 and September 1985.

[3] NRC "Release of UF_6 From a Ruptured Model 48Y Cylinder at Sequoyah Fuels Corporation Facility: Lessons Learned Report," NUREG—1198, May 1986 (hereinafter cited as "Lessons Learned Report"), at pp. 19, 22, and 24-27.

[4] NRC list of commercial nuclear fuel cycle facilities, February 1986.

[5] Hearing on "Review of Hazardous Chemical Regulation at Nuclear Facilities by the Nuclear Regulatory Commission and Other Federal Agencies" before the Subcommittee on Environment, Energy, and Natural Resources of the House Government Operations Committee, 99th Congress, 2nd Sess. (1986) (hereinafter cited as "Hearing Record").

Whether the answers to these questions indicated overall weaknesses in the regulatory framework for this type of facility.

The witnesses at the hearing were:

The Honorable Nunzio J. Palladino, Chairman, Nuclear Regulatory Commission;[6] accompanied by: Mr. Victor Stello, Mr. John G. Davis, Mr. James M. Taylor, Mr. Robert D. Martin, Mr. Dick Bangart, Mr. Dale Smith, Mr. Charles Cain, Mr. W.T. Crow, and Dr. Edward Shum;

Mr. James G. Randolph, President, Sequoyah Fuels Corporation and Senior Vice President, Kerr-McGee Corporation; accompanied by: Mr. Steven D. Emerson, Mr. John C. Stauter, Mr. Charles Grosclaude, Mr. Leon McCoy, and Mr. Bill Bradley;

Mr. James Makris, Deputy Director, Hazardous Response Support Division, Environmental Protection Agency;

Mr. John B. Miles, Jr., Director, Field Operations, Occupational Safety and Health Administration; and

Mr. Richard Krimm, Assistant Associate Director, Office of Natural and Technological Hazards Program, Federal Emergency Management Agency; accompanied by: Mr. Marshall Sanders and Mr. Gerry Smith.

During the course of the subcommittee's review, NRC issued several reports on the Sequoyah accident concerning: the health effects,[7] the cause and contributing factors,[8] the lessons learned,[9] and a safety evaluation of improvements made in plant equipment and procedures.[10] The Lessons Learned Report made recommendations for improvements in the Commission's licensing and regulation of nuclear fuel cycle facilities.

The purpose of this report is to summarize the findings and conclusions from the subcommittee's review and to make recommendations for appropriate corrective actions to minimize the possibility of a recurrence of this type of accident at Sequoyah or elsewhere, and to provide in advance for effective emergency response actions in the event such an accident should recur.

II. Background

A. THE SEQUOYAH PLANT

Sequoyah Fuels Corporation is a wholly-owned subsidiary of Kerr-McGee Corporation. Its plant, located near Gore, Oklahoma, is one of two commercial plants in the U.S. that convert processed uranium ore (yellowcake) into UF_6.[11] The other UF_6 fuel conver-

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[6] Chairman Palladino's term on the Commission expired June 30, 1986. He was replaced as Chairman by Mr. Lando W. Zech, Jr.

[7] Health Effects Study, previously cited in full.

[8] NRC "Rupture of Model 48Y UF_6 Cylinder and Release of Uranium Hexafluoride," NUREG—1179, Vol. 1, February 1986 (hereinafter cited as the "Accident Report").

[9] Lessons Learned Report, previously cited in full.

[10] NRC "Safety Evaluation Report By The Division of Fuel Cycle and Material Safety Related to the Authorization to Resume Operations for the Sequoyah Fuels Corporation UF_6 Conversion Facility Gore, Oklahoma," October 14, 1986 (hereinafter cited as the "Safety Evaluation Report").

[11] Accident Report, at p. 3.

sion plant, owned by Allied Chemical Corporation, is located in Metropolis, Illinois.

The Nuclear Regulatory Commission is charged with regulating commercial nuclear material—specifically source, byproduct, and special nuclear material—by the Atomic Energy Act of 1954. Since natural uranium is source material, Sequoyah is a fuel cycle and materials licensee of NRC.

The UF_6 produced at Sequoyah is shipped to the Department of Energy and other facilities where it is enriched and then sent to commercial facilities to be fabricated into fuel rods for nuclear powerplants.[12] Thus, there are numerous facilities throughout the country that handle UF_6 in one form or another.

Sequoyah has the capacity to produce 10,000 tons of UF_6 per year.[13] Yellowcake is converted to UF_6 through a multi-stage process that uses large quantities of toxic chemicals such as fluorine. As it is produced UF_6 is collected and solidified in devices called cold traps. It is then liquefied by heating and drained into 10-ton or 14-ton cylinders.

If hot UF_6 is released into the air it quickly reacts with the moisture in the atmosphere to form hydrofluoric acid (HF), a highly corrosive and toxic chemical, and uranyl fluoride (UO_2F_2), a heavy metal uranium compound which is only slightly radioactive. The main health hazards from a UF_6 release are: pulmonary edema (excess body fluids in the lungs) and other respiratory damage, skin burns and irritation from the hydrofluoric acid, and permanent or temporary kidney damage due to the heavy metal uranium in the uranyl flouride.

During the cylinder filling process the UF_6 is hot and flows freely, but if the filling continues for many hours or is stopped, the product cools and begins to solidify. In this situation the cylinder must be heated in order to take a sample for testing, or to remove the product from the cylinder for reprocessing should the test sample indicate that is necessary.

As the UF_6 is heated, it changes from a solid state to a liquid, expanding significantly. Consequently, there must be enough empty space in the cylinder to allow for the expansion. Otherwise the cylinder may rupture as it is heated and cause a release of the toxic gas.

For this reason the Atomic Energy Commission in 1966 issued guidelines which specified maximum allowable fill limits for UF_6 cylinders which would allow a 5-percent margin of empty space if the entire contents of the cylinder were liquefied, and warned against the heating of an overfilled cylinder.[14]

In order to protect against a toxic release during transit, cylinders must be cooled for a minimum of five days after filling and sampling to ensure that the UF_6 is in solid form before it is shipped to DOE.[15]

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[12] Id.
[13] Health Effects Study, at p. 2.
[14] Atomic Energy Commission "Uranium Hexafluoride Handling Procedures and Container Criteria," ORO-651, 1966.
[15] Accident Report, at pp. 3-3 and 3-4.

B. NRC LICENSING/REGULATION OF SEQUOYAH

The Sequoyah plant began producing UF_6 in 1970 after being issued a five-year license by the NRC.[16] In January 1975, Kerr-McGee submitted an application to renew its license for another five years.[17] One month later NRC issued a Final Environmental Impact Statement for the plant.[18] In June 1975, the plant doubled its production capacity to 10,000 short tons of UF_6 per year.[19] In October 1977, NRC renewed the Sequoyah license and issued an Environmental Impact Appraisal to support the license renewal and the plant expansion.[20] Under NRC rules if a licensee submits an application for license renewal at any time before a license expires, the licensee can continue to operate indefinitely until NRC approves or rejects the renewal.[21]

In March 1982, in response to an NRC order requiring emergency preparedness plans for contain fuel cycle and materials licensees, Kerr-McGee developed a Radiological Contingency Plan. This plan was incorporated into the Sequoyah license.[22]

In September 1982, Kerr-McGee again submitted an application for license renewal. The application was revised in October 1983.[23]

In August 1985, NRC issued an Environmental Assessment on the license renewal.[24] One month later NRC renewed the license and issued a Safety Evaluation Report to support the renewal decision.[25] The license contained several conditions. Among them was the requirement that Kerr-McGee provide the following reports within six months:

> (1) A report detailing the handling procedures for product cylinders containing liquid UF_6. The report shall include a detailed analysis of each step in the handling of hot cylinders and identify the possible scenarios which could result in cylinder rupture. The report shall also provide an assessment of the modifications and actions which could be taken to reduce the potential for a UF_6 release and justify the procedures being used; and
>
> (2) A report detailing measures and actions to mitigate the effects of a UF_6 release. The report shall deal with the potential release of material within the facility and outside the facility.[26]

During the eight years prior to the accident NRC conducted nine inspections of the Sequoyah plant. NRC found 18 items of noncompliance during these inspections. The items of noncompliance all

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[16] Safety Evaluation Report, at p. 2.
[17] Hearing Record, at p. 105.
[18] Id., at p. 93.
[19] Id., at p. 105.
[20] Id.
[21] 10 CFR, part 55, section 55.33, Renewal of Licenses.
[22] Letter from NRC Chairman Nunzio Palladino to Subcommittee Chairman Mike Synar, February 27, 1986 (hereinafter cited as "NRC Letter to Subcommittee"), response to question No. 5.
[23] Hearing Record, at p. 108.
[24] NRC Letter to Subcommittee, response to question No. 1.
[25] Id., response to questions No. 1 and No. 2.
[26] NRC "Materials License," Docket No. 40-8027, License No. SUB-1010, signed by W.T. Crow of NRC, September 20, 1985 (hereinafter cited as "September 1985 License Renewal").

CONTENTS

Union Calendar No. 96

100TH CONGRESS 1st Session | HOUSE OF REPRESENTATIVES | REPORT 100-167

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Whether the answers to these questions indicated overall weaknesses in the regulatory framework for this type of facility.

The witnesses at the hearing were:

The Honorable Nunzio J. Palladino, Chairman, Nuclear Regulatory Commission;[6] accompanied by: Mr. Victor Stello, Mr. John G. Davis, Mr. James M. Taylor, Mr. Robert D. Martin, Mr. Dick Bangart, Mr. Dale Smith, Mr. Charles Cain, Mr. W.T. Crow, and Dr. Edward Shum;

Mr. James G. Randolph, President, Sequoyah Fuels Corporation and Senior Vice President, Kerr-McGee Corporation; accompanied by: Mr. Steven D. Emerson, Mr. John C. Stauter, Mr. Charles Grosclaude, Mr. Leon McCoy, and Mr. Bill Bradley;

Mr. James Makris, Deputy Director, Hazardous Response Support Division, Environmental Protection Agency;

Mr. John B. Miles, Jr., Director, Field Operations, Occupational Safety and Health Administration; and

Mr. Richard Krimm, Assistant Associate Director, Office of Natural and Technological Hazards Program, Federal Emergency Management Agency; accompanied by: Mr. Marshall Sanders and Mr. Gerry Smith.

During the course of the subcommittee's review, NRC issued several reports on the Sequoyah accident concerning: the health effects,[7] the cause and contributing factors,[8] the lessons learned,[9] and a safety evaluation of improvements made in plant equipment and procedures.[10] The Lessons Learned Report made recommendations for improvements in the Commission's licensing and regulation of nuclear fuel cycle facilities.

The purpose of this report is to summarize the findings and conclusions from the subcommittee's review and to make recommendations for appropriate corrective actions to minimize the possibility of a recurrence of this type of accident at Sequoyah or elsewhere, and to provide in advance for effective emergency response actions in the event such an accident should recur.

II. Background

A. The Sequoyah Plant

Sequoyah Fuels Corporation is a wholly-owned subsidiary of Kerr-McGee Corporation. Its plant, located near Gore, Oklahoma, is one of two commercial plants in the U.S. that convert processed uranium ore (yellowcake) into UF_6.[11] The other UF_6 fuel conver-

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[6] Chairman Palladino's term on the Commission expired June 30, 1986. He was replaced as Chairman by Mr. Lando W. Zech, Jr.

[7] Health Effects Study, previously cited in full.

[8] NRC "Rupture of Model 48Y UF_6 Cylinder and Release of Uranium Hexafluoride," NUREG—1179, Vol. 1, February 1986 (hereinafter cited as the "Accident Report").

[9] Lessons Learned Report, previously cited in full.

[10] NRC "Safety Evaluation Report By The Division of Fuel Cycle and Material Safety Related to the Authorization to Resume Operations for the Sequoyah Fuels Corporation UF_6 Conversion Facility, Gore, Oklahoma," October 14, 1986 (hereinafter cited as the "Safety Evaluation Report").

[11] Accident Report, at p. 3.

sion plant, owned by Allied Chemical Corporation, is located in Metropolis, Illinois.

The Nuclear Regulatory Commission is charged with regulating commercial nuclear material—specifically source, byproduct, and special nuclear material—by the Atomic Energy Act of 1954. Since natural uranium is source material, Sequoyah is a fuel cycle and materials licensee of NRC.

The UF_6 produced at Sequoyah is shipped to the Department of Energy and other facilities where it is enriched and then sent to commercial facilities to be fabricated into fuel rods for nuclear powerplants.[12] Thus, there are numerous facilities throughout the country that handle UF_6 in one form or another.

Sequoyah has the capacity to produce 10,000 tons of UF_6 per year.[13] Yellowcake is converted to UF_6 through a multi-stage process that uses large quantities of toxic chemicals such as fluorine. As it is produced UF_6 is collected and solidified in devices called cold traps. It is then liquefied by heating and drained into 10-ton or 14-ton cylinders.

If hot UF_6 is released into the air it quickly reacts with the moisture in the atmosphere to form hydrofluoric acid (HF), a highly corrosive and toxic chemical, and uranyl fluoride (UO_2F_2), a heavy metal uranium compound which is only slightly radioactive. The main health hazards from a UF_6 release are: pulmonary edema (excess body fluids in the lungs) and other respiratory damage, skin burns and irritation from the hydrofluoric acid, and permanent or temporary kidney damage due to the heavy metal uranium in the uranyl flouride.

During the cylinder filling process the UF_6 is hot and flows freely, but if the filling continues for many hours or is stopped, the product cools and begins to solidify. In this situation the cylinder must be heated in order to take a sample for testing, or to remove the product from the cylinder for reprocessing should the test sample indicate that is necessary.

As the UF_6 is heated, it changes from a solid state to a liquid, expanding significantly. Consequently, there must be enough empty space in the cylinder to allow for the expansion. Otherwise the cylinder may rupture as it is heated and cause a release of the toxic gas.

For this reason the Atomic Energy Commission in 1966 issued guidelines which specified maximum allowable fill limits for UF_6 cylinders which would allow a 5-percent margin of empty space if the entire contents of the cylinder were liquefied, and warned against the heating of an overfilled cylinder.[14]

In order to protect against a toxic release during transit, cylinders must be cooled for a minimum of five days after filling and sampling to ensure that the UF_6 is in solid form before it is shipped to DOE.[15]

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[12] Id.

[13] Health Effects Study, at p. 2.

[14] Atomic Energy Commission "Uranium Hexafluoride Handling Procedures and Container Criteria," ORO 651, 1966.

[15] Accident Report, at pp. 3-3 and 3-4.

B. NRC LICENSING/REGULATION OF SEQUOYAH

The Sequoyah plant began producing UF_6 in 1970 after being issued a five-year license by the NRC.[16] In January 1975, Kerr-McGee submitted an application to renew its license for another five years.[17] One month later NRC issued a Final Environmental Impact Statement for the plant.[18] In June 1975, the plant doubled its production capacity to 10,000 short tons of UF_6 per year.[19] In October 1977, NRC renewed the Sequoyah license and issued an Environmental Impact Appraisal to support the license renewal and the plant expansion.[20] Under NRC rules if a licensee submits an application for license renewal at any time before a license expires, the licensee can continue to operate indefinitely until NRC approves or rejects the renewal.[21]

In March 1982, in response to an NRC order requiring emergency preparedness plans for contain fuel cycle and materials licensees, Kerr-McGee developed a Radiological Contingency Plan. This plan was incorporated into the Sequoyah license.[22]

In September 1982, Kerr-McGee again submitted an application for license renewal. The application was revised in October 1983.[23]

In August 1985, NRC issued an Environmental Assessment on the license renewal.[24] One month later NRC renewed the license and issued a Safety Evaluation Report to support the renewal decision.[25] The license contained several conditions. Among them was the requirement that Kerr-McGee provide the following reports within six months:

> (1) A report detailing the handling procedures for product cylinders containing liquid UF_6. The report shall include a detailed analysis of each step in the handling of hot cylinders and identify the possible scenarios which could result in cylinder rupture. The report shall also provide an assessment of the modifications and actions which could be taken to reduce the potential for a UF_6 release and justify the procedures being used; and
>
> (2) A report detailing measures and actions to mitigate the effects of a UF_6 release. The report shall deal with the potential release of material within the facility and outside the facility.[26]

During the eight years prior to the accident NRC conducted nine inspections of the Sequoyah plant. NRC found 18 items of noncompliance during these inspections. The items of noncompliance all

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[16] Safety Evaluation Report, at p. 2.

[17] Hearing Record, at p. 105.

[18] Id., at p. 93.

[19] Id., at p. 105.

[20] Id.

[21] 10 CFR, part 55, section 55.33, Renewal of Licenses.

[22] Letter from NRC Chairman Nunzio Palladino to Subcommittee Chairman Mike Synar, February 27, 1986 (hereinafter cited as "NRC Letter to Subcommittee"), response to question No. 5.

[23] Hearing Record, at p. 108.

[24] NRC Letter to Subcommittee, response to question No. 1.

[25] Id., response to questions No. 1 and No. 2.

[26] NRC "Materials License," Docket No. 40-8027, License No. SUB-1010, signed by W.T. Crow of NRC, September 20, 1985 (hereinafter cited as "September 1985 License Renewal").

were in the lower range of the enforcement findings that NRC is empowered to make.[27]

C. The Accident and Response

On the morning of Saturday, January 4, 1986, a 14-ton cylinder containing more than 31,000 pounds of UF_6 ruptured as it was being heated in a steam chest at the Sequoyah Fuels plant.[28] Virtually all of the UF_6 was released, whereupon it reacted with moisture in the air and vaporized into a large, dense, white cloud of hydrofluoric acid and uranyl fluoride. As previously noted, hydrofluoric acid is highly corrosive and can cause severe, even fatal, respiratory damage as well as skin burns and irritation. Although uranyl fluoride is radioactive, it is hazardous primarily because it contains uranium, a heavy metal which is chemically toxic and can cause kidney damage.[29] At the time of the accident about 42 workers were at the plant.[30] The vapor cloud enveloped the plant and was then carried south and southeast past an Interstate Highway, I-40, and several residences by a wind gusting up to 25 miles per hour. Approximately 100 persons offsite were in, or near, the path of the cloud.[31]

During the accident, workers evacuated the administration and process buildings and moved to an area of the plant upwind of the release. Shortly afterward Sequoyah plant officials notified local law enforcement groups and I-40 was closed.[32] The general public, including those living near the plant, first heard about the release from radio reports.[33] Later Sequoyah officials made door-to-door checks of nearby residents. All of the 42 workers onsite and approximatey 100 persons near the plant at the time of the accident were sent to hospitals and doctors for observation and/or treatment.[34]

Kerr-McGee officials notified NRC of the accident and the Commission's Region IV office, based in Arlington, Texas, immediately sent an investigative team to the plant.[35] OSHA was notified by Kerr-McGee and sent an investigator to the plant as well. EPA and FEMA learned about the accident from the Coast Guard and from news reports, respectively.[36]

In the days following the accident the NRC team coordinated efforts to clean up the plant and began an extensive investigation into the cause of the cylinder rupture. At the same time NRC put together an ad hoc interagency group to monitor and assess the accident's impacts on the health of workers and those near the plant during the release.[37]

[27] NRC Letter to Subcommittee, response to question No. 4; and Lessons Learned Report, at p. 16.

[28] Hearing Record, at p. 2.

[29] Health Effects Study, at p. 1.

[30] Id., at p. 9.

[31] Id., at p. 11.

[32] Id., at p. 9.

[33] Id., at p. 10.

[34] Id., at p. XV.

[35] Id., at p. 10.

[36] Lessons Learned Report, at p. 19.

[37] Health Effects Study, at p. XIII.

On January 9, 1986, Kerr-McGee, in a letter to NRC, agreed not to restart the plant without the concurrence of the Commission. This commitment was confirmed by NRC Region IV in a "Confirmation of Action" letter dated January 17, 1986.[38]

On October 2, 1986, NRC issued an order modifying the Sequoyah license. The modifications, incorporated as license conditions, included improvements in the plant's processes and equipment, training and supervision, and staffing, and required followup of health impacts on personnel exposed to uranium from the accident. The modifications also required Kerr-McGee to obtain the services of an independent oversight organization for the Sequoyah facility with knowledge of chemical plant operations, radiation hazards associated with uranium processing, NRC regulatory requirements, and quality assurance. The independent oversight organization was directed to maintain a 24-hour surveillance of plant processing operations to assure compliance with NRC and company regulations and procedures and was required to bring to the attention of NRC staff and Kerr-McGee any conditions it believed to be unsafe or not in compliance with NRC requirements.[39]

NRC issued a Notice of Violation to Kerr-McGee on October 14, 1986, citing 14 violations of NRC rules and regulations and proposing civil penalties totaling $310,000. Three of the violations were directly associated with the January 4 accident—failure to adhere to a written operations procedure prohibiting the heating of an overfilled cylinder, failure to train personnel in operating procedures important to safety, and failure to assure that operating procedures were followed. All three were Severity Level I violations—the most severe of NRC's five categories of violations—and NRC proposed fines of $100,000 for each. In addition, two Severity Level III violations were cited involving failure to establish and follow required procedures and violations of the company's Radiological Contingency Plan, for which the NRC proposed a $10,000 fine. The Commission also cited nine Level IV violations.[40]

On October 16, the Commission approved Kerr-McGee's request to restart the plant, subject to compliance with the additional conditions placed on its license earlier in the month. On November 14, 1986, NRC Region IV withdrew its Confirmation of Action letter of the previous January, removing the last Commission barrier to restart of the plant.[41] The following day Sequoyah employees began feeding yellowcake into the plant production process, and full production of UF_6 was resumed by about the end of the month.

III. NRC Investigation and Reports

In the course of NRC's investigation of the Sequoyah accident the Commission issued three major reports: "Rupture of a Model 48Y UF_6 Cylinder and Release of Uranium Hexafluoride" (the Accident Report), "Assessment of the Public Health Impact From the

[38] Safety Evaluation Report, at p. 2.

[39] NRC "Order Modifying License", Docket No. 40-08027, License No. SUB-1010, EA 86-91, Amendment No. 4, October 2, 1986.

[40] NRC "Notice of Violation and Proposed Imposition of Civil Penalties," Docket No. 40-08027, License No. SUB-1010, EA 86-91, October 14, 1986.

[41] Letter from Robert D. Martin, NRC Region IV Administrator, to James G. Randolph, Sequoyah Fuels President, November 14, 1986.

Accidental Release of UF_6 at the Sequoyah Fuels Corporation Facility at Gore, Okla." (the Health Effects Report), and "Release of UF_6 From a Ruptured Model 48Y Cylinder at Sequoyah Fuels Corporation Facility: Lessons Learned Report." These three reports constitute, in effect, the findings, conclusions, and recommendations of NRC in its response to the Sequoyah accident. These reports are summarized below.

A. THE ACCIDENT REPORT

NRC's investigation determined that the immediate cause of the accident was that a 14-ton cylinder was overfilled and then heated, in violation of the company's procedures and NRC guidelines, leading to a hydraulic rupture of the cylinder. But NRC also found deficiencies in the plant's operations, such as inappropriate and inadequate equipment and procedures for filling and weighing the cylinders and inadequate employee training to implement plant operating procedures. These were listed as contributing factors to the accident.[42]

The maximum fill limit for a 14-ton cylinder is 27,560 pounds of UF_6.[43] The cylinder at Sequoyah was significantly overfilled, probably to more than 31,000 pounds.[44] The cylinder was overfilled because the cart on which it was resting had not been rolled fully onto the scales.[45] NRC found in interviews with plant employees that there had been previous difficulties in fitting the cylinders onto the scales because the filling areas originally were designed for 10-ton cylinders and were never modified to accommodate the larger 14-ton cylinders when the plant began using them.[46] These findings led NRC to conclude that "The physical equipment and facilities used for filling and weighing the UF_6 cylinders were inappropriate for safe use with 14-ton cylinders." [47]

Not only was the cylinder overfilled, but the filling process took so long (three shifts) that the UF_6 began to cool and solidify, making it difficult to safely remove the excess. NRC found that when a plant operator realized the cylinder was overfilled and tried to drain the excess UF_6 back into a cold trap, he was unsuccessful.[48] Plant employees told NRC that the operator consulted with the assistant shift supervisor about what to do. The assistant shift supervisor decided that the cylinder should be transferred to a steam chest outside of the building to be heated.[49]

According to NRC when the cylinder was put into the steam chest, the UF_6 began to liquefy and expand. The hydraulic pressure increased until the cylinder ruptured and blew off a portion of the steam chest.[50] After the accident the cylinder had a 52-inch-long crack that was eight inches wide in one place.[51] NRC estimated

[42] Accident Report, at pp. 3-1.
[43] Id., at p. 2.
[44] Id.
[45] Id., at p. 3.
[46] Id., at p. 5-1.
[47] Id., at p. 4.
[48] Id., at pp. 3-6 and 3-7.
[49] Id.
[50] Id., at pp. 3-7 and 3-8.
[51] Id., at pp. 3-11.

that if the temperature in the steam chest was 200 degrees Fahrenheit, there would have had to have been at least 31,072 pounds of UF_6 in the cylinder for it to have ruptured.[52]

Although Sequoyah's written operating procedures prohibit the heating of an overfilled cylinder,[53] NRC found that many of the plant's employees were not aware of the prohibition.[54] Indeed, several of the employees were not even aware that written cylinder filling procedures existed; and many who were had not had training in how to implement them.[55] These facts led NRC to conclude that "The training of workers in operating procedures and ensuring the implementation of these procedures were not carried out effectively." [56]

B. THE HEALTH EFFECTS REPORT

The accident resulted in the death of the worker who was heating the cylinder when it ruptured. He inhaled the hydrofluoric acid fumes for a period of time and died from pulmonary edema, a condition where an excess of body fluids are generated and flood the lungs.[57] Other workers and persons near the plant also suffered less severe respiratory problems, eye irritations, and skin burns from the hydrofluoric acid fumes.[58]

Additionally, almost all of the plant workers exposed to the cloud suffered temporary kidney damage from uranium intake. It is possible that some who are still being tested may have permanent kidney damage.[59]

NRC found that most of the heavier-than-air uranyl fluoride created by the release fell out on the Sequoyah site and concluded that contamination of vegetation or animals offsite was not significant.[60]

C. THE LESSONS LEARNED REPORT

In June 1986, NRC issued a report on the lessons learned from the Sequoyah accident. This report contained many recommendations involving many different aspects of NRC's licensing, regulation, and inspection of nuclear fuel cycle facilities. The key recommendations, in the Committee's view, are summarized below.

1. NRC's Authority Over Chemical Hazards At Licensed Facilities

The report acknowledged that "NRC has not defined with precision what it believes to be the scope of its authority and responsibility with respect to chemical hazards * * *" and it recommended that the Commission do so in a publicly issued opinion.[61] The report suggested that OSHA assume jurisdiction over occupational hazards that are determined to be outside the scope of NRC's au-

[52] Id., at pp. 3-12.
[53] Sequoyah Fuels Corporation Procedure, "Uranium Hexafluoride Product Handling and Shipping," No. N-280-1, Revision 6, January 23, 1985, at p. 5.
[54] Accident Report, at pp. 3-13.
[55] Id., at p. 23.
[56] Id., at p. 4.
[57] Health Effects Study, at p. 10.
[58] Id.
[59] Id., at p. 57.
[60] Id., at p. xvi.
[61] Lessons Learned Report, at pp. 24 and 25.

thority and recommended that a memorandum of understanding (MOU) be drawn up to clarify the division of authority.[62]

2. NRC's Licensing Process

The report acknowledged that NRC had paid little attention to chemical hazards in licensing Sequoyah and that this may have compromised plant safety, to some extent. The report said:

> The major emphasis during the Sequoyah license renewal was on radiological safety and the assessment of the potential for environmental impact. Less effort was directed toward operational aspects having indirect radiological implications (that is, areas such as systems and piping containing licensed materials, training, procedures, and management audits). No effort was directed to those operational aspects not related to radiological safety, such as chemical hazards involving no NRC licensed materials. * * *
>
> The NRC emphasis on radiological and environmental aspects may have the unintended effect of causing a licensee to expend a disproportionate amount of effort in areas related to radiological safety relative to those areas associated with the chemical and physical processes which sometimes have more serious existing hazards.[63]

The report indicated that it could be debated as to whether the licensing process should cover nonradiological hazards. For example the report said that one of three major requirements for NRC approval of a fuel cycle facility license is that, "The applicant's proposed equipment, facilities, and procedures are adequate to protect health and minimize danger to life and property," but that "it is unclear" as to what extent beyond the area of radiological safety the NRC must assess these.[64]

> (1) A Standard Review Plan for review of fuel facility license applications including those for UF_6 conversion facilities, should be established, implemented, and maintained. Licensing guidance should also more definitively identify those areas of an applicant's operations which require the development and implementation of procedures and formalized training. This guidance should be in sufficient detail to permit the applicant to develop an acceptable program.
>
> (2) [The Nuclear Material Safety and Safeguards Division] should ensure that license reviewers have sufficient technical capability to more broadly evaluate the indirect effects of process equipment, facilities, and procedures on radiological safety. Such assurance can be obtained by increasing the training and qualifications of individual reviewers, contracting for outside expertise, or increasing the use of other NRC personnel with the necessary expertise.

[62] Id., at p. 25.
[63] Id., at p. 35.
[64] Id.

> (3) The current license format used by [the Nuclear Material Safety and Safeguards Division] should be evaluated to determine the need to more clearly identify licensee commitments incorporated into a license to ensure recognition of all applicable commitments, specifications, and requirements.
>
> (4) NRC should review each of the recommendations [for processing and facility design in] this report and determine whether specific changes should be made in license requirements and licensing criteria. The need for any changes should be communicated to applicable NRC licensees and other fuel facilities.[65]

3. NRC's Regulatory Program

The report acknowledged that NRC Region IV's inspections of Sequoyah focused primarily on radiological safety and essentially ignored major aspects of the plant's operations, procedures, and employee qualifications and training. The report said:

> The inspections performed at the Sequoyah facility over the 10-year period concentrated on matters pertaining to in-plant radiological safety, monitoring, and control of releases of radioactive material to the environment, waste management of radioactive material, and emergency preparedness. Aspects of facility operation such as engineering and design control, establishment and adequacy of administrative and operating procedures, the selection, training, and qualification of management and technical personnel associated with the facility, and the control of hazardous chemicals were not generally inspected during this period.[66]

All inspectors were "radiation specialists (health physicists)" and the inspections were "largely a function of individual inspector expertise."[67] According to the report, NRC requires that fuel facility inspectors be qualified only as radiation specialists. Consequently, just a few of the inspectors were aware of technical documents pertaining to UF_6 handling, such as the AEC cylinder handling guidelines.[68]

The report also pointed out that Sequoyah had fewer or briefer inspections than other similar facilities, such as the Allied Chemical plant.[69]

The report recommended that NRC inspections and training for inspectors be expanded to include all aspects of the processing and handling of licensed material. Following are the specific recommendations:

> *Inspection Program:*
>
> (1) The inspection program procedures contained in [Inspection and Enforcement] IE Manual Chapter 2600 should

[65] Id., at pp. 36 and 37.
[66] Id., at p. 41.
[67] Id.
[68] Id.
[69] Id.

be revised to better emphasize inspection program aspects relative to procedures, hardware, and personnel training and qualifications that indirectly affect radiological safety and radioactive material control.

(2) Anticipated inspection resource expenditures allotted by [the Office of Inspection and Enforcement] for major fuel facilities should be clearly identified for each individual facility, rather than being identified collectively, and reassessed with consideration of variations in complexity of facility operations and associated hazards that directly or indirectly affect radiological safety.

(3) Efforts should be made by regional offices to assure continuity in the designation of inspectors assigned to inspect major fuel facilities.

Training and Qualifications of Inspectors:

(1) Personnel associated with the establishment and implementation of inspection programs for major fuel facilities should be trained in aspects of the processing and handling of licensed material that directly or indirectly affect radiological safety and control of the material, as well as radiological contingency planning.

(2) The inspector qualification procedures contained in IE Manual Chapter 1231, *Inspector Qualifications,* should be amended to broaden the required qualification and formal training of fuel facility inspectors to develop overall expertise in the facility operations.

(3) Technical publications and information relevant to the technology, including standards and processes employed in fuel facility operations, should be referenced in IE inspection program procedures to provide guidance to inspection personnel.

(4) Since the current number of inspection personnel with fuel facility expertise and experience is limited, better utilization of these personnel appears necessary. This can be accomplished by interregional utilization of such personnel, consolidation of fuel facility inspection responsibility into fewer regions, or conduct of periodic team inspections by the region using appropriate specialists.[10]

Emergency Preparedness

(a) Sequoyah Radiological Contingency Plan

The report acknowledged many problems with Sequoyah's Radiological Contingency Plan, including that:

Information in the plan, in some cases, was inaccurate and out of date;

The plan did not go far enough, in some areas, such as making sure that emergency equipment was located in secure areas or that the communications system was adequate for an emergency; and

[10] Id., at pp. 42 and 43

Neither the company, NRC, nor offsite emergency personnel were adequately trained in the plan's procedures.[11]

The report made the following recommendations:

Sequoyah Radiological Contingency Plan:

(1) The individuals responsible for development, maintenance, updates, and implementation of the contingency plan should be clearly identified at both the corporate and site levels.

(2) Audits of contingency plan implementation should be conducted by individuals not having direct implementation responsibility, and the audits should include evaluation of the appropriateness of the plan, procedures, facilities, equipment (including location of facilities and equipment), training, and periodic exercises in the spectrum of accidents or emergencies possible at the facility.

(3) A systematic training program should be established to familiarize all plant personnel with the general contents of the contingency plan and appropriate response actions. Specific training should be provided to individuals (both site and corporate) who might be assigned specific response functions and responsibilities.

(4) Offsite organizations who might be requested to support an emergency response should be invited to attend training specific to the response expected.

(5) Drills and exercises involving substantial staff response to a spectrum of simulated emergency situations should be conducted periodically. The simulated events should be based on prepared scenarios to demonstrate specific objectives, and they should be observed and critiqued by qualified personnel. Any deficiencies observed should be evaluated and responsibility for corrective action assigned and followed.

(6) Drills and exercises should periodically include the offsite organizations which might be called upon for support (local police, civil defense, health departments, etc.), as well as corporate personnel.

(7) Consider requiring a designated Emergency Operations Center (EOC) on site and an alternate EOC either offsite or in another onsite location which is unlikely to be impacted by the incident. The EOC and alternate EOC should contain adequate communications capability and accommodations to provide for coordination of the onsite emergency response activities and notifications and coordination with offsite supporting organizations. The EOC or alternate EOC should be accessible 24 hours a day.

(8) Locations of emergency equipment and kits should be reviewed by the NRC and licensees so that in the event of an emergency in a given facility location, or inaccessibility of a large portion of the facility, access to adequate emergency equipment and facilities, including emergency de-

[11] Id., pp. 11-14.

contamination facilities, can be assured. Equipment caches should be in multiple locations.

(9) Considerations should be given to providing strategically placed "air capsule escape units" to allow workers to escape from portions of a facility in which there exists a potential for exposure to toxic fumes for more than a few moments.

(10) The facility communications system should include a radio system compatible with local police or other offsite responder communications systems. In addition the licensee should attempt to identify beforehand to local and state police, insofar as practical, offsite individuals who would be called on for support in the event of an emergency at the site. Radio communications with police officials during an emergency can resolve specific issues.

(11) Personnel of local agencies that might be called to respond to emergencies should be given training.

(12) Hospital staff who might reasonably be expected to deal with injuries from a major accident should be trained to deal with all aspects of the injuries. Radiological plans and their use in drills are desirable.

(13) Radiological contingency planning should include site control plans and methods for implementing site access control.[72]

(b) NRC's Emergency Response Planning and Rulemaking

The report acknowledged that NRC officials lack trarining in fuel cycle facility emergencies.[73] Also, there is no specific organization within the Commission to review fuel cycle facility contingency plans (nuclear power plant contingency plans are reviewed by NRC's Office of Inspection and Enforcement).[74]

The report made the following specific recommendations:

(1) Training and guidance should be provided to Headquarters Operations Officers and Emergency Officers relative to the handling of nonreactor events. The NRC Regions should develop additional training and awareness of nonreactor events and suitable response modes and should assure that radiological contingency plans and other facility information are readily available.

(2) Periodic NMSS [NRC's Office of Nuclear Materials Safety and Safeguards] training exercises should include events at fixed sites and involve the NRC Operations Center and regional personnel.

(3) If call-in of regional staff is anticipated or sustained communications are expected, early use of the Regional Incident Response Center should be considered to facilitate preliminary evaluation of the event and notification of regional staff.

(4) When there is significant media interest locally during or following an event, regularly scheduled press

[72] Id., pp. 11-14, 21-23.
[73] Id., at p. 17.
[74] Id., at p. 37.

briefings coordinated with licensee, NRC, and State responders should be considered. The current experience indicated the value of the "unified voice" approach for updating the status of an event. The result was the much reduced impact from separate inquiries to response team members.

(5) NRC should be prepared to initiate the installation of additional telephone lines early in an event at facilities with limited installed communications capability.

(6) NRC should have predetermined criteria for acceptable onsite and offsite contamination levels, preferably based on projected dose commitments or health impacts. Such criteria should be readily available and distributed so that ad-hoc acceptability criteria need not be generated under crisis conditions.

(7) The NRC team responding to contamination events should include an individual or individuals responsible for coordinating sample collection and data analysis. (For a response to a reactor event an Environmental Team Leader would normally be dispatched with the initial Site Team.) The person assigned the sample and data coordination function should be retained in that position sufficiently long to assure sampling, analyses, and data handling consistency. If personnel assignments are changed sufficient turnover time must be allowed to assure smooth transition. Specific training, exercises, and drills should be conducted in sample collection and data handling. The sample data should be entered into a computerized data base as early as possible for ready analyses and sorting by all parties with need for the data.

(8) The need for establishing standardized sampling and sample preparation procedures and the means of intercomparing laboratory results should be recognized and met early in any event involving multiple organizations.

(9) NRC should consider routine use of a "hot line" (a rumor control line) in response to nonreactor events. (State and local emergency plans for reactor sites presently require "hot line" provisions.)

(10) Consideration should be given to having the IE Emergency Preparedness Branch review radiological contingency plans for nonreactor facilities. The use of this group could make available the expertise developed in reviewing reactor plans and could enhance communications with the NRC Operations Center personnel.

(11) The Standard Review Plan (NUREG-0810) and the Standard Format and Content document (NUREG-0762) should be reviewed to ensure that they are adequate or revised, if appropriate. The radiological contingency plans for fuel facility and materials licensees should then be reviewed against the revised guidance to ensure that they meet the acceptance criteria.[75]

[75] Id., pp. 17-19, and 38.

(c) Interagency Coordination

The report acknowledged that NRC did not notify other Federal gencies about the accident. The reason for this, according to the eport, was that the accident was classified in such a way that IRC did not have to enter into a "formal response mode" under its rocedures.[76]

The report made the following recommendation:

> In the event of an emergency involving an impact on public health and safety, other Federal agencies may need to respond on a timely basis with personnel, equipment, or procedures for obtaining pertinent information. These agencies should be notified of an event as early as possible.[77]

The report recommended that NRC develop a Memorandum of nderstanding (MOU) with OSHA to clarify the division of authory for chemical hazards.[78] For EPA the report recommended that:

> NRC licensees should be reminded through an IE Information Notice of their obligation to report releases above reportable quantity limits to the [EPA] National Response Center and the potential of a criminal penalty under CERCLA [Comprehensive Environmental Response, Compensation, and Liability Act, or Superfund] for failure to do so.[79]

IV. The Subcommittee Investigation

The subcommittee investigation literally began on the day of the equoyah Fuels accident. Subcommittee Chairman Synar and subommittee staff members happened to be in the area and arrived the plant site within hours after the UF_6 cylinder ruptured.

On January 21, 1986, Chairman Synar and Congressman Edward Markey, Chairman of a subcommittee of the House Committee Energy and Commerce, wrote NRC asking for documents and sponses to 17 questions about the accident, NRC's licensing and spection procedures, jurisdiction of NRC and other Federal agenes over fuel cycle facilities such as Sequoyah, and Kerr-McGee's adiological Contingency Plan for the facility. NRC responded to e letter on February 27, 1986.[80]

On March 14, 1986, the subcommittee held a hearing on hazards chemical regulation by NRC and other Federal agencies, focusg on the Sequoyah accident. The subcommittee's investigation ntinued as NRC completed its investigation of the Sequoyah accint, imposed additional conditions on the Sequoyah license, prosed civil penalties for violations at the plant, and approved reart of the facility, and was completed shortly after NRC and err-McGee reached a settlement over the proposed civil penalties February 25, 1987.[81] The subcommittee examined the accident,

[76] Id., at p. 19.
[77] Id., at p. 20.
[78] Id., at p. 25.
[79] Id., at p. 26.
[80] The complete correspondence cited can be found in the Hearing Record at pp. 36-67.
[81] NRC, "Settlement Agreement," Docket No. 40-8027, License No. SUB ? EA 86-91, ruary 25, 1987.

NRC's licensing of Sequoyah and other fuel cycle facilities, NRC's regulatory oversight of Sequoyah, emergency response plans for fuel cycle facilities, and overlapping roles of NRC and other Federal agencies concerning chemical hazards at NRC-licensed facilities.

A. The Accident

Based upon the subcommittee's investigation and hearing, the committee finds no reason to question NRC's conclusions that the primary cause of the accident was the heating of an overfilled cylinder of UF_6 and that the factors contributing to the accident could be aggregated as follows:

> The physical equipment and facilities used for filling and weighing UF_6 cylinders were inappropriate for safe use with 14-ton cylinders.
>
> The training of workers in operating procedures and ensuring the implementation of these procedures were not carried out properly.[82]

However, the committee must conclude that deficiencies in NRC's regulatory program for the licensing and inspection of fuel cycle facilities were also a major contributing factor to the accident. In fact, NRC acknowledges a number of shortcomings in its regulatory program with respect to chemical or other toxic hazards at fuel cycle facilities in its own "Lessons Learned" report.

NRC's primary mission in licensing and regulating commercial nuclear facilities is to protect public health and safety.[83] A major focus of the subcommittee's investigation was why, if it was to easy to discover serious deficiencies in Sequoyah's equipment, procedures, and operations after the accident, that they were not detected through NRC's normal licensing and inspection procedures.

Chairman Synar voiced this concern at the hearing:

> In the two months since that accident the Nuclear Regulatory Commission has conducted an extensive investigation to determine the cause of the accident. The report of that investigation, which was presented at a meeting of the NRC yesterday, found a number of deficiencies in the plant's operations which contributed to this accident or could lead to similar accidents in the future.
>
> I have been assured by both NRC and company officials that the plant will not be restarted until all identified deficiencies have been corrected.
>
> But what bothers me is why it always takes an accident and deaths or injuries to get the regulators and the regulated to do what they should have done before. This was the third major accident involving hazardous materials to occur in my congressional district within a span of six months. All of them involved deaths and/or injuries, and in each instance subsequent investigation disclosed deficiencies which should have been identified and corrected earlier, and in so doing perhaps could have prevented the accident.[84]

[82] Hearing Record, at p. 22.
[83] NRC Letter to Subcommittee, February 27, 1986, response to question No. 9.
[84] Hearing Record, at p. 2.

While the consequences of the accident were tragic, they could have been much worse if weather conditions had been different, according to Dr. Edward Shum, Senior Environmental Engineer for NRC's Fuel Cycles Safety Branch, who was at the hearing.

> Mr. SYNAR. * * * [I]f there had been no wind and it had been a hot August day, could there have been more fatalities onsite and offsite?
>
> Dr. SHUM. We estimate that if the meteorology had been worse, the consequences of the accident could have been worse.[85]

B. NRC LICENSING OF SEQUOYAH

1. Sequoyah's Environmental Impact Statement

In licensing a commercial nuclear facility NRC must consider all environmental impacts, including potential accidents.[86] These are identified and assessed in an environmental impact statement (EIS) written by the licensee but reviewed, approved, and issued for public comment by the NRC staff.

Although the EIS requirement was not in effect in 1970 when Sequoyah was originally licensed, in February 1975, NRC's Division of Materials and Fuel Cycle Facility Licensing issued an EIS for Sequoyah[87] after regulations were adopted implementing the National Environmental Policy Act. The EIS listed "rupture or valve failure of a hot UF_6 product cylinder" as one of four potential accidents that could have significant offsite effects.[88] EPA, in comments included in an appendix to the EIS, asked for an estimate of the probability that such an accident would occur.[89] Kerr-McGee, in a letter to EPA also included in the EIS, responded that "* * * the probability of such an accident is less than one is 100 million."[90] Congressman Synar asked NRC about its review of Kerr-McGee's claim.

> Mr. SYNAR. * * * [D]id NRC verify the accuracy of Kerr-McGee's estimate that the probability of a UF_6 cylinder rupture was indeed less than 1 in 100 million? * * * [W]as it checked? * * *
>
> Mr. CUNNINGHAM. I understand, Mr. Chairman, we did not analyze or confirm the probability by Kerr-McGee.[91]

In fact the subcommittee's investigation revealed that prior to 1975, there had been at least three accidents involving UF_6 cylinders: one in 1960 at the Department of Energy's uranium enrichment plant in Paducah, Kentucky;[92] one in 1962 at Nuclear Fuel Services, Inc.'s fuel fabrication plant in Erwin, Tennessee;[93] and

[85] Id., at p. 179.
[86] 10 CFR, part 51.
[87] NRC, "Final Environmental Statement Related to the Sequoyah Uranium Hexafluoride Plant," NUREG-75-1007, Docket No. 40-8027, February 27, 1985.
[88] Id., at p. V-24.
[89] Id., at p. C-34.
[90] Id., at pp. D-53 and D-54.
[91] Hearing Record, at pp. 93 and 94.
[92] AEC, "Report of Investigation of UF_6 Release in C-333 Temporary Vaporizer."
[93] NRC, "A Regulatory Analysis on Emergency Preparedness for Fuel Cycle, and Other Radioactive Material Licensees," NUREG-1140, June 1985, at p. E7.

one in 1966 at DOE's feed materials production facility in Fernald, Ohio.[94] Congressman Synar asked NRC how it could allow Kerr-McGee's 1-in-100-million probability estimate to remain unchallenged, given that these three accidents had already occurred:

> Mr. SYNAR. Obviously it wasn't a 1-out-of-100-million chance, was it?
>
> Mr. CUNNINGHAM. We did not analyze the probability. I don't know the details of those accidents that you just described.[95]

The committee finds that NRC did not adequately review, or check the accuracy of, information that Kerr-McGee provided in the EIS regarding the probability and potential environmental consequences of a UF_6 cylinder rupture.

2. NRC's Renewals of Sequoyah's Li[illegible]

Because of the accident at Padu[illegible] which was very similar to the later one at Sequoyah, the Atomic Energy Commission had issued standardized procedures for the handling of UF_6 in 1966, which warned against the heating of an overfilled UF_6 cylinder.[96] These procedures, commonly referred to as "ORO-651," were mandated for all go[illegible]nt facilities and were adopted by most private companies [illegible]dustry-wide basis.[97]

In 1975, Kerr-[illegible] filed an application with NRC to renew the Sequoyah license [illegible]d double the plant's production capacity.[98] NRC approved the application in 1977, and, as previously noted, issued an environmental impact appraisal in support of the decision. The appraisal stated, "All practicable safety features have been incorporated in the design, construction, and operating procedures" of Sequoyah.[99]

Congressman Synar asked NRC how this conclusion could have been reached.

> Mr. SYNAR. My question to you is, what did "all practicable safety features" mean here? Did Sequoyah's operating procedures for handling UF_6 cylinders include the precautions against heating of overfilled cylinders which had been issued 11 years earlier? Apparently not.[100]

In fact a prohibition against the heating of overfilled UF_6 cylinders was not written into Sequoyah's operating procedures until January 1985—more than 25 years after the Paducah accident and almost two decades after the cylinder handling guidelines were issued.[101]

[94] Id.
[95] Hearing Record, at p. 105.
[96] AEC, "Uranium Hexafluoride Handling Procedures and Container Criteria," ORO-651, 1966, at pp. 75-76.
[97] Hearing Record, at p. 32.
[98] Sequoyah Fuels Corp., "License Renewal Application," January 24, 1975.
[99] "Environmental Impact Appraisal by the Division of Fuel Cycle and Material Safety Related to the Source Material License Renewal of the Kerr-McGee Nuclear Corp. Uranium Hexafluoride Facility, Sequoyah Co., Okla.," Docket No. 40-8027, License No. Sub-1010, October 1977, at p. 30.
[100] Hearing Record, at p. 108.
[101] Id., at p. 93.

Therefore the committee finds that NRC relicensing of Sequoyah was deficient in not assuring that the written operating procedures included a prohibition against the heating of overfilled UF_6 cylinders.

By the time NRC renewed the license in 1977, two more UF_6 cylinder accidents had occurred: one in 1975 at the government's enrichment plant in Oak Ridge, Tennessee;[102] and another in 1977 at the Comurhex plant in France.[103] In 1978 there was another UF_6 accident, this time at the government's enrichment plant in Portsmouth, Ohio.[104] Congressman Synar asked NRC about these accidents.

> Mr. SYNAR. * * * Now, did these additional accidents cause the NRC to suspect the chances of a UF_6 cylinder rupture might be considerably higher than 1 in 100 million?
>
> Mr. CUNNINGHAM. Yes, they did, Mr. Chairman. And that resulted in putting the requirement on the licensee to reevaluate its UF_6 handling.
>
> Mr. SYNAR. But not until 1985.
>
> Mr. CUNNINGHAM. That is correct.
>
> However, I should point out that the license renewal process was going on at that time. We were gathering a lot of data and there were numerous discussions. * * *[105]

In fact, NRC had been gathering a great deal of data on UF_6 cylinder handling. In 1982, Kerr-McGee again submitted an application to NRC for renewal of its license.[106] In May 1983, during its review of the application, NRC asked Kerr-McGee to provide "a complete discussion of the operations involved with handling and transport of the UF_6 cylinders, support mechanisms, and temperature at removal from loading status." [107] Kerr-McGee provided the information to NRC two months later.[108]

NRC reviewed the license renewal application and the additional information submitted by Kerr-McGee throughout most of 1985. It was during this period, in January 1985, that Sequoyah finally added a prohibition against the heating of overfilled UF_6 cylinders to its written operating procedures.

Sequoyah continued to operate during NRC's three-year review since, under NRC regulations, a licensee who applies for renewal at least 30 days prior to the expiration date of the license can continue to operate indefinitely until NRC completes review of the application and either approves or rejects the renewal.[109] NRC finally renewed Sequoyah's license in September 1985.[110]

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[102] Energy Research and Development Administration, "Investigation of a Uranium Hexafluoride Release Incident on September 17, 1975 in the K-1423 Toll Enrichment Facility," K-P-6197, December 9, 1975.

[103] A.J. Docouret, "An Experience of Accidental Release of UF_6," Comurhex Plant, Pierrelatte, France, July 1977.

[104] DOE, "Investigation of Occurrence Involving Release of Uranium Hexafluoride in a 14-ton Cylinder at the Portsmouth Gaseous Diffusion Plant on March 7, 1978," ORO-757, June 1978.

[105] Hearing Record, at p. 108.

[106] Sequoyah Fuel Corp., "License Renewal Application," September 1982.

[107] Letter from Marc J. Rhodes of NRC to Mr. W.J. Shelley of Kerr-McGee, June 3, 1983, at question No. 49.

[108] Id., at question 49 response.

[109] 10 CFR, part 55, section 55.33, Renewal of Licenses.

[110] NRC, "September 1985 License Renewal."

Despite having already obtained a great deal of information from Kerr-McGee on UF_6 cylinder operations at Sequoyah, NRC required the company, as a condition of the license renewal, to submit two additional UF_6 cylinder-related reports within six months. NRC described the reports in the following manner.

> (1) a report detailing handling procedures for product cylinders containing liquid UF_6. The report shall include a detailed analysis of each step in the handling of hot cylinders and identify the possible scenarios which could result in cylinder rupture.
>
> The report shall also provide an assessment of the modifications and actions which would be taken to reduce the potential for a UF_6 release and justify the procedures being used, and (2) a report detailing measures and actions to mitigate the effects of a UF_6 release. The report shall deal with the potential release of material within the facility and outside of the facility.[111]

Congressman Synar asked Mr. Cunningham why NRC approved the renewal of Sequoyah's license if the Commission was not satisfied with the procedures for handing UF_6 cylinders:

> Mr. SYNAR. If NRC was not satisfied that Kerr-McGee's procedures for handling UF_6 and dealing with a possible release were adequate, why did it approve the license renewal, since the old license was still in effect?
>
> * * * * *
>
> Mr. CUNNINGHAM. I think it is really a question of how serious or what the potential was for something adverse happening.
>
> Mr. SYNAR. Was that not clearly a high potential, given the history of accidents which has occurred within the decade?
>
> Mr. CUNNINGHAM. I would not characterize it as high potential given the number of cylinders.* * *[112]

Kerr-McGee was to have submitted the two reports to NRC in March 1986—three months after the accident occurred.

The committee is concerned that NRC's regulations allow existing licensees to operate facilities indefinitely until NRC approves a renewal. In the opinion of the committee NRC takes too long—in some cases, several years—to renew a license, which may allow some licensees to operate in an unsafe manner if there are serious deficiencies in the renewal application. The committee is also concerned that NRC approved the renewal of Sequoyah's license although it attached several conditions suggesting that the Commission was not satisfied regarding the safety of UF_6 cylinder handling procedures.

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[111] Id., at p. 1.

[112] Hearing Record, at p. 121.

C. NRC'S REGULATORY OVERSIGHT OF SEQUOYAH

NRC provides regulatory oversight of licensed facilities through periodic inspections. The Commission has established a Fuel Cycle Inspection Program which calls for ten areas of UF_6 conversion plant operations to be inspected at least once a year.[113] The ten areas are: management organization and controls, operator training and retraining, criticality safety, operations, maintenance and surveillance testing, radiation protection, radioactive waste management, transportation of radioactive materials, environmental protection, and emergency preparedness.

1. NRC Did Not Adequately Review and Approve Specific Procedures In Advance of Their Use

After the accident NRC, in a letter to Subcommittee Chairman Synar and Congressman Ed Markey (D-Mass.), described its policy for overseeing operational and safety procedures developed by licensees:

> The NRC does not review and approve each procedure prior to use by the licensee to carry out operational and health and safety programs either at the time they were conceived or during the licensee review and evaluation. Instead, the NRC has required through the license that the licensee establish, maintain, and adhere to written procedures for operational and radiation safety activities. The NRC inspection staff reviews selected radiation safety procedures during each inspection and verifies that all procedures have been developed and approved by the licensees according to the license requirements.[114]

During the Subcommittee hearing Congressman Synar asked then-NRC Chairman Palladino about the effectiveness of this policy.

> Mr. SYNAR. Mr. Palladino, if the NRC does not review and approve operational health and safety procedures in advance, how do you know that you are not licensing an unsafe operation?
>
> Mr. PALLADINO. Mr. Chairman, I think in that letter we are talking about procedures for the operation of a wide variety of processes that go on in the plant.
>
> We do require that these procedures be developed to provide disciplined thinking of what the process involves and what safety implications there might be, but we do not on a station-by-station basis go and review every procedure because they cover quite a range of activities and they are quite complex. This doesn't mean, however, that we don't review the safety implications of the operation and that we don't—aren't interested in making sure that these procedures exist because we do make sure that the procedures exist.[115]

[113] NRC, Inspection and Enforcement Manual, Chapter 2600, "Fuel Cycle Facility Radiological Safety Inspection Program," May 23, 1984, p. T1-1 to T1-3.
[114] NRC Letter to Subcommittee, response to question No. 8.
[115] Hearing Record, at p. 68.

But NRC was not aware of the fundamental operating and safety procedures regarding the handling of UF_6 that were in place at Sequoyah. NRC did not know Sequoyah's operating procedures, for years failed to include the AEC's warning against heating overfilled cylinders or that the procedures were revised in 1985 to include such prohibition.

Congressman Synar established this during the hearing:

> Mr. SYNAR. At the time of the accident, was the NRC aware that Kerr-McGee one year earlier, in Janaury 1985, had revised its written procedures for handling UF_6 to include the prohibition [against the heating] of overfilled cylinders such as recommended by the AEC 19 years earlier?
>
> Mr. CUNNINGHAM. I was not aware.[116]

In view of the foregoing information the Committee is concerned that NRC may not have in place an adequate program to assure that licensed facilities are actually operating in accordance with all license requirements and in a manner that best protects public health and safety.

2. Inspections Concentrated Almost Exclusively On Radiological Hazards and Largely Ignored Chemical and Other Hazards

During the Subcommittee hearing Congressman Synar asked Mr. Martin why NRC Region IV's inspections of Sequoyah didn't reveal the deficiencies cited in the Commission's report on the causes of the accident.

> Mr. SYNAR. If you could identify all these deficiencies in the days that your inspectors spent at the plant after the accident, I think the appropriate question that the people in Gore and the people of Sequoyah County and the people of Oklahoma would ask and the thing that I don't understand, is why didn't you spot them before the accident occurred?
>
> We are talking here about plant equipment, plant operations, plant procedures, and the training of employees in plant operations and procedures.
>
> Aren't these fairly basic things that the NRC should be checking in a license review of a plant inspection?
>
> Mr. MARTIN. In trying to respond to that question, the primary focus of our inspection activities on that facility has been toward radiological hazards associated with the operation of the facility. Therefore, when we have done inspections, although we have not been prevented from looking at process-related activities, our primary focus when we inspect has been on radiological activities, any releases of uranium, et cetera, into the water streams.* * *[117]

Congressman Synar asked Mr. Martin whether it made sense for NRC to focus solely on radiological hazards at plants like Sequoyah.

[116] Id., at p. 164.
[117] Id., at p. 165.

Mr. SYNAR. The logical question is whether UF_6 is basically radioactive as well as chemically hazardous—you agree with that?

Mr. MARTIN. Absolutely.

Mr. SYNAR. Since the radiological aspects of UF_6 cannot be separated from the hazardous chemical qualities, wouldn't it be logical and make common sense to check the plant equipment, the plant operations, the plant procedures, the training of employees?

Mr. MARTIN. The way you characterized that question, the answer is yes.[118]

The committee finds that NRC ignored the chemical hazards at Sequoyah even when it was clear that these hazards were as serious as, and inseparable from, the radiological hazards. It is the view of the Committee that NRC must assume regulatory authority over chemical hazards when they cannot be separated from, or could potentially affect, licensed radioactive material.

3. Procedures Selected for Inspections on Random Sample Basis

In the exchange between Congressman Synar and then-NRC Chairman Palladino previously cited from the Subcommittee hearing, Congressman Synar established that, although NRC requires licensees to have written operating and safety procedures on file, the Commission does not routinely review and approve these procedures as they are developed and before they are implemented. Congressman Synar then sought to explore whether and how NRC checks to see that these procedures are being implemented:

> Mr. SYNAR. I guess the natural question from here is, how does the NRC inspection staff select the safety procedures which are to be reviewed during the inspection and, if they don't review them all, as you have just admitted, how can they know whether the plant is operating safely?
>
> Mr. PALLADINO. * * * I think there is an important point to be made that ours is an audit process, the primary responsibility for safe operation is the licensee. We do expect him to follow his procedures.
>
> I will admit that our inspections maybe haven't been as broad as they might have been, but nevertheless the procedures are there to be followed by the licensee.
>
> Now, with regard to the individual inspections, Mr. Chairman, let me turn to Bob Martin, the administrator for Region IV.
>
> Mr. SYNAR. Mr. Martin, as you answer that question I have asked, will you not admit that the NRC does have a responsibility to determine whether the procedures and guidelines set down are adequate, at least to start with?
>
> Mr. MARTIN. The answer to that is yes.
>
> Mr. SYNAR. How do you review that?
>
> Mr. MARTIN. It is achieved by establishing the conditions under which the plant will operate during the licensing

[118] Id. at p. 166.

> and the engineering evaluation portions of the evaluation of the license.
>
> In terms of the inspections that we conduct, it is true, as pointed out previously, that we do not inspect for technical content each and every procedure which is utilized in a plant of this type, or for that matter, in any plant we regulate.
>
> We select samples of procedures during the course of the inspection, usually on a random basis, and we look to see whether or not the process described by the code for the manner in which they were going to assure themselves that the procedures were adequate was, in fact, followed.
>
> On some occasions for certain types of facilities, of which, in general, Sequoyah would not be the case, but a nuclear powerplant might be—under those conditions we might review a portion in detail.[119]

As previously noted, in the case of Sequoyah NRC limited its inspections mostly to those procedures concerning radiation safety. Between 1978 and 1985, NRC conducted nine inspections of Sequoyah and cited a total of 15 violations.[120] Almost all of the violations concerned radiation safety. All of the inspectors were radiation specialists, or health physicists.[121]

Because of this limited inspection effort, NRC was not aware until after the accident that it had not been uncommon for Sequoyah workers to overfill and then heat cylinders in violation of key operating procedures. NRC found that in 1985, 70 percent of all 14-ton cylinders were overfilled by 100 pounds and then heated.[122] This was a technical violation of procedures, but not necessarily a safety hazard. NRC also found, however, that in a few instances, in recent years, cylinders had been overfilled by 500 to 1,000 pounds and then heated. This definitely was a safety hazard and foreshadowed the incident that occurred on January 4, 1986.[123]

Congressman Synar made the point that, even though NRC's inspection program is directed primarily at radiation safety, it calls for inspectors to be aware of some basic aspects of a fuel cycle plant that were found to be deficient, and contributed to the accident, at Sequoyah.

> Mr. SYNAR. On page A-8 [of NRC's Inspection and Enforcement Manual] it says that in inspecting operating facilities, "inspectors should be completely familiar with the current license regulatory requirements—that change continuously for the procedure elements being inspected—including applicable ANSI standards, guides, and other codes where applicable."
>
> Wouldn't you say that this would cover ORO-651, the cylinder handling standards first issued by the AEC

[119] Id. at p. 68.

[120] Letters from NRC Region IV to Sequoyah Fuels Corp., November 14, 1985, July 15, 1985; May 8, 1985; September 20, 1984; September 12, 1984; August 13, 1984; May 19, 1983; May 10, 1983; April 26, 1983; April 6, 1983; April 26, 1982; and September 18, 1980.

[121] Lessons Learned Report, at p. 41.

[122] Hearing Record, at p. 164.

[123] Id.

almost 20 years ago that cautioned against the heating of overfilled cylinders and a caution that wasn't added to Kerr-McGee's procedures until 1985? * * *

Mr. MARTIN. In the context in which you asked that question, certainly the ORO report would be among the background information that could well help satisfy that requirement.

Mr. SYNAR. The answer is yes, is it not?

Mr. MARTIN. A conditioned yes. * * *[124]

4. Employee Training in Operational and Safety Procedures

As the hearing record established, NRC knew very little about Sequoyah's programs for training employees, even though NRC inspections were supposed to cover training programs and Sequoyah's license contained commitments on how they could be carried out.

> Mr. SYNAR. I also notice [in the Manual] that inspectors are supposed to inspect operator training and retraining at UF_6 plants at least twice a year. How could your inspectors not have known before the accident that there was no formal training in place for the plant employees if, in fact, they followed the inspection program?
>
> Mr. TAYLOR. I think that is once a year and I will have to defer to Bob [Martin].
>
> Mr. SYNAR. If it was once a year, why didn't they know it?
>
> Mr. MARTIN. * * * [T]he defect in training that we found during the AIT, the augmented investigation, had to do with the training of the staff on changes to procedures. It certainly was a defect in the training program.
>
> During the routine inspection program that has been conducted at that site, our focus was more on general employee training and general health and safety, radiological safety effects, not again on specific details of the operating process.
>
> Mr. SYNAR. The licensing documents provide for classroom training, Mr. Martin. Has there been classroom training at the Kerr-McGee plant in the last couple of years. * * *?
>
> Mr. DALE SMITH. They were characterized in terms of safety meetings and gatherings. But, formalized classroom training, I think the answer to that is no.[125]

The committee is concerned that because of NRC's failure to review or approve operational and safety procedures, the Commission did not have a basic awareness of key plant procedures and how they were being implemented. The committee also finds that NRC inspections have been limited, so NRC inspectors were unaware of certain important plant equipment, operational procedures, and employee training at a fuel cycle facility. The committee believes that the Sequoyah accident demonstrates that NRC does

[124] Id., at p. 177.
[125] Id.

not have a "hands-on" grasp of how its licensed fuel cycle facilities actually are operating.

Congressman Synar voiced this concern to NRC's Chairman, Mr. Palladino.

> Mr. SYNAR. * * * Mr. Palladino, it appears to me that NRC is largely "a paper tiger" and that for the most part it is concerned only with whether the proper piece of paper is on file and not with whether the procedures written on the paper provide adequate safeguards or whether they are observed in actual practice.
>
> Now, I hope I am wrong about that. Can you convince me that I am?
>
> Mr. PALLADINO. Mr. Chairman, our attention has been given so much to nuclear reactors where I believe we have achieved a situation where we are better than paper tigers, that I don't think the Commission itself has given as much attention to these kinds of facilities as we should, but I can assure you, Mr. Chairman, we will.[126]

The committee agrees with Mr. Palladino that NRC needs to devote more attention to the overall licensing and regulation of nuclear fuel cycle facilities.

D. EMERGENCY RESPONSE

The need for effective emergency response procedures at nuclear facilities was brought to the forefront of public debate after the 1979 Three Mile Island incident. Since that time State and local authorities, as well as area residents, have become more integrally involved in the preparation and planning of emergency response procedures at nuclear power plants. In addition, accidents such as the Bhopal, India, tragedy in 1985 followed by a chemical release at a similar facility in Institute, West Virgina, have sensitized the public to the hazards present in chemical processing facilities. Congressman Bob Wise described the growing concern:

> We are dealing with something on a nationwide basis and it is not just your district or mine or chemical plants exclusively or nuclear plants exclusively. We are seeing a whole new area which we are moving into in which people are becoming more sensitive, in which systems that were installed 20, 25 years ago now need to be replaced, in which we are having to re-examine some of the assumptions that we made in earlier years.
>
> The fact of the matter is that there are new requirements, the public demands more safety, and they have a right to it. It is a shame that it takes a tragedy such as this to bring this recognition.[127]

A primary focus of the subcommittee's investigation was the adequacy of emergency response procedures at the Sequoyah facility. In reviewing this area of concern the Subcommittee sought to establish (1) whether the information contained in the facility's emer-

[126] Id., at p. 178.
[127] Id., at p. 5.

gency response plan was accurate, and (2) whether the plan was adequate to protect the health and safety of the plant employees and residents of the surrounding communities.

1. Sequoyah's Emergency Response Plan

In response to orders from the NRC in 1981 Kerr-McGee established a Radiological Contingency Plan for its Sequoyah facility. The Contingency Plan indentified potential accident scenarios and outlined procedures to be taken in the event an accident occurred. The NRC approved the Sequoyah Contingency Plan in 1982. Kerr-McGee was responsible for reviewing the plan on an annual basis and submitting updates or changes to the NRC as necessary. In September 1985, in connection with the facility's relicensing review, the NRC again approved the Sequoyah Contingency Plan, noting that it was "appropriate for the continued implementation of an effective response capability." [128]

Congressman Wise established NRC's concurrence with the plan:

> Mr. WISE. So that as of September 1985 the NRC found Kerr-McGee to be as prepared as possible for the worst kind of accident.
>
> Isn't this correct?
>
> Mr. PALLADINO. I think so.
>
> Mr. CUNNINGHAM. That is correct.
>
> What this says is that they had an adequate contingency plan that met our requirements on our 1982 order.[129]

A critical element of effective emergency response is the timely notification of appropriate officials. The Sequoyah Contingency Plan listed two NRC emergency numbers to be contacted in the event of a major UF_6 release. Two weeks to the day and at the approximate time of the accident a subcommittee investigator attempted to reach the NRC officials listed in the plan. In both cases the emergency telephone numbers listed in the Contingency Plan were those of personal residences not connected with NRC. Neither Kerr-McGee nor the NRC could explain how the telephone numbers had been wrongly listed or why subsequent reviews by both Kerr-McGee and NRC had failed to identify the inaccurate listings. Congressman Wise asked the NRC for an explanation.

> Mr. WISE. Could you explain to the subcommittee why NRC emergency assistance numbers, numbers that were not once but twice approved by the NRC, are actually the residences of private citizens that are not in any way associated with the NRC?
>
> Mr. PALLADINO. I can't say why they are, but based on the evidence you have presented there certainly is an error on our part.[130]

On the basis of this error the Committee finds that inadequate attention was given to the accuracy of information submitted in the facility's Contingency Plan.

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[128] Id., at p. 125.
[129] Id., at p. 128.
[130] Id., at p. 137.

The subcommittee reviewed other aspects of the Contingency Plan to determine its effectiveness in responding to the 1986 accident. For example, the plan identified the need for proper safety equipment in the event of a major UF_6 release. Testimony at the hearing indicated, however, that protective equipment was not immediately available for the plant employees. This equipment had been stored in the middle of the plant production area and was engulfed in UF_6 fumes. Consequently, a protective source of oxygen wasn't available for either employees attempting to control the UF_6 release or those in immediate need of medical assistance.[131]

While employees at the site made commendable efforts under difficult [illegible] conditions, the Committee believes that inadequate [illegible] inhibited the employees' ability to [illegible]es.

[illegible] also indentified significant short[illegible] preparation for offsite emergen[illegible] [illegible]an called for notification of the [illegible]ssistance were required to set up road blocks [illegible] residents. Testimony at the hearing indicated that shortly after the accident the Highway Patrol was asked to close a portion of an Interstate highway adjacent to the plant. The Highway Patrol was not, however, asked to evacuate nearby residents. Kerr-McGee officials further acknowledged that the facility did not have any specific plans for notification and evacuation of surrounding communities.[132] Affected residents were first contacted by officials more than one hour after the accident when a plant employee drove door-to-door to advise that residents be examined at the local hospital.

Congressman Wise asked the NRC about the Contingency Plan's failure to prepare for emergencies "outside the fence:"

> Mr. WISE. This whole plan, I believe, is onsite, but it doesn't talk about what happens when that cloud [moving at] 25-mile-an-hour moves offsite, starts moving downwind.
>
> And how do you get word to those people? How do you evacuate them? How do you guarantee you are going to have the minimum of injuries or fatilities?
>
> And so, I would hope that you, as you explore with OSHA, as you explore with EPA, with the regional response team, will begin thinking also of offsite and how you safeguard those people, because this is totally inadequate.
>
> Mr. PALLANDINO. Mr. Wise, if you are asking are we satisfied with the offsite emergency plan, I for one, will say no, I am not satisfied. We will work not only with these agencies, but we have FEMA as an organization that we work with reactors. We have given a lot of attention to reactors and potential reactor accidents. It doesn't appear to me that we have given the equivalent attention to this kind of facility.[133]

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[131] Id., at p. 144.
[132] Id., at p. 213.
[133] Id., at p. 145.

2. NRC's Emergency Response Planning Requirements for Fuel-Cycle Facilities

The subcommittee sought to explore why, as Chairman Palladino acknowledged, the NRC had failed to provide adequate attention to emergency preparedness at its licensed fuel-cycle facilities. Following the Three Mile Island accident the NRC implemented, through an agency rulemaking, rather rigorous emergency response requirements for nuclear power plants. The Commission also, by order, required that its fuel-cycle and material licensees, such as the Sequoyah facility, submit Radiological Contingency Plans.

In 1981, the NRC issued an advance notice of a proposed rulemaking to further codify and strengthen emergency response requirements for its fuel cycle facilities. Improvements in offsite notification, evacuation, and local participation in response planning were cited as reasons to pursue an industry-wide rulemaking. The NRC received numerous industry complaints about the proposal and issuance of the rulemaking was delayed. In one instance NRC staff identified specific emergency response shortcomings at a nuclear fuels processing plant in Erwin, Tenn. Yet the NRC failed to require stricter site-specific emergency response measures, opting instead to proceed with consideration of the proposed industry-wide rulemaking.[134]

Internal debate about the need for additional emergency response requirements at fuel cycle facilities continued at NRC. Action was not forthcoming. A Commission staff memo summarized discussion about the proposed rule at a meeting of the NRC's Committee for Review of Generic Requirements.

> The rule is not needed to protect public health and safety and is not cost effective. It is needed to codify a relaxed version of existing NRC orders and reassure the public that a license and local authorities are capable of taking appropriate action if there is an accident.[135]

When asked about this statement, Mr. Victor Stello, Executive Director of the NRC, stated that only onsite response activities would be relaxed. He further explained that offsite notification requirements would be added under the proposed rule.

The committee is concerned about any NRC proposal to relax required emergency response measures whether onsite or offsite. The committee is also concerned that adequate opportunity be provided for participation by appropriate Federal, State, and local authorities in the emergency response planning process. In particular, local authorities must be properly educated in the potential hazards present and appropriate response measures to be taken should an accident occur. This education process must take place prior to, not during, an accident.

Further, the committee is greatly concerned that NRC has failed as yet to finalize and implement the proposed rulemaking on fuel cycle emergency preparedness. The committee notes that NRC expressed the need for improvements in this area in 1981. Six years

[134] Id., at p. 151.
[135] Id., at p. 153.

have passed, a major accident has occurred, yet the proposed rule still has not been implemented.

E. OVERLAPPING ROLES OF NRC AND OTHER AGENCIES CONCERNING CHEMICAL HAZARDS AT NRC-LICENSED FACILITIES

The effective coordination among Federal agencies in preventing, or responding to, accidents at energy facilities is vitally important. There was a significant overlap in agency jurisdictions in this accident, primarily because the accident was chemical in nature but the plant is identified as a nuclear, a chemical, facility and is licensed by the NRC.

At the subcommittee's hearing Congressman Clinger spoke of the importance of interagency coordination.

> Mr. CLINGER. * * * [T]here is no excuse for inadequacy of safety procedures just because one agency allows another to take the lead in oversight of certain facilities.
>
> * * * [T]hese are matters of life and death and real and direct cooperation among Federal regulators is necessary if these accidents are to be avoided in the future. This kind of cooperation is also necessary in the preparation of effective emergency response plans if the risks to human life are to be mitigated.
>
> Today I hope we will and can examine the interagency coordination involved in regulation of facilities like Sequoyah because that appears to me to be where the breakdown may have occurred.[136]

Following are brief descriptions of the responsibilities of, and roles played by, NRC and other agencies at Sequoyah.

1. Nuclear Regulatory Commission

NRC is the only Federal agency which had much involvement with Sequoyah prior to the accident. For 16 years the Commission licensed and regularly inspected the plant under the Atomic Energy Act, which gives NRC authority over source, special nuclear, and byproduct material. The processed uranium ore used in making UF_6 at Sequoyah is source material.[137]

When Kerr-McGee notified NRC of the accident, NRC immediately assumed a lead response role and sent a team of regional officials to the plant site.[138] But less than two weeks later NRC Commissioners publicly debated whether the Commission had jurisdiction over the accident.[139] This caused confusion among agencies like OSHA, which had overlapping jurisdiction but had deferred to NRC.[140] Eventually Commission officials decided that NRC's jurisdiction over licensed facilities extends to chemicals when those chemicals are mixed with radioactive elements, as was the case at Sequoyah.

[136] Id., at p. 4.
[137] NRC Materials License No. Sub-1010.
[138] Accident Report, at p. 1.
[139] NRC Transcript of Commission Meeting held on January 16, 1986.
[140] Hearing Record, at pp. 231-232.

2. Occupational Safety and Health Administration

Generally, OSHA is responsible for worker health and safety at facilities across the country. But under its enabling statute, the Occupational Safety and Health Act of 1970, OSHA's authority is limited to worker conditions not subject to the regulatory authority of another agency. Because there are many industrial facilities throughout the country and OSHA has limited resources, OSHA generally does not get involved with a facility unless there is a complaint or an accident or unless the facility handles extremely hazardous materials. Prior to the accident, OSHA had not been involved with Sequoyah.[141]

OSHA learned about the Sequoyah accident from radio and television reports, although Kerr-McGee did notify the agency within 48 hours of the death of one worker and hospitalization of others, as is required.[142] OSHA sent an investigative team to the plant site the day after the accident. But the team left soon afterwards, believing that NRC had primary jurisdiction.[143] When NRC later questioned its authority over the accident, OSHA sent its team back to the plant site. Later OSHA turned over the findings of its investigation to NRC.[144]

3. Environmental Protection Agency

EPA has regulatory authority under a number of laws regarding industrial chemical processing plants. These include the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, or Superfund), the Resource Conservation and Recovery Act (RCRA), the Toxic Substances Control Act (TSCA), the Clean Air Act (CAA), and the Federal Water Pollution Control Act (Clean Water Act).

RCRA authorizes EPA to regulate facilities which generate, treat, store, or dispose of hazardous chemical wastes but excludes source, special nuclear, or byproduct material from its scope of coverage. TSCA allows EPA to set rules for the production and distribution of toxic chemicals, but also excludes source, special nuclear, and byproduct material.

The CAA and Clean Water Act allow EPA to regulate regular effluent releases to the environment. But under the Clean Water Act EPA has established a National Response Center to handle releases of hazardous materials.

Under section 104(e) of CERCLA the National Response Center must be notified immediately of the release of certain quantities of hazardous chemicals and radionuclides, including 100 pounds or more of hydrogen fluroride and one pound or more of radionuclides. CERCLA gives EPA broad authority to respond to releases of hazardous materials. For example, EPA can immediately undertake cleanup action if a release poses serious health and environmental risks.

[141] Id., at p. 234.
[142] Id., p. 230.
[143] Id., pp. 231-232.
[144] Id., p. 231.

Prior to the accident EPA's involvement with Sequoyah was limited to commenting on environmental impacts of overall and specific plant operations.

EPA learned about the Sequoyah accident from the Coast Guard and immediaely sent a technical representative to the plant site.[145] Kerr-McGee did not notify EPA of the release under the CERCLA reporting requirement until one week after the accident.[146]

4. Federal Emergency Management Agency

FEMA generally coordinates Federal agency activities and provides assistance to State and local agencies in the planning and response for civil emergencies.[147] FEMA has arrangements with NRC for nuclear accidents.[148] For chemical accidents FEMA is part of the National Response Center.[149]

Prior to the accident FEMA's involvement with facilities like Sequoyah was limited to commenting on NRC's draft emergency preparedness rulemaking for nuclear fuel cycle facilities.[150]

FEMA learned about the Sequoyah accident from news reports and was never contacted by NRC.[151]

At the hearing Congressman Synar sought to explore why NRC did not do a better job of trying to resolve the jurisdictional issue in responding to Sequoyah.

> Mr. SYNAR. * * * [S]ince the testimony has indicated that the NRC has questions about its jurisdiction in this matter, why didn't the NRC immediately notify any other agencies that it believed might have jurisdiction?
>
> Mr. PARTLOW. * * * In terms of the notification to the other agencies at the table, my first thinking was about EPA. We arranged to have a staff member make a phone call to the Emergency Response Center at EPA. Something went wrong with the phone numbers, the call didn't get through, and it was hours later—because we were working on the situation at the plant—that we realized that. We then arranged for a call to Mr. Harry Calley. In the first hours my thinking was not about the need to make notification, but rather of what we could do about the situation. The need at that point to notify FEMA or OSHA was not apparent.
>
> Mr. SYNAR. So you had no plan or strategy here, you just said, "Well, we better call EPA."
>
> Mr. PARTLOW. We have plans and strategies that cover power reactors when they fall into a certain kind of emergency situation—unusual event, alert, and so forth. Unfortunately we did not have such a system worked out in advance for a plant such as Sequoyah.[152]

[145] Id., at pp. 219-220.
[146] Id., at p. 224.
[147] Id., at p. 239.
[148] Id., at p. 240.
[149] Id., at pp. 239-240.
[150] Id., at p. 242.
[151] Id., at pp. 240-241.
[152] Id., at pp. 242-243.

The committee agrees with Mr. Partlow. A key factor in the lack of interagency coordination following the Sequoyah accident was that NRC was unsure of the scope of its regulatory authority. The committee also finds that neither NRC nor the licensee were fully familiar with the responsibilities and notification requirements of other agencies concening the use, or release, of hazardous chemicals.

V. Summary of the Committee's Findings and Conclusions

On the basis of the subcommittee's review, the committee finds that:

A. The Accident

(a) The Sequoyah accident resulted in the death of one worker and caused temporary or permanent kidney damage to some 35 other workers. The accident sent more than 100 workers and persons offsite to hospitals and doctors for treatment or observation.

(b) The accident could have caused more deaths and injuries if weather conditions had been different.

(c) NRC, in an investigation, identified numerous deficiencies in Sequoyah equipment, procedures, and operations that either caused or contributed to the accident.

(d) The accident raises serious questions about NRC's licensing and inspection process, in that NRC failed to discover these deficiencies before the accident. This failure was, in the committee's opinion, a contributing factor to the accident.

B. NRC's Licensing Program

(a) NRC did not adequately consider, in the licensing process, the possibility that a UF_6 cylinder rupture could occur at Sequoyah.

(b) NRC failed to adequately take note of, or draw lessons from, six previous UF_6 cylinder accidents that had occurred prior to the Sequoyah accident and that had many safety implications for licensed fuel cycle facilities like Sequoyah.

(c) NRC does not, in the licensing process, adequately review or approve operational or safety procedures developed by the licensee.

(d) NRC did not take note of, or require for Sequoyah or similar facilities, important UF_6 handling and safety standards issued by the government in the 1960's. NRC's relicensing process was deficient in not assuring that Sequoyah had incorporated these standards into written procedures.

(e) NRC did not complete its review of Sequoyah's 1982 license renewal application in a timely manner.

(f) NRC regulations allow licensed facilities to operate indefinitely while NRC considers a renewal application. The renewal process sometimes takes too long and may allow some licensees to operate in an unsafe manner if there are serious deficiencies in the renewal application.

(g) NRC failed to address its valid concerns about UF_6 handling and releases in a timely manner through the licensing process for Sequoyah. The Sequoyah license should not have been renewed until the Commission's concerns were satisfied.

(h) NRC failed to adequately review, or check the accuracy of, information provided by Kerr-McGee during the licensing process at Sequoyah.

C. NRC's Inspection Program

(a) NRC does not review and approve all operating and safety procedures in advance of their implementation. For example, NRC was not aware that prior to 1985, Sequoyah's operating procedures did not contain the standard warning against heating an overfilled cylinder or that the procedures had been revised to include the prohibition in January 1985. For this reason NRC's inspection and regulatory program does not assure that licensed facilities are operating in accordance with license requirements and in a manner that best protects public health and safety.

(b) NRC inspections at Sequoyah focused almost solely on radiological safety and the control of releases of radioactive material to the environment. NRC generally did not inspect plant design, engineering equipment, operations, operating procedures, and employee qualifications and training. NRC inspections virtually ignored chemical hazards at the plant.

(c) NRC generally does not inspect fuel cycle facilities to see if all provisions of license agreements or all licensee operations and procedures are being carried out properly. Instead, NRC inspectors check randomly selected procedures.

(d) NRC's inspectors at Sequoyah were all "radiation specialists" or health physicists. NRC requires only that its inspectors have expertise in radiological safety.

(e) NRC inspectors were not aware that Sequoyah's cylinder filling areas were designed for 10-ton cylinders and had not been modified to accommodate 14-ton cylinders, nor were they aware before the accident that it was not uncommon for Sequoyah employees to overfill and then heat UF_6 cylinders.

(f) NRC inspection guidelines call for inspectors to inspect operator training programs. But NRC inspectors were not aware that plant operators were not familiar with the operating procedures containing the prohibition on heating overfilled cylinders. Inspectors also did not know that there was no classroom training of Sequoyah employees as was stated in the license. NRC has not devoted enough attention to the inspection of nuclear fuel cycle facilities.

D. Emergency Response

(a) Sequoyah's Radiological Contingency Plan contained inaccurate and outdated information. For example, the plan contained at least two wrong emergency phone numbers. NRC gave inadequate attention to the accuracy of information in Sequoyah's Contingency Plan.

(b) Emergency response equipment provided for in the plan was inaccessible during the accident.

(c) The plan did not contain adequate procedures for offsite emergency response. For example there were no specific procedures for notifying and evacuating nearby residents in an emergency. And local authorities and emergency response personnel were not properly educated in potential hazards and appropriate response measures to accidents at the plant.

(d) NRC failed to adequately address the need for additional emergency response requirements at fuel cycle facilities in a timely manner. At the time of the Sequoyah accident the Commission had spent five years reviewing emergency preparedness requirements in a proposed rulemaking isued in 1981. The proposed rule still has not been implemented.

E. INTERAGENCY COORDINATION

(a) After the accident, NRC debated the scope of its regulatory authority over Sequoyah.

(b) NRC was not aware of the notification requirements and responsibilities of other agencies which have jurisdiction over chemical hazards and/or releases. For example NRC failed to notify other agencies, such as EPA, about the release at Sequoyah. There also was confusion, in particular between NRC and OSHA, as to the appropriate roles of various Federal agencies in investigating the accident.

VI. RECOMMENDATIONS

On the basis of the subcommittee's investigation and hearing and the foregoing findings and conclusions, the committee makes the following recommendations:

1. NRC should determine, and publicly clarify, its legal authority to regulate all chemical hazards which could affect, either directly or indirectly, the safe use of licensed radioactive material. For example, in the case of a UF_6 conversion plant, NRC should determine whether it has authority over all aspects of the production of UF_6 since UF_6 is both chemically toxic and radioactive. The Commission also should clarify its authority over areas of the plant where there are nonradiological chemicals (such as fluorine storage tanks) if those areas pose hazards to the safe production and use of UF_6.

2. If the Commission feels that it does not have authority to regulate all chemical hazards at the facilities which it licenses, it should determine whether other Federal agencies have such authority. In that event NRC should develop definitive cooperative agreements with those agencies to clarify the divisions of authority and the procedures to be followed to assure that all agency requirements and responsibilities regarding chemical hazards or releases at NRC-licensed facilities are met.

3. If NRC feels that no Federal agencies have adequate regulatory authority over chemical hazards and operations at NRC-licensed facilities, the Commission should recommend to Congress whether NRC or some other Federal agency should be granted such authority.

4. NRC should identify and provide licensing guidance and reviews for all aspects of licensed facilities which could affect the safe use of licensed radioactive material.

5. NRC should require license reviewers to have qualifications and training for all aspects of licensed facilities which affect the safe use of licensed radioactive material.

6. NRC should amend its regulations to require that licensees submit license renewal applications far enough in advance of the expiration date of the license to allow NRC sufficient time to adequately review the renewal application before the license expires. NRC should make every effort to eliminate any unnecessary delays in reviewing license renewal applications.

7. In the event that NRC attaches conditions to its renewal of a license requiring the licensee to take certain actions, the Commission should follow up to ensure by means of a safety evaluation inspection and report that the actions have been carried out.

8. NRC should consider conducting a plant-wide inspection to verify that a licensee actually is carrying out license requirements and agreements before approving renewal of a license.

9. NRC should revise its inspection program to ensure that inspections cover all areas of licensed facilities which would affect the safe use of licensed radioactive material. Inspectors should focus heavily on plant operations, procedures, equipment, employee training, and emergency response.

10. NRC inspections of fuel cycle facilities should utilize individuals having qualifications and training in all areas of the facilities which affect environmental safety and health, not just those involving radiological hazards. If necessary, NRC should consider use of inspection "teams" to insure that such qualifications and training are represented on the team.

11. NRC should consider conducting joint inspections with representatives from other agencies at licensed facilities when those facilities are subject to the jurisdictions of other agencies.

12. The Radiological Contingency Plans of fuel cycle facilities should be reviewed and revised as necessary in order to correct the inadequacies discovered as a result of the Sequoyah accident and to assure that nonradiological hazards are adequately addressed.

13. The revised fuel cycle facility emergency response plans should, among other things:

   (a) Fully describe the notification requirements and other responsibilities that licensees have for all Federal and State agencies in emergencies;

   (b) Require employee training in, and annual updates of, the plan;

   (c) Require periodic emergency drills and exercises involving offsite emergency personnel and nearby residents, as well as headquarters and regional officials from NRC; and

   (d) Provide for licensee and NRC evaluations of all emergency drills.

14. Before approving revised fuel cycle facility emergency response plans, NRC should take part in, and monitor, test implementations of the plans.

15. Fuel cycle emergency plans should be reviewed by the same NRC officials who review nuclear power plant emergency plans as well as by the officials responsible for licensing and regulating fuel cycle facilities.

16. NRC's Headquarters Operations Center should have on hand, or have immediate access to, copies of all emergency response plans for licensed facilities.

17. In the event of an emergency at a licensed facility, NRC should set up one or more 24-hour "hot lines" (rumor control centers) to provide information to local residents, news media, and others.

18. NRC should propose, as soon as possible, a rule on emergency preparedness for fuel cycle facilities which would strengthen preparedness requirements and reflect some of the lessons learned from the Sequoyah accident. At a minimum the rule should require that State and local officials and nearby residents be actively involved in emergency planning and periodic emergency drills for licensed facilities.

REPORT:
RELEASE OF NITROGEN DIOXIDE
SEQUOYAH FUELS
GORE, OKLAHOMA
11/17/92

Prepared upon request for :

UNITED STATES NUCLEAR REGULATORY
COMMISSION

Submitted to:

L.J. Callan
Director, DR5S
U.S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011

Prepared by:

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Attachment 4

The University of Oklahoma
Health Sciences Center

DEPARTMENT OF FAMILY MEDICINE
College of Medicine
Division of Occupational Medicine

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cc:
Milhoan
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Cain
Kasner
Vasquez
Gilliland
Sanborn
Docket File

December 11, 1992

Mr. L.J. Callan
Director, DR5S
U.S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011

Dear Mr. Callan:

Enclosed please find the report requested regarding an 11/17/92 incident at Sequoyah Fuels plant in Gore, Oklahoma.

If you have additional questions you may reach Dr. Mitchell at 405-271-6177 and Dr. Coleman at 405-271-2070.

Thank you for allowing us the opportunity to be of service to the NRC.

Sincerely,

Lynn Mitchell | Ronald B. Coleman

Lynn V. Mitchell, M.D., M.P.H. | Ronald B. Coleman, Ph.D.

LVM:RBC:pg
ENCL (11 pg)

Ronald Coleman, Ph.D. and Lynn Mitchell, M.D., were called to assist an Augmented Inspection Team of the Nuclear Regulatory Commission (NRC) composed of Bill Fisher and Linda Kasner to investigate a non-radiological event that took place at the Sequoyah Fuels Plant, Gore, Oklahoma on November 17, 1992 at approximately 0815. Information was gathered by oral interviews with NRC employees Bill Fisher and Linda Kasner as well as from medical personnel. These medical personnel included LaNell Boyer, R.N. (nurse at Sequoyah fuels), Max Yancy, D.O., Sallisaw, Oklahoma, and Robert Fox, D.O., Wagoner, Oklahoma. No "exposed individuals" were directly interviewed.

EVENT DESCRIPTION

Operating practice at the facility utilizes nitric acid with the slow addition of yellow cake to form urinylnitrate and subsequently uranium hexaflouride. During this procedure on 11/17/92, 8,800 pounds of yellow cake had been deposited into a dry digester prior to the addition of nitric acid. This nitric acid-yellow cake sequence was in a reverse order of the Standard Operating Procedure (SOP) whereby an exothermic reaction formed and nitrous products were released. It is estimated that the reaction completed in approximately 10-20 minutes with the release of 2,700 pounds of nitrogen dioxide. The highly visible nitrogen dioxide plume exited the process building from two large outside exit sources and was blown northwest by a southeasterly wind at approximately 10-15 mph, across the river over the area of American Nursery and subsequently dispersed as it reached the area of Gore.

Photographs taken by a Sequoyah Fuels employee show a dark red/brown plume. American Nursery tree farm employees reported a cloud which changed from dark red to orange to a yellowish cast. As observed by the nursery employees, the plume obscured all portions of Sequoyah Fuels except the top of the tallest "Sequoyah Fuels stack." Further, this plume proceeded from Sequoyah Fuels and passed over the nursery. The plume then continued to disperse as it probably passed over the city of Gore approximately two (2) miles from the American Nursery. Residents of Gore apparently reported no visible plume and no eye or respiratory irritations.

EXPOSURE-RESPONSE COMMENTS

Dreger measurements for nitric acid were performed immediately following the emission at the release site and in Gore and those computations are being processed. No particular personal protective equipment was utilized during the time of the release other than some individuals in the control room who donned self-contained breathing apparatus' at some time during the release. Monitoring by Sequoyah Fuels demonstrated no significant loss of radioactive materials or uranium.

The contents of this emission were assumed to be nitrogen dioxide with minor amounts of nitric acid and other oxides of nitrogen. As moisture became available in the moving plume, greater proportions of nitric acid to nitrogen dioxide would be present while total concentrations were being diluted. Other oxides of nitrogen may have been present however, the amounts were assumed to be insignificant in terms of potential adverse health effects. With respect to nitric acid, at the moist tissue locations, the formation of nitric acid from nitrogen dioxide would be consistent with the toxicological properties of nitrogen dioxide. Minor amounts of nitric acid in the plume would behave toxicologically consistent with nitrogen dioxide. Thus, all potential adverse health effects would be consistent with exposure to nitrogen dioxide.

The literature concerning nitrogen dioxide describes the gas as dark brown, with a pungent acid odor and a density heavier than air. The odor detection is variously reported as 0.12 parts per million (ppm) and more frequently as 1 to 2 ppm. The TLV-

TWA is 3 ppm and the Occupational Safety and Health Administration (OSHA) transitional limits are a Permissible Exposure Limit (PEL) of 5 ppm and a final rule limit for STEL of 1 ppm.

For short term exposure via inhalation, 10 to 20 ppm can cause mild irritation of the nose and throat. Higher concentration (e.g. 25-50 ppm) can cause an inflammation of the lungs. Other expressions of symptoms consistent with nitrogen dioxide exposure are coughing, choking, headache, nausea and stomach or chest pain. These symptoms may occur during exposure or from 5-72 hours after for lesser concentrations. Dosages, in terms of concentration, and time in excess of those assumed to exist off-site in this event, can be toxicologically more extensive and serious, but were outside the exposure scenario assumed to have existed.

MEDICAL INTERVIEWS

Evaluation of the individuals reporting signs and symptoms include: 8 ± people employed by the Sequoyah Fuels Plant who were in and around the control room and/or facility where the procedure was being carried out, 3 fishermen who were actively engaged in fishing activities at the river when the cloud (plume) migrated their way, 24 individuals present at the American Nursery site across the river from Sequoyah Fuels, two individuals employed by a sand and gravel company, and one person who reported visualizing the plume while in route to Webber, Oklahoma.

At this time, the predominance of the Plant employees have been evaluated by Dr. William R. Anderson, Plant physician. A personal conversation with Dr. Anderson was not conducted. The NRC Inspection Team had carried out interviews with Dr. Anderson prior to and following our evaluation visit.

The following is a chronological report of the interviews conducted with the medical personnel.

A personal interview was carried out with Dr. Yancy on 11/24/92. He related the following information: Twenty-one (21) individuals from the American Nursery site have seen Dr. Yancy, with primary complaints being irritation of throat, mucous membrane irritation, and cough. Dr. Yancy uniformly evaluated these patients with a chest x-ray, Chem 20, UA and CBC as well as a comprehensive history and physical examination. He states that he has evaluated 7 individuals who had corneal abrasions all of which resolved except one who had a subsequent second injury with a bush which was unrelated to the nitrogen dioxide release. He has seen two or three individuals who complained of nausea, however, only one of whom has had emesis associated with that complaint. This individual also had anorexia and mild dehydration with a resolution of those symptoms over the week-end following the emission and then on return evaluation was asymptomatic for those complaints. Two to three individuals have also reported a burning sensation of their chest with shortness of breath (SOB), however Dr. Yancy reports that no objective signs of SOB have been noted and vital signs, including respiration, have been within normal limits (WNL) for the 21 individuals he has seen. A couple of individuals initially had an increase in blood pressure, but on recheck at a later date were noted to be WNL. He states he placed 3-4 individuals on Cipro (a broad-spectrum antibiotic) for a five day course due to complaints of bronchiolytic-type symptoms--primarily cough. One individual, Mr. Chad Miller, was given an intramuscular (IM) steroid injection and placed on a Medrol dose-pack (an oral steroid) as well as antibiotics, but had continuing symptoms and was evaluated in the Muskogee Emergency Room and referred to Dr. Lee, a pulmonologist in Muskogee, for a pulmonary evaluation.

One individual had viral type symptoms and was placed on Vancenase AQ (an inhaler), Amoxicillin (an antibiotic) for a rhinitis-type picture and did have some oral blistering which Dr. Yancy felt was consistent with viral sequlae.

Dr. Yancy reports that to define the 3 most significant cases he saw would be:

1. Chad Miller, the individual who had a burning sensation with SOB, was placed on steroids and antibiotics and subsequently is being referred for pulmonary evaluation.
2. Mr. Fieldhouse, the individual with nausea and vomiting who has since recovered and
3. The individual who had a significant corneal abrasion but was unable to fill his prescription until 2 days following that being prescribed and had an exacerbation of those symptoms.

Two of the individuals with corneal abrasions are to be seen 11/25/92 in follow-up. To my knowledge, there are no return appointments scheduled for any of the other individuals. Dr. Yancy states he did not see any female employees and there was no significant past medical history on these individuals that should be noted, such as asthma or chronic obstructive pulmonary disease (COPD). He states he released the individuals to work with the restrictions of no driving or machinery operation for the individuals with the corneal abrasions. In his estimation, Dr. Yancy reported that 70-80% of the individuals that he saw (21) had objective symptoms to the point that he [illegible] them to be consistent with an exposure to nitrogen dioxide. He said 100% of the individuals expressed anxiety over the situation. He offered the individuals information concerning nitrogen dioxide and told them by his own report that he did not think there would be any chronic sequelae or need for long-term follow-up with the acute symptomatology they were presently experiencing.

NOTE: The individuals related to Dr. Yancy the history of the exposure as a dark red cloud that turned orange then yellow that was approximately ground to eye level producing a bitter taste and a burnt smell. They estimated their exposure at 10-15 minutes. Some of the individuals did put cloths or handkerchiefs over their mouth and nose during the time and did try to leave the site of the cloud and/or get above it.

Conversation on 11/30/92 with LaNell Boyer, R.N., nurse at Sequoyah Fuels.
A telephone conversation was held with Ms. Boyer on 11/30/92 pm. She reports having seen four employees initially and 2 contract employees following the incident. At that time, the main complaints were sore throats, congestion and some chest tightness. One female employee did report nausea and vomiting for a one day episode and some eye irritation symptoms. One individual, Mr. Dan Howard, who was in the control room at the time of the incident was initially treated with oxygen for coughing and SOB, and was later seen by Dr. Anderson as were all of the six individuals. One other individual, Mr. Johnny Sumpter was subsequently seen by Dr. Anderson and started on steroids for what was considered to be minor pulmonary edema 48 hours following the incident. She states three or four other employees were later seen with like symptoms over the next 2-3 day period. At this point, approximately two weeks since the time of the incident, to her knowledge, all the Sequoyah Fuels employees are asymptomatic and have returned to full duty or lay-off respectively without further difficulty.

In follow-up with Dr. Yancy on 11/30/92, he reported seeing two sand and gravel employees following our meeting last Tuesday afternoon November 24th. The sand and gravel plant is reported to be located west of the tree farm along the river. One of the individuals complained of SOB while deer hunting the previous Saturday and the other individual was in for a general evaluation without major complaint. They said they didn't know when the incident had actually taken place because they were sand blasting at the time. They did not see a cloud and did have on protective eye equipment, as well as possibly protective masks for respiratory protection during the time of sand blasting. Dr. Yancy stated to me that he did not believe these individuals showed any objective signs consistent with exposure at the time of his evaluations.

One individual, who Dr. Yancy reported seeing, was hauling a load of soy beans on Highway 64 to Webber, Oklahoma. Over a period of approximately 30 minutes traveling to and from Webber, the individual reported seeing the cloud at the time of the incident. He however was seen for a gastrointestinal problem and Dr. Yancy did not feel that this was related to any possible exposure that might have occurred.

He also said he had been contacted by Mr. John Cochran who reported that he was no better and that he had a splitting headache possibly from coughing. He initially was treated with Cipro, Medrol Dose Pack and Tesalon Pearls (an antitussive) and was told by Dr. Yancy at the time of phone follow-up that it was an unlikely possibility that the headache he is experiencing at this point was from the possible exposure. He also notes that at this point, reviews of lab and x-rays collected on all the individuals who he evaluated showed normal variations, but no striking abnormalities had been noted and no consistent abnormalities throughout the 21 individuals initially seen from the tree farm.

A telephone interview was conducted with Dr. Fox on 12/2/92. He reports seeing two individuals from American Nursery. These individuals reported complaints consistent with those reported by other nursery workers to Dr. Yancy. They also had additional complaints of blisters in their mouths and severe headaches. They were treated with steroid injections and an inhaler. Follow up found these two workers without improvement by Dr. Fox's report and with additional symptoms. These included ear ache with a noted bleeding spot in one's external auditory canal as well as a pruritic skin rash on the body trunk. The other reported a 12 pound subjective weight loss associated with nausea and vomiting.

By Dr. Fox's report, due to the increased symptoms of these two patients, they were hospitalized on 11/30/92. At the time of hospitalization, they received intravenous (IV) fluids and evaluations to include blood lab, chest x-ray, and PFTs. Remarkable findings for one individual included an elevated glucose and moderately restrictive airway disease on PFTs. Chest x-rays were clear by his report. The findings and/or response in one worker may have been complicated by a history of asthma and aortic stenosis.

In final follow-up, Dr. Yancy was contacted on 12/9/92. He reported a telephone conversation with Mr. Miller but no formal re-evaluation had been done. He told Mr. Miller at that time to seek re-evaluation and/or treatment with himself if that was needed. No further follow-up is schedule to Dr. Yancy's knowledge.

Also, he noted several of the American Nursery workers had microscopic RBC's noted in their initial UA's and he was recommending this be repeated at a future date with appropriate evaluation if needed. No further medical issues were discussed pertinent to the patient evaluations completed by Dr. Yancy regarding this report.

On 12/9/92, a final follow-up telephone conversation was held with Dr. Fox. He reported that the two hospitalized individuals had been discharged and were, by his report, continuing to have nausea and vomiting. He theorized that there symptoms at this time were secondary to pain medication being taken for the other reported symptoms, i.e. headaches.

Dr. Fox also reported seeing two individuals with ongoing complaints of respiratory symptoms and persistent headaches, Mr. Chad Miller and Mr. John Cochran. He is continuing their treatment with antibiotics and bronchodilators and is scheduled to provide continuity care for them related to these complaints.

CONCLUSIONS

Following a review of the toxicological properties of nitrogen dioxide, nitrous oxides, and nitric acid, the individuals who reported viewing and/or inhaling fumes from the cloud are experiencing and expressing signs and symptoms consistent with exposure to the above named products. The signs and symptoms reported by Drs. Yancy, Anderson, and Fox are consistent with those noted in the literature. No signs or symptoms have been noted that would lead one to believe these are not valid and objective reports and determinations. While the oral lesions and bleeding external auditory canal are not reported numerous times, the nitrogen dioxide and resulting nitric acid are certainly mucous membrane irritants. Therefore, these complaints would not be out of the line of typical expected response.

It certainly appears from the medical information that we have attained that most of the symptomatology was mild and self limiting and we would expect that to continue to be the case. Literature based on well-founded epidemiological studies does report the recurrence of a three-fold response in individuals who have been heavily exposed, greater than 50 ppm for a period of 60 minutes of more to include a triad of pulmonary edema, progressing to fibrosis with resulting bronchiolitis obliterans in the worst case scenario. It is doubtful, at this time, that most individuals could expect any of these more severe sequelae to occur given the current estimates of time and dose relationship.

It does appear that Dr. Fox, at this time, is continuing to see individuals with persistent reports of pulmonary complaints and headaches. A continued evaluation to fully establish the etiology of these problems is encouraged so that hopefully a resolution can be forthcoming.

Also, if other individuals remain symptomatic, it certainly would be appropriate for follow-up with Pulmonary Function Studies, ABGs, and chest x-rays to be obtained on a interval basis to document any changes and appropriate medical evaluation and treatment instituted to hopefully lessen the severity of any of these future symptoms. It is my understanding that Dr. Fox will be conducting this follow-up for those employees currently in his care. This would not be recommended on a routine basis for individuals only experiencing mild self-limited symptomatology after a short history of exposure.

We appreciate the opportunity to assist in this effort and look forward to working with you in the future.

Respectfully submitted,

Lynn V. Mitchell

Lynn V. Mitchell, M.D., M.P.H.

Ronald B. Coleman / JG

Ronald B. Coleman, Ph.D.

NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064

Attachment 5

RECEIVED DEC 2 1 1992

DEC 1 8 1992

Docket: 40-8027
License: SUB-1010

Sequoyah Fuels Corporation
(Subsidiary of General Atomics)
ATTN: James J. Sheppard, President
P.O. Box 610
Gore, Oklahoma 74435

Gentlemen:

SUBJECT: NRC INSPECTION REPORT NO. 40-8027/92-30

On November 17, 1992, an NRC Augmented Inspection Team (AIT) was dispatched from NRC Region IV to the Sequoyah Fuels Corporation (SFC) facility to review an event that had involved a release of nitrogen dioxide, a toxic gas, earlier that day. The subsequent AIT inspection on November 17-21, 24, and 25, 1992, considered the nature of the event, its cause and effects, and the actions of SFC personnel in responding to it.

The enclosed inspection report describes the tasks assigned to the AIT, the areas examined during the inspection, and the AIT's findings and conclusions.

On November 18, 1992, the AIT briefed the media on what was known about the event. On November 20, 1992, the AIT met publicly with SFC management to discuss the status of the inspection and to answer questions from the licensee and the public. Upon concluding the AIT inspection on November 25, 1992, the inspection findings were presented to SFC management during a public exit meeting.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be placed in the NRC's Public Document Room.

We will be pleased to discuss any questions you have concerning this inspection

Sincerely,

James L. Milhoan

James L. Milhoan
Regional Administrator

Enclosure:
Appendix - NRC Inspection Report
40-8027/92-30 w/attachments

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cc:
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APPENDIX

U. S. NUCLEAR REGULATORY COMMISSION
REGION IV

Inspection Report: 40-8027/92-30

License: SUB-1010

Licensee: Sequoyah Fuels Corporation
P.O. Box 610
Gore, Oklahoma 74435

Facility Name: Sequoyah Facility

Inspection At: Gore, Oklahoma

Inspection Conducted: November 17-21 and 24-25, 1992

Team Members: G. M. Vasquez, Senior Health Physicist, Division of Radiation Safety and Safeguards

L. L. Kasner, Senior Radiation Specialist, Division of Radiation Safety and Safeguards

C. H. Robinson, Chemical Engineer, Fuel Cycle Safety Branch, Nuclear Material Safety and Safeguards

Team Leader: William L. Fisher 12/18/92
W. L. Fisher, Chief, Nuclear Materials Licensing Section
Division of Radiation Safety and Safeguards — Date

Approved: L J Callan 12/18/92
L. J. Callan, Director, Division of Radiation Safety and Safeguards — Date

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TABLE OF CONTENTS

DETAILS

1 INTRODUCTION (93800)

The Nuclear Regulatory Commission (NRC) has established a comprehensive program to provide for the timely, thorough, and systematic inspection of significant operational events at NRC-licensed facilities. This program includes the use of an Augmented Inspection Team (AIT) to determine the causes, conditions, and circumstances of an event and to communicate findings, safety concerns, and recommendations to NRC management and the licensee. In accordance with NRC Inspection Manual Chapter 0325, "Augmented Inspection Team," and Inspection Procedure 93800, "Augmented Inspection Team Implementing Procedure," on November 17, 1992, an AIT was sent to the Sequoyah Fuels Corporation facility (SFC) near Gore, Oklahoma, to review an event that had released a cloud of nitrogen dioxide gas to the environment earlier that day.

In consultation with the Office of Nuclear Material Safety and Safeguards, Region IV dispatched the AIT to gather facts related to the cause of and the licensee's response to the event. Specifically, the AIT was instructed to:

- Determine and document plant conditions and the sequence of events.
- Assess the radiological and chemical consequences of the event.
- Assess the effect, if any, of maintenance, operational procedures, and training upon the event and upon the licensee's response to the event.

The tasks of the AIT were defined in a memorandum dated November 17, 1992, from J. L. Milhoan, Regional Administrator, to W. L. Fisher, AIT Team Leader. (See Attachment A to this report.)

2 EVENT DESCRIPTION

2.1 System Description

2.1.1 Digestion

The licensee uses digesters to dissolve "uranium concentrate" (uranium compounds, such as oxides and diuranates) for feed to the solvent extraction system. The batch dissolution process in the digesters reacts uranium concentrate with nitric acid to form uranyl nitrate. The operation typically charges 12,000 pounds of uranium concentrate to a mixture of 1500 gallons of 40 percent nitric acid and 500 gallons of 60% nitric acid. Screw-type feed conveyors transfer the uranium concentrate from digester feed hoppers to the digesters.

The exothermic reaction of the uranium concentrate with nitric acid evolves nitrogen oxides. The reaction is controlled primarily by adjusting the rate at which the uranium concentrate is added to the nitric acid. The composition of the nitrogen oxides evolving from the reaction depends upon the nature of the uranium concentrate being fed and the molarity of the nitric acid.

2.1.2 Off-gas Handling

The digesters are ventilated through an off-gas wet scrub system, which includes a digester fume scrubber, a nitric acid recovery system, and a nitrogen oxide emission control (NOxEC) system.

Off-gases from the digesters are scrubbed in the digester fume scrubber, to remove particulates and a portion of the nitrogen oxides, before being processed through the nitric acid recovery system and the NOxEC system. This fume scrubber is equipped with an ejector to maintain a sufficient vacuum on the digesters. The vacuum sustained by the ejector is measured in the digesters.

Nitric acid recovery is accomplished with absorber towers. The NOxEC system prevents the evolution of noxious fumes into the atmosphere under normal operating conditions. A chemical scrubber uses sodium hydrosulfide to convert NOx gases to elemental nitrogen gas for unrestricted release. The vacuum sustained within the nitric acid recovery system is controlled and monitored from the control room.

2.2 <u>Process Systems and Components</u>

2.2.1 A screw-type feed transfer conveyor moves uranium concentrate from the feed hoppers to the digesters. The conveyor consists of a shaft-mounted helicoid that turns in a trough and that can operate in either direction. Power to convey is controlled from the control room board. Screw conveyors provide good control for feed applications where control of transport rate is required.

2.2.2 Sliding gate valves control the entry of uranium concentrate into the digesters. The gate valves allow selective discharge from the feed transfer conveyor to different digesters. Gate valves are used to stop the flow of uranium solids, not to regulate the flow.

2.2.3 A fume scrubber ejector creates a vacuum to remove gases generated in the digestion process. In the ejector, the kinetic energy of the scrubber fluid is used to create a vacuum for the digesters. The ejector consists of a nozzle which discharges a high velocity jet across a suction chamber connected to the digesters. Scrubbing fluid passing through a venturi develops a suction, causing digester off-gases to be entrained in the stream and passed through the scrubber system.

2.3 <u>General Description of the Event</u>

At 8:52 a.m., on November 17, 1992, a release of about 2700 pounds of nitrogen dioxide gas occurred in the digestion area of the main process building. The duration of the release was about 20 minutes.

The release resulted from an uncontrolled chemical reaction that occurred when nitric acid was added to a digester thought to be empty but which actually contained a significant quantity of uranium concentrate. The uncontrolled reaction between the uranium concentrate and the nitric acid released nitrogen oxide gases (NOx), primarily nitrogen dioxide (NO_2).

The inadvertent addition of uranium concentrate into the digester before adding nitric acid eliminated the operator's ability to control the reaction. The resultant uncontrolled reaction forced the nitrogen oxide gases out of the digester and into the digester area of the main process building. The gas escaped the main process building and was carried by a southeasterly wind toward Gore, Oklahoma, about 3 miles northwest of the plant.

On November 18, 1992, NRC Region IV issued a CONFIRMATORY ACTION LETTER to document the licensee's intent not to restart its uranium processes before investigating the event and obtaining NRC concurrence to restart. (See Attachment B to this report.)

2.4 Sequence of Events

The sequence of events was developed by the Augmented Inspection Team (AIT) from interviews with operators and from a review of the digest batch logs, the digest tank sample analysis logs, and the digest strip chart recorder.

2.4.1 Initial Operating Conditions

The AIT evaluated activities which established initial conditions before the event.

During the first shift (midnight to 8 a.m.) on November 17, 1992, operations was conducting routine dissolution. Uranium concentrate was being processed in digester No. 3 without any apparent abnormal conditions. After the shift turnover at 8:00 a.m., digester No. 2 was charged with approximately 1300 gallons of 40 percent nitric acid and 300 gallons of 60 percent nitric acid in accordance with operating procedures. This charging of nitric acid apparently initiated the reaction.

2.4.2 Chronology of Events

Date	Time(EDT)	Description of Events
Initial Conditions		
11/17	0:00 - 7:00 a.m.	Operator A charged 1500 gallons of 40 percent nitric acid and 500 gallons of 60 percent nitric acid into digester No. 3. Operator A removed 12,000 pounds of uranium concentrate from hoppers, of which about 3200 pounds was transported intentionally to digester No. 3 and about 8800 pounds was transported inadvertently

	to digester No. 2. Operator A maintained temperature control and vacuum for digester No. 3.
11/17 8:00 a.m.	Shift turnover occurred.
11/17 8:00 - 8:50 a.m.	Operator B charged 1300 gallons of 40 percent HNO_3 and 300 gallons of 60 percent HNO_3 to digester No. 2.

Event

11/17 8:50 a.m.	Inadvertent and uncontrolled chemical reaction occurred in digester No. 2.

Follow-up Actions

11/17 1:13 p.m.	Digester No. 2 sample results indicated 418 grams of uranium per liter of solution (gU/l) and 3.54 molar (M).
11/17 2:20 p.m.	Digester No. 3 sample results indicated 268 gU/l and 5.30 M.

2.4.3 Process Conditions During Event

The strip chart recorder indicates that digester No. 2 was at ambient temperature until about 0800 hours, when a temperature drop occurred at the approximate time nitric acid was added. A rapid temperature increase occurred at approximately 8:50 a.m.

The strip chart recorder indicates that a steady vacuum was being maintained at 1.25 and 0.70 inches of water for digesters No. 2 and No. 3, respectively. (Note: Historical data show that the vacuum sustained on digester No. 3 was always less than that on digester No. 2.) Also, the vacuum data for both digesters parallelled one another.

At the time of the event, the strip chart recorder showed a vacuum of 0 inches of water for both digesters, indicating that positive pressure existed in both digesters.

2.4.4 Conditions Following Event

Samples from the digesters, which were under agitation to produce a homogeneous sample, showed the concentration and molarity to be 418 gU/l and 3.54 M for digester #2, and 268 gU/l and 5.3 M for digester No. 3. From these concentration values and the known amount of nitric acid charged to the digesters, the mass of uranium concentrate inadvertently transported to digester No. 2 was determined and the amount of evolved NOx gas was estimated.

3 RESPONSE

3.1 Background Information

The SFC emergency response program is described in several series of documents which provide instructions for plant personnel. The overall governing document is the Sequoyah Fuels Corporation Contingency Plan, which is incorporated by reference in Sequoyah Fuels' NRC license. The current version of the contingency plan is Revision 5, dated December 1988. SFC is permitted to modify the contingency plan without amending its NRC license, provided that the modification does not reduce the effectiveness of the plan. On September 24, 1992, the licensee modified the plan to document the relocation of emergency equipment within the plant, as discussed in Section 3.7 of this report. These modifications were approved by NRC, as documented by Amendment 17 of License SUB-1010, dated November 10, 1992.

The contingency plan is supplemented by facility procedures titled Contingency Plan Implementing Procedures (CPIPs). This group of procedures provides instructions to be used by the staff for classifying events, for responding to events, and for making required onsite and offsite notifications concerning events. The licensee maintains supplemental documents in the control room, including records of telephone numbers for all required contacts, to ensure prompt notification of local, state, and federal agencies, and local residents, when required.

The AIT review of the licensee's response to the November 17, 1992, event focused upon emergency response actions taken, relative to instructions provided in the contingency plan and CPIP procedures. The review also focused upon other actions taken by the SFC staff in assessing and responding to the onsite and offsite effects of the release of nitrogen dioxide gas (NO_2).

Although several concerns were identified with regard to the licensee's response to this event, the AIT was not chartered to determine whether the concerns involved enforcement issues. That aspect of the November 17, 1992, event will be considered during a future inspection.

3.2 Initial Observation and Notification

At approximately 8:50 a.m. on November 17, 1992, using the plant public address system, control room operators instructed plant personnel that nitric acid fumes had been released in the main process building, that they should evacuate the west portion of the building and that they should gather in the east portion of the building. This announcement, which applied only to personnel in the main process building, was based upon information provided by several individuals who, having seen a dense, brown cloud near the digestion area and liquid spraying from a digestion tank, had reported their observations by radio to the control room.

3.3 Declaration and Termination of the Emergency

Two shift supervisors in the area then confirmed the digestion area release and directed the control room operators to declare an "Unusual Event." At 8:54 a.m., control room operators declared an unusual event over the facility public address system and instructed plant personnel in the main process building to evacuate to the south guardhouse. The announcement indicated that "nitric acid fumes" had been released in the main process building. The licensee did not activate the site alarm horn at this time.

Initial classification as an unusual event was inconsistent with the contingency plan and CPIP procedures, which define unusual event as an event indicating potential degradation in the level of safety of the plant. By definition, an unusual event involves no release of hazardous materials requiring offsite response or offsite monitoring.

On the other hand, the "Alert" classification is defined as an event which indicates actual or potential substantial degradation in the level of safety of the plant. Under the alert classification, any release of radioactive or other hazardous material may be significant onsite, but is expected to be well below concentrations significant to the health and safety of the offsite public. From its inception, the November 17, 1992, event appears to have required an alert classification, because the release resulted in an immediate degradation in the level of safety within the plant.

Plant personnel had observed a plume of gas leaving the main process building and heading northwest over the restricted area of the SFC site. (The plant's records show that the wind was from 153 degrees at 10 mph with gusts to 25 mph.) However, because of problems encountered with radio communications during the event, the onsite emergency director, who was located in the control room, was unaware that the plume was moving out of the main process building and threatening to move offsite. The safety engineer, having determined that the plume was likely to move beyond the site boundary, entered the control room to notify the senior shift supervisor (the onsite emergency director at the time) that the event should be upgraded.

At approximately 9:10 a.m., the event was upgraded to a "Site Area Emergency." The site area emergency announcement, which included local site announcement over the public address system, activation of the site alarm horn, and notification of several local, state, and federal agencies by telephone, apparently stated that the material released was nitric oxide fumes.

The announcements first that the material released was nitric acid fumes and then later that it was nitric oxide fumes might have confused health and safety personnel who were not well informed about potential chemical releases. For example, health and safety technicians initially used the wrong Drager sampler tubes to sample air in the main processing building. Instead of using sampler tubes intended for nitrogen dioxide, the main component of the released gas, they used sampler tubes designed for nitric acid.

From about 9:10 a.m. to 9:20 a.m., plant personnel continued to implement the licensee's emergency response program and to establish onsite and offsite response organizations as specified in Section 3 of the licensee's contingency plan. Implementation of the emergency response program included the transfer of onsite emergency director responsibilities from the senior shift supervisor (control room operations staff) to the manager of operations.

The onsite emergency log documented that the health and safety staff within the plant had taken Drager tube samples from various areas within the plant and had cleared the engineering and office areas before 9:51 a.m., but had reported "problems" in the maintenance shop and digestion areas at that time. Minutes before the event was terminated, at approximately 9:47 a.m., control room operators reported to the onsite emergency response center that the plant appeared to be clearing.

The site area emergency was terminated at 9:51 a.m., at the direction of the onsite emergency director, with an announcement for "...all personnel (to) return to their work stations." Reviews of the onsite emergency log and discussions with emergency response team members indicated that the decision to terminate the site area emergency had been based on information provided by a health and safety technician assessing the hazards inside the main process building during the event. The hazards assessment and control coordinator, who according to CPIP-21 was responsible for determining the extent of the release and the attendant hazards within the plant, was not consulted in the final decision to terminate the Site Area Emergency.

A condition report submitted by a health and safety technician after the event stated that one individual had reentered an area which had not yet been checked by the health and safety staff, and in doing so inhaled residual gases unnecessarily.

Based upon the examples above, discussions held with licensee staff, and review of emergency logs, the AIT concluded that the licensee's classification and termination of the event lacked coordination between critical plant personnel and members of the onsite emergency response team.

3.4 Offsite Notification

The site area emergency announcement indicated that nitric oxide fumes had been released. Subsequent notifications to the public indicated that nitric acid fumes had been released during the event. Thus, the licensee's initial communications to the public did not properly characterize the effluent, which consisted primarily of nitrogen dioxide.

Between 9:00 and 9:15 a.m., two Sequoyah Fuels Vice Presidents left the site independently to determine the plume characteristics and the threat to the general public. One vice president met with the Mayor of Gore, about 3 miles downwind from the plant. Both vice presidents reported that the plume appeared to be above ground such that personnel in its path might not have been exposed.

In addition to meeting with the Mayor of Gore, Sequoyah Fuels personnel also contacted the Mayor of Webbers Falls and other public officials regarding the release.

3.5 Offsite Monitoring

Noting that the plume was traveling offsite, approximately 10 minutes after the event began and before the declaration of a site area emergency, the manager, environmental, and an environmental engineer took NO_2 Drager tubes from the emergency kit at the south gatehouse, left the site, and drove to the town of Gore. They reported seeing a slight yellowish haze about 200-300 yards wide and 100-200 yards above the ground. They drove in front of the plume, as best they could determine, and took air measurements using the NO_2 Drager tubes. The Drager tube measurements showed no detectable NO_2, and the two individuals stated that they had not been able to smell or taste NO_2.

The licensee determined in retrospect that it had not been prudent for the environmental engineer to leave the site, because he held an alternate position on environmental assessment in the emergency response organization. However, since the individual designated as the primary was available, the environmental engineer's absence did not decrease the effectiveness of the emergency response organization.

The licensee also determined that an additional emergency kit had been needed at the south gatehouse for use by the environmental department. At the time of the event, the only emergency kit at the south gatehouse was intended for use by the health and safety department. The environmental department's designated emergency supplies were at the Carlisle training center.

Between 9:10 and 9:15 a.m., two Sequoyah Fuels senior health and safety technicians were dispatched to Gore to measure air concentrations. They reported that the plume was visible from Highway 64 on the way to Gore and that it appeared to be above the ground. The plume was not visible to them in Gore, but they estimated its location and obtained air samples, presumably near the plume centerline. The technicians took a 5-minute high volume air sample for uranium analysis and a Drager tube sample for NO_2 at three locations: near the Gore High School, at a convenience store near the intersection of Highways 100 and 64, and at the intersection of River Road and Highway 64. None of the samples indicated detectable NO_2 or uranium.

After the release had ended, the licensee analyzed an air sample from a fenceline air sampler which was believed to have been in the plume pathway. This air sample indicated 4 percent of the maximum permissible concentration (MPC) for uranium effluents to unrestricted areas.

Main process building roof vent samples indicated a maximum release concentration of 2 MPC by that path. This did not appear to be inconsistent with the fenceline air sample. Therefore, the team concluded that no measurable uranium had been released offsite during the event.

The licensee's documentation of surveys and air concentration measurements was weak, in that some technicians had not documented surveys as they occurred. As a result, the times that air samples had been taken were estimated only to within 10 minutes, sampling locations were not well known until the technicians were reinterviewed, and calculated results required clarification.

Emergency response procedure CPIP-21, "Hazards Assessment and Projection," is used to assess offsite hazards in order to provide information to appropriate agencies regarding the potential offsite effects of hazardous chemical releases. The procedure provides a simplified method of estimating downwind concentration, using a straight-line Gaussian plume dispersion model. A note in Section 4.1.1 of that procedure states that the procedure applies specifically to hydrogen fluoride, ammonia, fluorine, and uranium hexafluoride, but does not mention NO_2 releases. Failure of the procedure to apply to NO_2 was a weakness in the licensee's response to this event.

Using a Gaussian plume model after the event, the licensee estimated an NO_2 plume concentration of about 50 parts per million (ppm) at the fenceline, 2 ppm at 1 mile, and 0.5 ppm at Gore. Recognizing the limitations of this simplified model, the licensee also was attempting a more rigorous calculation of downwind plume concentrations.

3.6 Response by Health and Safety Technicians

The AIT interviewed 12 health and safety technicians (5 of whom were contract technicians) regarding their response during and following the event. These interviews raised some concern about the judgment of certain health and safety technicians, who had entered or partially entered main process building rooms containing visibly hazy atmospheres. One junior health and safety technician, who had worked as an operator before becoming a health and safety technician in July 1992, stated that he had held his breath while entering the health and safety office to obtain some Drager tubes for measuring air concentrations of nitric acid. He turned on a fan to clear out the office, while another technician propped the door open. Since no measurement had been taken, the air concentration of NO_2 in the office was not known.

A second health and safety technician stated that he had taken one of the Drager samplers from the first technician and had reached into the in-plant reading room, which also had a visibly hazy atmosphere, to obtain an air measurement. The technician stated that in doing so he had held his breath and had placed much of his upper body into the room. The lead health and safety technician saw him do this and told him to get out of the area. The technician stated that he measured about 2 ppm in the room, using a Drager tube sensitive for nitric acid. Later, the airborne concentration of NO_2 was measured at 60 ppm. A concentration of 50 ppm is considered immediately dangerous to life or health (IDLH).

Interviews indicated that initial measurements, such as the one described above, were made with Drager tubes intended for nitric acid, not for NO_2. The lead health and safety technician, who had known that the release originated in the digestion area, had assumed that the gases were nitric acid. Although the lead health and safety technician had prior nuclear experience, he had worked at Sequoyah Fuels only since April 1992 and had been unaware that the gas was NO_2. The acting health and safety supervisor knew that the release was composed of NO_2, and soon obtained the correct Drager tubes from the onsite emergency response area.

After the event, the licensee determined by reviewing the manufacturer's literature that an NO_2 concentration of 50 ppm (i.e., IDLH) results in a reading of about 3 ppm when using a Drager tube intended for nitric acid. As a consequence of using the nitric acid Drager tubes, initial air concentration measurements were erroneously low.

The team also identified a concern regarding health and safety technicians who entered areas of the plant, where airborne concentrations were not known, with no respiratory protection. Health and safety technicians stated that, before the site area emergency had been declared, they could see that the main hallway of the main process building was clear and reentered the building through the west doors, with no respiratory protection. Also, after obtaining the (wrong) Drager tubes, the lead technician and a junior technician entered the digestion area and made airborne measurements on the second level, with no respiratory protection. In both cases, the airborne concentration of the areas entered was not known before entering without respiratory protection.

Procedure HS-503, "Selection of Respiratory Protection Equipment," lists a Permissible Exposure Limit/Threshold Limit Value (PEL/TLV) of 1 ppm for NO_2 gas and an IDLH value of 50 ppm. (IDLH is defined as the maximum concentration from which one could escape within 30 minutes without any escape-impairing symptoms or any irreversible health effects.) According to Section 4.5 of Procedure HS-503, respiratory protection equipment shall be required for chemical gases and vapors when the concentration of any hazard exceeds the PEL/TLV. The concern about entering areas that previously had been filled with NO_2 gas arose when licensee representatives did not know whether NO_2 gas was visible at 1 ppm (because above values of 1 ppm, respiratory protection equipment is required).

Health and safety technicians stated that during normal emergency drills the workers report to the emergency equipment storage room, which is located at the No. 3 motor control center. However, during this event the area around the motor control center was filled with NO_2 and was thus inaccessible. As a result, the technicians had access to very little equipment for assessing air concentrations and contamination levels, for posting areas, and for performing other essential tasks. Further, since the in-plant health and safety office was filled with NO_2, technicians could not reach equipment in that location until the building atmosphere had cleared. The location of the emergency equipment storage room and of emergency equipment hindered the licensee's ability to respond to this emergency.

During the interviews, most contract health and safety technicians stated that they were uncomfortable with their level of knowledge of the Sequoyah Fuels contingency plan and felt unprepared to respond to a chemical release. Some stated they had not read the plan or its implementing procedures. As a result, when the site area emergency was declared and "nonessential personnel" were instructed to evacuate to the south gatehouse, the contract technicians had evacuated the plant as instructed.

Although the senior health and safety technicians who had been employed for several years felt confident in responding to the event, newer employees expressed concern about the training in the emergency response program. Several technicians expressed a concern that drills did not adequately prepare the staff. The technicians stated that drills were often similar and that no provisions had been made for alternate emergency equipment storage rooms. This posed a problem when that storage room became inaccessible due to the release.

3.7 General Response

At 8:50 a.m., control room operators announced that personnel in the main process building should evacuate the west side of the building and move to the east hallway. At this time, several individuals were present in the west hallway near the Laboratory and women's change room, the digestion area, the in-plant health and safety office, and the in-plant maintenance office. Interviews of operations, health and safety, and maintenance personnel who had been present in the area determined their route of evacuation and a sequence of actions taken within the plant as the release occurred. Several evacuation problems were identified.

Implementation of the evacuation procedure apparently failed to account for workers who had remained in the plant to make measurements, implement controls, and post areas. The health and safety technicians stated that they and several workers from other departments had not reported to responsible personnel for some time. This, along with other accountability problems, contributed to the licensee's inability to identify any workers who might have required rescue.

One individual, who had been in the maintenance office on the second level adjacent to the digestion area at the time of the release, failed to leave the area promptly when the initial evacuation notice was announced. The individual had observed the release through a window in the office and had contacted other maintenance personnel by telephone for instruction. The individual, a relatively new employee, was uncertain about the appropriate route of evacuation. Another maintenance person was sent to assist this employee. Both left the area as the unusual event was announced. This incident suggests that initial training for plant employees had not provided sufficient instruction in plant evacuation and emergency response.

An operator in the digestion area hallway at the time of the release had observed liquid spraying into the air from a digestion tank and a thick cloud of gas coming from the digestion area. The operator promptly notified two individuals, who were nearby at the process laboratory door, of the need to evacuate the area. The two employees walked to the step-off pad at the entrance to the digestion area and stopped to radio the control room before evacuating the area. Nitrogen dioxide and nitric oxide gas had filled the area, and the two individuals were sprayed with liquid (nitric acid solution) coming from the digestion tank. The individuals left the area and entered the women's change room to wash the acid from their skin. They remained in the change room until gases started to enter the room through the door. This sequence of actions may have resulted in unnecessary exposure of both individuals.

Employees working at the raffinate pond area at the time of the release were unaware that an unusual event had been announced, because no public address system was located at the centrifuge building. About 15 minutes after the release and after the staff had been instructed to gather at the south gatehouse, these employees were contacted by radio and instructed to report to the onsite accountability center. Had the wind been more easterly, this group of employees might have been exposed to the plume without proper warning.

Several individuals had evacuated the main process building through the plant warehouse in order to leave the plant area through the east gate. A health and safety technician posted at the gate directed these individuals to reenter the main process building so they could monitor themselves on change room contamination monitors before leaving the building. The women's change room is adjacent to the digestion area, where the release occurred. The individuals reentered an area containing unknown concentrations of nitrogen dioxide, indicating a lack of sensitivity by the health and safety technician to the potential chemical hazards present at the time.

One individual remained in the main process building, near the digestion area and the nitric oxide scrubber area, throughout the event without respiratory protection equipment. The individual, who was attempting to assist the operations staff in improving vacuum to the off-gas system serving digester No. 2, was not accounted for and did not use respiratory protection equipment while remaining in the area.

Personnel accountability had not been completed by the time the site area emergency was terminated, nor had plant medical personnel finished determining whether any injuries or medical problems had occurred. Also, the health and safety staff had not been given sufficient time to complete personal contamination surveys before the staff was instructed to return to their work stations.

Interviews of health and safety technicians indicated that, overall, evacuation to the south gatehouse had been orderly, including: accounting for, instructing, and assisting delivery drivers during evacuation; frisking individuals leaving the restricted area gate; and instructing certain workers on precautions.

Several workers who had been in the laundry/mask wash building came through "crash gates" and did not monitor themselves when leaving the restricted area, in order to avoid entering the plume. Under the circumstances, this appears to have been appropriate. However, such workers who came from the restricted area to the unrestricted area without monitoring themselves intermingled with other workers who had monitored themselves upon leaving the restricted area. Recognizing this problem, some contract health and safety technicians attempted to implement contamination controls. However, the accountability process, which was somewhat disorganized, appeared to take precedence. As a result, the technicians began to spot-check workers by surveying their hands and feet. The technicians reported that they had surveyed only about half of the workers by the time the site area emergency was terminated and everybody was instructed to return to their work stations. Later, however, the licensee announced that persons who had not been monitored when leaving the restricted area during the event should return to a change room to monitor themselves.

Some contract technicians expressed concern that the security force had allowed vehicles to enter and leave the site with no restrictions. Being concerned about the contamination controls, two contract technicians stated that they had generally frisked the tires of vehicles that had left the site.

The licensee recently had notified NRC of the relocation of certain emergency response equipment within the plant. This change involved the relocation of several pieces of emergency response equipment, including self-contained breathing apparatus (SCBA) units which had been located at the depleted uranium tetrafluoride (DUF_4) building and at the in-plant health and safety office. These units were to have been relocated to motor control center #3, which is located in the west side of the main process building. At the time of the event, the licensee had continued to store some SCBA units in the DUF_4 building and had temporarily stored several new SCBA units in the in-plant health and safety office.

Only two SCBA units were located in the control room for the four individuals needed there during the event. This was a problem, because the control room filled quickly with gas, due to the ventilation problems described in Section 5. In order to provide sufficient respiratory protection equipment to the control room staff, operations personnel had to retrieve the needed equipment from the DUF_4 building and from the north guard house, because motor control center #3 was engulfed in the plume and could not be reached. This resulted in a delay in providing needed safety equipment to the control room staff.

4 EFFECTS

AIT inspectors interviewed a number of individuals who believed they had been exposed offsite to the nitrogen dioxide plume and several Sequoyah Fuels employees who exhibited symptoms believed to be related to exposure to nitrogen dioxide gas. An AIT inspector met with the licensee's company physician to discuss the nature of symptoms exhibited by plant personnel and by members of the public during examinations performed throughout the week following the release. The inspector also met with a local physician, who had examined several members of the general public who might have been exposed to the plume.

NRC obtained the services of two expert consultants, a physician specializing in occupational medicine and a toxicologist, to review the observations of the examining physicians.

The apparent effects of exposure to the nitrogen dioxide, as related to the AIT by potentially exposed personnel and by medical personnel, are summarized below.

4.1 Onsite Effects

Several Sequoyah Fuels employees were exposed to nitrogen dioxide either because they were located near the digesters, where the release occurred, or because they were exposed to nitrogen dioxide which had entered the control room ventilation system.

Two individuals were provided medical attention during the release, one for hyperventilation and the other for upper respiratory irritation and coughing. Both individuals were examined by the company physician on November 18, 1992. One individual's symptoms were determined to be due to emotional stress experienced during the event. The second individual, a control room operator who had been in the control room during the release and for a short period thereafter, had persistent upper respiratory and eye irritation but did not evidence any abnormalities on a chest radiograph taken the following day. The company physician stated that he did not expect this individual to have any chronic effects and did not recommend further follow-up. However, 3 days after the event, the individual was examined by his personal physician because of complaints of chest "tightness" and problems with deep inspiration. His personal physician prescribed steroid therapy over a course of 2-3 days to relieve any inflammatory effects.

Another control room operator, who experienced respiratory complaints approximately 12-14 hours after the event, contacted the company nurse, but did not receive further examination because he left the area on vacation the following day.

Three other control room operators were examined by the company physician on the day of the event, due to upper respiratory irritation and eye irritation. The initial examinations revealed no significant acute effects, although each complained of persistent irritation for 1-2 days. One of these individuals, who developed chest tightness and difficulty in inspiration 2 days later, returned to the company physician and was given a breathing treatment (bronchodilator) and intravenous steroid medication to relieve any inflammatory effects. This individual was to be reexamined in 2-3 weeks to determine any effects on his baseline pulmonary function tests.

An operator who had not been present in the control room complained of chest tightness 6 days later and was sent for examination by the company physician. According to the company nurse, the individual was asymptomatic by the 7th day following the event.

Several other employees complained of persistent eye and throat irritation, some of which was aggravated by preexisting colds and sinus inflammation. One individual complained of persistent nausea and vomiting over a period of 2-3 days. According to the company nurse, the employees she was able to contact were asymptomatic 1 week following the event. (Some employees were on vacation and could not be reached, while others had been furloughed and were unavailable for contact.)

Except for one of the above individuals, the company physician stated that in his opinion the symptoms were minor and acute in nature. The other individual was not expected to experience any chronic effects but was to return at a later date for pulmonary function tests.

As for radiological uptakes, bioassay results of all exposed individuals showed that results were less than the licensee's action level of 25 micrograms of uranium per liter of urine. Therefore, no radiological consequences were anticipated. This was consistent with the finding that the release was predominantly NO_2.

4.2 Offsite Effects

From the media, the licensee, and concerned members of the public, the AIT learned that a number of individuals might have been exposed offsite to the plume of nitrogen dioxide. AIT inspectors contacted or attempted to contact each of these individuals.

A group of 24 individuals working at a tree farm across the river northwest of the Sequoyah facility apparently had been in the plume pathway at the time of the event. A group of three individuals had been fishing on the river in the plume pathway at the time of the event. Several other individuals reported that they had traveled in the vicinity of Sequoyah Fuels or Gore and had either heard about the plume or had observed it on November 17.

Promptly after the event, Sequoyah Fuels management acted to inform the public of the release by providing information sheets to local businesses and by issuing press statements. Although the statements indicated that the release had consisted of nitric acid fumes, rather than nitrogen dioxide, that error apparently did not cause or exacerbate any adverse effect upon the public.

Sequoyah Fuels management also discussed the event with the mayors of Gore and Webbers Falls and encouraged that questions be directed to appropriate plant personnel.

Sequoyah Fuels personnel contacted the tree farm management to arrange for medical examinations, after learning of the tree farm employees' apparent exposure. They also contacted the three apparently exposed fishermen.

During the afternoon of November 17, the Sequoyah Fuels company nurse went to the tree farm in response to a discussion between the senior vice president and a tree farm employee earlier that day. The nurse apparently spoke with only two individuals that afternoon, because the remainder of the nursery employees were unavailable. Sequoyah Fuels management later contacted the tree farm to offer to pay for medical examinations for the tree farm employees. The tree farm employees were examined either by a physician in Sallisaw, Oklahoma, or by other local physicians of their choice.

Inspectors interviewed the tree farm workers, who had been working in three groups in different areas of the tree farm at the time of the release. The workers reported that their first warning of the release had been observation of the plume as it moved from the Sequoyah Fuels facility toward the river. Although the workers heard an announcement coming from the plant, they were unable to understand the announcement, due to noise from equipment being operated at the time. The tree farm manager, who had been working with the group nearest the Sequoyah Fuels facility, stated that he had attempted to gather the workers as soon as he observed the release. However, he was unable to gather all the workers before the plume reached the tree farm. Because of the direction of the roads leaving the area, some of the workers drove back into the plume as they attempted to leave the area. Workers stated later that some individuals had been in the plume for 15 minutes and that the plume had been at ground level but dissipating as it passed them.

Tree farm workers reported tearing and irritated eyes, nausea and vomiting, headaches, upper respiratory tract irritation, and blisters in two individuals' mouths.

Twenty-one tree farm workers were examined by a physician in Sallisaw, Oklahoma, on November 19. The physician reportedly treated several individuals for corneal abrasions resulting from aggravated eye irritation, and reported that others exhibited nose and throat irritation. A few individuals exhibited cold and flu-like symptoms, including nausea and vomiting or persistent gastrointestinal complaints, and two individuals exhibited persistent complaints that were of minor concern.

One individual complained of nausea, vomiting, and anorexia, which later subsided. Another individual, who had upper respiratory complaints, was prescribed steroids by the physician and was referred later to a pulmonologist for further examination. Although this individual had complained of persistent respiratory difficulty, he had not kept a scheduled appointment with the pulmonary specialist and had not returned to the physician in Sallisaw by December 4, 1992,

Several tree farm workers were prescribed antibiotics for bronchitis. Approximately 75 percent of the initial group examined by the physician had inflamed nasal passages and throats. According to the physician, the bronchitis was not attributed directly to exposure to the plume. The physician stated that one individual had throat lesions, but noted that these appeared to be due to a viral infection and not the result of exposure to the plume. As of December 3, 1992, the remainder of these tree farm workers' complaints apparently had subsided.

Two of the tree farm workers were seen by a Wagoner, Oklahoma, physician, who hospitalized them on November 30, 1992, with an initial diagnosis of chemical pneumonia. The physician stated to NRC's medical consultants that the individuals presented "vague" symptoms, including skin rashes, oral lesions, persistent headaches, and respiratory difficulties. The individuals were expected to be released after a short hospital stay. The AIT had not received any further report on their progress as of December 4, 1992.

The Sequoyah Fuels company physician examined one of the tree farm workers, who was a regular patient, soon after the event. During an interview on November 20, 1992, the physician reported that the individual's symptoms, eye and throat irritation, appeared consistent with exposure to nitrogen dioxide. This appeared to be consistent with the Sallisaw physician's initial statements that approximately 75 percent of the individuals initially examined had symptoms which could have resulted from exposure to a chemical release and did not appear to be the result of preexisting medical problems.

Three individuals had been fishing on the Illinois river in the plume pathway between the Sequoyah Fuels facility and the tree farm, during the release. The group reported that they detected an acrid smell as the yellowish-brown plume passed overhead at treetop level. Although the group experienced tearing, persistent burning sensations in their noses and throats, and nausea in one individual, they remained on the river for approximately 2 to 2.5 hours after the release.

Two of the fishermen were examined later, by their personal physicians, for persistent coughing and for eye and throat irritation. One individual was prescribed eyedrops to relieve the irritation, but neither was prescribed medication for respiratory problems. The third individual has emphysema, according to his wife, who told an AIT inspector that the individual had been coughing "more than normal" following the exposure but that he did not seek medical attention.

Three other individuals were seen by the physician in Sallisaw 4 or 5 days after the event. Two, who were employed at a sand and gravel facility in Gore, had been working near the river during the release. According to the physician, neither individual had symptoms, but had sought medical attention as a precautionary measure. The third individual had been driving on Highway

64, near Webbers Falls, at the time of the release. The physician later reported that this individual did not appear to have any symptoms consistent with exposure to the hazardous material released in the plume.

In summary, several members of the public reported that they had been in the plume pathway during the release. Based on information provided by the examining physicians, the symptoms and medical complaints of some of the individuals appeared consistent with classic symptoms resulting from exposure to nitrogen dioxide. Of the individuals known to the AIT, either by direct contact or by local physicians, two were hospitalized for possible chemical pneumonia and a third was referred to a pulmonary specialist. The remainder of the individuals were provided treatment for eye irritation and other symptoms believed by the physicians to have been the result of preexisting medical problems. Several individuals presented complaints of throat irritation, persistent coughing, and nausea, but were not prescribed medication by the physicians.

5 CONTROL ROOM AND PROCESS LABORATORY VENTILATION

5.1 Nitrogen Dioxide in the Control Room

Licensee personnel reported that during the event on November 17, 1992, the control room filled quickly with nitrogen dioxide gas. Control room operators complained that the gas was visible and that they experienced tearing, throat irritation, and coughing. The resulting atmosphere required that the control room operators wear self contained breathing apparatus (SCBA) for approximately 1 hour during the event.

This problem appears to be inconsistent with NRC's understanding of corrective measures, implemented after the 1986 accident, that would have isolated control room ventilation from other plant systems.

Soon after the site area emergency was terminated on November 17, 1992, the licensee initiated an investigation to determine how nitrogen dioxide gas had entered the control room. Nitrogen dioxide gas had been detected by smell and sight in the control room almost as soon as it had been observed in the process area. Also, after the event the control room atmosphere had not cleared as quickly as had other areas of the plant.

5.1.1 Background

On June 27, 1992, an event involving fluorine gas entering the control room had raised questions about control room ventilation. In that event, fluorine released from a fluorine cell room during valve maintenance had been detected quickly by smell in the control room. The incident raised questions about the isolation of the control room ventilation system.

A quality assurance engineer had submitted deficiency Report 92-6-193 documenting the incident. The deficiency report noted that "CR personnel indicated that the fluorine leak was from a lockout valve that was being used while cell room recycle valve No. 700 was being repaired in the maintenance room." The deficiency report recommended that engineering determine the need to install an alarm system in the fluorine cell room, coupled with similar alarms in the control room, to indicate the release of hydrogen fluoride and fluorine gas. The report also recommended that engineering evaluate the need to modify the air supply system for the control room. The deficiency report was assigned to engineering for implementation of corrective measures.

The deficiency report was reviewed by engineering, which issued a formal response on July 27, 1992. The engineering investigation record described the problem, stating that HF released through a roof exhaust fan had been carried by a north wind to the front of the plant, where it was taken into the air makeup plenum.

The engineering response offered three recommendations.

- Ensure that isolation valves are fully closed and that the prevailing winds are not from the north before performing future such maintenance.

- Consider installing an air duct over the exhaust fan in the fluorine cell room.

- Consider installing a second air intake for the control room.

The engineering report did not suggest further investigation to review the adequacy of the control room air supply.

The quality assurance staff questioned this initial investigation and referred it back to engineering for further consideration. On October 2, 1992, the licensee initiated a maintenance work order request to install a hydrogen fluoride sensor in the air intake plenum which serves the main process building.

AIT inspectors reviewed the June 27, 1992, event, noting that the licensee's engineering study had considered only the obvious route of entry for control room air and had not included a detailed examination of the control room air supply system. Further, the proposed solution did not consider engineering controls to isolate the control room air supply to prevent exposure of control room operators to hazardous gases and vapors. This became of particular concern when operations staff stated that other gaseous releases also had been detected first in the control room.

5.1.2 Current Control Room Ventilation Investigation

The licensee's draft root cause analysis of the November 17, 1992, control room ventilation problem was reviewed with the manager of engineering by an AIT inspector on November 21, 1992. According to the engineering staff, the following problems had been identified:

- In expanding the Sequoyah facility in the early 1980's, an added third floor had walls which extended almost to the roof of the main process building. The air space above the third floor offices, between the drop ceiling and the roof, serves as a return air plenum for the HVAC system which serves not only the control room but also the second and third floor office spaces. Openings above and in the walls allow process area air to enter the system.

- During normal operation, this HVAC system provides 20 percent fresh air and 80 percent recirculated air. Recirculation creates a sufficiently negative pressure to draw process area air into the system for distribution to the control room and to the second and third floor office spaces.

5.2 Nitrogen Dioxide in the Process Laboratory

During the release in the digestion area, which is next to the process laboratory, nitrogen dioxide gas entered the process laboratory through the door and a through a window adjacent to the digestion area. After the event, the engineering staff determined that operation of the laboratory fume hood exhaust systems during the event had resulted in a negative pressure, drawing the nitrogen dioxide gas into the laboratory.

6 FINDINGS

6.1 Cause

The NOx release was caused by an uncontrolled exothermic chemical reaction between nitric acid and uranium concentrate that had been transferred inadvertently to digester No. 2. After inadvertently transferring uranium concentrate to digester No. 2, operators charged nitric acid to digester No. 2 in accordance with operating procedures. Normal operation requires charging of the acid first, so that the reaction rate can be controlled by adjusting the feed rate of uranium compounds. Charging the reactants in reverse order eliminated this ability to control the reaction rate.

Process records and analysis of the uranium concentration in digesters No. 2 and 3 following the incident verified the inadvertent transfer of uranium concentrate from the feed bin to digester No. 2 The test results showed concentrations of 418 and 268 gU/l for digesters No. 2 and 3, respectively.

The AIT concludes that approximately 8800 pounds of uranium concentrate intended to be fed to digester No. 3 was inadvertently transferred to digester No. 2. After the charging of approximately 1300 gallons of 40 percent nitric acid and 300 gallons of 60 percent nitric acid, an uncontrolled reaction produced NOx at a rate that exceeded the capacity of the off-gas handling system.

6.2 Root Cause

The AIT determined that the root cause of the event was an inoperable sliding gate valve combined with the inadvertent operation of a feed transfer conveyor in the opposite direction. Contributing factors included inadequacies in procedures, maintenance and surveillance, training, human factors, and management control, as discussed below.

6.3 Contributing Factors

The AIT considers as contributing factors those conditions that if eliminated would have prevented the event from occurring or would have significantly mitigated its consequences.

6.3.1 Procedures

Operators used an operating procedure step-by-step, but failed to heed a caution provided in the procedure. The procedure cautioned the operators to keep digesters isolated by ensuring that gate valves were closed when not being charged with uranium concentrate, but it provided no instructions on what to do if isolation was not possible. Procedure N-230-1, " Digestion of Yellowcake and Transfer of Slurry," Revision 11, November 1992, did not explicitly address notification of engineering or maintenance about dysfunctional equipment.

6.3.2 Equipment Problems

The AIT considered equipment that failed or was dysfunctional during the event and that had an impact on the sequence of events. The team determined that the inoperability of the fume scrubber ejector and the digester No. 2 sliding gate valve contributed to the event.

6.3.2.1 Sliding Gate Valve

The inability to close the gate valve between digester No. 2 and the feed transfer conveyor contributed to the condition which led to the uncontrolled chemical reaction. The AIT concluded that the sliding gate valve probably had been stuck open for several days before the November 17, 1992, event.

6.3.2.2 Fume Scrubber Ejector

The inability to maintain vacuum on the digesters, and the consequent need to start and stop the feed transfer conveyor, contributed to the inadvertent transfer of uranium concentrate to digester No. 2 on November 17. The AIT concluded that the fume scrubber ejector, which creates the vacuum, probably had been dysfunctional for some time. To compensate for the inadequate vacuum, operators had become accustomed to stopping the feed of uranium concentrate in order to decrease the reaction rate and the generation of nitrogen oxides that inhibited the vacuum capability. This stopping and starting of the feed transfer conveyor provided an opportunity to restart the conveyor in the wrong direction, thus inadvertently transferring uranium concentrate to digester No. 2.

6.3.3 Training

The AIT determined that the licensee's training regarding the use of maintenance requests was less than effective. Based on interviews with operators, the team determined that operations are often conducted without consulting with maintenance and engineering when equipment is dysfunctional. The team determined that without appropriate training or clear procedural guidance on communicating with maintenance and engineering, the potential existed for operations to have been conducted with dysfunctional equipment.

The AIT also determined that training for operations personnel in the digestion area was lacking with respect to chemical process safety. The team determined that training for operators assigned to the digestion area was lacking with respect to recognition of the significance of nonoperational equipment, the importance of procedural cautions, and the consequence of improper handling/transfer of uranium concentrate.

6.3.4 Human Factors

Less than adequate man-machine interface in regards to the arrangement of controls contributed to the inadvertent transfer of uranium concentrate to digester No. 2. The AIT concluded that the licensee had not adequately addressed the human factors aspects of the proximity and marking of controls governing the feed of uranium concentrate to the digesters. The location and orientation of the controls ensured ease of operation but did not minimize the chances of operator error. Also, the function of the controls was not easily recognizable, in that the direction of motion of the feed transfer conveyor was not adequately marked.

6.3.5 Management Control

The AIT identified an apparent weakness in the licensee's ability to identify equipment problems needing correction in the plant. Operations personnel had worked around the sliding gate valve and vacuum problems, rather than requiring that the problems be fixed. Neither of the problems was being tracked by management for resolution.

6.4 <u>Generic Implications</u>

The team assessed the generic implications of the incident by analyzing the potential for NOx releases from uncontrolled chemical reactions in other plant systems. As discussed below, no other opportunities for significant NOx releases were identified.

6.4.1 Miscellaneous Digestion System

The use of a single dissolution tank in miscellaneous digestion eliminates the possibility of unknowingly charging reactants in reverse order, as occurred between digesters No. 2 and 3.

6.4.3 Uranyl Nitrate Hexahydrate (UNH) Boildown System

In the UNH boildown operation, UNH is concentrated by water evaporation. Being a physical transformation, this cannot result in an exothermic chemical reaction generating nitrogen oxides.

6.4.4 Denitration System

In denitration, uranyl nitrate is decomposed at elevated temperatures to produce uranium trioxide and nitrogen oxides. Thermal decomposition requires no other reactants, only elevated temperature, thus preventing charging multiple reactants in reverse order.

7 CONCLUSIONS

7.1 Cause of the Event

7.1.1 Major Conclusions

A sliding gate valve on digester #2 was stuck in the open position. Operations personnel had known for some time that the valve was stuck or at least that it had been sticking, but apparently had elected to work around it rather than repair it, thus violating a caution statement in an operating procedure.

Uranium concentrate feed material was transported erroneously to the stuck-open sliding gate valve by an improperly operated feed conveyor, thus allowing the concentrate to enter digester #2 without operator knowledge. No inherent mechanism existed to have prevented this error or to have warned the operator that this error had occurred.

7.1.2 Other Conclusions

The inability of the NOx gas treatment system to handle the rate of NOx produced during normal digestion caused an operator to start and stop the uranium concentrate feed conveyor repeatedly, resulting in the inadvertent reversal of the conveyor and the transport of concentrate to the stuck-open valve. The inadequate capacity of the NOx gas treatment system appears to have been known and accepted by operations personnel. However, neither operations nor maintenance nor engineering appears to have been aware that a deteriorated ejector was the cause of the inadequate vacuum.

7.2 Offsite Monitoring

7.2.1 Major Conclusion

No measurable uranium was released offsite.

7.2.2 Other Conclusions

Efforts to follow and attempt to measure the nitrogen dioxide plume offsite appear to have been reasonable.

There were some weaknesses in documenting offsite monitoring data.

7.3 Response by Health and Safety Technicians

7.3.1 Major Conclusion

At least one health and safety technician displayed poor judgment by entering a visibly hazy, unmeasured atmosphere in the main process building without wearing respiratory protection. One health and safety technician partly entered a visibly hazy area without wearing respiratory protection. Later measurements indicated that the airborne concentrations were IDLH.

7.3.2 Other Conclusions

At least two health and safety technicians and other workers failed to follow the established accountability and evacuation procedures by remaining in the main process building during the site area emergency evacuation and not reporting to responsible managers. This probably resulted from emergency drills having not considered scenarios making the emergency equipment storage area inaccessible.

Contamination controls at the south gatehouse were not entirely effective. For example, monitored and unmonitored personnel intermingled. Also, some employees were not surveyed before reentering the plant after the site area emergency had been terminated.

There appears to have been a training weakness in not adequately preparing health and safety technicians to assess the hazard of nonradiological releases. For example, one technician instructed workers who had already evacuated the main process building to reenter the building, which contained unknown concentrations of nitrogen dioxide, in order to exit through a change room.

Without first obtaining the approval of the responsible person, a health and safety technician had told some workers to return to their normal work stations, some of which had not been cleared for reentry.

7.4 Response (General)

7.4.1 Major Conclusion

The event was initially misclassified as an unusual event, rather than an alert.

7.4.2 Other Conclusions

The evacuation and accountability aspects of the emergency response were not carried out well enough to ensure that plant personnel had evacuated as instructed. In fact, some individuals did not evacuate as instructed.

The Sequoyah Fuels staff had not been prepared adequately to evacuate the facility. Routine drills apparently had involved scenarios that did not prepare the staff for such an event. Plant personnel did not understand the appropriate routes of evacuation. In-plant communications during the event did not adequately inform personnel of hazards within or ensure safe exit from the main process building.

The location and quantity of nonradiological emergency equipment were not entirely adequate.

7.5 Onsite and Offsite Effects

7.5.1 Major Conclusions

The control room ventilation system was not effective in protecting control room operators from toxic gas. This condition apparently resulted from inadequate design and modification of the control room ventilation system and other systems with which it interfaced. A fluorine release in the cell rooms in June 1992 appears to have been an inadequately studied precursor to the control room ventilation aspects of the November 17, 1992, event.

Bioassay data indicate that there were no significant intakes of uranium within the plant.

Approximately 27 persons were exposed offsite to the cloud of nitrogen dioxide. The cloud appears to have dispersed sufficiently to have prevented significant exposures in Gore, Oklahoma.

At least eight employees were exposed to nitrogen dioxide onsite.

ATTACHMENT A

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064

NOV 17 1992

MEMORANDUM FOR: William L. Fisher, Chief
Nuclear Materials Licensing Section

FROM: James L. Milhoan, Regional Administrator

SUBJECT: AUGMENTED INSPECTION TEAM AT SEQUOYAH FUELS CORPORATION SITE

This memorandum tasks you as the team leader for an Augmented Inspection Team (AIT) at the Sequoyah Fuels Corporation in Gore, Oklahoma, and it provides you with a charter by which to conduct the inspection.

On November 17, 1992, at approximately 9:10 am (CST), there was an unexpected reaction in a digester tank at the Sequoyah Fuels Corporation (SFC) Gore, Oklahoma facility. This reaction resulted in the release of nitric acid fumes and nitric oxide which formed a plume that was carried over the town of Gore. The licensee declared a site area emergency.

In order for the NRC to understand the event better and to assess the potential consequences and the safety significance of it, an AIT will be utilized. You are designated as the team leader. The team's charter is to:

1. Ascertain and document the plant conditions and the sequence of events during this occurrence. Specifically assess:
   - the cause (or causes) of the event;
   - the evacuation of the control room;
   - the operational response and the steps taken to mitigate the event; and
   - the execution of the emergency plan.
2. Assess the radiological and chemical consequences of the event in terms of what was released and where it was deposited.
3. Assess the effect, if any, of maintenance, operational procedures, and training upon the event and the licensee response to the event.

The team composition will be yourself, L. Kasner, M. Vasquez, and C. Robinson from NMSS. The AIT will be conducted in accordance with NRC Inspection Manual Chapter 93800, "Augmented Inspection Team Implementing Procedure."

The team is to emphasize fact finding in its review of this event and the related circumstances. The AIT is to determine the facts surrounding this

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event, concentrating on what happened and being alert to identify safety issues.

The AIT should assemble onsite in Gore, Oklahoma by November 18, 1992. You should provide Region IV management with updates on the team's progress including a daily briefing at 4:00 pm (CST) daily for Region IV, NMSS, and other interested staff members.

You shall prepare a written report of you inspection so that it can be issued no later than 30 days after completion of the inspection.

James L. Milhoan

James L. Milhoan
Regional Administrator

cc:
R. Bernero, NMSS (6 E6)
R. Cunningham, NMSS (6 H3)
E. Jordan, AEOD (3701)
L. Callan
AIT members

ATTACHMENT B

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064

NOV 18 1992

Docket No. 40-8027
License No. SUB-1010
CAL 92-11

Sequoyah Fuels Corporation
(Subsidiary of General Atomics)
ATTN: James J. Sheppard
President
P.O. Box 610
Gore, Oklahoma 74435

Dear Mr. Sheppard:

SUBJECT: CONFIRMATORY ACTION LETTER

On November 17, 1992, there was an unexpected chemical reaction in a digester at the Sequoyah Fuels Corporation Gore, Oklahoma plant. This resulted in the release of a plume of nitric acid fumes and nitric oxide and led the licensee to declare a site area emergency, which was in effect for approximately 40 minutes.

Pursuant to a telephone conversation between Mr. J. Ellis, Senior Vice President of Sequoyah Fuels Corporation, and myself on November 17, 1992, it is our understanding that you have committed not to restart your uranium processes before:

- you complete an investigation of the circumstances and causes of the event, and

- you brief the NRC staff on the findings and obtain our concurrence on the restart of the processes.

The actions described above do not preclude actions necessary to assure the safe shutdown of the process streams in accordance with good engineering and operational practices.

Pursuant to Section 182 of the Atomic Energy Act, 42 U.S.C. 2232, and 10 CFR 2.204, you are required to:

1) Notify me immediately if your understanding differs from that set forth above,

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CERTIFIED MAIL - RETURN RECEIPT REQUESTED

2) Notify me if for any reason you cannot complete the actions, and

Issuance of the Confirmatory Action Letter does not preclude issuance of an order formalizing the above commitments or requiring other actions on the part of the licensee. Nor does it preclude the NRC from taking any action for violations of NRC requirements that may have prompted the actions addressed in this letter. In addition, failure to take actions addressed in this Confirmatory Action Letter may result in enforcement action.

The responses directed by this letter are not subject to the clearance procedures of the Office of Management and Budget as required by the Paperwork Reduction Act of 1980, Pub L. No. 96-511.

Sincerely,

James L. Milhoan

James L. Milhoan
Regional Administrator

cc:
NRC Public Document Room
Oklahoma Rad Control Program Director

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Harmon, Curran & Tousley
2001 S Street, N.W., Suite 430
Washington, D.C. 20009

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Muskogee, OK 74402-0357

Newman & Holtzinger, P.C.
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Suite [illegible]0
Washington, D.C. 20036
General Atomics
ATTN: R. N. Rademacher

General Atomics
ATTN: R. N. Rademacher
Vice President
Human Resources
P.O. Box 85608
San Diego, CA 92138

ATTACHMENT C

1 PERSONS CONTACTED

1.1 Licensee Personnel

*R. Adkisson, Vice President, Business Development
J. Barnes, Process Engineer
G. Barrett, Safety Engineer
J. Bohannon, Manager, Quality Assurance
L. Boyer, R.N., Occupational Nurse
R. Cook, Vice President, Administration
J. Cottner, UO3 Area Maintenance Supervisor
*J. Dietrich, Vice President, Regulatory Affairs
*J. Ellis, Senior Vice President
L. Franklin, Engineering
J. Gilbreath, UO3 Shift Supervisor
J. Habacher, H&S Technician
C. Harlin, Manager, Licensing
D. Howard, Control Room Operator
J. Hummingbird, UF6 Shift Supervisor
R. Jones, H&S Technician
D. Knoke, Chemist
S. Lampson, Engineer
H. Leatherman, Engineer
A. Lucy, Health and Safety Supervisor
R. Mathews, Operator
L. McCarty, UO3 Shift Supervisor
S. Munson, Manager, Health and Safety (H&S)
R. Parker, Manager, Operations
J. Pulse, Control Room Operator
T. Riggs, Chemical Engineer
D. Scarborough, Operator
W. Shell, UO3 Area Shift Supervisor
*J. Sheppard, President
L. Silverstein, Manager, Maintenance
J. Sumpter, Control Room Operator
C. Tisdale, Maintenance Scheduling and Planning
C. Urbanowich, Maintenance Engineer
F. Warner, Manager, Engineering (Acting)
C. Watson, H&S Technician
E. Watts, Control Room Operator

*Present during exit briefing on November 25, 1992.

Other licensee personnel contacted during the inspection included operators, foremen, security force members, technicians, and administrative personnel.

1.2 Offsite Contacts

Dr. W. Anderson
R. Bates, Sequoyah County Department of Health
J. B. Bennett
R. Coleman, Ph.D., NRC Consultant
J. Hardin, Ecology and Environment
L. Mitchell, M.D., NRC Consultant
J. Murphy, American Nursery Products
R. Smith
J. White, Oklahoma State Department of Health
Dr. M. Yancy

Other individuals also were contacted during the inspection.

2 EXIT BRIEFING

On November 25, 1992, W. L.Fisher and L. J.Callan briefed Sequoyah Fuels representatives on the findings of the AIT. The licensee did not contest any of the stated findings.

ATTACHMENT D

DOCUMENTS REVIEWED

Operating Procedures:

N-170-4, NOx Emission Control (Revision 8, 11/92)
N-230-1, Digestion of Yellowcake and Transfer of Slurry (Revision 11, 11/92)
N-230-5 Miscellaneous Digestion
N-250-1 UNH Boildown (Revision 9, 7/92)
N-260-1 Denitration (Revision 14)
N-600-1 Nitric Acid Recovery (Revision 7, 08/92)
Process System Startup Checklists

Other Procedures:

G-004 Reporting Requirements for Abnormal Events
G-020 Sequoyah Facility Training System
G-021 Plant Operator Training and Qualification
G-190 Investigation and Reporting
HS-503, Selection of Respiratory Protection Equipment
HS-410, Operation of the Draeger Multigas Detector Model 21/31

Operating Logs:

Digest Batch Logs
Digest Tank Sample Analysis Computer Log
Strip Chart Recorder
UF6 Control Room Log
UF6 Shift Supervisor Log
UO3 Control Room Log
UO3 Shift Supervisor Log

Maintenance Document:

Work Order Computer Printout

P&IDs:

170-M-1003 NOxEC System
170-M-1005 NOxEC Flowsheet
230-M-101 Digestion Flowsheet
600-M-1001 Nitric Acid Recovery and Off Gas Treatment
600-M-101 Nitric Acid Recovery and Off Gas Treatment Flowsheet

SFC Contingency Plan, Revision 5

Contingency Personnel List

Control Room Emergency Contact Records

Contingency Plan Implementing Procedures:

CPIP-11, Recognition and Classification of an Emergency
CPIP-12, Unusual Event
CPIP-13, Alert
CPIP-14, Site Area Emergency
CPIP-16, Activation of Assembly and Support Center
CPIP-17, Offsite Response Center Activation and Operation
CPIP-21, Hazards Assessment and Projection
CPIP-22, Onsite Emergency Monitoring
CPIP-23, Offsite Environmental Monitoring
CPIP-31, Emergency Exposure Control and Respiratory Protection
CPIP-32, Emergency Contamination Control and Decontamination
CPIP-33, Emergency Monitoring of Personnel

Emergency Response Documents:

Environmental Response Log
Onsite Emergency Director Log
Offsite Emergency Director Log
Accountability Log
Event Announcement Records
Miscellaneous staff statements documenting the event and actions taken
Emergency Response Critique Records

Other Documents:

Condition Reports relative to the event
Personnel assignment records
Summary of In-Plant Drager Measurements
Manufacturer's Literature on Drager Tubes
Results of Off-Site Measurements
(In-Plant) Air Sampling Data (Radiological)
NOx Release Calculations
Bioassay Results
Hazard Communication Chemical List
Training Exams
MSDSs

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064

Attachment 6

RECEIVED JAN 2 5 1993

JAN 2 1 1993

Docket: 40-8027
License: SUB-1010

Sequoyah Fuels Corporation
(Subsidiary of General Atomics)
ATTN: James J. Sheppard, President
P.O. Box 610
Gore, Oklahoma 74435

SUBJECT: NRC INSPECTION REPORT 40-8027/92-31

This refers to the special, announced inspection conducted by Ms. L. L. Kasner and Mr. G. M. Vasquez, accompanied by Ms. M. L. Thomas, of this office on December 8-11, 16-17, and 23, 1992. The inspection included a review of activities authorized by Source Materials License No. SUB-1010. During a telephonic interim exit briefing conducted on December 11 and a second, final exit briefing conducted on December 23, 1992, the findings of the inspection were reviewed with you and those members of your staff identified in the enclosed report.

The inspection was conducted to examine Sequoyah Fuels Corporation's (SFC) implementation of the corrective actions developed by SFC following the November 17, 1992, release of nitrogen dioxide. As a result of the release, both the uranium hexafluoride conversion and the depleted uranium tetrafluoride (DUF4) process systems were shut down. SFC made a commitment to suspend process operations until (1) a full investigation was completed and the causes of the event were determined, and (2) NRC was briefed on the findings of the investigation and concurred in the decision to restart process operations. This commitment was formalized in a Confirmatory Action Letter issued by NRC on November 18, 1992. By letter dated November 23, 1992, SFC notified NRC of its decision to suspend uranium hexafluoride conversion operations indefinitely. The letter also noted SFC's intent to seek NRC concurrence for resuming operations in the DUF4 facility until SFC's current contractual obligations were met.

SFC developed a corrective action plan for the problems identified following the November 17 event which was provided to NRC for review by letter dated December 8, 1992. The corrective action plan was later discussed during a public meeting held at the Sequoyah facility on December 9, 1992. In addition to the specific actions described in the plan, at NRC's request SFC submitted a supplemental letter dated December 14, 1992, describing additional measures to be implemented prior to requesting or receiving authorization to resume production activities in the DUF4 facility.

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Areas examined during the inspection are identified in the report. Within these areas, the inspection consisted of a review of management controls, a selective review of procedures and representative records, the worker training associated with certain procedures and programs implemented as a result of the November 17 event, interviews of personnel, and observation of activities in progress.

The findings of the inspection confirmed that SFC had implemented the general and DUF4 plant-specific actions described in its corrective action plan. In addition, on December 23 an inspector verified that the additional measures proposed to address concerns expressed by NRC, as described in SFC's December 14 letter, had been implemented as well. These findings served as the basis for NRC's decision to issue a Confirmatory Action Letter on December 23 authorizing SFC to resume depleted uranium hexafluoride reduction operations in the DUF4 facility.

Within the scope of this inspection, no violations or deviations were identified.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be placed in the NRC's Public Document Room.

Should you have any questions concerning this inspection, we will be pleased to discuss them with you.

Sincerely,

L. J. Callan, Director
Division of Radiation Safety
and Safeguards

Enclosure:
Appendix - NRC Inspection Report
40-8027/92-31

cc:
Oklahoma Radiation Control Program Director

Diane Curran, Esq.
Harmon, Curran & Tousley
2001 S Street, N.W., Suite 430
Washington, D.C. 20009

APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Inspection Report: 40-8027/92-31

License: SUB-1010

Licensee: Sequoyah Fuels Corporation
P.O. Box 610
Gore, Oklahoma 74435

Facility Name: Sequoyah Facility

Inspection At: Gore, Oklahoma

Inspection Conducted: December 8-11, 16-17, and 23, 1992

Inspectors: Linda L. Kasner, Senior Radiation Specialist
G. Michael Vasquez, Senior Health Physicist

Accompanying Personnel: Mary L. Thomas, NRC Intern

Approved: Charles L. Cain 1/19/93
Charles L. Cain, Chief, Nuclear Materials Inspection Section Date

Inspection Summary

Areas Inspected: Special, announced inspection of onsite followup of an event, operations and management oversight programs, maintenance activities, and procedure development and worker training.

Results:

- Several concerns were identified relative to the scope of SFC's corrective action plan. Three issues were identified as requiring further response by SFC. The issues included (1) resolving operational as well as hardware related deficiencies, (2) providing assurance that DUF4 operators would comply with facility operating procedures, and (3) describing the level of oversight planned by licensee management. (Sections 1 and 2)
- The licensee responded to the concerns noted above and supplemented its initial corrective action plan by letter dated December 14, 1992. (Sections 1 and 2)

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ATTN: R. N. Rademacher
Vice President, Human Resources
P.O. Box 85608
San Diego, California 92138

- SFC completed the general and DUF4 plant-specific corrective actions identified in the corrective action plan and satisfactorily implemented measures to address the concerns noted above. (Sections 2, 3 and 4)

- Based upon the results of the inspection, the licensee was subsequently authorized to resume depleted uranium hexafluoride reduction operations on December 23, 1992.

Summary of Inspection Findings:

- No violations or deviations were identified.

Attachment:

- Persons Contacted and Exit Briefing

DETAILS

1 BACKGROUND

On November 17, 1992, an event occurred involving an offsite release of nitrogen oxide and nitrogen dioxide at the Sequoyah facility. An Augmented Inspection Team (AIT) was dispatched to the facility to review the event and the licensee's response. Based upon the inspection findings, the root cause of the event appeared to be an inoperable valve in a digestion tank and an operator error involving operation of a conveying system carrying feed material to the digestion tanks. Concerns were raised regarding the circumstances related to the event in that operators were aware that the valve was inoperable for a period of weeks but had not reported the problem to SFC management or submitted a maintenance work request to repair the valve. Also of concern was the fact that the control room filled with toxic chemical gases during the event, requiring that control room operators don respiratory protection equipment. Several other problems were also identified involving the licensee's emergency response program.

NRC issued a Confirmatory Action Letter on November 18, 1992, documenting the licensee's commitment to delay restart of both the depleted uranium tetrafluoride (DUF4) and uranium hexafluoride (UF6) processes until the licensee completed a full investigation of the event and received NRC concurrence on restart of the processes. On November 23, SFC announced that it would not resume active operation of its UF6 production process and would instead place the facility in "standby" mode. In correspondence issued on that date, SFC noted its intent to obtain NRC concurrence to resume operations in the DUF4 facility and to operate the facility until SFC's current contractual obligations are fulfilled.

By letter dated December 8, 1992, SFC provided a corrective action plan to NRC for review. The corrective action plan included actions to be taken to address the root cause and contributing factors for the November 17 event and other problems identified during the AIT's review of the licensee's response. On December 8-11, 1992, NRC inspectors began a review of the licensee's corrective action plan and the actions taken by SFC following the event.

Based upon the results of the initial segment of this inspection, on December 11, 1992, the licensee was notified that three outstanding issues needed to be addressed before NRC could authorize restart of the DUF4 facility. The issues included (1) resolving operational as well as hardware related deficiencies ("work-arounds"), (2) providing assurance that DUF4 operators would comply with facility operating procedures, and (3) describing the level of oversight planned by licensee management during the initial restart period.

The licensee responded to these issues, describing further measures to be implemented prior to requesting authorization for restart by letter dated December 14, 1992. A NRC inspector reviewed the licensee's status in implementing these measures, as well as some outstanding items identified in the corrective action plan, on December 16-17, 1992. At that time, two outstanding issues remained to be completed and further information regarding surveillance of plant activities was being prepared by the licensee.

By letter dated December 22, 1992, SFC notified NRC that with exception of instruction to be provided to one individual who was absent from the facility, the two outstanding items had been completed and supplemented its previous correspondence with a description of the management oversight program to be implemented during the initial startup period. On December 23, 1992, an inspector verified that the corrective actions applicable to the DUF4 operations, as well as the necessary generic corrective actions, had been completed.

2 OPERATIONS AND MANAGEMENT OVERSIGHT (88020, 88005)

2.1 Operational Deviation Program

As noted in Section 1, the root cause of the November 17 event was determined to be an inoperable (isolation) valve on a digestion tank combined with an operator error involving operation of a feed material conveying system. Of significant concern was the fact that operators had been aware that the valve was not functioning properly for a period of weeks and had done nothing to bring the problem to the attention of the area manager or to initiate repair of the valve.

Because of the nature of this problem, and the fact that this type of oversight could occur in either the UF6 or DUF4 plants, the licensee considered this a generic issue in its corrective action plan. The proposed corrective action included developing a policy on continuing plant operations when nonfunctional equipment or instrumentation was identified by the staff. The licensee's proposed response involved two elements; (1) identifying all hardware deficiencies ("work-arounds") before startup and determining which items required corrective action prior to startup, and (2) strengthening the existing condition reporting system to include evaluation of hardware deficiencies and work-arounds.

The licensee's initial proposed corrective action was discussed with NRC staff following a meeting held with the licensee on December 9, 1992. At that time, formal documentation to implement the policy had not yet been issued and the licensee had not conducted a complete review of the potential work-around issues at the site. However, licensee managers explained that they intended to implement and reinforce requirements for operators to document equipment and instrument failures in condition reports which, in accordance with the licensee's condition reporting system, would be submitted to the appropriate manager for review. In addition, if the manager determined that the equipment or instrument could not be repaired promptly, a temporary operating procedure would be issued to document any specific actions required to continue operations with impaired equipment or instrumentation. When necessary, as determined by the senior vice president, the licensee planned to conduct a safety review prior to continuing operations with impaired equipment associated with safety-related systems or those containing hazardous materials.

During this discussion and in subsequent conversations, inspectors identified concerns regarding the licensee's proposed corrective action in that the licensee's definition of an "operational work-around" was too narrow. Specifically, the licensee's proposed definition essentially was limited to hardware deficiencies and was not broad enough to include tasks that were not proceduralized, routine operations outside prescribed process parameters, or nonproceduralized actions taken to restore process conditions to prescribed limits. The licensee was requested to provide a written response describing the scope of the program that it planned to implement and the specific nature of the potential problems that the program was intended to address.

The licensee responded by letter dated December 14, 1992, and included, as an attachment to the letter, a copy of an internal memo issued by the senior vice president to the operations and engineering staffs. The letter described the licensee's modified definition of "operational deviations" which was expanded to include the concerns noted above. The attached memo instructed the operations supervisors and process engineers to review equipment and work practices in their area of responsibility to identify any existing operational deviations and to provide a description of the nature of any identified deviations in a condition report. Licensee managers noted that they intended to review all such submissions to determine whether any deviations needed to be addressed prior to requesting authorization to restart the DUF4 facility.

In addition to the measures described above, the licensee proceduralized its "Operational Deviation" program by modifying two facility procedures as described below.

- Procedure G-192, "Condition Reports," was modified to require that all equipment failures or malfunctions be evaluated to determine if immediate repairs are needed or if the associated system could be operated safely without the affected equipment. If the determination is made that immediate repair is not necessary, personnel are required to submit a condition report documenting the deficiency and any compensatory measures to be taken in lieu of repair. Further, the modification specifies that the condition report must provide justification for continued operation, including the basis for deciding that the system can be operated safely, and requires that a temporary operating procedure (TOP) be prepared to formally document any necessary compensatory measures.

  This procedure was later modified to specify that the actions noted above applied only to equipment or instrumentation associated with process systems bearing or containing hazardous materials, or those designed to ensure the safe operation of such systems.

- Procedure G-002, "Temporary Operating Procedures," was modified to indicate additional circumstances requiring that a TOP be generated. The supplemented procedure provided examples consistent with those used to define an operational deviation.

One operational deviation identified for the DUF4 facility was addressed by a TOP during the inspection. The licensee was also developing TOPs to address several other activities associated with startup of process systems that were not in proceduralized configurations due to the shutdown on November 17, and activities associated with cleaning out process systems in the UF6 plant.

In addition, condition reports were generated for equipment found to be inoperable as a result of the licensee's review of work-around issues. With respect to the DUF4 facility, a condition report was generated for an interlock bypass implemented because a nuclear gauge that serves as a level indicator had been sent to the manufacturer for repair. The gauge is normally located in the off-gas cyclone seal leg, and the licensee was considering a design change analysis to operate the system without use of the gauge permanently because the engineering staff had determined that it was a redundant system component.

At the conclusion of the inspection, the only outstanding operational issues associated with the DUF4 facility were some routine instrument calibrations that the instrument and electronics group planned to perform after the process systems were warmed up, prior to feeding material into the reduction reactor.

In summary, the licensee completed the generic actions to address operational and maintenance deficiencies related to the DUF4 facility. Each DUF4 operator participated in a review of equipment problems and operational practices and concurred with the issues identified to SFC management. The licensee proceduralized a formal Operational Deviation program and discussed the program requirements with staff members.

Similar actions were taken for the uranium trioxide (UO3) and UF6 process areas. Although the licensee did not intend to resume uranium conversion operations, there were several activities planned to remove intermediate powder products (UF4 and UO2) from process systems. In addition, the licensee planned to process the feed material left in the digestion tanks and in a slurry tank to convert the material to UO3 so that it could be easily removed from storage bins.

The reviews performed for the UO3 process area identified a few maintenance items that required attention before the clean out activities could proceed. At the conclusion of the inspection, the licensee was preparing a prioritized schedule to complete the repairs prior to initiating clean out activities. Several maintenance issues were identified for the UF6 process area. The engineering staff was performing a review of these items to determine which, if any, needed to be addressed before the transport systems were operated to empty the UF4 currently located in storage bins.

NOTE: The licensee did not plan to operate any process systems in the UF6 process area that would result in conversion of intermediate products, but instead plans to operate transport systems in order to drum the material currently located in storage bins.

2.2 Management Oversight

During the December 9, 1992, meeting with licensee representatives, NRC staff was informed of the licensee's intent to implement a temporary surveillance program involving site managers. The program was further described in SFC's letter dated December 1[illegible], 1992. By internal memo dated December 19, 1992, SFC management described its expectations of the personnel assigned to provide surveillance under the program.

An inspector reviewed the documents noted above and discussed the program with licensee management. Although the activities defined in the program appeared appropriate, the inspector noted that some of the individuals assigned to participate in the program did not have operational experience and were probably not familiar with the plant. This concern was also raised by the DUF4 area manager with the president. At the conclusion of the inspection, the concern was discussed with SFC's president, who indicated that he was aware of the area manager's concern and would review the matter further.

In addition to the surveillance program planned by licensee managers, SFC's Quality Assurance (QA) program was to provide additional surveillances. The inspectors noted that staffing for the QA program had been substantially reduced. The QA engineers that had previously comprised the QA staff were either contracted or were employees of General Atomics, and were no longer working at SFC. During the inspection, the Manager, Quality Assurance, and a Quality Control (QC) technician were expected to perform the activities formerly performed by the QA department. SFC's organization had been modified to make the former Manager, QA responsible for laboratory support in addition to QA responsibilities. The licensee had not formalized plans for QA oversight of the DUF4 plant, but the intent was that both the Manager, QA and the QC technician would perform QA surveillances of the DUF4 activities and the cleanout activities.

NRC raised questions regarding licensee management's assurance that operators working in the DUF4 facility would comply with existing procedures and the newly implemented programs, given the fact that the maintenance work-around issue observed during the November 17 event was generic in nature. This issue was discussed briefly during a public meeting held at the facility on December 9, 1992.

In response to NRC's concerns regarding procedural compliance, the licensee noted that as a result of the November 17 event, the staff had been sensitized to the need to report maintenance requirements promptly and further noted that DUF4 operators had received consultation in similar matters in response to events which occurred earlier this year in the DUF4 facility. However, in a letter dated December 14, 1992, which responded to other concerns expressed by

NRC, the licensee committed to conduct discussions with operations managers and supervisors regarding procedure compliance and the operational deviation program. In addition, the letter noted that the president would issue internal correspondence to re-emphasize management's expectations regarding these issues.

On December 23, 1992, an inspector verified that the actions described above had been completed. At that time, the senior vice president had met with all but one shift supervisor who was absent from duty at the time. The internal memo referenced in the licensee's December 14 letter was issued on December 17 and provided a description of the consequence(s) of failing to comply with procedures based on the November 17 event. The letter also referenced the nature of disciplinary actions that management proposed if employees failed to comply with facility procedures.

In addition to discussions held with the shift supervisors, the DUF4 area manager noted that he intended to conduct similar meetings with all DUF4 operators prior to startup. The area manager also noted that DUF4 operators had been enforcing procedure compliance amongst the staff for some time, and on several occasions operators had consulted with their supervisors when they had observed fellow employees failing to comply with operating procedures. The manager explained that in some cases, this practice had resulted in disciplinary actions being taken with employees.

2.3 Staffing of Operations Personnel

The inspectors verified that adequate staffing of certified operators existed in each area. Operators in the DUF4 plant remained the same and SFC planned to maintain four complete shifts of DUF4 operators. Each shift would consist of a supervisor, a control room operator, and two field operators. The area manager maintained his responsibilities.

The licensee also maintained a number of operators that were certified in both the UO3 and UF6 areas. In addition, the licensee maintained shift supervisors that were certified in the area they were supervising, and in several cases, the shift supervisors were certified in both areas. UO3 and UF6 area managers were reassigned and were no longer directly responsible for their areas.

The former UF6 area manager was assigned as the manager of a newly formed technical support organization that replaced the engineering organization. The former UO3 area manager, along with several former engineers and the former laboratory manager, were reassigned to the technical support organization. The technical support organization was charged with providing the technical support formerly provided by the engineering department.

The Manager, Operations, and Senior Vice President remained in their positions.

3 HARDWARE RELATED DEFICIENCIES AND MAINTENANCE ACTIVITIES (88025)

The licensee's corrective action plan, developed in response to the November 17 event, included several hardware related deficiencies identified during the investigation following the event. In addition, the review performed after the event, to identify any existing hardware related work-arounds, identified a few items involving the solvent extraction process area and several involving the UF6 process area. As noted in Section 1, hardware and equipment related issues relative to the DUF4 facility were resolved, and the licensee was still reviewing the issues related to the UF6 process area to determine which, if any, needed to be resolved prior to operating the intermediate powdered product transport systems to clean out the facility.

Highlights of the inspectors' review of actions taken to resolve generic maintenance problems identified during the November 17 event and those related to the UO3 process area are summarized below.

- Sliding Gate Valve:

  In addition to repairing the malfunctioning valve, the licensee implemented procedural controls (via TOP 92-562) to require physical inspection of the sliding gate valves, as well as requiring that the tanks be physically inspected to ensure that no powdered feed material was present in the tank, prior to adding nitric acid solution to the digestion tanks.

- NOx Scrubber System:

  Licensee representatives, including maintenance personnel, reported that the eductor in the fume scrubber system had been eroded and that there was no question it had been impaired prior to the event. The eductor was replaced and the system appropriately tested. Continued manipulation of the screw conveyor speed was expected to be required to control the digestion rate and hence to keep production of nitrogen oxides down to a level that the fume scrubber could handle.

- Labeling of Directional Conveying System Controls:

  Inspectors observed that the control room indicators were modified as stated in SFC's letter dated December 8, 1992. A new sign had been installed on the control panel.

- Control Room Ventilation Modifications:

  In addition to isolating the air return plenum for the control room and second and third floor office spaces, the licensee modified a contingency plan implementing procedure (CPIP-38) to ensure that control room and other occupied area air intake systems are shut down in the event of a release of hazardous materials under certain conditions. Specifically, if meteorological conditions are such that hazardous gases could be carried into the air intake plenum for the subject areas, the HVAC system is to be shut down immediately following the release. Likewise, process area HVAC units are to be shut down and exhaust fans turned on so that the control room remains at positive pressure relative to the surrounding process areas.

- Repair and Testing of the Public Address System:

  During the November 17 event, the public address system located in the DUF4 facility was inoperable because of hardware failure. The licensee repaired this system and tested the remaining public address systems used for emergency response.

4 EMERGENCY RESPONSE PROCEDURE MODIFICATIONS AND WORKER TRAINING (88050)

During the AIT review of the November 17 event, several deficiencies were identified regarding the licensee's emergency response. Some of these issues included personnel accountability, contamination controls, evacuation of affected plant areas, event classification, and the sequence of actions taken to terminate the event. Through selected reviews of licensee documentation and interviews of personnel, the inspectors verified that SFC had completed its corrective actions as stated in the December 8, 1992, letter.

H&S technicians received further training on the hazards of gaseous chemical releases, that was not covered by general employee training. The inspectors observed that extra self-contained breathing apparati were added in the control room. CPIPs were updated to include more guidance or specific requirements regarding: event classification; alternate locations for the emergency response center; use of emergency radios; recordkeeping; additional environmental assessment equipment kit (at the south guardhouse); and contamination monitoring at the assembly and support centers.

Appropriate additional training had been conducted over several days for emergency response personnel. In some cases training consisted of classroom lectures in addition to reading the new procedure modifications.

ATTACHMENT

1 PERSONS CONTACTED

1.1 Licensee Personnel

J. Bohanon, Manager, Quality Assurance and Laboratory Support
* J. Dietrich, Vice President, Regulatory Affairs
* J. Ellis, Senior Vice President
**C. Harlan, Manager, Licensing
T. Kruppa, Technical Support
S. Lambson, DUF4 Area Manager
C. Mooneyham, Technical Support
S. Munson, Manager, Health & Safety
R. Parker, Manager, Operations
L. Silverstein, Manager, Maintenance
**J. Sheppard, President
L. Tharp, Manager, Technical Support

In addition to the personnel listed above, the inspectors contacted other licensee personnel during this inspection period.

*Denotes personnel present at the interim telephonic exit conducted on December 11, 1992

** Denotes personnel present at the final exit briefing conducted on December 23, 1992.

2 EXIT MEETING

An interim telephonic exit was conducted on December 11, 1992, by G. M. Vasquez, M. L. Thomas, and L. J. Callan. At that time, the licensee was requested to respond to three outstanding issues: (1) resolving operational as well as hardware related deficiencies ("work-arounds"), (2) providing assurance that the DUF4 operators would comply with facility operating procedures, and (3) describing the level of oversight planned by licensee management during the initial restart period.

A final exit was conducted on December 23, 1992, by L. L. Kasner.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064

Attachment 7

RFC

JAN 29 1993

Docket: 40-8027
License: SUB-1010
EA: 93-010

Sequoyah Fuels Corporation
(Subsidiary of General Atomics)
ATTN: James J. Sheppard, President
P.O. Box 610
Gore, Oklahoma 74435

SUBJECT: NRC INSPECTION REPORT 40-8027/92-32 (Notice of Violation)

This refers to the special, announced inspection conducted by Mr. G. M. Vasquez of this office on December 28-31, 1992, and January 3-6, 1993. The inspection included a review of activities authorized by Source Materials License No. SUB-1010. At the conclusion of the inspection, the findings were reviewed with those members of your staff identified in the enclosed report (Enclosure 2) during an interim exit briefing conducted on January 6, 1993, and a final exit briefing conducted by telephone on January 12, 1993.

The inspection was conducted to observe Sequoyah Fuels Corporation's (SFC) activities related to the restart of the depleted uranium tetrafluoride (DUF4) plant as well as any ongoing cleanout activities at the uranium hexafluoride conversion plant. Both plants had been shut down after the November 17, 1992, release of nitrogen dioxide. Previous inspection findings confirmed that SFC had implemented sufficient corrective actions in response to the event, and on December 23, 1992, NRC authorized SFC to resume depleted uranium hexafluoride reduction operations in the DUF4 facility.

Areas examined during the inspection are identified in the report. Within these areas, the inspection consisted of a review of management controls, a selective review of procedures and representative records, interviews of personnel, and observation of activities in progress.

In general, the inspector observed that the licensee's activities were adequately reviewed prior to the activity commencing. Equipment problems were promptly identified to management and were appropriately reviewed. Operations management and staff were sensitive to the need for careful review of activities associated with plant cleanout, since many of the activities were somewhat different from routine operations. Plant staffing also appeared adequate for the activities performed, and overall management oversight appeared appropriate.

In addition, the inspection was conducted to evaluate the findings of the Augmented Inspection Team (AIT) regarding the circumstances surrounding the November 17, 1992, release of nitrogen dioxide (reference NRC Inspection

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Report 40-8027/92-30 dated December 18, 1992) to determine whether any violations of regulatory requirements occurred.

Based on the results of this inspection, six apparent violations were identified and are being considered for escalated enforcement action in accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions" (Enforcement Policy), 10 CFR Part 2, Appendix C. These violations involved an event on November 17, 1992, in which nitrogen dioxide gases were released from the plant (reference NRC Inspection Report 40-8027/92-30 dated December 18, 1992). Accordingly, no Notice of Violation is presently being issued for these inspection findings. In addition, please be advised that the number and characterization of apparent violations described in the enclosed inspection report may change as a result of further NRC review.

An enforcement conference to discuss these apparent violations has been scheduled for March 2, 1993. This enforcement conference will be open to public observation in accordance with the Commission's trial program as discussed in the enclosed Federal Register notice (Enclosure 3). The purposes of this conference are to discuss the apparent violations, their causes and safety significance; to provide you the opportunity to point out any errors in our inspection report; and to provide an opportunity for you to present your proposed corrective actions. In addition, this is an opportunity for you to provide any information concerning your perspective on 1) the severity of the issue, 2) the factors that the NRC considers when it determines the amount of a civil penalty that may be assessed in accordance with Section VI.B.2 of the Enforcement Policy, and 3) the possible basis for exercising discretion in accordance with Section VII of the Enforcement Policy. You will be advised by separate correspondence of the results of our deliberations on this matter. No response regarding these apparent violations is required at this time.

Also, certain other licensed activities, unrelated to the November 17 event, appeared to be in violation of NRC requirements as specified in the enclosed Notice of Violation (Notice). The single violation described in the Notice involves an unauthorized transfer of licensed material to individuals offsite. This is of concern because other instances have been identified where SFC has failed to maintain licensed material in the restricted area.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. In your response, you should document the specific actions taken and any additional actions you plan to prevent recurrence. After reviewing your response to this Notice, including your proposed corrective actions and the results of future inspections, the NRC will determine whether further NRC enforcement action is necessary to ensure compliance with NRC regulatory requirements.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosures will be placed in the NRC's Public Document Room.

The response directed by this letter and the enclosed Notice are not subject to the clearance procedures of the Office of Management and Budget as required by the Paperwork Reduction Act of 1980, Pub. L. No. 96.511.

Should you have any questions concerning this inspection, we will be pleased to discuss them with you.

Sincerely,

L. J. Callan, Director
Division of Radiation Safety
and Safeguards

Enclosures:
1. Appendix A - Notice of Violation
2. Appendix B - NRC Inspection Report 40-8027/92-32
3. Federal Register Notice

cc:
Oklahoma Radiation Control Program Director

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San Diego, California 92138

APPENDIX A

NOTICE OF VIOLATION

Sequoyah Fuels Corporation (SFC)
Gore, Oklahoma 74435

License No. SUB-1010
Docket No. 40-8027

During an NRC inspection conducted on December 28-31, 1992, and January 3-6, 1993, one violation of NRC requirements was identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," 10 CFR Part 2, Appendix C, the violation is listed below:

> 10 CFR 40.51(a) and (b)(5) require, in part, that no licensee transfer source material except to a person authorized to receive such materials under the terms of a specific or general license issued by the Commission or an Agreement State.
>
> Contrary to the above, on November 11, 1992, the licensee transferred source material, consisting of three barrels containing natural uranium in solution, to a waste disposal firm that was not authorized to receive such source material under the terms of a specific or general license issued by the Commission or an Agreement State.
>
> This is a Severity Level IV violation (Supplement VI).

Pursuant to the provisions of 10 CFR 2.201, Sequoyah Fuels Corporation is hereby required to submit a written statement or explanation to the Regional Administrator, Region IV, with a copy to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555, within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation" and should include for the violation: (1) the reason for the violation, or, if contested, the basis for disputing the violation, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken to avoid further violations, and (4) the date when full compliance will be achieved. If an adequate reply is not received within the time specified in this Notice, an order may be issued to show cause why the license should not be modified, suspended, or revoked, or why such other action as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time.

Dated at Arlington, Texas
this 29thday of January1993

APPENDIX B

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Inspection Report: 40-8027/92-32

License: SUB-1010

Licensee: Sequoyah Fuels Corporation (SFC)
P.O. Box 610
Gore, Oklahoma 74435

Facility Name: Sequoyah Facility

Inspection At: Gore, Oklahoma

Inspection Conducted: December 28-31, 1992, and January 3-6, 1993

Inspector: G. Michael Vasquez, Senior Health Physicist

Approved: Charles L. Cain 1/27/93
Charles L. Cain, Chief, Nuclear Materials Inspection Section — Date

Inspection Summary

Areas Inspected: Special, announced inspection observing restart of the Depleted Uranium Tetrafluoride (DUF4) facility, ongoing cleanup activities in the UF6 production facility, and a review of the Augmented Inspection Team (AIT) findings to determine if regulatory requirements were violated.

Results:

- The licensee's response to an incident involving a very small release of uranium hexafluoride in the DUF4 plant (during equipment maintenance) was found to be appropriate (Section 1).
- Operations staff were found to be sensitive to equipment problems and dispositioned them appropriately (Section 1).
- Overall management controls and oversight appeared appropriate for the ongoing activities (Section 2).
- SFC's response and review of the release of contaminated waste oil appeared appropriate. Several weaknesses were identified as a result of the incident (Section 3).

Summary of Inspection Findings:

- A total of six apparent violations associated with the November 17, 1992, event were identified (Section 4).
- Violation 40-8027/9232-01, concerning an unauthorized transfer of licensed material to individuals offsite, was opened (Section 3).

Attachment:

- Persons Contacted and Exit Briefing

DETAILS

1 PLANT STATUS AND OPERATIONS (88020)

1.1 DUF4 Operations

Initially during the inspection period, licensee staff were conducting preparations to restart the DUF4 plant. These preparations included routine preventive maintenance activities and repair of a controller of the operator interface unit (OIU). Even though the plant could have been run with one of the two OIU's (one is completely redundant), SFC management decided to wait and obtain the necessary parts to ensure both of the units were fully operational. By December 30, 1992, SFC restarted the DUF4 plant. However, other equipment problems resulted in short maintenance outages.

As the chemical reator was heating up on December 30, 1992, recently installed insulation on top of the Zone 1 heater of the DUF4 reactor began smoldering and caused a UF6 detector to alarm. Operators reacted appropriately, evaluated the alarm, informed the supervisor, and removed the insulation from the head. As a result, Condition Report 93-1-4 was generated, and the Technical Support group investigated the cause. The cause was believed to have been a contaminant on the insulation.

Early in the morning of December 31, 1992, the partial condenser plugged, resulting in a shutdown of the DUF4 plant. Licensee supervision appropriately decided to wait a few hours until the day shift staff was available, when additional maintenance personnel would be on site, to begin clearing out the partial condenser. The night shift maintenance workers, however, did remove the heads to the partial condenser. Before the day shift commenced, the operators and the Health & Safety (H&S) technician observed the heads "smoking," due to UF6 in the line, as the maintenance workers removed the head. (The maintenance workers were wearing rubber anti-acid suits and supplied air respirators.) As a result of the unexpected UF6, the technician required all workers to wear respiratory protection on the 3rd, 4th, and 5th levels of the DUF4 plant.

H&S required urine samples of workers in the area to determine if any uranium uptakes had occurred and later found that three workers exceeded administrative action levels. Based on the urinalysis, three workers were determined to have minor uptakes of uranium. Specifically, urinalyses indicated values of 224 micrograms per liter (ug/l), 129 ug/l, and 70 ug/l of uranium. The workers were placed on work restrictions in accordance with SFC's procedures, and as expected the material rapidly cleared. Although the licensee had not completed its determination of the airborne exposures (the maximum permissible concentration times the number of hours), the bioassay sample results indicated that the exposures were expected to be well within regulatory limits. As a result of the uptakes, the licensee began an evaluation of its work practices to prevent recurrence. Apparently, the partial condenser was plugged with more UF6 than normal, resulting in the unexpected (small) release. Air samplers in the area showed elevated airborne concentrations of natural uranium, with a maximum of 1.77 times the maximum permissible concentration (specified in 10 CFR 20) on the fifth level.

DUF4 operators identified other problems and dispositioned them in accordance with SFC procedures. When needed, temporary operating procedures were issued. Licensee managers characterized the problems as minor, and the inspector concurred with the determination. These problems included a noncontrolling thermocouple on the DUF4 reactor that had malfunctioned; the weight alarm on the oversized drum alarming a little later than the preset point; the printer at the DUF4 packaging station not working; a HF detector on the fourth level leaking electrolyte; and a malfunctioning automatic valve feeding the UF6 analyzer from the upstream sample location (SFC has a manual valve available, as well as two other independent sample locations, so this condition was viewed as minor).

Through interviews, the inspector found that operators were sensitive to operational deviation and procedural compliance issues. The number (and minor nature) of the operational deviations noted above appeared to demonstrate that the operators were sensitive to a high level of formality. Issues were brought to management's attention promptly and were reviewed appropriately.

1.2 Cleanout Activities

During this inspection period, SFC performed limited cleanout activities in the UF6 plant. The limited nature of this effort was due to unexpected equipment problems, safety reviews, and staffing limitations (i.e., limited staff, with many in training and/or vacations). The general plans for the UO3 area cleanout included digesting the yellowcake feed that was already in the feed bins in the sampling plant, then digesting the existing material in miscellaneous digest, along with the remaining slurry that existed. This material would be processed through the remaining UO3 area as normal and stored in the UO3 storage bin. After the material in the system is processed, SFC planned to process a mixture of nitric acid and water to flush out the digestion tanks and adjustment tanks, and send material to solvent extraction (SX). The SX process would be run to continue the flushing out process. The material would continue to feed to the boildown and denitration processes. SFC was planning to use two boildown tanks and only two denitrators. These activities would convert the material that was in the bins and in the process to UO3, at which time the material could be drummed and shipped to Allied Signal's uranium conversion plant in Metropolis, Illinois. Other activities may be performed to place equipment in long-term, standby mode.

However, prior to performing these activities SFC had to perform preventive maintenance and fix equipment problems. These activities included preventive maintenance on the emergency diesel generator, the nitrogen oxide scrubber (NOx), the pH meter on the combination stream, and pressure relief valves on the boiler; and to fix the recompression evaporator sump pump and its recirculation pump. Additionally, operators were to walk-down the NOx scrubber system prior to operating the UO3 area.

In the UF6 area, SFC had drummed most of the material in the reduction and hydrofluorination processes. A vacuuming campaign to further clean out these systems was expected to occur some time in the future. SFC had much UF4 in storage bins that it was preparing to drum. The plans included feeding the UF4 through the tower feed bin and drumming the powder at the ash receivers. But before doing this, SFC wanted to de-post the ash receivers (ARs) as a high radiation area. SFC procedures included the dose equivalent rate from beta activity in its determination of a high radiation area. This appeared to be conservative and resulted in additional cleanout activities in the AR area. These cleanout activities were important so that SFC did not have to comply with the additional requirements of a high radiation area, prior to drumming the expected 150 drums of UF4.

SFC also evaluated whether it needed to continue testing of the Q-circuit, despite the fact that the fluorine cell area had been shut down. SFC's license requires that the Q-circuit be tested monthly and calibrated annually. SFC's evaluation showed that no part of the Q-circuit was needed to clean out the electrolyte from the cells, or for any other plant activity that was ongoing.

In general, the inspector noted that workers were not under time pressures to complete assigned tasks. Senior managers appeared sensitive to the availability of staffing, noting that several workers were unavailable due to general employee training, transportation training, or vacations.

In summary, the inspector observed that work activities were adequately reviewed prior to commencing. However, cleanout activities were limited due to equipment problems, preventive maintenance, staffing, training, and vacation schedules. Operational activities associated with the DUF4 plant appeared appropriate. Operations staff were sensitive to operational deviations and dispositioned them in accordance with SFC procedures. SFC's commitment to carefully review its activities and to ensure adequate available staffing appeared to outweigh schedule pressures.

2 Management Oversight (88005)

SFC's management oversight program had several aspects to it. First, it involved discussions between senior managers and managers/supervisors. It also involved discussions between managers/supervisors and workers. Next, SFC noted that SFC managers would divert their time to fewer activities, thereby effectively increasing the management oversight of these activities. The program also involved a modified manager-on-shift program, as well as some oversight by the quality assurance (QA) organization. The manager-on-shift program consisted of a manager being assigned to review SFC activities 2 hours prior to day shift, 2 hours after day shift, and then another manager would review activities 2 hours prior to the afternoon shift and 2 hours after shift change. As noted in NRC Inspection Report 40-8027/92-31, dated January 21, 1992, a concern was noted in that some of the individuals participating in the program did not have operational experience and were probably not familiar with the plant. SFC decided not to modify its plan, and senior managers felt that even though some of the individuals did not have operational experience they would be a "fresh set of eyes." SFC representatives also stated their intent to develop a checklist for these individuals to help them in their oversight activities.

The inspector reviewed the log entries for the manager-on-shift, and it appeared that the managers who had participated were adequately performing their tasks, as outlined in SFC's internal memorandum. The inspector noted that the managers who had participated in the oversight program up to that time were managers with operational experience.

The inspector noted that the Sequoyah Oversight Team restarted its oversight activities on January 4, 1993. The team's activities during that week appeared appropriate, following up with SFC's planned activities as well as SFC's planned staffing changes.

The inspector was informed that most of SFC's workers and managers were actively seeking other employment. The furlough schedule showed further layoffs occurring in mid-January, March, and June. SFC estimated some individuals would be employed until January 1994, but the company did not provide any estimates beyond that. As a result, managers, engineers, and other workers were actively seeking other employment. This made for a very dynamic situation regarding management and technical support. For example, during the inspection, SFC's Manager, Quality Assurance (QA) resigned, stating that January 15, 1993, would be his last day. At the conclusion of the inspection, SFC had not yet appointed another Manager, QA. In addition, SFC planned a management reorganization the week following the inspection.

Overall, while there were minor weaknesses in the manager-on-shift program, management controls appeared appropriate for the limited number of activities that were ongoing. Managers appeared well informed on operational deviation issues and responded appropriately. QA surveillances were conducted as planned. Management appeared effective in communicating its messages regarding procedural compliance and operational deviation issues, as evidenced by the information contained in Section 1 above.

However, due to the nature of placing the plant in a long-term standby mode and furloughing employees, many managers were expected to leave employment as soon as they find other suitable employment. This dynamic situation will continue to be reviewed during future inspections to ensure compliance with license requirements, adequate staffing for ongoing activities, and adequate staffing for the Contingency Plan.

3 BARRELS OF CONTAMINATED SOLUTIONS FOUND OFFSITE (88025)

On December 18, 1992, SFC informed NRC that the Oklahoma State Department of Health (OSDH) had informed SFC that it had found some barrels that appeared to contain contaminated waste oil. SFC dispatched H&S personnel to also investigate and found some contamination levels on the barrels, and some of the data indicated that perhaps the solutions inside were contaminated. The following is a brief description of the event.

On November 11, 1992, 17 drums of waste liquid were shipped to an offsite vendor. These included 11 drums of waste oil, 5 drums of waste glycol and water, and 1 drum of waste glycol.

During the week of December 14, 1992, a citizen contacted OSDH and expressed concern that some barrels of waste oil received from SFC at a processing facility in Haskell, Oklahoma, may contain radioactive material. On December 17, 1992, a representative of OSDH made measurements of 190 microRoentgen per hour (uR/hr) and 182 uR/hr at contact on two barrels, with a background of less than 10 uR/hr. (SFC had sent a total of 17 drums on November 11, 1992, but only 7 drums remained.) These radiation levels were well below the limits prescribed by 10 CFR 20.105(b)(2) "Permissible levels of radiation in unrestricted areas"; therefore, they posed no undue risk to the general public. OSDH also took samples and was analyzing them.

On December 18, OSDH contacted SFC, and SFC sent H&S personnel to perform surveys of the barrels. Positive readings were obtained, and SFC arranged with the facility owner to place the drums in a locked building that would be patrolled by a 24-hour guard over the weekend. SFC measured a small spot on the floor near drum No. 162 that read 2,800 dpm/100 cm^2 of beta activity. However, licensee personnel reported that the area was quickly and easily decontaminated, and no other areas of contamination were found.

On December 21, SFC performed more thorough surveys of the processing facility and found no further contamination. SFC retrieved the remaining seven barrels and returned them to the Sequoyah Facility. Interviews with SFC personnel indicated that they performed surveys at the oil processing facility from the location where the drums were received on November 12, 1992, through the locations where the other 10 drums were processed and the remaining 7 were stored. The inspector's review of licensee survey data and interviews with licensee personnel indicated that SFC's efforts to determine whether contamination existed at the processing facility were appropriate.

Maximum external contamination levels on the drums were 100,000 disintegrations per 100 square centimeters (dpm/100 cm^2) of fixed beta activity along the bottom seam of drum No. 163, and 3,000 dpm/100 cm^2 of removable beta activity. SFC's administrative limit for release of material offsite is 15,000 dpm/100 cm^2 fixed beta and 1,000 dpm/100 cm^2 removable beta.

Sample results showed that of the 7 remaining drums, 2 drums contained licensed material. Drum No. 162 contained 11.6 grams per liter (g/l) of uranium, 229 milligrams per liter (mg/l) of nitrates, 2,476 mg/l of fluorides, and a pH of 2.6. Drum No. 163 contained 5.6 g/l of uranium (other constituents were not known during the inspection). The remaining five barrels contained less than 0.05 percent uranium by weight; therefore, these were releasable in accordance with 10 CFR 40.13, "Unimportant quantities of source material." SFC's waste oil procedure allows for release of waste oil if it is less than 0.05 percent uranium by weight. Otherwise, the oil is filtered to reduce the concentration.

During the inspector's reviews of the incident, he found that the barrels are routinely sampled several times over a period of months. The samples are submitted to the laboratory for analyses. However, the former Manager, Laboratory, reviewed lab data and found that an anomaly occurred in the computer program that runs the counting equipment. He found that in cases when two standardizations are run without first initializing the program, the software erroneously sums and/or multiplies standardization data, rather than using the most recent data. The former manager noted that the lab supervisors and workers did not detect the error. As a result, the instrument provided erroneously low readings. In reviewing previous standardization data, he found that the bad standardizations occurred for two drums; drum Nos. 82 and 162.

Through further reviews, he found that drum No. 163 had been released due to technician error. A lab technician, who had been working in the lab only since July 1992, apparently believed that the counting equipment provided data in units of grams per liter, when in fact it provided data in units of percent uranium by weight. The technician converted the data and reported it to the waste management group as 0.03 percent instead of 0.3 percent. The lab supervisor who reviewed and approved the analysis did not detect the error, and as a result drum No. 163 was considered acceptable for shipment.

The offsite waste oil processor informed SFC that drum No. 82 had been blended with other oils and sent to a cement kiln in Kansas. The uranium concentration in drum No. 82 had been conservatively estimated at 0.57 percent.

The former manager also reviewed all the standardizations that had been performed on the counting equipment through 1989. He reported that he found only one other instance where the error occurred (and it had also gone undetected). It involved an attempt to increase the sensitivity of the instrument in determining uranium in a solvent for process controls. The false reading did not result in any safety issue.

Other weaknesses identified included procedure deficiencies, weaknesses in controlling drums, and deficiencies in determining which lab analysis to perform. While the licensee's root cause analysis was not complete at the conclusion of the inspection, it appeared to have been sufficiently comprehensive.

10 CFR 40.51(a) and (b)(5) require, in part, that no licensee transfer source material except to a person authorized to receive such materials under the terms of a specific or general license issued by the Commission or an Agreement State. The fact that the licensee transferred source material in a manner not authorized pursuant to 10 CFR 40.51 was identified as a violation (40-8027/9232-01). Specifically, SFC transferred three barrels containing

natural uranium in solution, in concentrations greater than 0.05 percent by weight.

4 ISSUES RELATED TO THE NOVEMBER 17, 1992 EVENT (88025)

The inspector also reviewed issues related to the November 17, 1992, event that were identified by SFC in its December 8, 1992, letter to NRC discussing the causes of the event, and that were verified by the Augmented Inspection Team (reference NRC Inspection Report 40-8027/92-30 dated December 18, 1992).

Both SFC and the AIT found that operators did not follow a caution statement in Procedure N-230-1, "Digestion of Yellowcake and Transfer of Slurry," Revision 11. License Condition 9 of NRC License SUB-1010 authorizes use of licensed materials in accordance with the statements, representations, and conditions contained in Chapters 1 through 8 of the license renewal application dated August 23, 1985, as supplemented. Section 2.7.1 in Chapter 2 of this license renewal application, as supplemented, states, in part, that it shall be the responsibility of the senior vice president to see that written operating procedures are established, maintained, and adhered to for all operations and safety-related activities involving source or hazardous materials. A caution statement in Section 4.2.2 of Procedure N-230-1, "Digestion of Yellowcake and Transfer of Slurry," instructs operators to locally ensure that the slide gate valve to a previously used digester is closed if the digester to be placed in service is not the same as the one used to mix the most recent batch.

However, on November 16-17, 1992, SFC operators did not ensure that the slide gate valve to digestion tank No. 2, which had been previously used, was closed prior to mixing batches in a different digester tank. As a result, yellowcake feed material was inadvertently transferred to a digestion tank prior to the addition of nitric acid, which ultimately resulted in a release of nitrogen dioxide to the atmosphere on November 17, 1992. This was identified as an apparent violation of License Condition 9, Section 2.7.1, of the referenced license renewal application and Section 4.2.2 of Procedure N-230-1. (40-8027/9232-02).

A second item of concern was that nitrogen dioxide (NO2) gases entered into the control room. While the NO2 concentrations had not been determined, the concentrations were high enough to require evacuation of nonessential personnel from the control room, and to require remaining personnel to don respiratory protective equipment. License Condition 9 of NRC License SUB-1010 authorizes use of licensed materials in accordance with the statements, representations, and conditions contained in Chapters 1-8 of the license renewal application dated August 23, 1985, as supplemented. Chapter 8 of the license renewal application states that the licensee shall implement, maintain, and execute the response measures of the Radiological Contingency Plan submitted to the Commission on August 20, 1986, as supplemented.

Section 6.1.1 of the Contingency Plan states: "The control room is ... the initial control center for directing the onsite response effort to an event.

The control room is sealed to prevent entry of external contamination from the process area. Automatic dampers located in the air supply ducts close when smoke is sensed at the inlets." However, on November 17, 1992, the control room was not sealed to prevent entry of external contamination from the process area. As a result, following a release of nitrogen dioxide, toxic gases entered into the control room, requiring control room personnel to don respiratory protective equipment. This was identified as an apparent violation of License Condition 9, Chapter 8, of the referenced license renewal application and Section 6.1.1 of the Radiological Contingency Plan (40-8027/9232-03).

The AIT also found that two Health and Safety (H&S) technicians entered, or partially entered, main process building rooms containing hazardous chemicals such that the rooms had visibly hazy atmospheres (reference Section 3.6 of NRC Inspection Report 40-8027/92-30 dated December 18, 1992). Chapter 8 of the license renewal application referred to by License Condition 9, states that the Sequoyah Facility Contingency Plan interfaces with several related Contingency documents, particularly the Contingency Plan Implementing Procedures (CPIPs). The detailed instructions for implementation and support of the Plan are contained in these procedures. Section 4.2.3 of CPIP-22, "Onsite Emergency Monitoring," requires, in part, that monitoring personnel don protective clothing and/or respirators to provide protection equal to or greater than the anticipated hazard. A visibly hazy atmosphere is indicative of an anticipated hazard requiring the use of such protective measures.

During the November 17, 1992, event, a Health & Safety technician entered into a visibly hazy room (the in-plant H&S office) without donning respiratory protection that was equal to or greater than the anticipated hazard. The technician was obtaining drager tubes to measure airborne concentrations in the plant to begin controlling or releasing areas in the plant after the release had terminated.

In addition, another Health & Safety technician partly entered into another visibly hazy room (the in-plant break room) without donning respiratory protection that was equal to or greater than the anticipated hazard. The technician was attempting to measure the airborne concentrations. Measurements of this second area later indicated that airborne concentrations of nitrogen dioxide were above a level that was immediately dangerous to life and health.

In these two instances, the technicians were not performing rescue functions or were not attempting to mitigate the event. There was no necessity for an immediate action; therefore, their exposures to a hazardous chemical in unknown concentrations were unnecessary. Further, the two instances were in violation of SFC emergency procedures; therefore, these were identified as two examples of an apparent violation of License Condition 9, Chapter 8, of the referenced license renewal application, Section 4.2.3 of CPIP-22 (40-8027/9232-04).

Another item of concern was that of personnel accountability. During events such as the November 17 event, it is important to determine if a worker is injured or incapacitated and requires rescue. However, as discussed in Section 3.7 of NRC Inspection Report 40-8027/92-30, at least two H&S technicians, as well as other workers from other departments all of whom were responding to the event, had not reported to responsible personnel for some time (even after the Site Area Emergency was declared). Further, one individual (a shift supervisor) remained in the main process building (near the digestion area) throughout the event without respiratory protective equipment. The supervisor attempted to assist operations staff in improving the vacuum to the off-gas system, and he was not accounted for while remaining in the area (for the purposes of determining whether rescue was required). Further, personnel accountability had not been completed by the time the Site Area Emergency was terminated nor had plant medical personnel finished determining whether any injuries or medical problems had occurred.

Section 5.4.2 of SFC's Contingency Plan states that all persons responding to the emergency will be accounted for by the onsite emergency director. All others will be accounted for at the Assembly & Support Center (ASC). However, at least two Health & Safety technicians and a shift supervisor who responded to the event were not accounted for. Further, accountability for all personnel was not completed at the ASC. This was identified as an apparent violation of License Condition 9, Chapter 8, of the referenced license renewal application, Section 5.4.2 of SFC's Contingency Plan (40-8027/9232-05).

Another issue identified by the AIT involved use of the onsite air horn signal system. As identified in Section 3.3 of NRC Inspection Report 40-8027/92-30, at the declaration of the Unusual Event the licensee did not activate the site alarm horn. The inspector noted that SFC's Contingency Plan states that activation of the air horn signal system also automatically shuts down the ventilation supply fans for the administration, laboratory, and change room areas, and the control room. If the ventilation had been shut down at the declaration of the Unusual Event, the airborne NO2 concentrations in the control room may have been reduced.

Section 6.3.1 of the Contingency Plan (Plan) states, in part, that the facility public address system is used in conjunction with the air horn signal system to alert employees and direct them away from hazardous areas. Section 6.3.1 further states that these two systems comprise the onsite emergency notification system and that the air horn signal alerts personnel to an emergency condition. However, on November 17, 1992, the air horn signal was not sounded upon the declaration of the Unusual Event, an emergency condition as described in the Plan. This was identified as an apparent violation of License Condition 9, Chapter 8, of the referenced license renewal application, Section 6.3.1 of SFC's Contingency Plan (40-8027/9232-06).

Another issue of concern was the delay in classifying the event as an Alert or as a Site Area Emergency. Proper classification is important because the classification determines the type and level of assessment, and the corrective and protective actions to be taken. As discussed in Section 3.3 of NRC

ATTACHMENT

1 PERSONS CONTACTED

1.1 Licensee Personnel

J. Bohanon, Manager, Quality Assurance and Laboratories
J. Dietrich, Vice President, Regulatory Affairs
*J. Ellis, Senior Vice President
*C. Harlan, Manager, Licensing
T. Kruppa, Technical Support
S. Lambson, DUF4 Area Manager
C. Mooneyham, Technical Support
*S. Munson, Manager, Health & Safety
R. Parker, Manager, Operations
L. Silverstein, Manager, Maintenance
J. Sheppard, President
L. Tharp, Manager, Technical Support

In addition to the personnel listed above, the inspectors contacted other licensee personnel during this inspection period.

* Denotes personnel present at both the interim exit briefing conducted on January 6, 1993, as well as the final exit briefing conducted telephonically on January 12, 1993.

2 EXIT MEETING

On January 6, 1993, the inspector met with licensee representatives to discuss the findings relative to the DUF4 restart, ongoing cleanout activities, and the event involving the discovery of contaminated solutions found offsite.

On January 12, 1993, the inspector conducted a telephonic exit with licensee representatives to discuss the findings relative to the apparent violations associated with the November 17, 1992, event.

in prior reviews for the Yankee Nuclear Power Station. The plant was licensed before the requirement for issuance of a Final Environmental Statement.

Agencies and Persons Consulted

The NRC staff reviewed the licensee's request and did not consult other agencies or persons.

Finding of No Significant Impact

The Commission has determined not to prepare an environmental impact statement for the proposed exemption. Based upon the foregoing environmental assessment, we conclude that the proposed action will not have a significant effect on the quality of the human environment.

For further details with respect to this action, see the application for exemption dated May 22, 1992, which is available for public inspection at the Commission's Public Document Room, 2120 L Street, NW., Washington, DC 20555, and at the local public document room at Greenfield Community College, 1 College Drive, Greenfield, Massachusetts 01301.

Dated at Rockville, Maryland, this 2d day of July 1992.

For the Nuclear Regulatory Commission.

Richard F. Dudley, Jr.,

Acting Director, Non-Power Reactors, Decommissioning and Environmental Project Directorate, Division of Reactor Projects—III/IV/V, Office of Nuclear Reactor Regulation.

[FR Doc. 92-16232 Filed 7-9-92; 8:45 am]

BILLING CODE 7590-01-M

Regulatory Guides; Issuance, Availability

The Nuclear Regulatory Commission has issued a revision to a guide in its Regulatory Guide Series. This series has been developed to describe and make available to the public such information as methods acceptable to the NRC staff for implementing specific parts of the Commission's regulations, techniques used by the staff in evaluating specific problems or postulated accidents, and data needed by the staff in its review of applications for permits and licenses.

Regulatory Guide 8.7, Revision 1, "Instructions for Recording and Reporting Occupational Radiation Exposure Data," describes an acceptable program for the preparation, retention, and reporting of records of occupational radiation exposures. It includes copies of NRC Forms 4 and 5 and detailed instructions on completing them.

Comments and suggestions in connection with items for inclusion in guides currently being developed or improvements in all published guides are encouraged at any time. Written comments may be submitted to the Regulatory Publications Branch, Division of Freedom of Information and Publications Services, Office of Administration, U.S. Nuclear Regulatory Commission, Washington, DC 20555.

Regulatory guides are available for inspection at the Commission's Public Document Room, 2120 L Street NW., Washington, DC. Copies of issued guides may be purchased from the Government Printing Office at the current GPO price. Information on current GPO prices may be obtained by contacting the Superintendent of Documents, U.S. Government Printing Office, Post Office Box 37082, Washington, DC 20013-7082, telephone (202) 512-2249 or (202) 512-2171. Issued guides may also be purchased from the National Technical Information Service on a standing order basis. Details on this service may be obtained by writing NTIS, 5285 Port Royal Road, Springfield, VA 22161.

Authority: 5 U.S.C. 552(a).

Dated at Rockville, Maryland, this 30th day of June 1992.

For the Nuclear Regulatory Commission.

Eric S. Beckjord, Director,

Office of Nuclear Regulatory Research.

[FR Doc. 92-16224 Filed 7-9-92; 8:45 am]

BILLING CODE 7590-01-M

Two-Year Trial Program for Conducting Open Enforcement Conferences; Policy Statement

AGENCY: Nuclear Regulatory Commission.

ACTION: Policy statement.

SUMMARY: The Nuclear Regulatory Commission (NRC) is issuing this policy statement on the implementation of a two-year trial program to allow selected enforcement conferences to be open to attendance by all members of the general public. This policy statement describes the two-year trial program and informs the public of how to get information on upcoming open enforcement conferences.

DATES: This trial program is effective on July 10, 1992, while comments on the program are being received. Submit comments on or before the completion of the trial program scheduled for July 11, 1992. Comments received after this date will be considered if it is practical to do so, but the Commission is able to assure consideration only for comments received on or before this date.

ADDRESSES: Send comments to: The Secretary of the Commission, U.S. Nuclear Regulatory Commission, Washington, DC 20555, ATTN: Docketing and Service Branch.

Hand deliver comments to: One White Flint North, 11555 Rockville Pike, Rockville, MD between 7:45 a.m. to 4:15 p.m., Federal workdays.

Copies of comments may be examined at the NRC Public Document Room, 2120 L Street, NW. (Lower Level), Washington, DC.

FOR FURTHER INFORMATION CONTACT: James Lieberman, Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555 (301-504-2741).

SUPPLEMENTARY INFORMATION:

Background

The NRC's current policy on enforcement conferences is addressed in Section V of the latest revision to the "General Statement of Policy and Procedure for Enforcement Actions," (Enforcement Policy) 10 CFR part 2, appendix C that was published on February 18, 1992 (57 FR 5791). The Enforcement Policy states that, "enforcement conferences will not normally be open to the public." However, the Commission has decided to implement a trial program to determine whether to maintain the current policy with regard to enforcement conferences or to adopt a new policy that would allow most enforcement conferences to be open to attendance by all members of the public.

Policy Statement

Position

The NRC is implementing a two-year trial program to allow public observation of selected enforcement conferences. The NRC will monitor the program and determine whether to establish a permanent policy for conducting open enforcement conferences based on an assessment of the following criteria:

(1) Whether the fact that the conference was open impacted the NRC's ability to conduct a meaningful conference and/or implement the NRC's enforcement program;

(2) Whether the open conference impacted the licensee's participation in the conference;

(3) Whether the NRC expended a significant amount of resources in making the conference public; and

(4) The extent of public interest in opening the enforcement conference.

I. Criteria For Selecting Open Enforcement Conferences

Enforcement conferences will not be open to the public if the enforcement action being contemplated—

(1) Would be taken against an individual, or if the action, though not taken against an individual, turns on whether an individual has committed wrongdoing;

(2) Involves significant personnel failures where the NRC has requested that the individual(s) involved be present at the conference;

(3) Is based on the findings of an NRC Office of Investigations (OI) report; or

(4) Involves safeguards information, Privacy Act information, or other information which could be considered proprietary.

Enforcement conferences involving medical misadministrations or overexposures will be open assuming the conference can be conducted without disclosing the exposed individual's name. In addition, enforcement conferences will not be open to the public if the conference will be conducted by telephone or the conference will be conducted at a relatively small licensee's facility. Finally, with the approval of the Executive Director for Operations, enforcement conferences will not be open to the public in special cases where good cause has been shown after balancing the benefit of public observation against the potential impact on the agency's enforcement action in a particular case.

The NRC will strive to conduct open enforcement conferences during the two-year trial program in accordance with the following three goals:

(1) Approximately 25 percent of all eligible enforcement conferences conducted by the NRC will be open for public observation;

(2) At least one open enforcement conference will be conducted in each of the regional offices; and

(3) Open enforcement conferences will be conducted with a variety of the types of licensees.

To avoid potential bias in the selection process and to attempt to meet the three goals stated above, every fourth eligible enforcement conference involving one of three categories of licensees will normally be open to the public during the trial program. However, in cases where there is an ongoing adjudicatory proceeding with one or more intervenors, enforcement conferences involving issues related to the subject matter of the ongoing adjudication may also be opened. For the purposes of this trial program, the three categories of licensees will be commercial operating reactors, hospitals, and other licensees, which will consist of the remaining types of licensees.

II. Announcing Open Enforcement Conferences

As soon as it is determined that an enforcement conference will be open to public observation, the NRC will orally notify the licensee that the enforcement conference will be open to public observation as part of the agency's trial program and send the licensee a copy of this Federal Register notice that outlines the program. Licensees will be asked to estimate the number of participants it will bring to the enforcement conference so that the NRC can schedule an appropriately sized conference room. The NRC will also notify appropriate State liaison officers that an enforcement conference has been scheduled and that it is open to public observation.

The NRC intends to announce open enforcement conferences to the public normally at least 10 working days in advance of the enforcement conference through the following mechanisms:

(1) Notices posted in the Public Document Room;

(2) Toll-free telephone messages; and

(3) Toll-free electronic bulletin board messages.

Pending establishment of the toll-free message systems, the public may call (301) 492-4732 to obtain a recording of upcoming open enforcement conferences. The NRC will issue another Federal Register notice after the toll-free message systems are established.

To assist the NRC in making appropriate arrangements to support public observation of enforcement conferences, individuals interested in attending a particular enforcement conference should notify the individual identified in the meeting notice announcing the open enforcement conference no later than five business days prior to the enforcement conference.

III. Conduct of Open Enforcement Conferences

In accordance with current practice, enforcement conferences will continue to normally be held at the NRC regional offices. Members of the public will be allowed access to the NRC regional offices to attend open enforcement conferences in accordance with the "Standard Operating Procedures For Providing Security Support For NRC Hearings And Meetings" published November 1, 1991 (56 FR 56251). These procedures provide that visitors may be subject to personnel screening, that signs, banners, posters, etc., not larger than 18" be permitted, and that disruptive persons may be removed.

Each regional office will continue to conduct the enforcement conference proceedings in accordance with regional practice. The enforcement conference will continue to be a meeting between the NRC and the licensee. While the enforcement conference is open for public observation, it is not open for public participation.

Persons attending open enforcement conferences are reminded that (1) the apparent violations discussed at open enforcement conferences are subject to further review and may be subject to change prior to any resulting enforcement action and (2) the statements of views or expressions of opinion made by NRC employees at open enforcement conferences or the lack thereof, are not intended to represent final determinations or beliefs.

In addition to providing comments on the agency's trial program in accordance with the guidance in this notice, persons attending open enforcement conferences will be provided an opportunity to submit written comments anonymously to the regional office. These comments will subsequently be forwarded to the Director of the Office of Enforcement for review and consideration.

Dated at Rockville, MD, this 7th day of July 1992.

For the Nuclear Regulatory Commission.

Samuel J. Chilk,

Secretary of the Commission.

[FR Doc. 92-16233 Filed 7-9-92; 8:45 a.m.]

BILLING CODE 7590-01-M

OFFICE OF PERSONNEL MANAGEMENT

Request for Clearance of a Revised Information Collection to Add Form RI 38-7 to OMB Clearance Number 3206-0128

AGENCY: Office of Personnel Management.

ACTION: Notice.

SUMMARY: In accordance with the Paperwork Reduction Act of 1980 (title 44, U.S. Code, chapter 35), this notice announces a request for clearance of a revised information collection, to add form RI 38-7 to the Application for Refund of Retirement Deductions (CSRS). OPM must have SF 2802 completely filled out and signed before paying a refund of retirement contributions. SF 2802B must also be complete if there are spouse(s) or former

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064

Attachment 8

MAR 25 1993

Docket No. 40-8027
License No. SUB-1010
EA 93-010

Sequoyah Fuels Corporation
(Subsidiary of General Atomics)
ATTN: James J. Sheppard, President
P.O. Box 610
Gore, Oklahoma 74435

Gentlemen:

SUBJECT: NOTICE OF VIOLATION AND PROPOSED IMPOSITION OF CIVIL PENALTY - $18,000 (NRC INSPECTION REPORTS 92-30, 92-31 AND 92-32)

This is in reference to NRC inspections related to a November 17, 1992, nitrogen dioxide release from the Sequoyah Fuels Corporation (SFC) Sequoyah Facility in Gore, Oklahoma. Inspection reports describing the circumstances surrounding this event, SFC's corrective actions following the event, and apparent violations of NRC requirements were issued on December 18, 1992; January 21, 1993; and January 29, 1993, respectively. The apparent violations identified during these inspections were discussed with you and other SFC representatives at a March 2, 1993, public enforcement conference in the NRC's Arlington, Texas office. Subsequent to the enforcement conference, SFC provided additional information regarding two issues that were discussed at the conference: personnel accountablity and the possible health consequences of the November 17, 1992 release. This information was provided to the NRC in a letter dated March 10, 1993.

The circumstances surrounding the November 17, 1992, event are described in detail in the NRC's December 18, 1992, Augmented Inspection Team (AIT) report. In brief, approximately 23,000 cubic feet of nitrogen dioxide were released from the facility to the environment when nitric acid was added to a digester tank which was believed to have been empty but which contained approximately 8,800 pounds of uranium concentrate. The nitrogen dioxide gas, which was released from the facility over a period of approximately 20 minutes and was dispersed as it traveled in a northwesterly direction, effected facility workers and members of the public in the vicinity of the facility who were exposed to the release. These effects included upper respiratory and eye irritation that, in some cases, lasted for several days. In addition, nitrogen dioxide entered the facility's control room, forcing control room personnel to don respiratory equipment during their response to the emergency.

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

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The November 17th event was caused, in part, by a failure to adhere to facility procedures requiring that operators ensure the closure of a slide gate valve between the uranium concentrate feed transfer conveyer and a previously used digestor tank if a different digestor is being placed in service. This failure, which violated a caution statement in the procedure governing this type of operation, permitted uranium concentrate to be inadvertently added to the wrong digestor. When nitric acid was added to this digestor, an uncontrolled reaction occurred and resulted in the production and release of nitrogen dioxide.

The NRC's inspections also found that other circumstances had contributed to the occurrence of this event. First, the slide gate valve to the digestor was essentially inoperable, i.e., it was stuck open, and had not been functioning properly for weeks prior to the event. Although the operators and some supervisors knew of this fact, they failed to inform the Area Manager or initiate a work request to repair the valve. Secondly, the problems with the fume scrubber ejector system on the digestors had caused operators to adopt a practice of starting and stopping the feed transfer conveyor in order to control the chemical reaction. This practice increased the probability that operators would run the conveyor in the wrong direction and add uranium concentrate to the wrong digestor, which is what happened in this instance. Finally, SFC failed to take adequate corrective action to resolve deficiencies with the control room ventilation system, following a fluorine intrusion event on June 27, 1992. Though a deficiency report was generated and assigned to engineering for implementation of corrective measures, those measures were insufficient to prevent the intrusion of nitrogen dioxide during the November 17, 1992, event. This is a particular concern because the operations staff had been aware of other gaseous releases that were first detected in the control room.

The violations of NRC requirements and SFC license conditions associated with this event are described in the enclosed Notice of Violation and Proposed Imposition of Civil Penalty (Notice). The violation in Section I concerns the failure to adhere to a caution statement in a facility procedure that required operators to locally ensure the closure of a slide gate valve to a digestor. This failure was the direct cause of the nitrogen dioxide gas release. The violations in Section II involve: a failure to ensure that the control room was sealed to prevent the intrusion of contaminants from the process facility during an emergency (Violation II.A); a failure to ensure that all individuals were accounted for following an evacuation of the facility (Violation II.B); a failure of some facility personnel to don appropriate respiratory protective equipment in responding to the emergency (Violation II.C); and a failure to utilize the air horn system in conjunction with the public address system to alert personnel of the emergency (Violation II.D). Each of the violations in Section II had the potential for significant injury or loss of life to site personnel, had conditions (such as wind direction) been slightly different.

During the enforcement conference, you disputed a sixth potential violation involving the classification of the emergency condition. At issue was your guidance that did not adequately address the classification of events involving non-radioactive hazardous materials. However, this item is not being cited because it did not affect the facility's overall response, as the actions that would have been triggered by the classification had already been initiated, and additional guidance was subsequently issued. In addition, during the enforcement conference, you disputed Violation II.C. This violation is being cited because, although you could account for everyone responding to the emergency, the facility's accountability system could not account for all other personnel, i.e., those at the assembly area, because the data was not kept up-to-date.

The regulatory significance that NRC attaches to the violations surrounding this event is increased by the fact that facility operations continued despite the licensee's knowledge of the equipment problems discussed above. SFC management had not provided operators adequate guidance regarding the continuation of facility operations with equipment that was inoperable or malfunctioning. In addition, SFC's efforts to improve adherence to procedures, which has been a recurring problem at the facility, were not effective in this instance. In effect, the entire system of physical and administrative controls that were intended to prevent a significant release of nitrogen dioxide from the digestors failed in this instance.

The failure to (1) follow operating procedures that resulted in the release of toxic gas that had the potential for significant injury or loss of life to site personnel or the general public, and (2) adequately implement all portions of the facility Contingency Plan during an actual emergency is a very significant regulatory concern. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," (Enforcement Policy) 10 CFR Part 2, Appendix C, 57 FR 5791 (February 18, 1992), the violations that led to this event and increased the potential for significant personnel injury have been classified at Severity Level II.

The NRC recognizes that SFC took both immediate and long-term corrective action to restore compliance with license conditions and to resolve the deficiencies revealed by this event. These actions included the resolution of equipment problems, the development of procedures governing facility operations with inoperable equipment and additional training of facility personnel. The NRC issued a Confirmatory Action Letter (CAL) on November 18, 1992, confirming SFC's commitment to delay facility operations until it completed investigations of the event and received the NRC's concurrence on restart. On November 23, 1992, SFC announced that it would not resume operation of the uranium hexafluoride (UF6) facility and that it would operate the depleted uranium tetrafluoride (DUF4) facility only until SFC's current contractual obligations were fulfilled. On December 23, 1992, based on inspections to con[illegible] SFC's completion of its corrective action plan, the NRC authorized SFC to resume operations of the DUF4 facility.

To emphasize the importance of ensuring compliance with requirements that are designed to protect the safety of facility employees and the general public, I have been authorized, after consultation with the Director, Office of Enforcement, and the Deputy Executive Director for Nuclear Materials Safety, Safeguards and Operations Support, to issue the enclosed Notice of Violation and Proposed Imposition of Civil Penalty (Notice) in the amount of $18,000 for the Severity Level II problem described above and in the Notice. The base value of a civil penalty for a Severity Level II problem is $8,000. The civil penalty adjustment factors in the Enforcement Policy were considered, as discussed below.

The base civil penalty was neither escalated nor mitigated for the identification factor as the violations were identified as the result of a self-disclosing event. After considering SFC's corrective actions, as discussed above, the base civil penalty was mitigated 50 percent. The base civil penalty was escalated 75 percent due to SFC's poor past performance. The full 100 percent escalation was not applied for this factor in recognition of the significant improvements recently implemented in other areas of SFC's operation. In addition, the fact that SFC had knowledge of equipment problems that, if corrected, might have precluded this event, warranted an additional escalation of 100 percent. The other factors were considered and no further adjustments were considered warranted. Therefore, the base civil penalty was escalated a total of 125 percent.

In developing this enforcement action, the NRC considered the pending changes to the status of the SFC facility, as discussed above. Notwithstanding those changes, SFC will still be involved with licensed activities into the foreseeable future that include operation of the DUF4 facility and long term decommissioning activities. Therefore, broad enforcement discretion was not exercised in order to emphasize the continuing responsibility of SFC to comply with all aspects of the NRC's requirements while engaged in those licensed activities.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. In your response, you should document the specific actions taken and any additional actions you plan to prevent recurrence. After reviewing your response to this Notice, including your proposed corrective actions and the results of future inspections, the NRC will determine whether further NRC enforcement action is necessary to ensure compliance with NRC regulatory requirements.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be placed in the NRC Public Document Room.

NOTICE OF VIOLATION
AND
PROPOSED IMPOSITION OF CIVIL PENALTY

Sequoyah Fuels Corporation
Sequoyah Facility
Gore, Oklahoma

Docket No. 40-8027
License No. SUB-1010
EA 93-010

During NRC inspections conducted on December 28, 1992, through January 12, 1992, violations of NRC requirements were identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," 10 CFR Part 2, Appendix C, the Nuclear Regulatory Commission proposes to impose a civil penalty pursuant to Section 234 of the Atomic Energy Act of 1954, as amended (Act), 42 U.S.C. 2282, and 10 CFR 2.205. The particular violations and associated civil penalty are set forth below:

I. License Condition 9 of NRC License SUB-1010 authorizes use of licensed materials in accordance with the statements, representations, and conditions contained in Chapters 1 through 8 of the license renewal application dated August 23, 1985, as supplemented. Section 2.7.1 in Chapter 2 of this license renewal application, as supplemented, states, in part, that it shall be the responsibility of the Licensee to see that written operating procedures are established, maintained, and adhered to for all operations and safety-related activities involving source or hazardous materials. A caution statement in Section 4.2.2 of Operating Procedure N-230-1, "Digestion of Yellowcake and Transfer of Slurry," instructs operators to locally ensure that the slide gate valve to a previously used digester is closed if the digester to be placed in service is not the same as the one used to mix the most recent batch.

   Contrary to the above, the Licensee did not see that written operating procedures were adhered to for all operations and safety-related activities involving source and hazardous material. Specifically, on November 16 and 17, 1992, SFC operators did not ensure that the slide gate valve to Digestion Tank No. 2, which had previously been used, was closed prior to mixing batches in two different digester tanks.

II. License Condition 9 of NRC License SUB-1010 authorizes use of licensed materials in accordance with the statements, representations, and conditions contained in Chapters 1 through 8 of the license renewal application dated August 23, 1985, as supplemented. Chapter 8 of the license renewal application states that the Licensee shall implement, maintain, and execute the response measures of the Radiological Contingency Plan submitted to the Commission on August 20, 1986, as supplemented. Further, Chapter 8 states that the Sequoyah Facility Contingency Plan interfaces with several related Contingency documents, particularly the Contingency Plan Implementing Procedures (CPIPs). The detailed instructions for implementation and support of the contingency plan are contained in the CPIP procedures.

   A. Section 6.1.1 of the Contingency Plan states that the control room is sealed to prevent entry of external contamination from the process area.

9303300263 4PP

The responses directed by this letter and the enclosed Notice are not subject to the clearance procedures of the Office of Management and Budget as required by the Paperwork Reduction Act of 1980, Pub. L. No. 96-511.

Sincerely,

James L. Milhoan

James L. Milhoan
Regional Administrator

Enclosure:
Notice of Violation and Proposed Imposition of Civil Penalty

cc:
Oklahoma Radiation Control Program Director

Diane Curran, Esq.
Harmon, Curran & Tousley
201 S Street, N.W., Suite 430
Washington, D.C. 20009

Brita Haugland-Cantrell, Esq.
2300 North Lincoln Boulevard
112 State Capitol Building
Oklahoma City, Oklahoma 73105-4894

James Wilcoxen, Esq.
Wilcoxen & Wilcoxen
Attorney for Cherokee Nation
P.O. Box 357
Muskogee, Oklahoma 74402-0357

Newman & Holtzinger, P.C.
ATTN: Maurice Axelrad
1615 L Street, N.W.
Suite 1000
Washington, D.C. 20036

General Atomics
ATTN: R.N. Rademacher
Vice President
Human Resources
P.O. Box 85608
San Diego, California 92138

Contrary to the above, on November 17, 1992, the control room was not sealed to prevent entry of external contamination from the process area. Specifically, contaminated air was recirculated into the control room from outside the main process building and from the process areas through an air intake and recirculation plenum that was not sealed from potentially contaminated process areas.

B. Section 4.2.3 of CPIP-22, "Onsite Emergency Monitoring", requires, in part, that monitoring personnel don protective clothing and/or respirators to provide protection equal to or greater than the anticipated hazard.

Contrary to the above, during the November 17, 1992, event, a health & safety technician entered a visibly hazy room (the in-plant H&S office) containing nitrogen dioxide gas without donning any respiratory protection equipment. In addition, another health & safety technician partly entered into another visibly hazy room (the in-plant break room) containing nitrogen dioxide gas without donning any respiratory protection equipment. Measurements of this second area later indicated that airborne concentrations of nitrogen dioxide were above a level that was immediately dangerous to life and health. Rooms that are visibly hazy with nitrogen dioxide gas indicate a hazard that requires respiratory protective equipment.

C. Section 5.4.2 of the Contingency Plan states that all persons responding to the emergency will be accounted for by the Onsite Emergency Director. All others will be accounted for at the Assembly & Support Center (ASC).

Contrary to the above, on November 17, 1992, the licensee did not and could not account for all personnel who were required to report to the ASC prior to releasing them after the Site Emergency was terminated.

D. Section 6.3.1 of the Contingency Plan states, in part, that the facility public address system is used in conjunction with the air horn signal system to alert employees and direct them away from hazardous areas. Section 6.3.1 further states that these two systems comprise the onsite emergency notification system and that the air horn signal alerts personnel to an emergency condition.

Contrary to the above, on November 17, 1992, the air horn signal was not sounded upon the declaration of an Unusual Event, an emergency condition as described in the Contingency Plan.

Violations I and II.A through D are a Severity Level II problem
(Supplements VI and VIII).
Civil Penalty - $18,000

Pursuant to the provisions of 10 CFR 2.201, Sequoyah Fuels Corporation (Licensee) is hereby required to submit a written statement or explanation to the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, within 30 days of the date of this Notice of Violation and Proposed Imposition of Civil Penalty (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation" and should include for each alleged violation: (1) admission or denial of the alleged violation, (2) the reasons for the violation if admitted, and if denied, the reasons why, (3) the corrective steps that have been taken and the results achieved, (4) the corrective steps that will be taken to avoid further violations, and (5) the date when full compliance will be achieved.

If an adequate reply is not received within the time specified in this Notice, an order or demand for information may be issued as to why the license should not be modified, suspended, or revoked or why such other action as may be proper should not be taken. Consideration may be given to extending the response time for good cause shown. Under the authority of Section 182 of the Act, 42 U.S.C. 2232, this response shall be submitted under oath or affirmation.

Within the same time as provided for the response required above under 10 CFR 2.201, the Licensee may pay the civil penalty by letter addressed to the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, with a check, draft, money order, or electronic transfer payable to the Treasurer of the United States in the amount of the civil penalty proposed above, or the cumulative amount of the civil penalties if more than one civil penalty is proposed, or may protest imposition of the civil penalty, in whole or in part, by a written answer addressed to the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission. Should the Licensee fail to answer within the time specified, an order imposing the civil penalty will be issued. Should the Licensee elect to file an answer in accordance with 10 CFR 2.205 protesting the civil penalty, in whole or in part, such answer should be clearly marked as an "Answer to a Notice of Violation" and may: (1) deny the violations listed in this Notice, in whole or in part, (2) demonstrate extenuating circumstances, (3) show error in this Notice, or (4) show other reasons why the penalty should not be imposed. In addition to protesting the civil penalty, in whole or in part, such answer may request remission or mitigation of the penalty.

In requesting mitigation of the proposed penalty, the factors addressed in Section VI.B.2 of 10 CFR Part 2, Appendix C should be addressed. Any written answer in accordance with 10 CFR 2.205 should be set forth separately from the statement or explanation in reply pursuant to 10 CFR 2.201, but may incorporate parts of the 10 CFR 2.201 reply by specific reference (e.g., citing page and paragraph numbers) to avoid repetition. The attention of the Licensee is directed to the other provisions of 10 CFR 2.205, regarding the procedure for imposing a civil penalty.

Upon failure to pay any civil penalty due which subsequently has been determined in accordance with the applicable provisions of 10 CFR 2.205, this matter may be referred to the Attorney General, and the penalty, unless compromised, remitted, or mitigated, may be collected by civil action pursuant to Section 234(c) of the Act, 42 U.S.C. 2282c.

The response noted above (Reply to Notice of Violation, letter with payment of civil penalty, and Answer to a Notice of Violation) should be addressed to: Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555 with a copy to the Regional Administrator, U.S. Nuclear Regulatory Commission, Region IV, 611 Ryan Plaza Drive, Suite 400, Arlington, Texas 76011.

Dated at Arlington, Texas
this 25th day of March 1993

APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: 40-08027/87-05 License: SUB-1010

Docket: 40-08027

Licensee: Sequoyah Fuels Corporation (SFC)
Kerr-McGee Center
Oklahoma City, Oklahoma 73125

Facility Name: Sequoyah Uranium Hexafluoride Conversion Facility

Inspection At: Gore, Oklahoma

Inspection Conducted: April 6-10, 1987

Inspector: Wesley L. Holley 5/19/87
W. L. Holley, Radiation Specialist, Date
Nuclear Materials Safety Section

Approved: R. J. Everett 5/20/87
R. J. Everett, Chief, Nuclear Materials Date
Safety Section

Inspection Summary

Inspection Conducted April 6-10,1987 (Report 40-08027/87-05)

Areas Inspected: Special, unannounced inspection of licensee activities following the November 14, 1986, NRC authorization for full facility restart. The inspection period was a continuation of the NRC's facility coverage initiated November 3, 1986. The inspection consisted of a review of ongoing process activities, startup preparations, startup activities in the UO_3 and UF_6 production areas, operator training, procedure review, and reviews of Independent Overview Team (IOT) activities.

Results: Within the areas inspected, no violations or deviations were identified. One unresolved item is discussed in paragraph 4.e.

DETAILS

1. Persons Contacted

*W. L. Utnage, Facility General Manager
J. V. Marler, Manager, Operations
S. P. Knight, Manager, Administration and Services
L. R. Lacey, Manager, Safety, Industrial Hygiene, and Health Physics
D. R. Swaney, Manager, Quality Assurance
L. A. Tharp, UO_3 Area Manager
G. R. Jackson, UF_6 Area Manager
G. P. Salalosky, Manager, Industrial Hygiene and Health Physics
G. Barton, Manager, Procedures and Training
S. R. Fryer, Jr., Manager, Facility Engineering
D. R. Knoke, Manager, Laboratory
R. A. Parker, Manager, Facility Maintenance
J. G. Stampelos, IOT Assistant Program Manager

The NRC inspector also met with other licensee supervisors, operators, and technicians as well as IOT team members on shift coverage.

*Present at the exit briefing.

2. Scope of Special Inspection

On November 3, 1986, the NRC began 24-hour facility coverage to coincide with IOT coverage and plant restart preparations. The inspection coverage leading up to the date of full restart authorization was reported in NRC Inspection Report 40-08027/86-15. On November 14, 1986, the NRC authorized full facility restart. From this date to the end of the inspection period on February 27, 1987, the NRC maintained 7-day per week, 24-hour inspection coverage consisting of at least one NRC inspector on each 8-hour shift. Coverage was not provided during the holiday period of December 25-28, 1986, when process activities at the facility were shut down. Since February 27, 1987, the NRC has had intermittent inspection coverage of an 8-hour shift for 7 and 5-day weeks at various times. This inspection was a 5-day inspection.

The primary purpose of the special inspections was to observe process and maintenance activities, implementation of operations procedures, and the performance of hardware installed during recent plant modifications. Secondary inspection goals were to assess the adequacy of procedures, to review the performance of the IOT, and to monitor routine health physics activities.

3. Facility Process and Maintenance Activities

All major plant process systems were in operation during the inspection period. Various equipment problems continued to occur. For this

Attachment 9

JUN 5 1987

Docket: 40-08027/87-05
License: SUB-1010

Sequoyah Fuels Corporation
ATTN: J. C. Stauter, Director
Nuclear Licensing and Regulation
Kerr-McGee Center
Oklahoma City, OK 73125

Gentlemen:

This refers to the special, unannounced inspection conducted by Mr. W. L. Holley during the period April 6-10, 1987, of the activities authorized by NRC Source Material License SUB-1010 and to the discussion of our findings held by the NRC inspector with members of your staff at the conclusion of the inspection. The enclosed NRC Inspection Report 40-08027/87-05 documents this inspection.

The purpose of the inspection was to observe ongoing activities at the Sequoyah Fuels Facility following the NRC restart authorization of November 14, 1986. The inspection consisted of selective examinations of procedures and representative records, interviews of personnel, and observations by the NRC inspector.

Within the scope of the inspection, no violations or deviations were identified.

Should you have any questions concerning this inspection, we will be pleased to discuss them with you.

Sincerely,

/s/

William L. Fisher, Chief
Nuclear Materials and Emergency
Preparedness Branch

Enclosure:
Appendix - NRC Inspection Report
40-08027/87-05

cc w/enclosure:
Oklahoma Radiation Control Program Director

RIV:NMIS	C:NMIS	C:NMEPB	AC
WLHolley:de	RJEverett	WLFisher	MEmerson for
5/19/87	5/20/87	5/21/87	6/4/87

IE07
1/1

8706110139 870605
PDR ADOCK 04008027
C PDR

FEMA Region VI
ATTN: J. Overmyer
Federal Regional Center, Room 206
Denton, TX 76201

EPA Region VI
ATTN: R. Rhoades
1445 Ross Avenue
Dallas, TX 75202-2733

OSHA Region VI
ATTN: T. Littrell
555 Griffin Square Bldg.
Dallas, TX 76202

bcc:
DMB - Original (IE-07)
R. D. Martin
J. H. Frye, III, ASLBP
R. J. Everett
E. Flack, OE
*RSTS Operator
*RIV Files (2)
*MIS System
W. L. Fisher
R. L. Bangart
*D. Weiss, (RM/ALF)
S. Lewis, OGC
M. Emerson (2)
W. L. Holley
*NMIS
C. H. Weil, III, OAC

*w/766

inspection period, some of the equipment problems consisted of: sampling plant bin plugging, reduction/hydrofluorination (A line gear box maintenance, B line 3rd stage agitator gear box repair, and B line filter change); and a leakage in a denitrator line. As usual, some of the problems were associated with piping or valve leaks and flow restrictions causing clogging/plugging. Maintenance activities were observed to be accomplished according to the respective provisions of work orders, hazardous work permits, and electrical work permits.

The NRC inspector toured the plant on various shifts during the inspection to observe process and maintenance activities. The majority of the maintenance activities were performed on the day shift and were concentrated on equipment which adversely affected the process operation.

During the inspection, the licensee was in the process of changing out the transformers in the electrical transformer yard. Throughout the week there were short duration power outages in various areas of the plant as PCB cooled transformers were changed out for air cooled transformers. These transitions were performed properly without compromising safety in plant functions.

The NRC inspector was present when certain abnormal events took place with plant systems. Reviews of these occurrences are discussed in paragraph 4.

No violations or deviations were identified.

4. NRC Inspector Observations

a. Off-gas Release

The NRC received a telephone call from the Oklahoma Radiation Control Program Director concerning a call from a neighbor of Sequoyah Fuels. The neighbor indicated that odors coming from Sequoyah Fuels could be detected on the neighbor's premises at 7:30 a.m. on Friday, April 3, 1987.

The NRC inspector determined that digester off-gases (nitrogen oxides) were released in the digester area prior to 8:00 a.m. and these off-gases possibly could have been smelled offsite. (Guards at the south entry/exit portal have smelled these gases on other occasions.) The licensee had a sintered yellowcake feed material that, when the hard coating was dissolved by acid feed, produced a large amount of gas, which overwhelmed the exhaust/scrubber system. There were no fluorines in such releases. The licensee has a state of Oklahoma Health Department Permit No. 7, which limits the nitrogen oxide visible emissions from the plant to 20 percent opacity. This release was not observed; therefore, the 20 percent opacity was not exceeded.

b. UF_6 Cylinder Inspection

Since the licensee has become aware of the UF_6 cylinder stiffening ring defect problem (reported in NRC Report 40-08027/87-01), the licensee has placed greater emphasis on UF_6 cylinder QA inspection before shipping these cylinders. The NRC inspector observed the licensee perform a very thorough visual inspection of five UF_6 cylinders before shipping. The NRC inspector confirmed the conclusion of the licensee that no apparent defects were present by inspecting the cylinders. Four of these five cylinders manufactured by W. H. Stewart may have stiffening rings made from nonspecification material.

c. Perimeter Lighting

It was reported in NRC Inspection Report 40-08027/87-04 that four of the perimeter lights were out. During this inspection, the NRC inspector again inspected the perimeter lights at night and found six lights out. The licensee planned to repair these lights during the week of April 12-18, 1987.

d. Radioactive Waste Management

The NRC inspector performed a small portion of a Radioactive Waste Management, Inspection Procedure 88035, inspection. Only the semi-annual effluent reports were inspected. No problems were identified.

e. Uranium Embargo Allegation (RIII-87-A-0068)

In response to an allegation identified by Region III, the inspector reviewed the licensee's recent import of yellowcake. 10 CFR 110.27 forbids the import of uranium of South African origin in any form as of December 31, 1986. The NRC inspector determined that a shipment of yellowcake left Durban, South Africa, on February 3, 1987, and arrived on the licensee's premises on March 27, 1987. This shipment was designated as Lot No. 8786. A licensee representative stated that the yellowcake in question is owned by a foreign company and Sequoyah Fuels had agreed to take possession and process the material until further directed by that company. Further review by the NRC is proceeding concerning this shipment of yellowcake and this matter is considered an unresolved item. (40-08027/8705)

f. Emergency Drills

During this inspection, several drills for fire, first aid, and communications were conducted by the licensee according to the scheduled frequency. The NRC inspector noted that the drills were conducted in accordance with licensee commitments, the contingency plan, and the contingency plan implementing procedures.

g. "Alert" Emergency Condition

On April 10, 1987, at 8:32 a.m., the licensee control room received a telephone call informing them that a bulldozer had accidentally ruptured the plant's main water line (16-inch diameter) from Tenkiller Lake. The plant's water pressure immediately went to zero. At 8:40 a.m., the licensee declared an Alert emergency condition. The licensee immediately terminated the operation of the plant in a safe expeditious manner and the Alert emergency condition was declared to be terminated at 10:00 a.m. There was no release of radioactive materials during the incident. Sufficient cooling water was available at all times for shutdown and also the supply of water for the fire fighting system was not in jeopardy. To be prepared for any contingency requiring more water than the 250,000 gallon reserve, the licensee obtained a 1120 gpm fire engine pumper from a neighboring town and connected it to a 300,000 gallon reservoir. Safety and fire fighting personnel were on standby throughout the incident and until the plant was in "cold shutdown." There were no offsite consequences associated with this incident.

h. NPDES Report

The licensee reported to the state of Oklahoma and EPA that the EPA NPDES pH limit had been exceeded at the combination stream outfall 001 position during the emergency condition mentioned previously in 4.g. The sample was determined to have a pH of 4.5, which was out of the allowed pH limit range of 6-9. During the accident, the water supply for dilution of the process streams was terminated before the process streams could be terminated. This made the acidity of the combination stream rise. The licensee sampled this stream as soon as personnel were available during the incident. Upon determination of the pH, a crew with sand bags was dispatched to dam up the stream and contain the stream until dilution water became available. Subsequently the pH was determined to be 8.0 before the stream was allowed to return to normal flow.

No violations or deviations were identified by the NRC inspector.

5. Independent Oversight Team Activities

The NRC inspector interfaced frequently during various shifts with IOT members. It was determined that IOT personnel and coverage continued to meet the requirements of the NRC Order dated October 2, 1986. The IOT members did not identify any violations of NRC requirements or significant safety concerns during this inspection.

Attachment 10

AUG 16 1990

August 13, 1990

NOTE FOR: George H. Bidinger, IMUF

FROM: W. Scott Pennington, IMUF

SUBJECT: EVENT TREND ANALYSIS FOR THE URANIUM HEXAFLUORIDE (UF_6) CONVERSION FACILITIES

During the July 1990 Operational Events Briefing, the staff was requested to review the occurrence of spills/releases of radioactive and hazardous materials at the two UF_6 conversion facilities. More specifically, the staff was requested to determine if there was an apparent trend for these incidents since the Sequoyah Fuels accident in early 1986.

The enclosed event trend analysis was presented at the Operational Events Briefing held on August 6, 1990. The analysis includes both actual and potential releases and categorizes the events based on root causes. Based on the analysis, the staff did not identify any trends. However, the staff noted that of the nine incidents at Sequoyah Fuels, five occurred during NRC inspections and two resulted in reporting violations. This suggests that, in the past, Sequoyah Fuels may have been reluctant to contact the NRC about some incidents.

Original Signed By

W. Scott Pennington, IMUF

Enclosure: As stated

Distribution w/encl.

~~Dockets 40-3392~~ 40-8027	PDR	LPDR	NRC File Center
MVasquez, RIV	Region III	Region IV	GFrance, RIII
MHorn	CRobinson	WSPennington	VLTharpe
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SP/NOTE TO GBIDINGER

OFC:IMUF: WSP	IMUF:
NAME:WSPennington:mh:ls:	VLTharpe:
DATE:8/10/90:	8/13/90:

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BB-1

Releases/Spills and Potential Releases at Sequoyah Fuels Corporation, Gore, Oklahoma

October 14, 1986 - The contents of a yellowcake drum were spilled on the fourth level of the sampling plant. The spill occurred when a drum, which was shorter in height than standard drums, was placed into the drum dumper enclosure and dumping was attempted without the normal firm contact with the funnelling device fitted over the drum. The incident did not meet the reporting requirements of an unusual event. All material was contained in the sampling enclosure under negative pressure. The results of the 8-hour air samples taken during the spill and the cleanup both inside the fourth level sampling enclosure and at the operator's position just outside the enclosure were 2.8 MPC and 1.8 MPC, respectively. The maximum weekly exposure to personnel which resulted from the spill and its cleanup was 3.08 MPC-HR.

January 10, 1987 - A spill of about one half pound of UF_6 occurred while a cylinder fill line was being evacuated to a cold trap. The operator opened a valve too quickly allowing residual UF_6 to drain out of the line before a vacuum was fully established. An unusual event was declared. An air sample obtained from within the cylinder room showed a uranium concentration of 27 MPC averaged over an 8-hour sample period. Health physics surveys confirmed there was no release to general areas of the plant. No offsite environmental uranium concentrations above background were noted.

February 6, 1987 - A drum of yellowcake was inadvertently turned over spilling about one-third of its contents (about 300 pounds) in an open bay area adjacent to the main sampling plant wall. The spill occurred as a result of the yellowcake drum being disfigured on the bottom and catching on the drum conveyor leading to the sampling plant. An air sample obtained within the sampling room showed 4.38 MPC for an 8-hour sampling period. A violation was noted regarding the failure to declare an unusual event.

April 3, 1987 - Digestor off-gases (nitrogen oxides) were released when a reaction between sintered yellowcake and nitric acid produced a volume of gas which overwhelmed the exhaust/scrubber system. The emission did not exceed the limit established in Oklahoma Health Department Permit No. 7.

May 24, 1989 - A release of hydrogen fluoride (HF) gas occurred when an HF storage tank rupture disk opened. Tank pressure had increased due to high ambient temperature and although the HF would have been normally channeled to other process vessels, a valve on the tank had been left open, allowing the HF to be released. An alert was declared at the site. After 6 minutes, the leak was stopped by closing the valve on the HF storage tank. It was estimated that approximately 40 pounds of HF was released to the atmosphere. This event did not involve any radioactivity or any injuries to personnel. There were no offsite effects. The licensee notified county officials, the Oklahoma Hazardous Materials Emergency Response Commission, and the National Response Center.

November 8, 1989 - During a routine, unannounced inspection, an unusual event was declared due to a release of anhydrous hydrogen fluoride (AHF) from an AHF vaporizer. Maintenance work was underway to remove one of the three vaporizers from the process circuit and replace it with the auxiliary vaporizer. The AHF vaporizer system had a common emergency vent header for the three vaporizers. The failure of a high pressure rupture disk activated the emergency vent system allowing HF fumes into the common vent header. A bleed valve was open on the vaporizer which had been taken out of service for maintenance, allowing backflow of fumes into the vaporizer room. Facility personnel donned self-contained breathing apparatus and protective clothing to close the bleed valve and terminate the release. The licensee estimated that less than 100 pounds of HF was released. To prevent reoccurrence of this type of incident, the common vent system was eliminated.

January 4, 1990 - A pallet became contaminated when it was used to support a ruptured yellowcake drum which had burst after freezing. Some material leaked onto the pallet, and subsequent movement of the pallet lead to further contamination. Although attempts were made to isolate the pallet for decontamination, contamination control of the pallet was inadequate.

January 22, 1990 - A solenoid valve failure caused a spill of approximately 7 tons of depleted uranium tetrafluoride (DUF_4) powder within the UF_6 reduction plant. The licensee had taken proper and timely actions to mitigate the spill and evaluate its environmental and health impacts. However, violations were noted regarding the failure to (1) properly report the spill in accordance with 10 CFR 20.403(d)(2); and (2) provide complete and accurate information properly characterizing the spill and its size in accordance with 10 CFR 40.9. The maximum permissible limits established for intakes and offsite releases were not exceeded.

February 16, 1990 - Overflow of a fluoride sludge retention basin caused a release of about 4,200 gallons of treated wastewater into the Robert S. Kerr Reservoir. The uranium content of the released water was significantly below the 10 CFR Part 20 limit for unrestricted MPC for natural uranium. The fluoride content of the release exceeded the state license requirement, and the licensee notified the EPA and State of Oklahoma.

Note: Of the nine incidents summarized, five occurred while NRC staff were conducting onsite inspections, and two lead to violations regarding failure to report. This suggests that, in the past, SFC may have been reluctant to contact the NRC and that some non-reportable incidents may never have been revealed to the NRC.

Radiological

86	87	88	89	90
1	2	0	0	2

Total 5

Non-Radiological

86	87	88	89	90
0	1	0	2	1

Total 4

Total 9

Actual Releases

86	87	88	89	90
1	2	0	0	2

Total 5

Actual Releases

86	87	88	89	90
0	1	0	2	1

Total 4

Total 9

Potential Releases

None Reported

Potential Releases

None Reported

Total 0

Operator Error

86	87	88	89	90
1	2	0	0	0

Total 3

Operator Error

None Reported

Total 3

Maintenance

86	87	88	89	90
0	0	0	0	0

Total 0

Maintenance

86	87	88	89	90
0	0	0	1	0

Total 1

Total 1

Equipment Failure

86	87	88	89	90
0	0	0	0	2

Total 2

Equipment Failure

86	87	88	89	90
0	1	0	1	1

Total 3

Total 5

COMBINED TOTALS

Allied-Signal and Sequoyah Fuels

Radiological

86	87	88	89	90
3	6	6	0	4

Total 19

Non-Radiological

86	87	88	89	90
0	3	0	4	1

Total 8

Total 27

Actual Releases

86	87	88	89	90
2	5	6	0	3

Total 16

Actual Releases

86	87	88	89	90
0	3	0	4	1

Total 8

Total 24

Potential Releases

86	87	88	89	90
1	1	0	0	1

Total 3

Potential Releases

None Reported

Total 3

Operator Error

86	87	88	89	90
2	3	1	0	1

Total 7

Operator Error

None Reported

Total 7

Maintenance

86	87	88	89	90
1	1	3	0	0

Total 5

Maintenance

86	87	88	89	90
0	0	0	2	0

Total 2

Total 7

Equipment Failure

86	87	88	89	90
0	2	2	0	3

Total 7

Equipment Failure

86	87	88	89	90
0	3	0	2	1

Total 6

Total 13

CONTINGENCY PLAN

FOR

SEQUOYAH FACILITY,

SEQUOYAH FUELS CORPORATION

GORE, OKLAHOMA

DOCKET NO. 40-8027

SOURCE MATERIAL LICENSE NO. SUB-1010

Revision No. 5, 12/88

0309S

Table of Contents

4.0 CONTINGENCY RESPONSE ORGANIZATION

4.1 Normal Plant Organization

The Sequoyah Facility has a formal organizational structure for both normal and off-normal (back shifts, holidays, and weekends) hours. Figure 4-1 is a block diagram of the Sequoyah Fuels Corporation organization and illustrates levels of responsibility within the facility. A full personnel complement is available Monday through Friday during the day shift. Figure 4-2 shows the shift organization which comprises the normal personnel complement during back shifts, holidays, and weekends. Initial emergency response duties are the responsibility of this group during off-normal hours.

Management of the normal operating organization is provided by the General Manager and a secondary echelon of managers who direct facility activities in the areas of:

Operations
Facility Maintenance
Health, Safety, and Environment
Facility Engineering
Laboratory
Administration and Services

Should one of these permanently assigned individuals be absent, the positional responsibilities are delegated to another competent individual.

The Senior Shift Supervisor is in the immediate onsite position of authority and responsibility for the safe and proper operation of the facility. He is responsible for the initial evaluation of any abnormal situation and for directing the appropriate response. If an abnormal situation falls within the realm of the emergency classification system described in Section 3 of this Plan, the Senior Shift Supervisor will declare the event at the appropriate classification level. The Senior Shift Supervisor will then assume the position of Onsite Emergency Director. For events classified at the Alert level and above, upon arrival of the General Manager (or alternate), and following an adequate briefing, the Senior Shift Supervisor will turn over the responsibilities of Onsite Emergency Director in accordance with the applicable Contingency Plan Implementing Procedure (CPIP).

4.2 Onsite Contingency Response Organization

The Sequoyah Facility has a formal Onsite Contingency Response Organization, including provisions for direction and coordination of response resources during normal and off-normal hours. Figure 4-3 illustrates the Onsite Contingency Response Organization, and Table 4-1 shows major functional responsibilities as related to members of the organization.

4.2.1 Onsite Emergency Director

The Onsite Emergency Director has overall responsibility for execution of the Contingency Plan. During emergency conditions, the Senior Shift Supervisor will initially assume this position, until relieved by the Facility Manager, or alternate, in accordance with the applicable CPIP. The Senior Shift Supervisor will normally go to or remain in the Control Room unless it is necessary that he leave the Control Room to perform necessary assessment, corrective, or protective actions. The order of succession for the position of Onsite Emergency Director is as follows:

*
1. General Manager
2. Manager, Operations
3. Manager, Facility Maintenance
4. Manager, Health, Safety and Environment
5. Manager, Facility Engineering
6. Manager, Laboratory
7. Manager, Administration and Services

The position of Onsite Emergency Director carries with it the authority to commit whatever resources and actions are necessary to mitigate the situation.

The Senior Shift Supervisor, acting as Onsite Emergency Director, will perform the following actions:

a. Identify, verify the existence of, and initially classify the emergency as an Unusual Event, Alert, Site Area Emergency, or General Emergency.
b. Activate the Onsite Contingency Response Organization as appropriate, and initiate appropriate measures to mitigate the event.
c. Determine if releases of radioactive and/or hazardous materials have occurred, and, if so, assess the potential onsite and/or offsite hazards involved.
d. Initiate notification of appropriate offsite agencies and response groups.

e. Ensure that all significant actions and events are documented.

* Following notification of an existing or potential emergency, the General Manager, or designated alternate, will proceed to the Control Room. After a comprehensive briefing on the status of the facility, potential or actual onsite and offsite hazards, and the state of the Contingency Plan implementation, he will assume the responsibilities of Onsite Emergency Director from the Senior Shift Supervisor. The Onsite Emergency Director will continue implementation of the Contingency Plan and relevant CPIP's, and, as appropriate:

a. Assess and verify the situation and assure that appropriate mitigating and corrective actions are underway.
b. Review the initial event classification and alter the classification, if appropriate.
c. Continue the assessment of the actual or potential onsite and/or offsite hazard.
d. Continue the notification process.
e. Augment the onsite response organization with additional personnel as required.
f. Establish additional communications as necessary and provide current status information to offsite authorities.
g. Ensure that all appropriate implementing procedures are being executed and that all significant events and actions are documented.

4.2.2 <u>Operations Coordinator</u>

The Operations Coordinator reports to the Onsite Emergency Director. His responsibilities include:

a. Supervise the Senior Shift Supervisor and the operating crew.
b. Supervise the execution of assigned CPIP's.
c. Supervise the facility Fire and Rescue Team.
d. Coordinate post-event assessment.

4.2.3 <u>Hazards Assessment and Control Coordinator</u>

The Hazards Assessment and Control Coordinator reports to the Onsite Emergency Director. His responsibilities include:

a. Assess hazards from radiation and/or hazardous material releases to onsite and offsite personnel and make recommendations to the Onsite Emergency Director for mitigating, corrective and protective actions.
b. Supervise monitoring teams onsite, and, if necessary, offsite.
c. Ensure that adequate protective measures are taken by personnel performing emergency duties.
d. Supervise any required personnel or facility decontamination activities.
* e. Maintain facility security and access control during and after the event.
f. Support efforts on the areas of fire control, search and rescue, first aid, and post-event assessment.

4.2.4 Damage Control and Repair Coordinator

The Damage Control and Repair Coordinator reports to the Onsite Emergency Director. His responsibilities include:

a. Direct the activities to repair equipment damaged during the course of the event.
* b. Supervise First Aid efforts.
c. Support efforts in the areas of hazard survey and assessment, facility decontamination, and post-event assessment.

4.2.5 Technical Support Coordinator

The Technical Support Coordinator reports to the Onsite Emergency Director. His responsibilities include:

a. Supervise the Emergency Communicators.
b. Provide engineering and technical support to the Onsite Emergency Director.
c. Support efforts in hazard survey and assessment and post-event assessment.

4.2.6 Administration Coordinator

The Administration Coordinator reports to the Onsite Emergency Director. His responsibilities include:

a. Supervise personnel accountability and evacuation activities.
b. Supervise record-keeping and documentation activities.
* c. Support communications efforts.
d. Request augmentation personnel as needed from the Assembly and Support Center (ASC).

4.2.7 Senior Shift Supervisor

The Senior Shift Supervisor reports to the Operations Coordinator. His responsibility is to continue to direct plant systems operations from the Control Room. Under the Operations Coordinator's supervision, he will direct operational activities to mitigate conditions on affected systems and/or areas of the facility, and to ensure unaffected systems and areas are maintained in a stable and safe condition.

4.2.8 Assembly & Support Center (ASC) Supervisor

The ASC Supervisor reports to the Administration and Security Coordinator. His responsibilities include:

a. Conduct personnel accountability activities at the ASC.
b. Supervise personnel at the ASC and dispatch individuals to augment the response effort as requested by the Administration and Security Coordinator.

4.2.9 Emergency Communicator

The Emergency Communicator receives direction from the Onsite Emergency Director for communications functions, but is administratively supervised by the Technical Support Coordinator. His responsibilities include:

a. Implement initial notification of response personnel and offsite agencies.
b. Provide information updates to offsite agencies.
c. Provide the communications link with offsite response centers.

4.2.10 Emergency Teams

The facility has three types of emergency teams with specific response assignments and specialized response training. These teams are:

Fire and Rescue Team - under the direction of the Operations Coordinator.

* Monitoring Team - under the direction of the Hazards Assessment and Control Coordinator.

* <u>First Aid Team</u> - under the direction of the Damage Control and Repair Coordinator.

4.2.11 <u>Activation of the Onsite Contingency Response Organization</u>

The degree of activation of the Onsite Contingency Response Organization varies with the classification level of the event. The Onsite Emergency Director also exercises some judgment as to the degree to which the on-shift organization will be augmented 1) by calling in off-shift personnel at the Unusual Event and Alert levels, and 2) by the types and numbers of augmentation personnel called in at the Site Area and General Emergency levels. Activation will generally occur as stated below:

Unusual Event -	Assumption of Onsite Emergency Director duties by the Senior Shift Supervisor in the Control Room. Activation of on-shift personnel based upon the specific event.
Alert -	Full activation of the Onsite Contingency Response Organization. Activation of the Onsite Emergency Center (OEC).
Site Area Emergency - & General Emergency	Full activation of onsite and offsite response organizations. Activation of all onsite and offsite response centers. Recall of additional personnel based upon actual or anticipated need.

4.3 <u>Offsite Assistance</u>

4.3.1 <u>Offsite Response</u>

* Certain Sequoyah Fuels Corporation personnel are assigned Offsite Response Organization duties at the Site Area Emergency and General Emergency levels.

* Revised

a. Offsite Response Organization:

The Offsite Response Organization, shown in Figure 4-4, is comprised of key individuals. During a Site Area Emergency or General Emergency, these individuals man the Offsite Response Center (ORC). The ORC is a near-site response center located in the Carlile Training Center, about one mile East of the facility. The Offsite Response Organization is headed by the Offsite Emergency Director. The Offsite Emergency Director is responsible for coordinating the overall corporate response to the event. This position will be filled by the Vice President, Business Development, or a designated alternate. The Offsite Response Organization is composed of four functional groups:

- Environmental Assessment
- Technical Support
- Administration and Logistics
- Public Information

Each group is headed by an individual with expertise in the applicable field. The function of the Offsite Response Organization is to: 1) perform offsite environmental and hazard monitoring/assessment, 2) provide technical, administrative and logistical support to the onsite response effort, and 3) provide communications and liaison with corporate management, offsite agencies and response groups, and the media.

b. General Atomics Emergency Organization:

Certain General Atomics personnel assigned to the San Diego office have responsibilities for the compliance oversight of the Sequoyah Facility under normal and/or emergency situations. This group of individuals, designated as the General Atomics Emergency Organization, has pertinent expertise in nuclear engineering and manufacturing, administration, public information, radiological health and safety, chemical safety, industrial hygiene, and environmental assessment. The function of the Emergency Organization is to support the post-accident assessment and recovery actions at the Sequoyah Facility site. To effectively carry out these functions, the group is led by a chairman designated by the President of Sequoyah Fuels Corporation. In addition to performing the above-mentioned functions, the Emergency Organization performs the following:

* - Provides assistance and advice to the Offsite Emergency Director when requested.
- Procures, coordinates, and directs supplemental response resources, both from within and outside the corporation.

4.3.2 Medical Treatment Facilities and Transportation

* Sequoyah County Memorial Hospital, Sallisaw, approximately 17 miles from the plant, and Sparks Regional Medical Center in Fort Smith, approximately 40 miles from the plant, will be utilized for treatment of personnel who cannot be treated in the facility First Aid Room. Physicians and staff personnel at the above two hospitals and the other physicians in Oklahoma City and the local area are available and aware of the chemical hazards, contamination control measures, and required treatment for exposures resulting from a UF_6 release or other hazardous chemical accident.

A fully-equipped ambulance is maintained at the Sequoyah Facility. The hospitals will be contacted over the commercial telephone system to advise them of transport of injured/contaminated personnel.

4.3.3 Police Assistance

During and after an emergency, the local Police Departments in Sallisaw, Vian, Gore, and Webbers Falls, and the Oklahoma State Highway Patrol, can be called upon for security, access, and traffic control assistance. Initial notification of the police dispatch center will be provided by a dedicated line commercial telephone to avoid the potential for spectator interference during the initial response phase, while traffic control is being established.

Subsequently, radio communications will be established. The Sequoyah Facility has a radio system tuned to the local police frequency to allow communications during an emergency to the 24-hour police dispatch center at the Sequoyah County Sheriff's office in Sallisaw. This arrangement will allow mobilization of all local, county, and state police resources as well as other designated response agencies. Since all police agencies can use this frequency, communication will be possible continuously with all police agencies during an emergency. This radio system is backed up by the commercial telephone system.

4.4 Coordination with Offsite Agencies

The facility reports the occurrence of events as required directly to State and local officials and to the U.S. Nuclear Regulatory Commission (NRC), Region IV, during the day shift, or to the NRC Emergency Operations Center, Washington, D.C., during back shifts, weekends, and holidays. Certain chemical releases or spills, which fall within the reporting criteria of the Comprehensive Environmental Response, * Compensation, and Liability Act of 1980 (CERCLA), or the Superfund Amendments and Reauthorization Act (SARA), Title III, are promptly reported to the National Response Center and to state and local response organizations, as required. If conditions warrant, assistance will be requested from the following organizations:

4.4.1 Sequoyah County Civil Defense

Location: Sallisaw, OK, approximately 15 miles east of the facility.

a. Activates Emergency Operations Center, time and conditions permitting.
b. Establishes emergency communications links with Muskogee County Civil Defense and other offsite emergency protective response agencies.
c. Assists in coordination of emergency access control.
d. Notifies Coast Guard, Missouri Pacific Railroad, and other entities requiring special emergency protective response actions.
e. Provides/coordinates sheltering and corresponding needs of evacuees, stranded motorists, etc.
f. Notifies Oklahoma Civil Defense Agency and provides status updates information.
g. Notifies appropriate County officials.

4.4.2 Muskogee County Civil Defense

Location: Muskogee, OK, approximately 25 miles northwest of the facility.

a. Establishes communications links and coordinates emergency response actions with Sequoyah County Civil Defense and the Sequoyah Facility emergency organization.
b. Activates the Emergency Operations Center staff if time permits and/or accident scenario merits such action.
c. Establishes communications links between the Emergency Operations Center and other emergency response agencies in County.
d. Provides back-up assistance to Sequoyah County for access control and/or evacuation functions.
e. Notifies appropriate County officials.

4.4.3 Oklahoma State Highway Patrol

Locations: Dispatch Headquarters - Muskogee, OK, approximately 25 miles northwest of the facility. Troop Headquarters - Sallisaw, OK, approximately 15 miles east of the facility.

a. Controls access on Interstate 40 interchanges during accident.
b. Provides back-up assistance to other law enforcement agencies if needed.

4.4.4 Sequoyah County Sheriff's Office

Location: Sallisaw, OK, approximately 15 miles east of the facility.

a. Controls access to affected area by blocking county/local road systems leading into the area. Reroutes traffic away from affected area.
b. Provides back-up assistance for security, and/or evacuation functions if necessary.

c. Provides communication assistance and coordination in cooperation with Civil Defense.
d. Notifies appropriate County officials.

4.4.5 Muskogee County Sheriff's Office

Location: Muskogee, OK, approximately 25 miles northwest of the facility.

a. Provides back-up assistance to other law enforcement agencies, if needed.
b. Notifies appropriate County officials.

4.4.6 Gore Police Department

Location: Gore, OK, approximately 2.5 miles northwest of the facility.

a. Controls/diverts traffic on U.S. Highway 64 southeast of Gore away from the affected area.
b. Notifies City officials.

4.4.7 Vian Police Department

Location: Vian, OK, approximately 5 miles east of the facility.

a. Controls/diverts traffic on U.S. Highway 64 west of Vian away from the affected area.
b. Notifies City Officials.

4.4.8 Webbers Falls Police Department

Location: Webbers Falls, OK, approximately 3 miles west of the facility.

a. Provides back-up assistance to Gore Police Department for access/traffic control, security, or evacuation functions if needed.
b. Notifies City officials.

4.4.9 U.S. Coast Guard Station

Location: Robert S. Kerr Lock and Dam, approximately 15 miles southeast of the facility.

Controls/diverts river traffic on Arkansas River Navigation System away from the affected areas.

c. Provides communication assistance and coordination in cooperation with Civil Defense.
d. Notifies appropriate County officials.

4.4.5 Muskogee County Sheriff's Office

Location: Muskogee, OK, approximately 25 miles northwest of the facility.

a. Provides back-up assistance to other law enforcement agencies, if needed.
b. Notifies appropriate County officials.

4.4.6 Gore Police Department

Location: Gore, OK, approximately 2.5 miles northwest of the facility.

a. Controls/diverts traffic on U.S. Highway 64 southeast of Gore away from the affected area.
b. Notifies City officials.

4.4.7 Vian Police Department

Location: Vian, OK, approximately 5 miles east of the facility.

a. Controls/diverts traffic on U.S. Highway 64 west of Vian away from the affected area.
b. Notifies City Officials.

4.4.8 Webbers Falls Police Department

Location: Webbers Falls, OK, approximately 3 miles west of the facility.

a. Provides back-up assistance to Gore Police Department for access/traffic control, security, or evacuation functions if needed.
b. Notifies City officials.

4.4.9 U.S. Coast Guard Station

Location: Robert S. Kerr Lock and Dam, approximately 15 miles southeast of the facility.

Controls/diverts river traffic on Arkansas River Navigation System away from the affected areas.

4.4.10 Sequoyah County Fire/Rescue Service

Location: Sallisaw, OK, approximately 15 miles east of the facility.

a. During major emergencies these services will be under the supervision of the Fire Chief of the City of Sallisaw. Overall coordination, in terms of response role, will remain with the Civil Defense Executive Group and Civil Defense Director.
b. Provides back-up assistance to Sequoyah Facility emergency organization and/or other offsite emergency response agencies, if required.

4.4.11 Sequoyah County Health Department

Location: Sallisaw, OK, approximately 15 miles east of the facility.

a. Advises hospitals/medical personnel of accident type, anticipated casualties, and health-related information.
b. Coordinates with Muskogee County Health Department and Oklahoma State Health Department.
c. Issues accident-related health advisories to public media.
d. Alerts County Medical Examiner's Office, coordinates casualty removals.
e. Tests for contamination of drinking water supplies, crops, livestock, and other consumables having possible contact with any hazardous material release.
f. Provides nursing assistance, counseling, and special assistance needs to elderly, handicapped, and emergency response workers.
g. Conducts post-accident survey in affected areas to identify any immediate health affects and gather samples for analysis.

4.4.12 Oklahoma State Health Department - Radiological Group

Location: Oklahoma City, OK, approximately 150 miles west of the facility.

Assists in evaluating extent of release and counseling on matters associated with public health, cleanup, and restoration involving radioactive or hazardous materials.

4.4.13 Oklahoma State Health Department - Pollution Control Discharge Report Center

Location: Oklahoma City, OK, approximately 150 miles west of the facility.

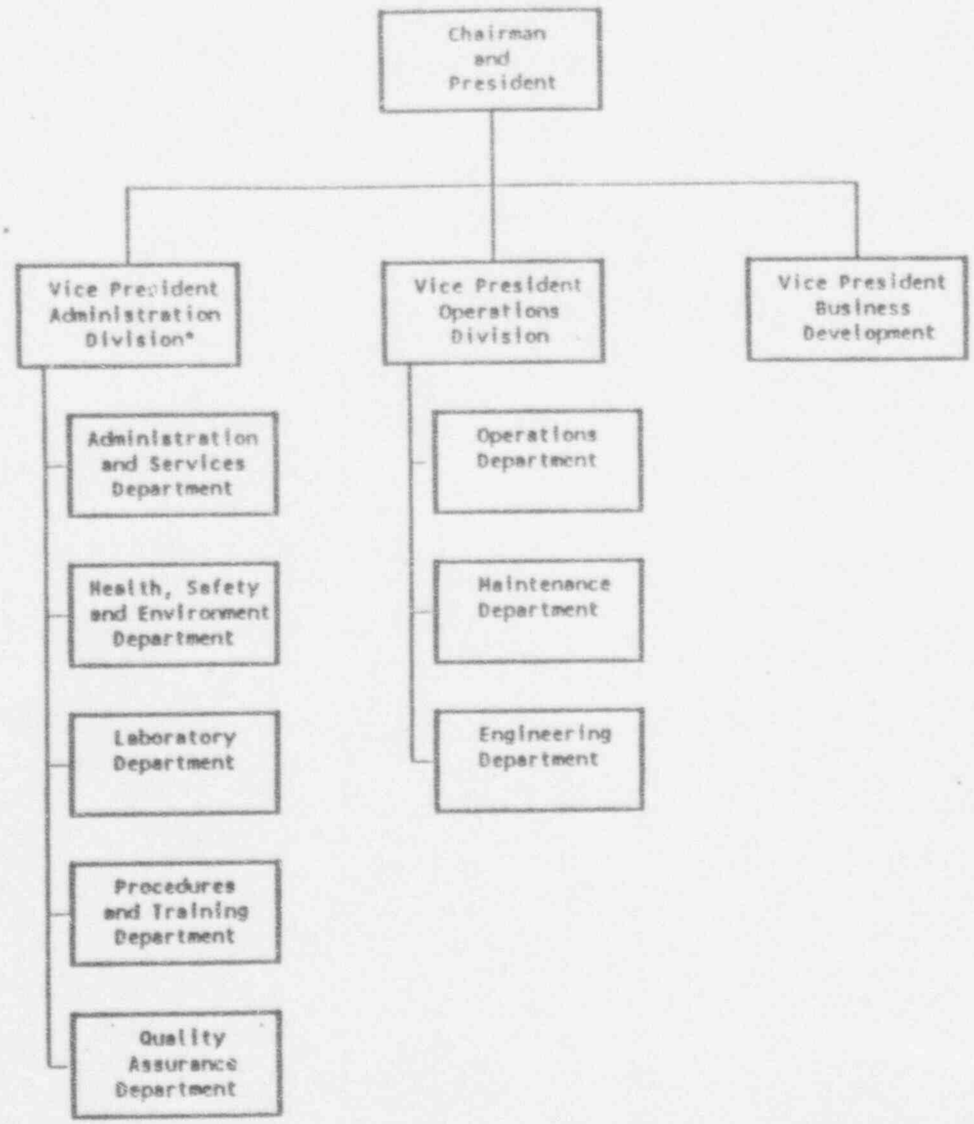
Notifies the public if a liquid release poses a problem to the drinking water system.

4.4.14 National Response Center

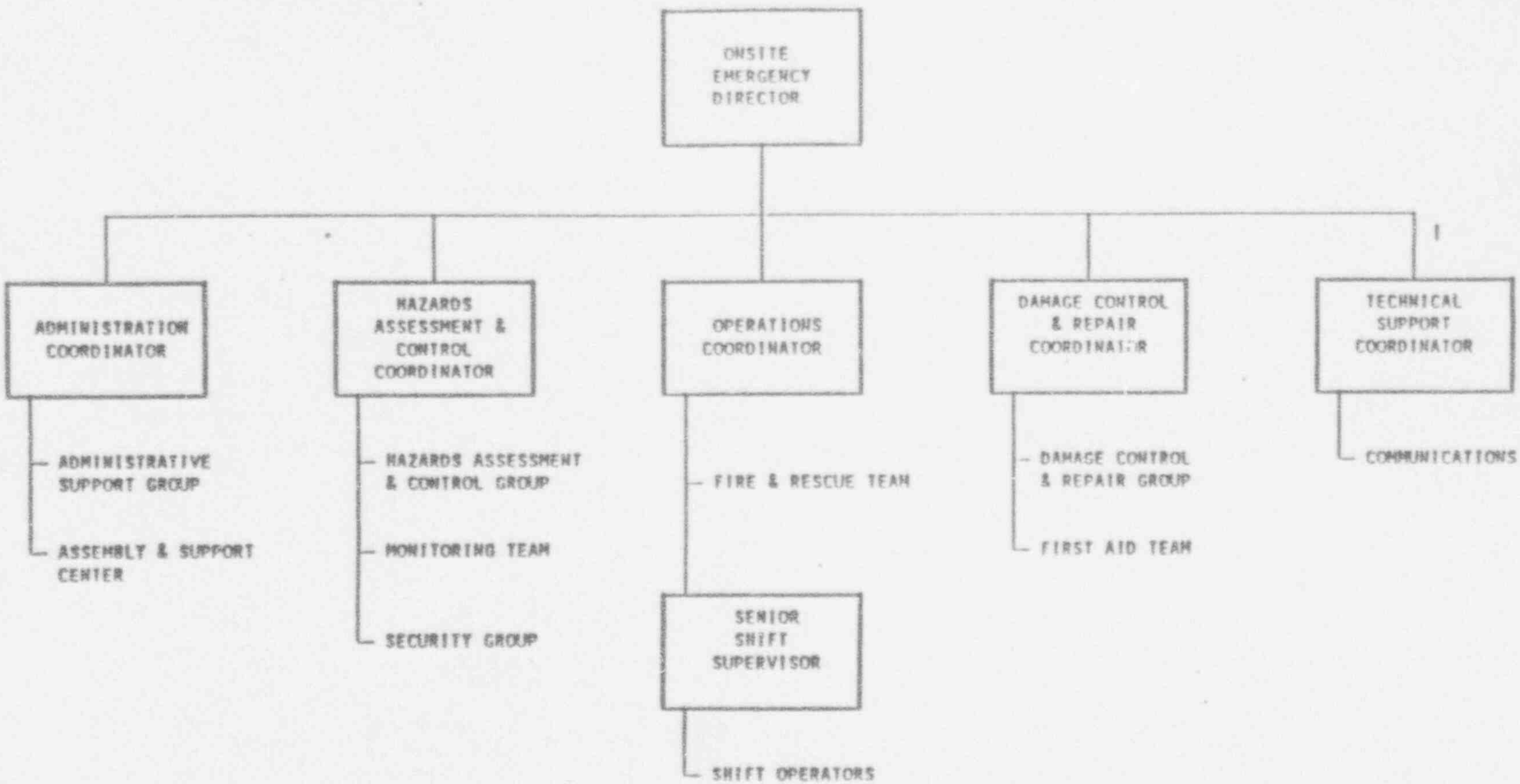
Location: Washington, D.C.

Alerts EPA and other cognizant government agencies of chemical and waste releases in order that coordinated response efforts and assistance can be provided.

SEQUOYAH FUELS CORPORATION

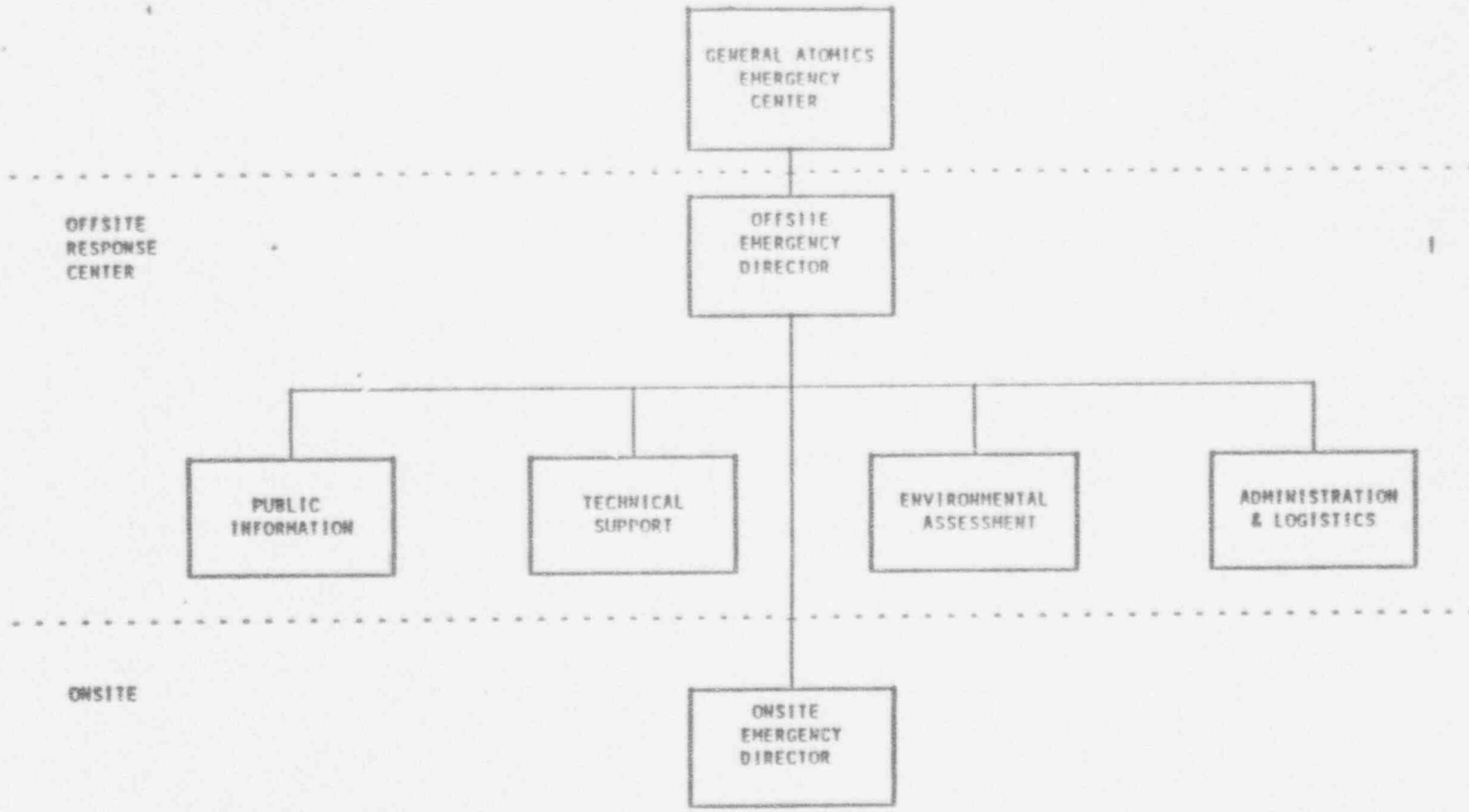


* General Manager, Sequoyah Facility



ONSITE CONTINGENCY RESPONSE ORGANIZATION

FIGURE 4 - 3



OFFSITE RESPONSE ORGANIZATION

FIGURE 4 - 4

	ONSITE EMERGENCY DIRECTOR	OPERATIONS COORDINATOR	HAZARDS ASSESSMENT & CONTROL COORDINATOR	DAMAGE CONTROL & REPAIR COORDINATOR	TECHNICAL SUPPORT COORDINATOR	ADMINISTRATION COORDINATOR	SENIOR SHIFT SUPERVISOR
DIRECTION & CONTROL	P	S	S				
PLANT SYSTEMS OPERATIONS		P					S
HAZARD SURVEY & ASSESSMENT			P	S	S		
FIRE CONTROL		P	S				
RESCUE OPERATIONS		P	S				
FIRST AID			S	P			
PERSONNEL DECONTAMINATION			P				
SECURITY & ACCESS CONTROL			P				
REPAIR & DAMAGE CONTROL				P			
RECORD KEEPING						P	
PERSONNEL ACCOUNTABILITY			S			P	
FACILITY DECONTAMINATION			P	S			
COMMUNICATIONS					P	S	
POST-EVENT ASSESSMENT		P	S	S	S		

P - Primary
S - Support

FUNCTIONAL RESPONSIBILITIES

4.2 Onsite Contingency Response Organization

The Sequoyah Facility has a formal Onsite Contingency Response Organization, including provisions for direction and coordination of response resources during normal and off-normal hours. Figure 4-3 illustrates the Onsite Contingency Response Organization, and Table 4-1 shows major functional responsibilities as related to members of the organization.

4.2.1 Onsite Emergency Director

The Onsite Emergency Director has overall responsibility for execution of the Contingency Plan. During emergency conditions, the Senior Shift Supervisor will initially assume this position, until relieved by the Senior Vice President (or alternate), in accordance with the applicable CPIP. The Senior Shift Supervisor will normally go to or remain in the Control Room unless it is necessary that he leave the Control Room to perform necessary assessment, corrective, or protective actions. The order of succession for the position of Onsite Emergency Director is as follows:

1. Senior Vice President
2. Manager, Operations
3. Manager, Engineering
4. Manager, Health and Safety

The position of Onsite Emergency Director carries with it the authority to commit whatever resources and actions are necessary to mitigate the situation.

The Senior Shift Supervisor, acting as Onsite Emergency Director, will perform the following actions:

a. Identify, verify the existence of, and initially classify the emergency as an Unusual Event, Alert, Site Area Emergency, or General Emergency.
b. Activate the Onsite Contingency Response Organization as appropriate, and initiate appropriate measures to mitigate the event.
c. Determine if releases of radioactive and/or hazardous materials have occurred, and, if so, assess the potential onsite and/or offsite hazards involved.
d. Initiate notification of appropriate offsite agencies and response groups.

4.0 CONTINGENCY RESPONSE ORGANIZATION

4.1 Normal Plant Organization

The Sequoyah Facility has a formal organizational structure for both normal and off-normal (back shifts, holidays, and weekends) hours. Figure 4-1 is a block diagram of the Sequoyah Fuels Corporation organization and illustrates levels of responsibility within the facility. A full personnel complement is available Monday through Friday during the day shift. Figure 4-2 shows the shift organization which comprises the normal personnel complement during back shifts, holidays, and weekends. Initial emergency response duties are the responsibility of this group during off-normal hours.

* Management of the normal operating organization is provided by a Senior Vice President or Vice President, and managers who direct facility activities in the areas of:

Operations
Maintenance
* Health and Safety
Engineering
* Environmental
Process Laboratory
Procedures and Training

Should one of these permanently assigned individuals be absent, the positional responsibilities are delegated to another competent individual.

The Senior Shift Supervisor is in the immediate onsite position of authority and responsibility for the safe and proper operation of the facility. He is responsible for the initial evaluation of any abnormal situation and for directing the appropriate response. If an abnormal situation falls within the realm of the emergency classification system described in Section 3 of this Plan, the Senior Shift Supervisor will declare the event at the appropriate classification level. The Senior Shift Supervisor will then assume the position of Onsite Emergency Director. For events classified at the Alert level and above, upon arrival of the Senior Vice President (or alternate), and following an adequate briefing, the Senior Shift Supervisor will turn over the responsibilities of Onsite Emergency Director in accordance with the applicable Contingency Plan Implementing Procedure (CPIP).

SEQUOYAH FACILITY

OPERATING ORGANIZATION

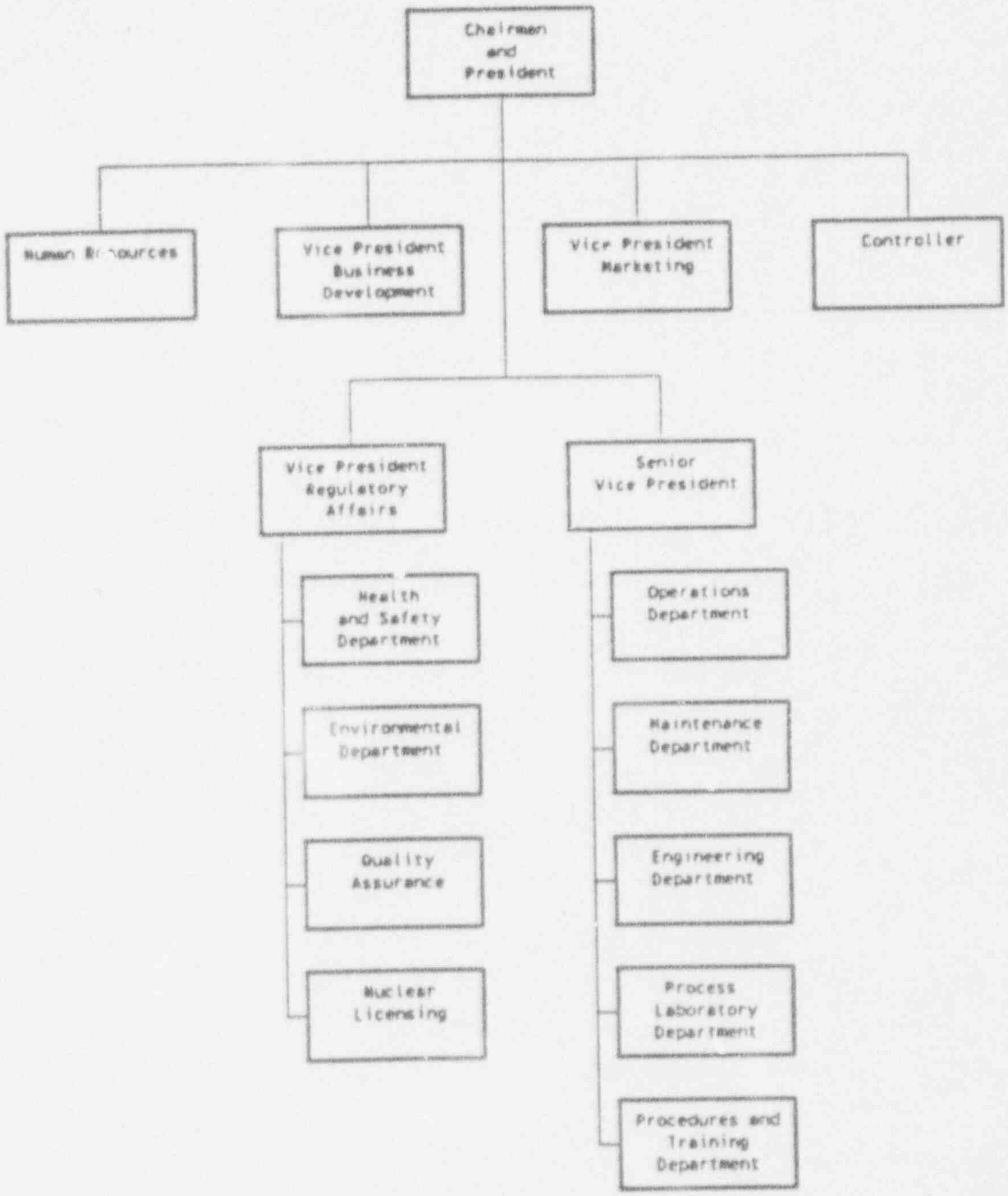


FIGURE 4 - 1

Table of Contents (Cont.)

0.0 EXECUTIVE SUMMARY

Introduction

The Sequoyah Facility Contingency Plan has been developed in accordance with the requirements of a U.S. Nuclear Regulatory Commission (NRC) Order to Modify License, dated February 11, 1981, and follows the general guidelines set forth in NUREG 0762. This Plan is an update and expansion of the Sequoyah Facility Radiological Contingency Plan, which was originally filed in compliance with the NRC Order. The Plan provides an organized and methodical approach toward emergency response and addresses a spectrum of emergency conditions postulated for this type of facility. Although the probability of an accident is low, and has been substantially lowered further by a comprehensive upgrade of facility safeguards and human factors improvements, this Plan will be maintained to provide for protection of the health and safety of facility employees and members of the general public in the vicinity of the Sequoyah Facility.

The Sequoyah Facility is located about 150 miles east of Oklahoma City, 40 miles west of Fort Smith, AR, and 25 miles southeast of Muskogee, OK. Located in rural Sequoyah County, OK, the 2100 acre site tract is bounded on the north by U.S. Highway 64, on the west by the Illinois and Arkansas Rivers, and on the south by Interstate Highway 40. The area around the facility is relatively sparsely populated, with Gore (population 600) and Webbers Falls (population 485) comprising the principal near site population centers.

The Sequoyah Facility Contingency Plan interfaces with several related contingency documents, particularly the Contingency Plan Implementing Procedures (CPIP's). The detailed instructions for implementation and support of the Plan are contained in these procedures. The Plan has been appropriately structured to coordinate activities with offsite response agencies and groups such as the Sequoyah Fuels Corporate Emergency Organization, Federal, State, and local government response groups, and law enforcement agencies.

Background

* The most potentially hazardous accident at the Sequoyah Facility is the sudden rupture of a heated multi-ton cylinder of UF_6. Since natural and depleted uranium is processed at this facility,

the release of UF_6 presents a chemical rather than a radiological hazard. Lethal exposures due to uranium chemical toxicity to the kidneys or HF burns to lung tissue would result in acute radiation doses of less than one rem effective dose equivalent. Therefore, radiation doses are not a limiting factor during an emergency situation. Lethal exposures from chemical hazards may occur in the immediate vicinity of the release point. Injury may occur for several hundreds of meters downwind of the release. Lethal exposures offsite are not considered plausible (NUREG 1140).

Concept of Operations

The concept of operations employed in this Plan is based upon a graduated and escalating level of emergency response which will be activated according to the severity of the emergency condition. This approach provides the flexibility necessary to ensure adequate emergency response to a spectrum of potential events. The Plan addresses three sequential phases of activation: the initial phase, which is dominated by the facility staff; the second phase, where site and corporate groups are activated and working together with appropriate offsite agencies; and the third phase, where recovery efforts are performed by site, corporate, and other critical support groups. During the first phase, the Onsite Contingency Response Organization executes the necessary notification and activation procedures and performs initial assessment, mitigating, corrective, and protective actions. During the second phase, assessment, corrective, and protective activities continue, with the corporate response personnel assuming the responsibilities for such activities as communications with offsite agencies, the media, and the general public; offsite radiological and environmental assessment; and technical and logistical support for the onsite response effort. During the final phase, the immediate hazard is over, the facility is in a stable, shutdown condition, and the major effort is being expended on recovery from the emergency, then restoration of facility operations.

Plan Structure

The Plan is divided into nine chapters: General Description of the Facility, Engineered Provisions for Abnormal Operations, Event Classification, Organization, Response Measures, Equipment and Facilities, Maintenance of Preparedness, Records and Reports, and Recovery. The first two chapters describe the facility and NRC licensed activity, as well as design features which contribute to limiting exposure to, or release of, radioactive or hazardous chemical materials. Brief descriptions of the subsequent seven chapters are summarized in the following paragraphs.

Event Classification: Emergencies are categorized into four classes: Unusual Event, Alert, Site Area Emergency, and General Emergency. The facility's condition, the magnitude of the event, and the degree of the actual or potential onsite and/or offsite hazard are key elements in determining the classification of the event. The lowest class, in order of severity, is Unusual Event. This class of emergency describes an event involving some potential degradation of the overall level of plant safety, but no hazard presently exists. The Alert class deals with events representing a significant actual or potential degradation in plant safety, but if hazardous conditions exist, they are usually limited to small, noncritical areas of the site. A Site Area Emergency declaration indicates a substantial degradation of plant safety. Serious hazards could exist onsite. The General Emergency class denotes that a major release of radioactive and/or hazardous materials is imminent or ongoing. Hazardous conditions are anticipated offsite for some distance beyond the site boundary (Protected Area). Figure 0-1 is an event sequence flow chart illustrating Plan implementation.

Organization: The principal organizational structures important to this Plan are the Normal Shift Organization, the Onsite Contingency Response Organization, and the Offsite Response Organization. Direction and control of the Onsite Contingency Response Organization is the responsibility of an Onsite Emergency Director; an Offsite Emergency Director is responsible for directing the Offsite Response Organization. Onsite, the Senior Shift Supervisor is initially responsible for assessing an emergency situation, taking appropriate mitigating actions, activating this Plan, and notifying the appropriate personnel and offsite agencies. He will be succeeded as Onsite Emergency
* Director by the Senior Vice President or an alternate, as provided in the appropriate implementing procedure. Once fully activated, the onsite organization includes the following coordinators and their groups: Operations; Hazards Assessment & Control; Damage Control & Repair; Technical Support; Administration and the Senior Shift Supervisor. Should conditions warrant, further staff augmentation is accomplished by recall of additional off-shift personnel.

which contribute to limiting exposure to, or release of, radioactive or hazardous chemical materials. Brief descriptions of the subsequent seven chapters are summarized in the following paragraphs.

Event Classification: Emergencies are categorized into four classes: Unusual Event, Alert, Site Area Emergency, and General Emergency. The facility's condition, the magnitude of the event, and the degree of the actual or potential onsite and/or offsite hazard are key elements in determining the classification of the event. The lowest class, in order of severity, is Unusual Event. This class of emergency describes an event involving some potential degradation of the overall level of plant safety, but no hazard presently exists. The Alert class deals with events representing a significant actual or potential degradation in plant safety, but if hazardous conditions exist, the, are usually limited to small, noncritical areas of the site. A Site Area Emergency declaration indicates a substantial degradation of plant safety. Serious hazards could exist onsite. The General Emergency class denotes that a major release of radioactive and/or hazardous materials is imminent or ongoing. Hazardous conditions are anticipated offsite for some distance beyond the site boundary (Protected Area). Figure 0-1 is an event sequence flow chart illustrating Plan implementation.

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* Revised

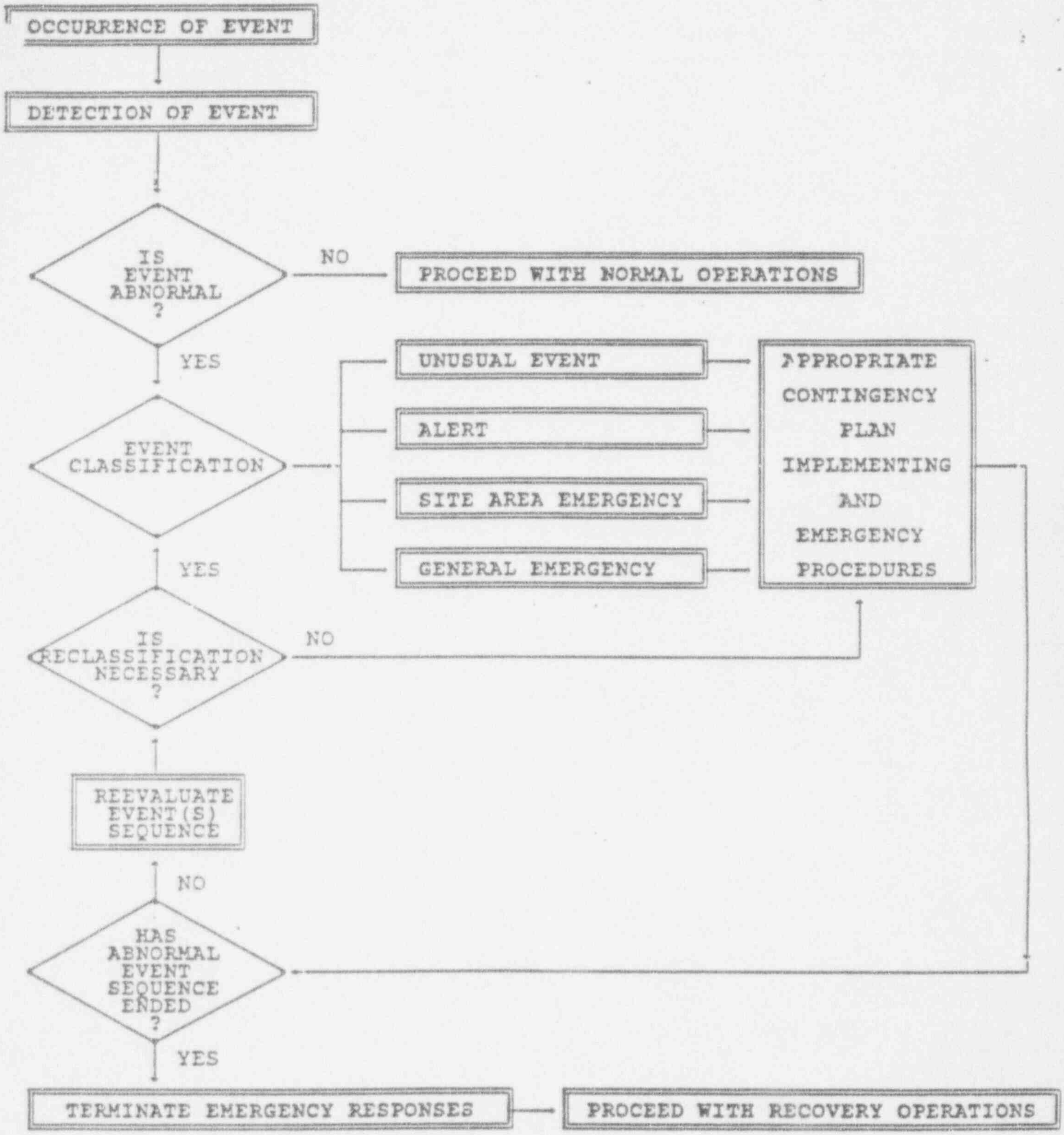
Response Measures: Response measures include assessment, corrective, and protective actions. Assessment actions are necessary to determine the type of hazardous material involved and the magnitude of release, if any. Factoring in meteorological data allows identification of the areas potentially affected and estimates of the magnitude of the hazard. Corrective actions are specified responses to given conditions, taken to mitigate or terminate the event, and are addressed in appropriate CPIP's or Emergency Procedures. Protective actions onsite include localized evacuations, use of protective equipment or supplies, exposure and contamination control, first aid, and medical treatment. Offsite protective actions for members of the nearby public involve sheltering indoors with notifications triggered by sirens and backed up by an automatic telephone system. Communications with offsite response agencies are established by using telephones and radios to allow implementation of traffic control measures to prevent traffic from entering the immediate vicinity of the facility during an emergency.

Equipment and Facilities: The chief emergency centers involved in this Plan are the Onsite Emergency Center, from which the Onsite Emergency Director and his key staff control and direct the onsite response effort; the Assembly and Support Center, which serves as an emergency resource and personnel accountability center; and the Offsite Response Center, from which the Offsite Emergency Director directs offsite support activities. Emergency equipment includes redundant communications systems, protective clothing and equipment, monitoring instruments, meteorological instruments, fire detection and suppression systems, first aid, medical, and emergency kits.

Maintenance of Preparedness: Contingency planning is an ongoing effort which will persist throughout the life of the Sequoyah Facility. A Contingency Plan Coordinator is responsible for maintaining the Plan, the CPIP's, and all emergency facilities, equipment, and supplies in a constant state of readiness. He works with the facility Training Coordinator to ensure that all facility employees and members of both onsite and offsite response organizations receive proper initial and continuing training. He also plans, organizes, and conducts several drills and one major onsite exercise of the Plan each year. Drills and exercises are formally critiqued and deficiency items are corrected. Once per year, the Contingency Plan Coordinator arranges an independent review of the Plan and CPIP's.

Records and Reports: Records of incidents, documentation of prsparedness assurance, and offsite reporting arrangements are specified in this Plan. Complete documentation is required of all incidents resulting in implementation of the Plan. Records are also required to assure preparedness, such as: training records, records of drills and tests, records of emergency equipment and supply inventories, and documentation of Plan reviews and updates.

Recovery: The Plan establishes general requirements for recovery from an emergency. Requirements for re-entry of the site or affected areas of the facility are set. The major steps to plant restoration are detailed, and the criteria for resumption of operations are addressed.



CONTINGENCY PREPAREDNESS

EVENT SEQUENCE FLOW CHART

FIGURE O - 1

1.0 GENERAL DESCRIPTION OF THE PLANT

1.1 Licensed Activity Description

Source Material License SUB-1010 was issued to Kerr-McGee Nuclear Corporation (presently Sequoyah Fuels Corporation) on February 20, 1970, authorizing the operation of a uranium hexafluoride manufacturing facility. The license set a quantity limitation of 20 million metric tons of uranium, in any form, that the licensee may possess at any one time. The latest license renewal was on September 20, 1985 and will expire on September 30, 1990.

The UF_6 plant is currently designed to produce 10,000 metric tons of uranium per year as high purity uranium hexafluoride using uranium concentrates (yellowcake) as the starting material. The manufacturing process includes wet chemical purification to convert yellowcake to pure uranium trioxide, followed by dry chemical reduction, hydrofluorination, and fluorination techniques to produce uranium hexafluoride.

The depleted UF_4 (DUF_4) plant is designed to produce 7,500,000 lbs/yr of metal grade uranium tetrafluoride from depleted uranium hexafluoride (DUF_6) obtained from the DOE as tails from the gaseous diffusion enrichment process. The process includes reduction of UF_6 to UF_4 with dissociated ammonia (75% hydrogen, 25% nitrogen), followed by separation and recovery of byproduct HF from the solid UF_4 product.

Normal operation of the Sequoyah Facility produces heat along with solid, liquid, and gaseous effluents, which are treated to meet Federal and State pollution control standards before discharge or disposal. Liquid and solid wastes containing radioactive materials (natural uranium and decay products) are stored in lined settling basins. Plant effluent water streams, which contain traces of radioactivity, are released through a permitted NPDES outfall to the Illinois River. Process airborne effluents pass through devices to remove uranium and noxious gases produced in the manufacturing process.

1.2 Site and Facility Description

1.2.1 General

The plant site and the surrounding Sequoyah Fuels property are a mixture of rolling pastures and timberland with some steep slopes and a small number of cultivated fields. Approximately one-third of the site area is meadow land, while the remainder is wooded. Prior to plant construction, the immediate area was used partly for the cultivation of wheat and soybeans, with the balance in pasture and woodland.

1.2.2 Plant Location

As shown in Figure 1-1, the Plant is located in Eastern Oklahoma about 150 miles east of Oklahoma City, 40 miles west of Fort Smith, Arkansas, and 25 miles southeast of Muskogee, Oklahoma. The 2100 acre site tract, as shown on the USGS topographic map, Figure 1-2, is bounded on the north by U.S. Highway 64, on the west by the Illinois and Arkansas Rivers, on the south by Interstate Highway 40 and on the east by the eastern boundary of Section 22. The immediate plant site, as shown in the attached aerial photo, Figure 1-3 and in Figure 1-4 is a fenced, protected area covering about 75 acres in Section 21, Township 12 North; Range 21E East Sequoyah County, Oklahoma, with access provided by Oklahoma Highway 10 adjacent to the eastern boundary of the site. Additional details of the installation including all of the structures, the wastewater process system, and the environmental monitoring system sample stations are shown in Figure 1-5.

1.2.3. Regional Demography and Land

a. Population Distribution

The area in the vicinity of the plant site is relatively sparsely populated and experienced a population growth of only 3% in the period from 1970 to 1980. Population data from the 1980 census for the general plant area are presented in Table 1-1.

An estimate based on data from topographical maps, population statistics, limited agricultural use data and recreation statistics indicates the following present land use distribution within a ten mile radius of the plant:

Land Use	Percent*
Agricultural (mostly pasture)	30
Recreation	35
Residential	20
Commercial and Industrial	15
Unused rough terrain	25

*Due to multiple use of some areas, total exceeds 100%.

Aside from a slight intensification of demand for land within the incorporated communities, the plant installation has had minimal effect on the land use pattern. Land-use patterns are not expected to change appreciably in the near future.

The U.S. Government land south of the Interstate Highway 40 is part of about 21,000 acres of land and water that make up the Sequoyah National Wildlife Refuge.

For more detailed information on the Sequoyah Facility, refer to Chapter 10 of the License SUB-1010.

1.3 Process Description -UF6 Plant

This section contains an overview of the Sequoyah Facility UF_6 Plant process description. Refer to License SUB-1010, Chapters 3, 5, 6, 12, 14, an 16 for more detailed information.

1.3.1 Process Technology and Equipment

The process for producing UF_6 at the Sequoyah Facility utilizes technology which has been proven by successful performance at various DOE plants, notably at the Fernald, Ohio; Paducah, Kentucky; Oak Ridge, Tennessee; Hanford, Washington; and the now inactive Weldon Springs, Missouri sites. The Sequoyah process follows the DOE approach involving preparation of pure uranium trioxide from ore concentrates (yellowcake) and dry chemistry conversion to uranium hexafluoride.

The uranium ore concentrate is dissolved in nitric acid, purified by solvent extraction and converted to UF_6 by successive treatments with hydrogen (H_2), hydrofluoric acid (HF), and fluorine (F_2). The fluorine is produced onsite as needed by electrolysis of HF in a molten KF-HF electrolyte.

1.3.2 Production Method

The production method at the Sequoyah Facility involves (a) yellowcake sampling, (b) digestion of the yellowcake in nitric acid, (c) purification of the uranyl acid solution by solvent extraction, extraction, (d) denitration of the uranyl nitrate to produce uranium trioxide, (e) hydrogen reduction of the uranium trioxide to uranium dioxide, (f) conversion of the uranium dioxide to uranium tetrafluoride by reaction with anhydrous hydrogen fluoride, and (g) formation of uranium hexafluoride by contacting the uranium tetrafluoride with elemental fluorine. Figures 1-6 and 1-7 respectively show a block diagram schematic flowsheet of the production process. After sampling, ore concentrate (yellowcake) is dissolved in nitric acid to form uranyl nitrate and the uranium is extracted from the impurities with a solvent consisting of tri-butyl phosphate (TBP) and hexane in a series of pumper decanters. The solvent, containing purified uranium, is passed through pulse columns to re-extract the uranium into water. The solvent, now stripped of uranium, is treated with ammonium sulfate-caustic to remove traces of uranium and TBP degradation products and then recycled to the extraction pumper decanters. The pure aqueous uranium nitrate concentrate solution is then concentrated to uranyl nitrate hexahydrate and thermally decomposed in a continuous trough denitrator to form solid UO3. The nitrogen oxide gases formed in dissolution and denitration steps are recovered by scrubbing and absorption, and recycled to the process as nitric acid.

After grinding, the UO_3 is converted to UF_6 in three successive dry processing steps. The powder is fed first to a two-stage fluid-bed and is contacted with with H2 to reduce the UO_3 to UO_2. This product is then hydrofluorinated in series-connected stirred fluid-bed reactors in which UF_4 is formed by reaction with anhydrous HF. Any excess HF, along with the water formed by the reaction, is condensed to produce an aqueous acid which is neutralized with lime. The UF_4 is then fluorinated to UF_6 by reaction with F_2 in a flame type reactor. The gaseous UF_6 is collected by desublimation in refrigerated in refrigerated heat-exchangers (cold traps). These units are operated on a batch-cycle and are periodically taken off-line and heated to liquefy and drain the UF_6 into product cylinders. Excess fluorine gas is passed through a clean-up reactor (CUR) filled with UF_4 to assure complete utilization of fluorine. The UF_6 formed in the CUR is recovered in cold traps. Non-condensible gases are exhausted through the HF scrubber for treatment.

The raffinate from the solvent extraction step, containing impurities and insoluble materials, is pumped to holding tanks for sampling and then is neutralized with ammonia and released to holding ponds to settle precipitated impurities. Before recycling, the solvent is treated with ammonium sulfate-caustic to to remove any traces of uranium and TBP degradation products.

Elemental fluorine required for the final processing step is generated as needed by the electrolysis of a molten KF-HF electrolyte.

1.3.3 Detailed Process And Equipment Description

Descriptions of the production systems involved are presented below.

a. Sampling the Dry Ore Concentrate (yellowcake):

The dry concentrate (yellowcake) is received from uranium mills in mills in 55-gallon steel drums. The drums are weighed, hoisted to the top level of the sampling plant, and dumped into a bin. The concentrate discharges from the bin and passes thru two stages of stream samplers. The sample weight is approximately 1% of the feed. The accountability samples are taken from the 1% sample. The sampled yellowcake is elevated to the the digestor feed hoppers. The empty drums are cleaned by vacuum, tared and stored or recycled. A dust collector provides the ventilation for control of airborne particulates from the sampling plant.

b. Digestion of Dry Yellowcake:

The sampled yellowcake is reacted with preheated nitric acid in three 4,000 gallon digestors which operate on a batch basis. The uranium in the feed concentrates, present in the the form of oxides or diuranates, is solubilized and forms uranyl nitrate. The digestion is accompanied by evolution of nitrogen oxides. After digestion, the digestor tank contents are transferred to two 4,000 gallon tanks where adjustment of acid concentrations and miscellaneous chemicals are added. Overall residence time varies from 12 to 24 hours. The nitrogen oxide gases formed during digestion are cooled and scrubbed to remove entrained solids, then peped to the nitric acid absorber in the nitric acid recovery plant. The recovered acid is recycled.

c. Unloading, Sampling and Digestion of Wet Yellowcake:

Some concentrates are received as wet yellowcake slurry, which contains approximately 30 weight percent uranium (U) equivalent. The slurry is transported in stainless steel cargo tanks meeting DOT specifications MC310, MC311, MC312 or MC331. A special yellowcake slurry receiving area is provided at the Sequoyah Facility. This area contains facilities and equipment for unloading the cargo tank, and sampling the uranyl nitrate solution fan dissolving the ammonium diuranate (ADU) slurry with nitric acid (See Figure 1-8).

Tanks for receiving, weighing and sampling the uranium product (ADU), are enclosed in a building constructed on a concrete curbed foundation that provides sufficient capacity to contain spillage in case of accidental release. accidental release. The building contains three tanks: one 1,000 gallon tank and two 10,000 gallon tanks. The 1,000 gallon tank is used for non-routine, small operations, calibration of the load cells on the 10,000 gallon receiving and weigh tank and all accountability weighing. The second 10,000 gallon tank is used for measured storage. The receiving and transfer pumps are contained in a small building with a curbed foundation that drains to teh large curbed area in case of spillage in the pump houses. The area where the cargo tank is parked is also curbed adequately to contain the entire tank volume.

A predetermined amount of nitric acid is pumped into the receiving tank. A portion is then pumped from the receiving tank into the cargo tank until the level switch indicates proper level. When acid has been consumed, the contents of the cargo tank are pumped back to the receiving and weighing tank. The dissolving operation is repeated until the slurry is totally dissolved. The uranyl nitrate in the receiving tank is mixed, weighed, sampled, and then transferred to the 10,000 gallon storage tank. The storage tank contents are subsequently pumped to the process tankage used to prepare the feed for solvent extraction purification.

d. Unloading, Sampling & Digestion of Wet UF_4 (See Fig. 1-9):

The UF4 slurry, as received, is approximately 35 wt. percent on a uranium (U) basis. The slurry is shipped in thick-walled poly drums, each with approximately 55 gallons of volume. The UF_4 slurry receiving building rests on a curbed foundation with sufficient capacity to contain the contents of the digestion tank in case of an accidental release. The drums are emptied by inversion over the process feed hopper using a mechanical drum dumper. The slurry is then pumped into the digester containing a pre-mixed quantity of HNO_3-$Al(NO_3)_3$ to dissolve the solids. After digestion, the resulting solution is mixed, weighed and sampled in the same equipment used for processing wet yellowcake. The solution is then pumped to the process tankage used to prepare the feed for the solvent extraction operation.

e. Solvent Extraction:

The digestion liquor containing uranyl nitrate, soluble impurities, and some insoluble solids, is transferred to the solvent extraction step for purification. A 30% (by volume) solution of TBP in hexane comprises the organic solvent for the selective extraction of uranium.

The uranium is extracted as a nitrate complex from the aqueous digestion solution into the organic solvent by using a series of four-foot diameter by six-foot high pumper-decanters. The solvent flow is counter-current to the aqueous flow. The loaded organic solvent, nearly saturated with uranyl nitrate, is then scrubbed with a small amount of water in mixer settlers to remove residual entrained aqueous solution. This scrubber liquid and impurities are returned to the feed stream. The scrubbed solvent is then transferred to a pulse column where the uranium is re-extracted into slightly acidified water. The stripped solvent is purified in the solvent rework system and the composition is adjusted to replace any hexane and TBP losses before feeding back to the extraction pumper decanters. A solution of ammonium sulfate and caustic is used to purify the solvent by removing traces of uranium and solvent degradation products.

The extraction step aqueous phase, or raffinate, contains the unextracted soluble and insoluble impurities. This barren solution is transferred to a raffinate decanter where any contained organic is removed. The raffinate is pumped to holding tanks for sampling and then to membrane lined disposal ponds for neutralization and storage.

The pure uranium aqueous product from the pulse column, stripped of the loaded organic, is piped to the uranyl nitrate hexahydrate (UNH) decanter and is mixed with excess hexane to remove traces of organic. This very pure aqueous solution of uranyl nitrate is stored in feed tanks that supply the evaporators and concentrators.

f. Preparation of UO_3:

The pure uranyl nitrate is concentrated by evaporation in a vapor recompression evaporator. Batch boildown tanks are then used to concentrate the solution to approximately 10 lbs U/gal. The concentrated solution is then heated in agitated trough denitrators to thermally decompose the uranyl nitrate to UO_3. The condensate from the recompression evaporators is used as is used as strip solution to re-extract the uranium from the loaded organic in the pulse columns. The boildown tanks are heated by steam. The boiling temperature is controlled at levels ranging from 235° to 255° F. Solution freezing points range from 140° to 200° F, thus requiring heating of all transfer lines and storage tanks.

The concentrated uranyl nitrate hexahydrate (UNH) is denitrated to UO_3 in a horizontal, electrically heated and agitated trough (maintained at approx. 525°F). Nitric acid is recovered from the denitrator-offgas, as described for the digest area (i.e. a wet scrubber followed by the nitric acid absorber). The uranium trioxide product overflows through a weir into a collection bin below the reactor. The uranium trioxide product is conveyed to a hammer mill and then to the feed hopper for reduction.

g. Reduction of Uranium Trioxide to Uranium Dioxide:

The powdered UO_3 is then converted to UO_2 with H_2 produced by cracking ammonia gas in a fluid bed reactor. The fluid-bed reduction is a two-stage system operated with series powder flow and parallel gas flows. Both stages are heated electrically and are provided with external air cooling coils to maintain the proper temperatures for the reduction step.

Uranium trioxide is screw fed from a weighed storage hopper into the reductor near the top of the bed. The outlet gases carry the uranium dioxide product into a collection hopper. The gases are then vented through sintered metal tube filters. The filters are pulsed periodically with nitrogen to dislodge powder which drops into the hopper. The uranium dioxide is then transferred to a sealed bin for feeding to hydrofluorination.

The hydrogen gas used for UO_3 reduction is supplied as needed by cracking ammonia. A mixture of 75 mole percent hydrogen and 25 mole percent nitrogen is formed by dissociation of ammonia and is passed through the fluid beds. The off-gases, after filtering, are vented through a burner to burn the excess hydrogen. The burner has several safety features. First, a natural gas burner is used to ignite the hydrogen. If gas supply pressure falls too low, propane gas is manually added into the system to maintain pressure. Natural gas low pressure is annunciated as a major alarm in the Control Room to trigger corrective actions. Another safety feature is a flame scanner. If the flame is lost, the pilot gas block valves close automatically, the waste gas vent valve opens, and flow to and from the ammonia dissociators is stopped.

h. Hydrofluorination of Uranium Dioxide to Uranium Tetrafluoride:

The uranium dioxide is converted to uranium tetrafluoride by contacting the solids with anhydrous HF vapor in two stages of stirred fluid bed reactors. The HF vapor enters the 2nd stage reactor and flows countercurrent to the solids.

The hydrofluorinator consists of a 16-inch diameter by 12 feet long feed screw reactor followed by two 30-inch diameter stirred fluid beds arranged in series. The 6 foot deep powder bed in each reactor is agitated slowly with a wall scraping type stirrer. Uranium dioxide powder is screw fed into the screw reactor near the top of the bed. The partially reacted product powder and the outlet gases are discharged into an intermediate hopper which feeds the second reactor. The outlet gases vent through carbon filters. The second fluid bed functions as the first, with the exception that the outlet gases carry the powder to the uranium tetra-fluoride product hopper and are then introduced, without filtering, to the bottom of the first reactor. Both reactors are provided with electrical heating and external forced air cooling. The excess HF and water formed in the reaction are condensed and sent to waste treatment to be neutralized with lime.

i. Fluorination and Condensation

The UF_4 is converted to UF_6 by reaction with F_2 in flame type reactors. Primary reactors operate with an excess of F_2 gas to assure maximum conversion of UF_4. The secondary clean-up reaction units use an excess of UF_4 powder to react with the excess F_2

from the vent gas stream. The UF_6 gas product is collected by desublimation in primary and secondary refrigerated cold traps.

Gas flows are controlled in an optional range, and 95% or more of the uranium tetrafluoride is consumed. Unreacted solids are collected in an ash receiver mounted directly below the tower. The gases and a small part of unreacted uranium tetrafluoride are discharged through a gas cooler and a sintered metal filter. Solids collected in the filter usually contain a high percentage of non-volatile impurities and are reprocessed through a wet uranium recovery system. Ash in the tower receiver is primarily uranium tetrafluoride which is recycled.

The UF_6 gas leaving the primary fluorinator is passed through a heat exchanger (cold trap) which operates at 30° F where a large portion of the uranium hexafluoride is removed by desublimation. An elthylene glycol-water mixture is used as the cooling fluid in the cold trap. The non-condensed gas is compressed and flows to the clean-up reactor.

j. UF_6 Condensation:

The UF_6 product is collected in two different types of batch heat exchangers. The first or primary cold trap operates at approximately 30° F, and removes most of the UF_6. This trap is of tube and shell construction. A glycol-water solution is circulated through the tubes during the cooling cycle. When a batch is collected, the trap is heated to liquefy and drain the UF_6. Heated glycol-water is passed through the tubes. The UF_6 is heated to above its triple point of 147° F (22.0 psia), filtered and drained into an evacuated shipping cylinder.

A secondary cold trap cooled to -60° F is used to back-up the primary cold traps. These traps are smaller but of similar construction to the primary cold traps, and they are cooled with freon instead of glycol-water. These traps operate as batch units also and are heated to allow the UF_6 to be drained from them. Non-condensible gases from the cold traps are vented to the HF scrubber.

k. Draining and Shipping:

The hot UF_6 product is drained from a single cold trap through an evacuated header and an in-line filter into a shipping cylinder. The shipping cylinder is normally either a 10 ton or 14 ton size. Occasionally smaller cylinders may be filled. The shipping cylinder is inspected prior to filling to assure it is not defective. The cylinder is placed on a transfer cart and tare weighed. It is then moved to the fill position where it is connected to the fill header by a "pig-tail". There are two identical fill stations. The cart has load cell weigh scale built into it, and the cart itself sets on a second scale while in the fill position. The UF_6 is then drained from the cold trap into the cylinder until the specified fill net weight is reached. The cart scale and the platform scale record the gross weight of the filled cylinder. The cylinder is then removed from the filling station. If the cylinder is filled within four hours, it is transferred directly to the product scale station for sampling and accountability weighing. Product quality is verified from this sample. If more than four hours were required to fill the cylinder, it is reheated to homogenize the liquid contents before sampling and accountability weighing. No cylinder is reheated if it is not within a specified maximum weight. The cylinder is allowed to cool at least five days prior to being shipped or transferred.

l. Fluorine Production:

The system consists of 60 electrolytic cells with two collection systems systems for the hydrogen and fluorine gas. Fluorine is produced from HF by the electrolysis of HF dissolved in a fused salt bath of KF-HF in medium temperature, water-cooled cells. Hydrogen is produced as a by-product and subsequently burned. The fluorine is compressed with a centrifugal compressor and is charged to the uranium hexafluoride production reactors. Hydrogen flows to a gas burner. Both the hydrogen and fluorine headers are controlled at about 1 inch of water, positive pressure, on the cell side. Close control of the pressure of both these streams is provided to prevent mixing fluorine and hydrogen. The hydrogen stream contains about 3 mole percent HF. The

HF is a waste product, and is disposed of by first burning, then scrubbing. The burner has a combustion safeguard system to assure that it does not flame out. If flame out does occur, the cell room and fluorinators are shutdown.

1.4 Process Description -Depleted UF4 Plant

This section contains an overview of the Sequoyah Facility Depleted UF_4 Process. Refer to License SUB-1010, Amendment Application for the DUF_6 to DUF_4 facility (November 5, 1986), Chapters 9, 10, and 16 for more detailed information.

1.4.1 Process Technology

The process technology for the Sequoyah Facility Depleted UF_4 Process was derived from research, development,and production operations of the United States Atomic Energy Commission and DOE at Oak Ridge, Tennessee; Paducah, Kentucky; and Fernald, Ohio. In the process, depleted UF_6 is reduced with hydrogen to produce solid UF_4 and byproduct hydrofluoric acid.

The hydrogen is used in the form of dissociated ammonia (75% hydrogen, 25% nitrogen). The HF byproduct is recycled to the Sequoyah Fuels UF_6 Facility.

1.4.2 Production Method

Production of depleted UF_4 involves: (a) heating depleted UF_6 (DUF_6) cylinders to vaporize UF_6 for reactor reactor feed; (b) preparing dissociated ammonia (DA) to feed the reactor; (c) reaction of UF_6 and DA at elevated temperature; (d) separation of UF_4 solid and reaction offgas (mostly HF); (e) offgas treatment to remove dust and unreacted UF_6; (f) recovery of HF from reactor offgas; (g) grinding of UF_4 solids; (h) packaging of UF_4 product in 55 gallon drums. Figure 1-10 shows a block diagram with material balance. Figure 1-11 shows a schematic flowsheet of the production process.

1.4.3 Detailed Process and Equipment Description

Descriptions of the production of the production systems involved are as follows:

a. Distributed Control System

The operation of the depleted UF_4 plant is controlled through a Bailey Controls Network 90 microprocessor-based Distributed Control System (DCS). Reliability of the system is achieved by: (1) redundancy of components and functions within the system, (2) hardware and software security checks performed by the system to ensure module integrity, (3) an Uninterruptible Power Supply, which uses nicket-cadmium batteries.

Remote operation of most plant functions is achieved through programmed control from the Process Control Unit (PCU) located in the Motor Control Center of the depleted UF_4 plant. The PCU consists of data processing (both digital and analog) and process control modules. Redundant Operator Interface Operator Interface Units (OIU's), located in the central control room of the main UF_6 plant, are used for programming of the Process Control Unit, monitoring of the UF_4 plant system, and execution of the alarm functions.

b. DUF_6 Vaporizing

Depleted UF_6 is received as a solid in 10-ton or 14-ton UF_6 cylinders. Thick walled 14-ton cylinders, Model 48Y, have a 200 psig and 250°F pressure and temperature rating. Thin walled 14-ton cylinders, Model 48G, have a 100 psig and 235°F pressure and temperature rating. Ten ton, Model 48X cylinders can also be handled in the system.

Autoclaves are used to heat DUF_6 cylinders and vaporize the DUF_6 for introduction into the processing system. The autoclaves completely contain the cylinders when they are heated so that any leakage of DUF_6 from a cylinder, a cylinder valve, or the copper "pig tail" attached to the valve, will not escape to the room or to the environment.

The two autoclaves are horizontal steel cylindrical pressure vessels, 6 feet in diameter by 21 feet long, with design pressure of 200 psig and design temperature of 250°F. Each autoclave has a fixed head which contains all piping and instrument connections to the autoclave. A hydraulic system opens and closes the retractable cylindrical portion of the autoclave.

A pressure relief line is attached to the fixed head of the autoclave and vents out the roof via a rupture disc and a pressure relief valve. If a pressure in excess of 200 psig occurs in the autoclave, the rupture disc and pressure relief valve will open to reduce autoclave pressure to 180 psig, at which point the pressure relief valve will close. If autoclave pressure exceeds a pre-set limit, the Distributed Control System (DCS) will initiate automatic shut down of the autoclaves.

Before a UF_6 cylinder is processed, it is placed on a scale cart and weighed on scales inside the process building. Given the cylinder tare weight engraved on the cylinder nameplate, the net weight of UF_6 is established for the cylinder. Weigh tickets are printed both in the field and in the control room. The field and control room operators independently confirm that the net weight of UF_6 in the cylinder is below the maximum allowable weight before the cylinder is released to process.

After weighing, the cylinder is transferred to one of the two autoclaves, using a 20-ton bridge crane. After the cylinder is in position in the autoclave, the DUF_6 discharge piping is connected to the cylinder discharge valve via a copper "pigtail". The pigtail is then leak tested with 65 psig nitrogen. The cylinder valve is then opened and the pressure in the pig tail will fall to less than atmospheric, since the cylinder is under a negative pressure. If this sequence is not followed, the DCS will not allow the control room operator to turn on the steam to the autoclave. This feature prevents heating a cylinder with a closed or plugged cylinder valve.

The extension handle from the motorized valve closer is then connected to the cylinder discharge valve. The motorized valve closer is designed only to close the valve, not to open it. The valve closer motor is outside the autoclave fixed head and its extension handle passes through the head via a stuffing box arrangement.

After the autoclave is closed and locked, the control room operator uses the DCS to open the steam supply to the autoclave. Pressure is controlled at about 6 psig which corresponds to 230°F for saturated steam. At 230° F the DUF_6 is liquid and at a vapor pressure of about 60 psig. The DUF_6 cylinder is then ready to feed DUF_6 vapor to the chemical reactor system.

The condensate from each autoclave is combined and collected in a condensate receiver and pumped alternately to one of two condensate holding tanks. Each holding tank holds about 24 hours of condensate condensate production. When one tank is full, condensate flow is shifted to the empty tank and the full tank is agitated and sampled. The sample is analyzed for uranium and fluoride content. If uranium and fluoride are not present, the condensate is drained to the calcium fluoride settling and storage basin #2 in Restricted Area No. 1 If uranium or fluoride is present, the condensate is treated with lime as it enters the above mentioned settling basin.

Any leakage of DUF_6 from a cylinder being heated within an autoclave reacts with the steam condensate and stream vapor within the autoclave. This reaction will produce hydrofluoric acid (HF) and uranyl fluoride (UO_2F_2), causing an increase in pressure. In order to contain these materials within the autoclave, there are remotely operated containment valves on all pipe connections to the autoclave (i.e. steam supply, condensate removal, DUF_6 to process, and steam sampling line) except the pressure relief line.

Also, the remotely operated motorized DUF_6 cylinder valve can be closed to stop leakage from the cylinder valve stem and pig tail. All these valves are operated via the DCS.

In order to limit the chemical reaction which can take place in the event of a DUF_6 leak, the amount of water as steam and condensate which can be retained in the autoclave is limited by level controls to that amount which could produce 200 psig pressure if completely reacted. A high condensate level causes the DCS to shut off the steam supply to the autoclave.

The HF and UO_2F_2 generated by the reaction of DUF_6 with water are both soluble in water, and the presence of small amounts would increase the electrical conductivity of the condensate. Condensate conductivity is continually monitored by the DCS. High conductivity causes the DCS to close the steam supply valve.

After the DUF_6 cylinder is emptied, both the DUF_6 feed valve at the autoclave and the autoclave steam supply valve is closed. The pig tail is purged with a small measured amount of nitrogen back into the DUF_6 cylinder several times, and the cylinder valve is closed using the remote operated motorized closer. As the cylinder cools, any residual DUF_6 vapor condenses and the pressure in the cylinder drops below atmospheric pressure. The autoclave is then opened, and the pig tail and extension handle on the cylinder valve are disconnected from the empty cylinder.

The empty DUF_6 cylinder is removed from the autoclave using the bridge crane and placed on the cylinder weight cart on the cylinder scale to determine how much residual UF_6 ("heel") remains in the cylinder.

c. Dissociated Ammonia Supply

Ammonia is thermally dissociated in one of the three existing ammonia dissociators located at the existing UF_6 conversion building. The dissociated ammonia (75% hydrogen, 25% nitrogen) is piped to the depleted UF_4 plant. The ammonia should be 99.9 percent decomposed to nitrogen and hydrogen.

The dissociated ammonia passes through a molecular sieve to remove any residual ammonia, which would react with uranium hexafluoride and produce an unwanted byproduct. The molecular sieve consists of two parallel vertical cylindrical tubes filled with an adsorbent zeolite having a strong affinity for ammonia. The dissociated ammonia flows through the adsorbent in one tube and exits that tube essentially free of ammonia. When the adsorbent in the first tube is to be regenerated, the flow of dissociated ammonia is diverted through the second tube. The first tube is regenerated by heating the adsorbent with electric heaters and purging with nitrogen. This causes the adsorbed ammonia to be vaporized from the adsorbent and carried away by the nitrogen purge gas.

Any dust particles in the DA are removed by a filter before feeding the DA to the reactor.

d. DUF_4 Chemical Reactor

The UF_6 reactor system mixes hot UF_6 vapor with hydrogen (in the form of dissociated ammonia) and converts the UF_6 to UF_4 solid and byproduct gaseous HF in the reactor tube. The flow rate of each of the feed gases is accurately metered and controlled to produce a high conversion of UF_6 to specification quality UF_4 product.

The dissociated ammonia flow rate is controlled at approximately 1.2 times the theoretical quantity required for complete chemical reaction, as indicated in the following chemical equation:

$$DUF6(g) + 1.2H2(g) + 0.4N2(g) = DUF4(s) + 0.2H2(g) + 0.4N2(g) + 2HF(g)$$

The chemical reactor consists of a small reactor mixing head mounted via a flanged connection to the top of the reactor tube. The mixing head is designed to produce a cyclonic swirl of the UF_6 and DA at the top of the reactor. The reactor is a 20' long tapered tube, 12" diameter at the top and 20" diameter at the bottom. The bottom of the reactor is welded to a 3.5' long cylindrical support spool which is welded to the cooling screw conveyor.

The 20' tapered section of the reactor tube is divided into four temperature control zones, each having its own heating and cooling capabilities. Each zone is heated by a separate 45 kW electric heater. The output of each heater is independently controlled using temperature sensors attached to the outside wall of the reactor. Ambient air is compressed reactor. Ambient air is compressed by a blower and introduced between each heater section and the reactor tube for cooling as required.

The temperature of the reactor is controlled at about 1200°F(maximum) at the top and about 850°F at the bottom, electric heaters and cooling air as required. The majority of the reaction occurs at the top of the reactor. The DUF_4 formed is a powdery solid. The DUF_4 and the remaining gaseous reaction products pass from the bottom of the reactor to cooling screw conveyor.

In normal operation of the reactor, the UF_4 product is cooled rapidly as it leaves the flame and falls through the reactor into the cooling screw below. Part of the UF_4 product strikes the reactor wall and sticks there as a soft layer of dust. This dust layer is removed by automatically cycled pneumatic impactors which shake the DUF_4 off the walls of the reactor. If the dust layer is not removed, reaction heat may be retained inside the reactor, resulting in the formation of a glassy slag on the reactor walls. If a slag layer accumulates, it may be necessary to thermally cycle the reactor for deslagging purposes.

e. Separation Of DUF_4 Solid From Reaction Offgas

A cooling screw conveyor, 10 inches in diameter and long, is mounted horizontally under the reactor. It is water cooled through an external jacket. Solid DUF_4 powder falls from the reactor into the bottom of the conveyor, along with reaction offgases. The powder is cooled to about 300°F and conveyed to a rotary valve. A bed of DUF_4 powder (seal leg) is maintained in the chute above the rotary valve to prevent downward flow of the offgases with the powder.

The off gases are also cooled to about 300°F and exit from the cooling screw conveyor through a disengagement chamber mounted on top of the conveyor near the discharge end.

f. Offgas Treatment

The off gases from the cooling screw conveyor pass through a combination cyclone-filter where entrained dust is removed. The entrained dust drops into a chute, forming a seal leg just above a rotary valve which empties into the discharge end of the cooling screw conveyor, thus combining the dust with the main product stream.

The off gases then pass through a sintered metal filter where any small amount of remaining dust is removed. The collected dust drops into a small dust can below the filter. This dust will be removed from the collection can via the vacuum cleaning system.

Two activated carbon traps in series downstream of the filters adsorb any traces of unreacted DUF_6 in the offgas stream.

g. HF Recovery, H_2 Burning, and HF Scrubbing

After off gas treatment, the gases pass through the partial HF condenser and are cooled to -10°F. About two-thirds of the contained HF will be condensed to a liquid and drained to one of two anhydrous hydrogen fluoride (AHF) rundown tanks. The partial HF condenser is a shell and tube type, with -15°F refrigerant on the shell side.

The remaining -10°F off-gas stream then passes through a final HF condenser and is cooled to -95°F. Most of the remaining HF will be condensed to a liquid and drained to one of the two AHF rundown tanks. The final HF condenser is a shell and tube type, with -100°F refrigerant on the shell side.

The -95°F off-gases are then piped to the existing Sequoyah UF_6 conversion process building, fed into the HF_2F_2 burner to burn excess H_2, and then through the existing waste gas HF scrubber to remove any HF remaining. The amount of H_2 and total gases feeding to this existing scrubber add only a few percent to the load and can be easily accommodated in the existing system.

The recovered anhydrous HF in the two AHF rundown tanks are sampled and analyzed for purity before being transferred to the existing Sequoyah UF_6 conversion facility AHF storage tanks.

h. UF_4 Solids Handling

The DUF_4 product discharges from the rotary valve through a crusher-delumper and a pulverizer which grind the material to specification size. The pulverized DUF_4 drops into the product transfer screw conveyor via another seal leg and is conveyed to a bucket elevator which elevates the product and drops it through a vibrating screen to the product storage bin.

The dust collection system maintains a slight negative pressure on the solids handling system to prevent discharge of UF_4 powder into the processing area.

i. Product Packaging

The product storage bin and/or the dust collector hopper discharge DUF_4 product through screw conveyors into a product weigh bin. The combined streams are sampled prior to entering the weigh bin. When the weigh bin has received a 1400 pound batch of DUF_4 product, the weigh bin feed screw conveyors automatically shut off. The 1400 pound batch is then dispensed to a 55 gallon product drum through a ventilated drumming hood inside a drumming enclosure. The enclosure is vented to the dust collector to prevent escape of powder into the operating area.

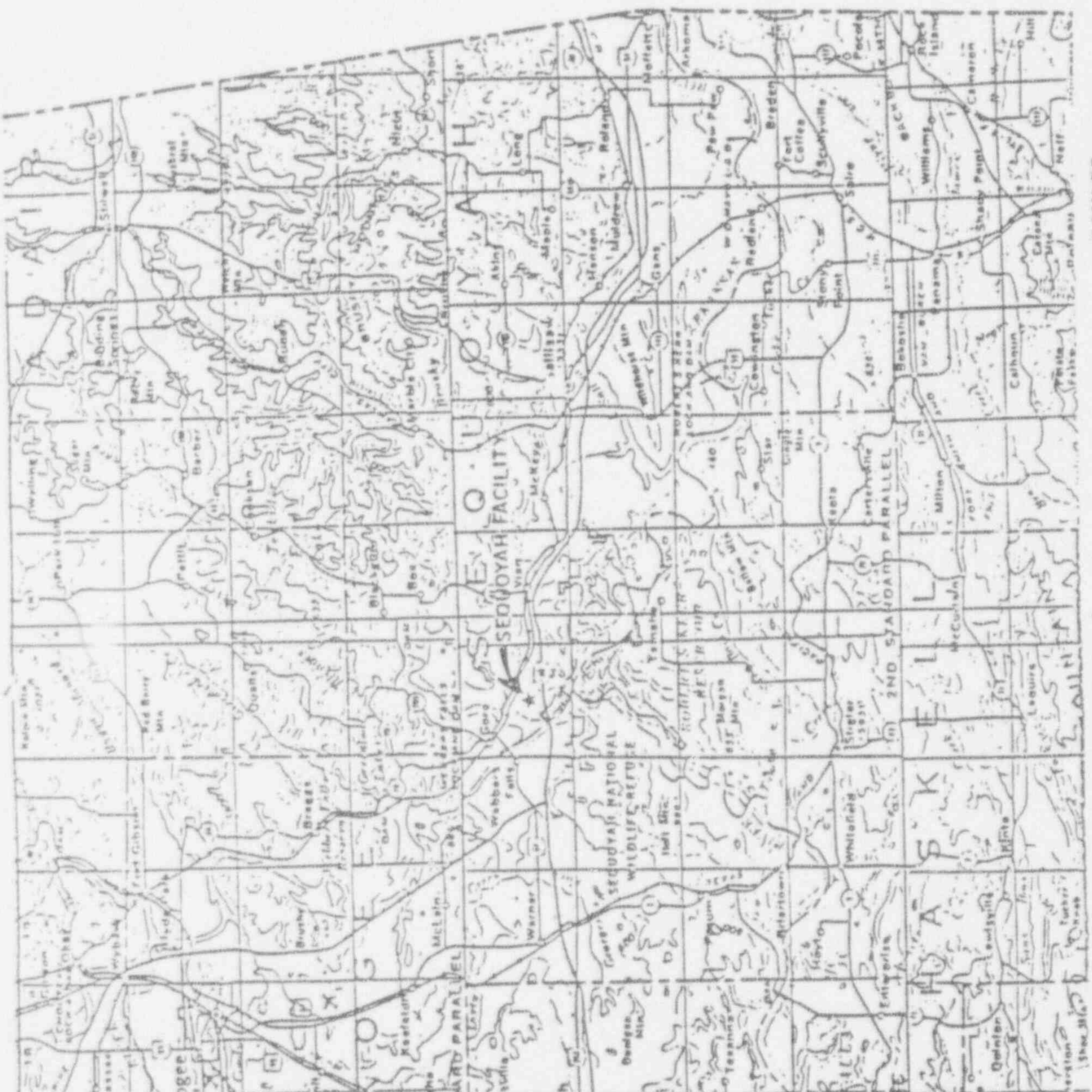

SEQUOYAH FACILITY
SEQUOYAH NATIONAL WILDLIFE REFUGE
2ND STANDARD PARALLEL
Muskogee
Eufaula
Checotah
5 MILES

FIGURE 1 - 1

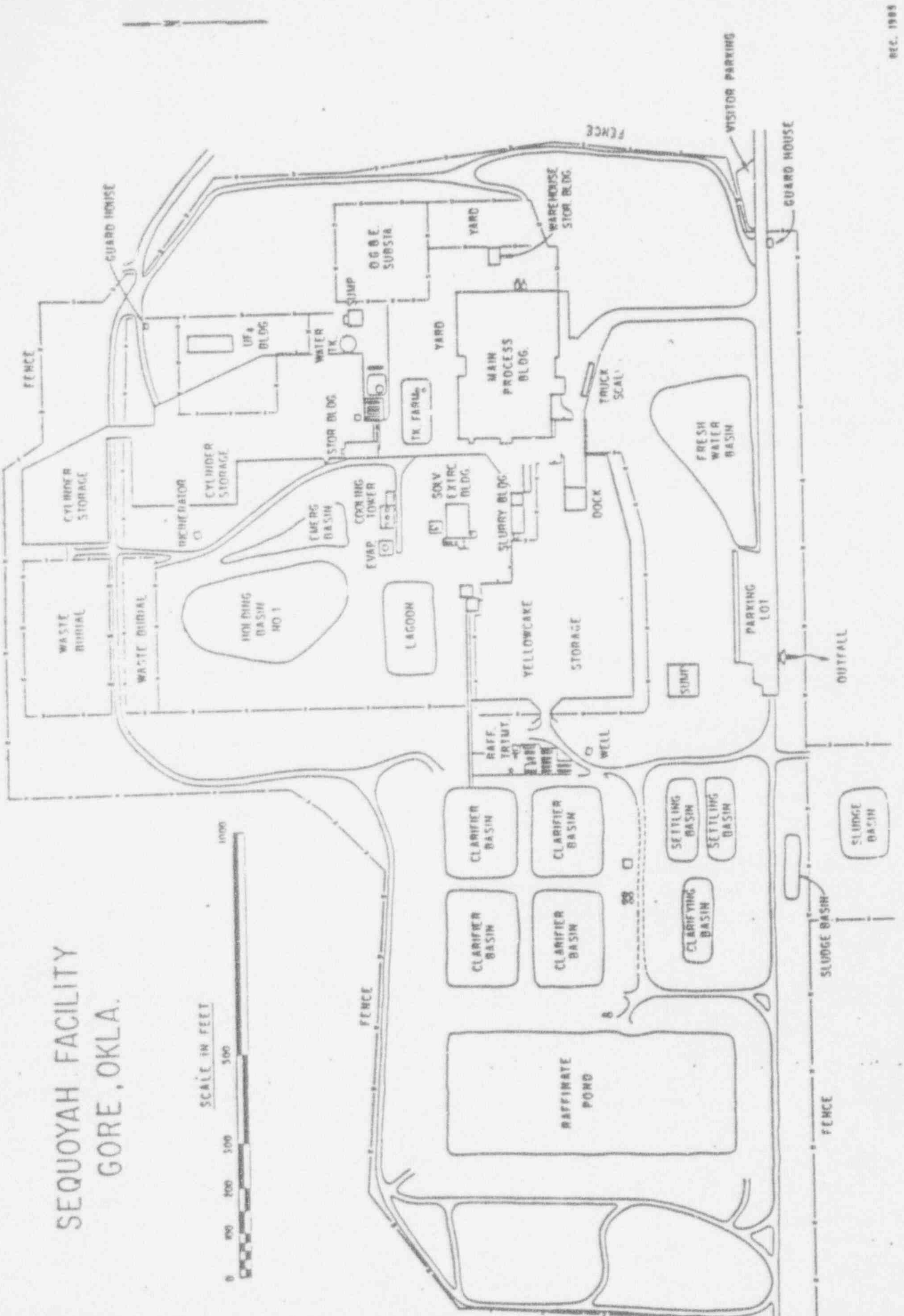
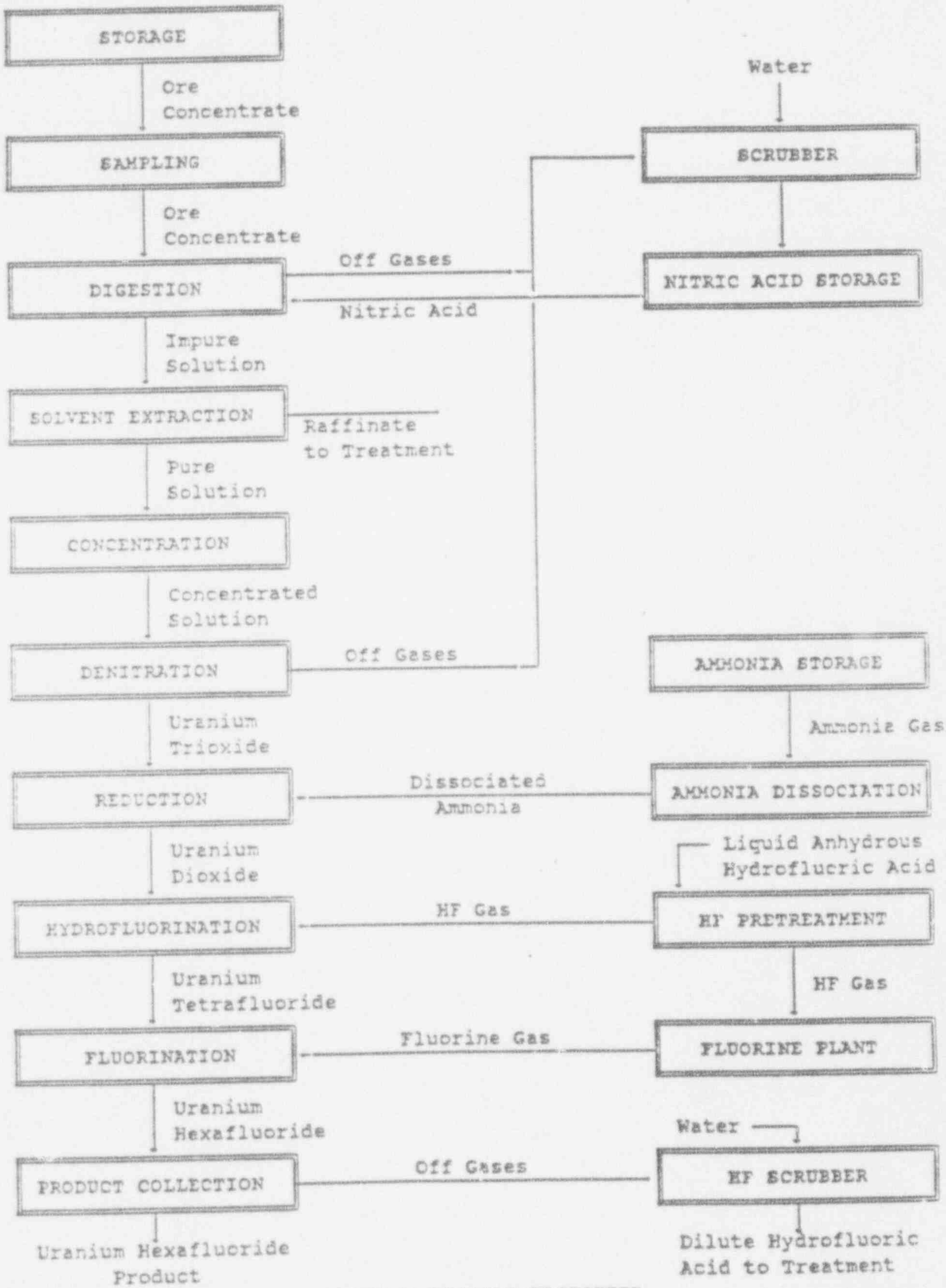
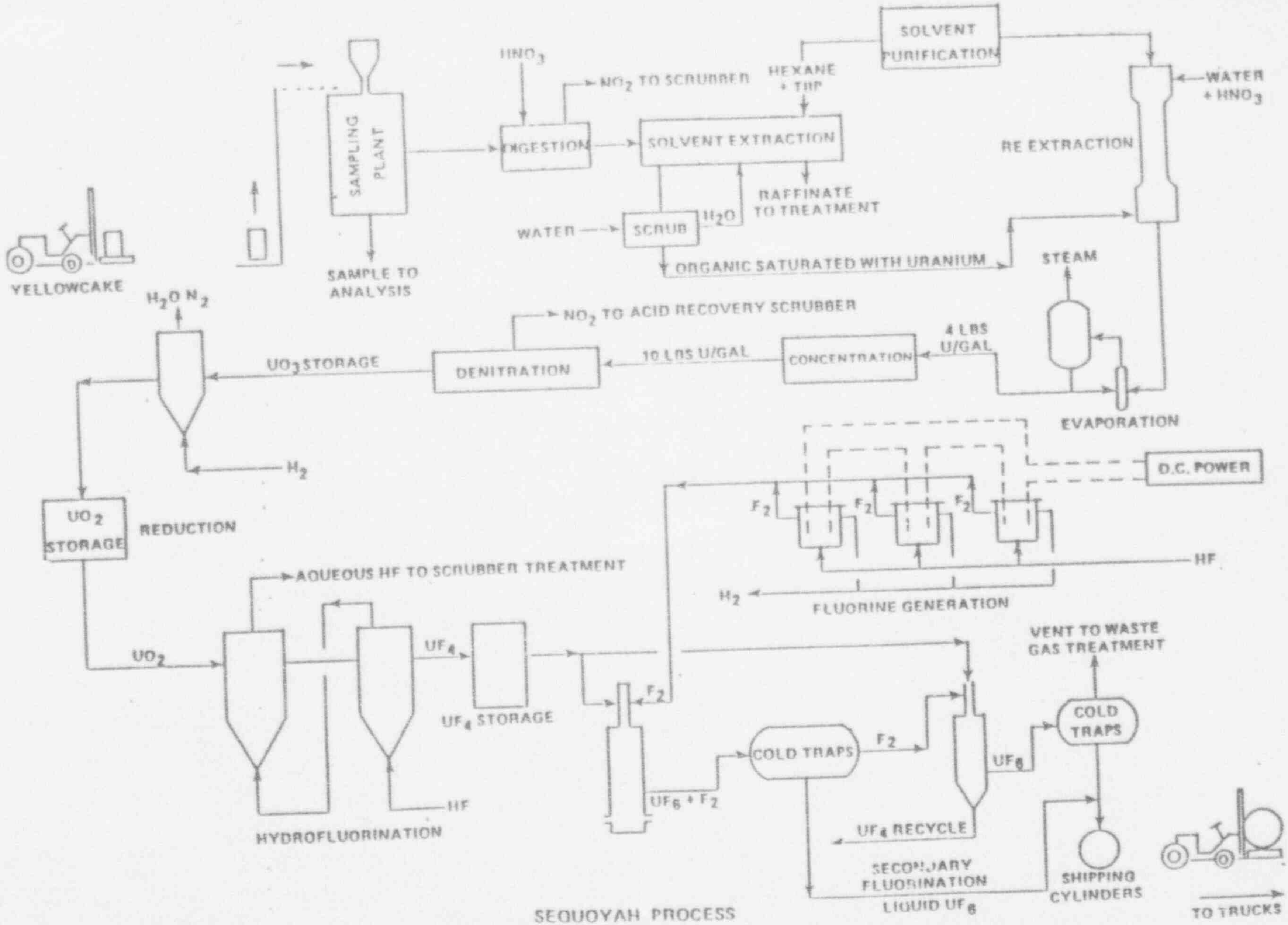

SEQUOYAH FACILITY
GORE, OKLA.
SCALE IN FEET
0
100
200
300
500
1000
FENCE
GUARD HOUSE
VISITOR PARKING
WAREHOUSE STOR. BLDG.
YARD
OGBE SUBSTA.
SUMP
UF4 BLDG
WATER TK.
STOR BLDG
TK. FARM
MAIN PROCESS BLDG.
TRUCK SCALE
FRESH WATER BASIN
DOCK
CYLINDER STORAGE
INCINERATOR
COOLING TOWER
EMERG. BASIN
EVAP.
SOLV. EXTRC. BLDG.
SLURRY BLDG
WASTE BURIAL
HOLDING BASIN NO 1
LAGOON
YELLOWCAKE STORAGE
PARKING LOT
OUTFALL
SUMP
RAFF. TRTMT.
WELL
CLARIFIER BASIN
SETTLING BASIN
CLARIFYING BASIN
SLUDGE BASIN
RAFFINATE POND
REC. 1985

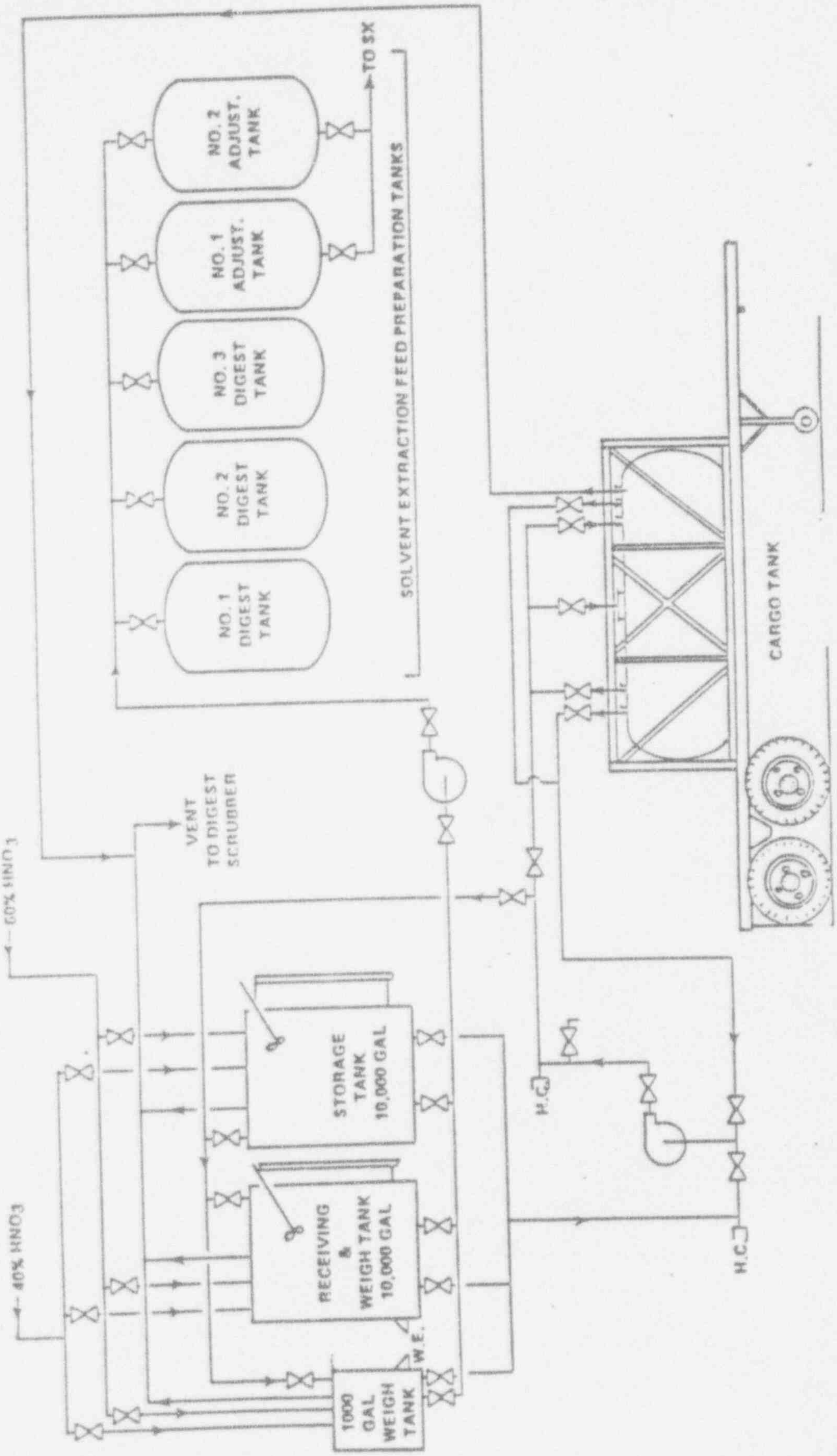
FIGURE 1 - 4



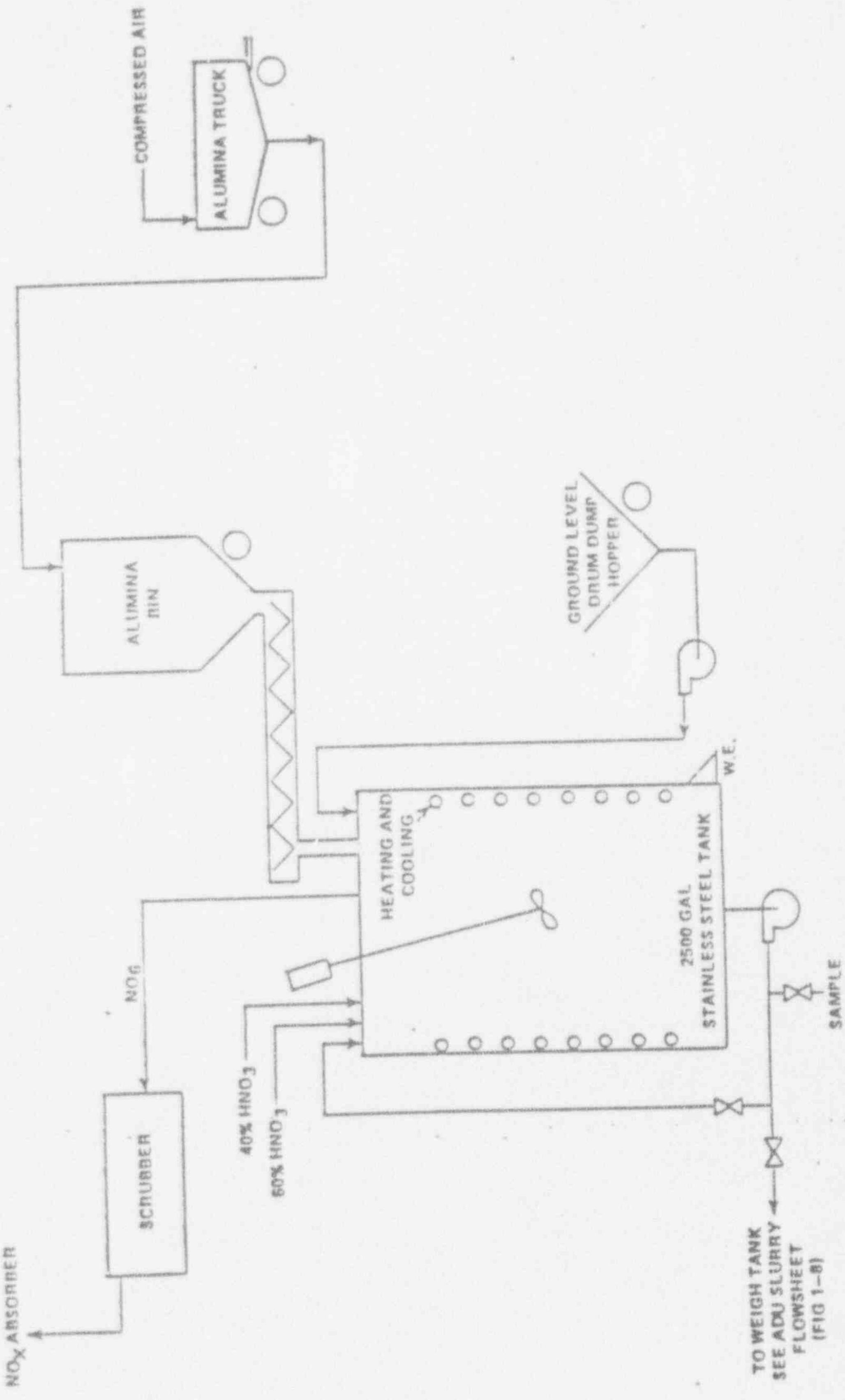
SEQUOYAH PROCESS FLOWSHEET
FIGURE 1 - 6



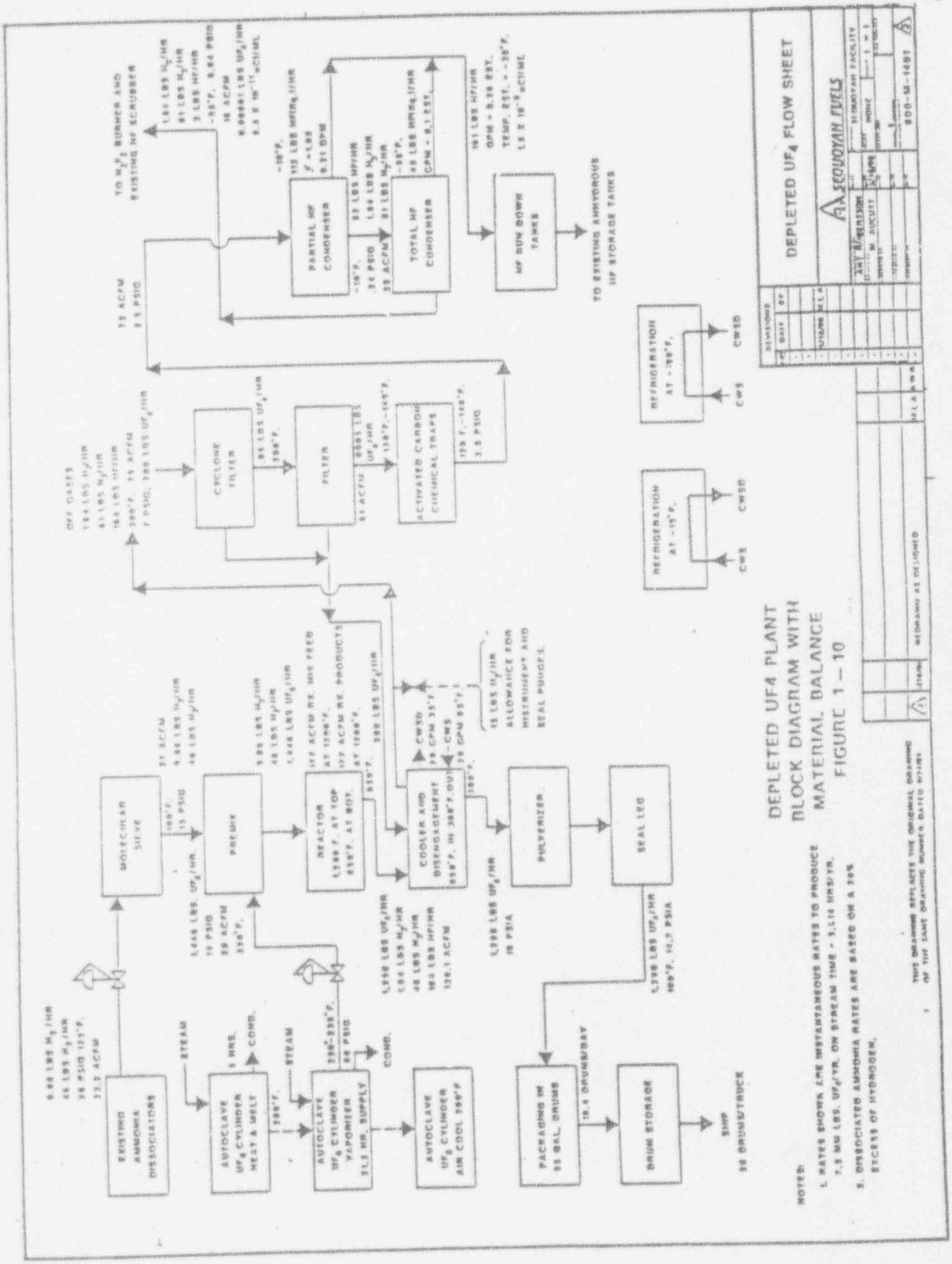
SEQUOYAH PROCESS
SCHEMATIC FLOWSHEET
FIGURE 1 – 7



ADU SLURRY RECEIVING AND STORAGE
FLOW SHEET
FIGURE 1-8

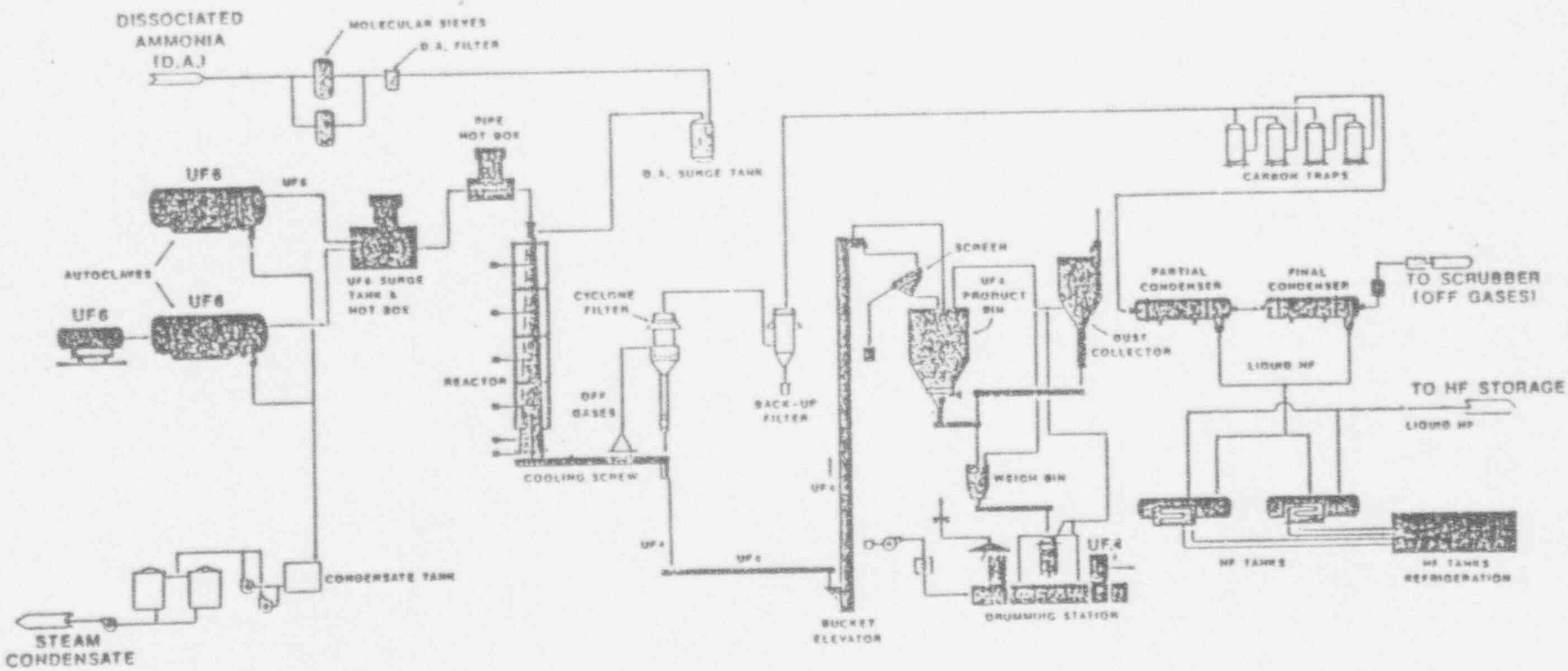


UF_4 SLURRY PROCESSING
FLOW SHEET
FIGURE 1–9



DEPLETED UF4 PLANT
BLOCK DIAGRAM WITH
MATERIAL BALANCE
FIGURE 1 – 10

DEPLETED UF4 PLANT



SCHEMATIC FLOWSHEET
FIGURE 1 – 11

2.0 ENGINEERED PROVISIONS FOR ABNORMAL OPERATIONS

The Sequoyah Facility handles only natural and depleted uranium. Therefore there are no radiological hazards associated with the operation that could result in acute offsite radiation doses exceeding 1 rem to the whole body, 5 rems to the thyroid, or 3 rems to other critical body organs (NUREG-1140). There is no possibility of nuclear criticality. As a result, the facility has been designed with operational safeguards common to chemical plants. The systems are highly instrumented and abnormal operations are alarmed in the plant Control Room. See section 16.3 of the License SUB-1010 pages 16-53 through 16-66 for a detailed description.

2.1 Criteria for Accommodation of Abnormal Operations

2.1.1 Process Systems

a. UF_6 Plant

The standard chemical plant safeguards are provided throughout the process systems, e.g., level indicators and alarms on tanks, critical process system temperatures and pressures, and flow rates. The major chemical process hazard in the facility, fluorine production and subsequent production of UF_6, is controlled by a safety shut-down circuit (Q circuit). The Q circuit utilized in the fluorine production facility is an electrically interlocked system of sensing devices that automatically terminates the production of fluorine, and thus UF_6, when any abnormal condition occurs in the fluorine production plant, the UF_6 production system, or the off-gas treatment system. Failure of the hydrogen burner from the cell room is an example of a condition that will trip the Q circuit. Q circuit instrumentation, alarms, and interlocks are periodically checked in accordance with License SUB-1010, Section 6, paragraph 10. The periodic checks incorporate simulation of malfunctions at various points in the system whereby functional reliability can be determined and established.

Several changes have been made at the UF_6 drain station since the January 4, 1986 accident involving the rupture of an overfilled cylinder, to insure that UF_6 shipping cylinders are not overfilled. These changes include: an interlock to assure that the cylinder is in proper position on the scale with automatic valves in the UF_6 header that will not open if interlocks are not satisfied; two independent weighings while the cylinder is in the fill position; an increase in scale capacity to 150% of the gross weight of a 14 ton cylinder; and both local and Control Room readout of the fill scales to verify that the cylinder is filled properly. Automatic UF_6 filling valves are designed to fail safe (open or closed depending on function upon loss of power. The UF_6 drain station is enclosed in a confinement structure equipped with external instrumentation. In the event of a leak the structure can be sealed and released UF_6 can be vented to the main plant dust collector system. Scale reliability is maintained by calibration checks of each scale with two different test weights - tare and full cylinder. The UF_6 cylinder loading scales are checked for accuracy using two test weight cylinders after any scale maintenance or cleaning or whenever a weight discrepancy is suspected. Upon resumption of operation, a weight calibration is done daily for the first week, weekly for the next month and then monthly thereafter.

The cylinder heating station consists of a steam chest utilizing an atmospheric pressure heating system (maximum temperature approximately 212°F). The station is equipped with a cylinder over-pressure sensing valve which will automatically shut off the steam to the chest upon pressure exceeding the safety set point (100-150 psig). An alarm is activated locally and in the Control Room. No filled UF_6 cylinder will be heated in the steam chest unless the overpressure sensor/steam shutoff interlock system is operable.

b. Depleted UF_4 Plant

The depleted UF_4 Plant is constrained by the distributed control system (DCS) to operate within narrow bounds that ensure safe and effective operation. From the standpoint of safety, the DCS interlocks and the overall process design are devised to:

(1) contain and mitigate a DUF_6 leak inside an autoclave
(2) ensure complete reaction of DUF_6 in the chemical reactor;
(3) detect hydrogen leaks and shut down the plant if a level of 2% hydrogen or greater is detected in the process area;
(4) prevent leakage of DUF_4 powder to the process area;
(5) prevent offgas, which contains hydrogen, from entering the solids handling system;
(6) prevent offgas, which contains hydrogen, from entering the AHF rundown tanks.

The distributed control system operates on its own uninterruptible power supply, so that it maintains control even if the plant experiences a power outage. In the event of power failure, the DCS automatically shuts off the flow of DUF_6 and DA to the reactor and closes the four containment valves on the autoclave. The burner and scrubber will continue to operate on the main plant's emergency power system. The nitrogen supply system requires no power and will continue to operate in the event of a general power failure. All electric motors will turn off and all electrically actuated valves and other control devices position themselves to the failed safe position.

In general, operator errors will not pose safety hazards because the DCS only operates within predetermined limits that ensure safe operation. If operator error causes the system to cross those limits, the DCS automatically shuts down the system. There is a provision for a manually initiated rapid emergency shutdown in case DCS design does not prove adequate in certain circumstances. Two Emergency Stop buttons are located in the plant, and one is accessible from the control room keyboard.

In the event of a major failure of the DCS, the plant can be shut down manually by closing manual block valves on the feed lines. The plant can then be held in a standby condition until the DCS can be fixed.

2.1.2 Chemical Systems

The nonradioactive chemical operations at the Sequoyah Facility include the chemical storage (tank farm) and supply systems and the fluorine production operations. Additional details are included on pages 10-15 through 10-17, Chemical Systems, of the License SUB-1010.

2.1.3 Alarm System and Release Prevention

Alarm systems are provided in the Control Room that indicate abnormal operating conditions. Activation of any of the automatic alarm/safety systems in the operating areas is also indicated on the control panels in the Control Room. The Control Room Operator immediately investigates this alarm warning signal following specific procedures that shut-down the areas involved. In this manner a sequential safe shut-down of each system is assured through administrative control in the Control Room.

The Plant operating personnel provide almost continuous surveillance of all operating areas through routine inspections and observations. UF_6 and other uranium compounds are readily detectable visually, which provides an immediate identification method for operator actions to initiate an alarm in the Control Room for any abnormal condition.

The Onsite Emergency Notification System provides a means of alerting and passing information to employees under abnormal conditions. It is composed of the onsite air horn signal and the public address systems. The air horn signal alerts personnel to listen for information over the public address system. Should the system be inoperable, radio communications with operators and supervisors in the production areas provide the necessary communications capability to activate a plant-wide alarm to alert workers and initiate corrective procedures for release prevention or mitigation. "CAUTION" and "DANGER" tags are placed on safety related alarm systems at both the instrument and the Control Room to denote inoperability.

2.1.4 Emergency Electrical Power System

The Sequoyah Facility is equipped with a diesel powered electrical generator to provide power to certain critical equipment in the event of a total loss of offsite electrical power. All emergency loads are connected to a motor control center which is fed through an automatic transfer switch. This switch senses the loss of 480V power and automatically starts the emergency generator. After a time delay of approximately 30 seconds, to allow the generator to reach operating speed, the switch transfers the emergency loads to the generator. Upon restoration of normal power, the load is transferred back to normal power. The emergency generator is operationally tested weekly. The generator is a diesel oil fueled unit rated at 300 KW at a 0.8 power factor, continuous duty. A bank of 24 VDC batteries with 120 VAC electrical charging is maintained to assure that the engine will start when signaled. The diesel oil supply tank has 2000 gallon capacity and also supplies fuel to a diesel engine driven fire pump.

The emergency generator delivers 480 VAC power. A transformer in the system furnishes 120 VAC power for emergency use also.

2.1.5 Fire Protection System

Fire protection for the plant is designed in accordance with the National Fire Protection Association codes and approved by the Factory Insurance Association. The facility fire protection system consists of wall mounted fire extinguishers, cable tray sprinklers, and foam systems for the Solvent Extraction Building, the diesel fire pump, and the emergency diesel-generator engine. A detailed description of the fire protection system is provided on pages 10-7 and 10-8 of the License SUB-1010. The S-X fire protection system is described on pages 10-18 through 10-21 of the License. The fire protection system for the depleted UF_4 plant is described on Page 10-3 of License SUB-1010, Amendment Application for the DUF_6 to DUF_4 facility (November 5, 1986).

The fire protection water supply is provided by a pump complex consisting of one 2000 gpm, 100 psig electric-driven pump, one diesel engine-driven pump of the same pressure and capacity, and a 50 gpm, 120 psig electric-driven jockey pump.

The pumps take suction through redundant dual lines from the water storage tank. The plant water supply is also connected to the pump suction for emergency use. Smoke detecting devices are provided in each electrical room to detect the presence of combustion products and sound an alarm in the Control Room. CO_2 extinguishers are located outside each electrical room.

All cable trays throughout the plant are equipped with temperature sensors which sound an alarm in the Control Room to indicate over heating. Wherever three or more cable trays are stacked vertically, fixed type water sprays are provided, with individual sprays thermally activated. Flow switches sense water flow and secure all electrical power (except emergency power) in the areas being sprayed, in addition to sounding an alarm in the Control Room. The engine-driven fire pump and the diesel engine of the emergency generator are also provided with individual thermally activated fire water spray heads, also having flow switches and alarming in the Control Room. Protection for the Solvent Extraction Building is provided by a foam-water system designed to deliver 16 gpm per one-hundred square feet of building area for a 10 minute period.

2.1.6 Support Systems

The civil-structural design criteria for the facility include the following codes, standards, and references:

- National Building Code (NBC) and State of Oklahoma Building Code.
- American Institute of Steel Construction (AISC) "Manual of Steel Construction", sixth edition.
- "American Concrete Institute (ACI-318-63) "Building Code Requirements for Reinforced Concrete".
- American Welding Society Specifications for Welding in Building Construction (AWS, 01.0-66)
- American Society for Testing Materials (ASTM).
- ASCE Paper 3269 "Wind Forces on Structures"
- Oklahoma Highway Department Standard Specifications for Roads and Bridges.
- American Petroleum Institute (API) Standard 650
- American Water Workers Association (AWWA) Standard Specification for Elevated Steel Water Tanks, Standpipes and Reservoirs, D-100-65.
- American Society of Mechanical Engineers (ASME) Unfired Pressure Vessels.
- National Fire Protection Association, Vols. 1 through 9.

a. Structural Performance vs. Site Environmental Factors:

- Severe Natural Phenomena
The structural design criteria for the plant provides that the design wind forces will be as specified by NBC 1967 Appendix K for moderately severe windstorms. The design forces for seismic loading are as specified by NBC Zone L (low earthquake susceptibility). Structures were designed as directed in appendix J of NBC allowable working stresses and were increased 33% for the above loading conditions. The factor of safety against overturning was not less than 1.5 for those loading conditions.

- Accidents at Neighboring Activities
There are no industrial activities in the near vicinity of the plant that could impact the facility.

b. Confinement Barriers and Systems:

All process equipment designed to handle source materials provides for either totally enclosed or negative pressure systems to prevent release of the materials to the atmosphere. UF_6 processing equipment is provided with cold traps, filters, and scrubbers in series to minimize environmental releases. At the DUF_4 Plant, DUF_6 cylinders are heated in autoclaves to contain leakage. Additional details on ventilation requirements are found on page 3-8, 3-9 and 3-10 of the License SUB-1010.

The depleted UF_4 plant is ventilated by five two-speed exhaust fans mounted along the crest of the roof of the process building and ten sets of manually adjusted louvers in the east and west walls of the building. The ventilation system was designed to produce eight air changes per hour. The depleted UF_4 plant has its own dust control system to prevent release of dust from the solids handling system and a vacuum cleaning system for cleanup of powder spills. The ventilation system is described on Pages 10-1 and 10-2 of License
* SUB-1010, Amendment Application for the DUF_6 to DUF_4 facility (November 5, 1986).

The UF_6 plant is provided with ventilation systems which exhaust air from the main building at a rate of approximately 450,000 cfm. A plant dust control system and a plant vacuum system are provided at strategic points throughout the facility to provide pick-up of dust from spills or dust from packing leaks.

The vacuum system is capable of collecting larger amounts of solid materials that might be spilled during abnormal operating conditions. The main plant dust collection system has a set point for low flow with an alarm light in the Control Room to trigger corrective action to restore normal flow rates. A description of heating, ventilation and air conditioning is found in Section 10.3 of the License SUB-1010.

Activation of the air horn signal system (Section 6.3.1) automatically shuts down the ventilation supply fans for the administration, laboratory, and change room areas, and the Control Room.

c. Access and Egress of Operating Personnel and Emergency Response Teams:

The 75 acre plant site is surrounded by a 6 foot high cyclone fence with three strands of barbed wire at the top. Security guards are on 24 hour duty at the facility. All plant personnel enter and exit through the security portal at the South gate. The North gate is used for controlled access and egress of construction personnel during periods of construction activity. Inside the fenced Protected Area is a smaller fenced area known as the Restricted Area. The purpose of this area is to protect personnel from unnecessary exposure to radiation, radioactive materials, and other hazardous materials and conditions. Access to the Restricted Area is through the main processing building or a controlled access gate. Aisles, traffic ways and stairways inside buildings and roadways and bridges within the facility boundary shall be maintained during normal operations with enough clearance to allow evacuees and/or emergency personnel to respond unhindered in the event of an emergency.

Evacuation of the facility operating area will be accomplished through the main building exit or Restricted Area "crash gates" and South Protected Area gate or the North Protected Area gate.

The decision as to which evacuation route to use will be made by the Onsite Emergency Director.

Plant emergency response personnel have access to all plant buildings. Entrance of plant operating personnel is normally limited to the South gate. Site access is controlled during actual emergencies.

d. Fire and Explosion Resistance and Suppression:

Non-combustible construction is utilized throughout the plant buildings. All plant facilities are steel framed structures except the shop and utility building and the building addition on the north side of the process building where 12 inch masonry walls are utilized as a bearing walls. A central area is available through the receptionist's office, where the PBX and fire alarm system are located.

The following fire protection requirements governed building design:

- Four hour fire walls: Between the east side of the process building and the west side of the fluorine building and south side of the shop and utility building.
- Two hour fire walls: Provided for all the electrical rooms, cable spreading area and the stair enclosure to the Control Room.
- non-combustible construction was also used throughout the depleted UF_4 facility. The building is a steel frame structure with metal decked floors and roof. Interior enclosures for the motor control center toilet and UPS battery installation are constructed of masonry.

e. Shielding:

The use of radiation shielding is not necessary in a plant processing natural uranium compounds due to their very low specific activity and the low penetration power of emitted radiation.

2.1.7 Control Operations

Controlling and maintaining the plant in a state of readiness to respond to abnormal conditions is dependent on the capabilities of plant engineered systems and the following programs:

a. Preventive maintenance program.
b. Routine check and test of operating equipment.
c. Routine audit of control system.
d. Ambient monitoring of process chemical concentrations.

2.2 Demonstration of Engineered Provisions for Abnormal Operations

2.2.1 Process Systems

a. UF_6 Plant:

The safety shut-down circuit (Q circuit) built into the fluorine production and UF_6 generation systems has performed satisfactorily since the start up of operations in 1970. The process instrumentation, alarms, and interlocks are periodically checked and repaired as required. The periodic checks incorporate simulation of malfunctions at various points in the system whereby functional reliability can be determined and established.

b. Depleted UF_4 Plant:

The Distributed Control System (DCS) permits operation of the plant only when operating parameters are within predetermined limits. If operator error causes any of these limits to be exceeded, the DCS automatically responds by shutting down the operation.

An emergency shutdown may be initiated manually through any of three emergency STOP buttons. Two are located in the plant, and one is located in the control room on the Operator Interface Unit.

The Distributed Control System operates on its own uninterruptible power supply, so that it maintains control even if the plant experiences a power outage. In the event of power failure, the DCS automatically shuts off the flow of DUF_6 and DA to the reactor and closes the four containment valves on the autoclave. The burner and scrubber will continue to operate on the main plant's emergency power system. The nitrogen supply system requires no power and will continue to operate. All electric motors will turn off and electrically actuated valves and other control devices position themselves to the failed safe position.

If the DCS should fail, the plant can be shut down manually by closing block valves on the reactor feed lines.

2.2.2 Alarm Systems and Release Prevention Capability

The Onsite Emergency Notification System and the Offsite Emergency Warning System are tested on a monthly basis. Visual detection allows immediate response to isolate the source of a release and thus minimize loss of material and potential contamination.

3.0 EVENT CLASSIFICATION

3.1 Classification System

The Sequoyah Facility Contingency Plan is based on four levels of emergency classification. These classifications determine the type and level of assessment, corrective, and protective actions to be taken by the Sequoyah Facility Onsite Contingency Response Organization and Offsite Response Organization. They also specify the procedures for notifying and initiating response and protective actions from offsite support organizations. An emergency classification represents a qualitative estimate of the status of the facility. Inputs to the emergency classification system include the status of systems, the observations of operating personnel, and the levels of radiological or hazardous materials in areas of the facility or in facility effluents.

* |

Once the emergency is classified, appropriate information will be communicated to offsite authorities including what levels of preplanned actions are to be taken by their emergency organizations. Actions initiated by these authorities are based upon projected hazards to the offsite populace.

In the following section, the classifications used by the Sequoyah Facility are addressed. Additionally, the parameters used to declare a particular emergency classification are described, and the actions that would be taken by the Sequoyah Facility's response organizations are summarized.

3.2 Classification Scheme

The most severe type of accident addressed by this Plan, a major release of UF_6, represents a chemical rather than a radiological hazard. Exposure of onsite personnel sufficient to result in death, due to uranium chemical toxicity or HF burns to lung tissue, would result in acute radiation doses of less than 1 rem effective dose equivalent. Offsite fatalities are considered implausible (NUREG-1140). As compared to EPA Protective Action Guides, doses resulting from a major release at the Sequoyah Facility are expected to be substantially below guideline levels for each population addressed. These Guides expressed as projected whole body gamma dose in Rems are as follows: 1 to 5 Rems for general population, 25 Rems for emergency workers, and 75 Rems for lifesaving activities. Therefore, radiation doses and EPA Protective Action Guides are not key elements in the Sequoyah Facility's classification scheme. For purposes of this Plan Table 3-1 contains recommended exposure levels for chemicals constituting major potential hazards at the Sequoyah Facility.

The four levels of emergency classification established for the facility, in order of ascending severity, are:

Unusual Event
Alert
Site Area Emergency
General Emergency

These classifications are described in detail in the following sections.

3.2.1 Unusual Event

Description

Unusual events are in process or have occurred which indicate a potential degradation of the level of safety of the facility. No releases of radioactive or hazardous materials requiring offsite response or monitoring are expected.

Purpose

The purpose of the declaration of an Unusual Event is to (1) assure that the first step in any response later found to be necessary has been carried out, (2) bring the on-shift operating staff to a state of readiness, and (3) provide systematic handling of unusual events information and decision making.

Actions

1. Augment on-shift resources as needed.
2. Assess situation and respond.
3. Escalate to a more severe class, if appropriate, or
4. Close out followed by a written summary to file within 30 days.

Examples of Unusual Events

* 1. Minor release of airborne radioactive materials that cannot be secured by the immediate actions of operations personnel.
2. Spill of dry uranium compound with significant levels of airborne radioactive material not confined to the immediate area of the spill.
3. Loss of critical engineering safety or fire protection features.
4. Fire resulting in minor property damage. Fire is quickly extinguished.

* |

5. Loss of critical indicators, annunciators, or alarms.
6. Loss of site electrical power for greater than 15 minutes.
7. Transportation of a contaminated injured individual to an offsite medical facility.
8. Security threat: suspected minor breach of security (e.g. persons on company property outside of the Protected Area attempting unauthorized entry of the Protected Area).
9. Natural phenomenon experienced:
   - Tornado sighting in the immediate vicinity of the site.
   - Earthquake of sufficient strength to be physically apparent, but not sufficiently strong to cause structural damage to the facility.
10. Other hazards experienced or projected:
    - Aircraft crash onsite.
    - Onsite explosion. No significant damage.

3.2.2 Alert

Description

Events are in process or have occurred which involve an actual or potential substantial degradation of the level of safety of the facility. Any releases of radioactive or hazardous materials may be significant onsite, but are expected to be well below concentrations potentially significant to the health and safety of the offsite public.

Purpose

Purpose of Alert declaration is to:

1. Assure that emergency personnel are readily available if situation becomes more serious.
2. Provide current status information to offsite agencies.

Actions

1. Notify state, federal and local agencies of alert status and reasons for alert.
2. Promptly notify in-plant supervision and the offsite response organization.
3. Activate the Onsite Contingency Response Organization and onsite response centers.

* Revised

4. Assess situation and respond.
5. Dispatch onsite monitoring teams.
6. Provide periodic plant status updates to offsite authorities.
7. Provide periodic meteorological assessments to offsite agencies including hazard assessment for actual releases.
8. Escalate to more severe class, if appropriate, or
9. Close out by verbal summary to offsite agencies and written summary within 48 hours.

Examples of Alert Events:

* 1. Significant release of airborne radioactive materials with airborne concentrations expected to exceed 1 MPC at the site boundary for an extended period.
2. Fire resulting in significant property damage. Fire is extinguished within 15 minutes with no loss of critical engineered safety features.
3. Significant potential for breach of retention basin embankment, e.g., due to natural phenomena.
4. Anticipated non-peaceful demonstrator activity or planned activity of a militant group.
5. Security compromise: confirmed ongoing breach of security (e.g., trespassers presently inside the protected area).
6. Natural phenomenon + experienced:
   - Tornado touchdown onsite.
   - Earthquake of sufficient strength to cause structural damage to facility buildings.
7. Other hazards + experienced or projected:
   - Onsite explosion resulting in structural or equipment damage affecting facility operations.

\+ These events are discussed in more detail in the CPIP.

3.2.3 Site Area Emergency

Description

Events are in process or have occurred which involve actual or likely major failures of plant functions needed for protection of the public. Offsite releases are not expected to represent a threat to public health and safety.

Purpose

The purpose of a Site Area Emergency declaration is to:

1. Assure that response centers are manned.
2. Assure that monitoring teams are dispatched.
3. Assure that personnel required for protective actions are in place.
4. Provide consultation with offsite authorities.
5. Provide update for the public through offsite authorities.
6. Provide meteorological and release hazard assessment to offsite agencies.
7. Escalate to General Emergency class if appropriate, or
8. Close out by briefing of offsite authorities followed by written summary within 24 hours.

Actions

1. Inform state, federal and local offsite agencies of Site Area Emergency status.
2. Notify onsite management and the corporate response organization.
3. Activate the Onsite Contingency Response Organization, the Offsite Response Organization, and all response centers.
4. Assess situation and respond.
5. Provide plant status updates to offsite agencies.
6. Make senior technical and management staff available for onsite consultation.

Examples of Site Area Emergency Events:

1. Large UF_6 release (cylinder plug or valve leaking within or outside the plant building). Example: airborne concentrations expected to exceed 1 MPC at an offsite plume environmental monitoring station. (Visible offsite substantially beyond the site boundary).
2. Major loss of U_3O_8 dry powder (tornado resulting in major release of drummed feed material to the unrestricted area).
3. * Large release of anhydrous hydrofluoric acid or anhydrous ammonia.
4. Any major fire affecting the operability or safe shutdown of the plant.
5. Retention basin failure with uncontrolled liquid release offsite.
6. Security breach: imminent loss of physical control of the facility.

3.2.4 General Emergency

Description

Events are in process or have occurred which involve an actual or imminent major release of hazardous materials. Release can be reasonably expected to represent a threat to the public health and safety for areas beyond the site boundary. (Protected Area)

Purpose

The purpose of a General Emergency declaration is to:

1. Initiate predetermined protective actions for employees and the public.
2. Provide continuous assessment from all measurements.
3. Provide consultation to offsite agencies.
4. Provide updates for the public through off-site agencies.

Actions

1. Notify state, federal, and local offsite authority of status.
2. Activate offsite alarm system.
3. Notify onsite management and the corporate response organization.
4. Activate the Onsite Contingency Response Organization, the Offsite Response Organization and all response centers.
5. Assess situation and respond.
6. Dispatch onsite and offsite monitoring teams.
7. Provide plant status update to offsite agencies.
8. Make senior technical and management staff available on-site for consultation.
9. Provide meteorological and hazard estimates to off-site agencies for actual releases.
10. Provide release and hazard assessment based upon available plant condition and foreseeable contingencies.
11. Close out by briefing off-site authorities followed by written summary within 24 hours.

Examples of General Emergency Events

1. Major UF_6 release. Rupture of one cold trap or one hot cylinder with a substantial portion of the contents being released.
2. * Major release of anhydrous hydrofluoric acid or anhydrous ammonia.
3. Control Room and/or site evacuation.

3. A major fire causing extensive facility damage.
4. Security breach: loss of physical control of the facility or sustained damage to vital areas/systems at the facility due to sabotage.

3.3 Range of Postulated Accidents

A range of events varying from highly improbable accidents which have a potential for causing significant off-site impacts to more frequent incidents of small consequence are discussed. These include the following:

1. Rupture of a hot UF_6 product cylinder.
2. Fire in the solvent extraction circuit.
3. Ammonia (NH_3) valve leak or line breakage.
4. Acid spill.
5. UF_6 pigtail leak.
6. Spill of dry uranium compounds.

Natural uranium, although radioactive, is of low specific activity, and radiation emitted has low penetrating power. Therefore, the primary health and safety consideration with regard to natural uranium is its chemical toxicity as a heavy metal. Thus, the immediate environmental considerations of accidents that could occur are related almost exclusively to the toxic effects of chemicals, including uranium, which might be released to the environs in the event of an accident.

This analysis of probable events and their appropriate emergency classification has been developed to conform with the NRC guidance on plan requirements in NUREG 0762, Standard Format & Content for Radiological Contingency Plans for Fuel Cycle and Materials Facilities. It also reflects the technical assessments contained in the following documents:

- NUREG 1140, A Regulatory Analysis on Emergency Preparedness for Fuel Cycle and other Radiological Material Licenses, S.A. McGuire, USNRC Draft Report for Comment, June 1985.

- NUREG 1189, Volumes 1 and 2, Assessment of the Public Health Impact from the Accidental Release of UF_6 at the Sequoyah Fuels Corporation Facility at Gore, Oklahoma, Ad Hoc Interagency Public Health Assessment Task Force, March 1986.

- NUREG 1157, Environmental Assessment for Renewal of Special Nuclear Material License No. SUB-1010, Docket No. 40-8027, Sequoyah Fuels Corporation.

This analysis also reflects the significant improvements at the Sequoyah Facility instituted in the Spring of 1986 following the January 4, 1986 accidental release of UF_6. These improvements include:

- Major equipment modifications designed to prevent the possibility of overfilling cylinders which could lead to cylinder rupture.
- Review and revision of all operating procedures.
- Retraining and recertification of all personnel.
- Addition of qualified technical and managerial staff.
- Major upgrade of management oversight measures.
- Confinement of major activities with potential for UF_6 release.
- Revision of onsite contingency procedures, retraining of response personnel and acquisition of additional emergency response, communication and protective equipment.
- Upgrade of offsite emergency response program.

Taken together, these measures constitute a three-level program for risk management. Risk Prevention includes the extensive improvements in equipment, training, and management oversight designed to reduce the likelihood of occurrences of an accident. Risk Confinement involves confinement of activities involving the greatest potential risks within enclosed areas to minimize potential onsite and offsite impacts of a release.

Risk Control involves both onsite and offsite measures. Onsite response procedures, training and equipment are designed to protect employees and to allow any release to be promptly controlled. Offsite warning systems, response procedures, and public education and training are designed to protect the public in the event of a major release with potential offsite consequences.

These Risk Management measures have been evaluated by Pickard, Lowe and Garrick and a team of senior Sequoyah Fuels engineers to develop a Probabilistic Risk Assessment. (Analysis and Improvements in Handling Procedures for Product Cylinders Containing Liquid UF6, License No. SUB-1010, Docket No. 40-8027, License Condition 11A & 11B, Sequoyah Fuels Corporation, April 20, 1986.) This assessment indicates that the risks of accidents have been significantly reduced by these improvements. Specifically, it is estimated that the following accident frequencies may occur:

- 1.8 small leaks per year of a localized nature which are usually contained onsite by environmental equipment.
- One per 70 years for a large leak which is generally confined to the plant site.
- One per 1000 years for a cylinder rupture with onsite impact and potential offsite impact.

For perspective it was noted that a major chemical release north of the plant due to a railroad accident would have a calculated probability of occurrence which is comparable to the calculated probability for a cylinder rupture.

1. Rupture of Hot UF6 Product Cylinder

The worst-case accident at the Sequoyah uranium conversion facility is the rupture of a hot 14-ton UF_6 product cylinder in an outdoor area. The liquid UF_6 released would react promptly with moisture to form a dense cloud of uranyl fluoride (UO_2F_2) and hydrogen fluoride (HF). This potential accident has been analyzed in detail by NRC in NUREG-1140. It is concluded that fatalities would be possible for individuals in the immediate vicinity of the release if they were unable to escape from the plume. Injuries would be possible for several hundred meters downwind without attempted escape, and decreasing levels of irritation would be possible at greater distance. "The release of UF_6 presents a chemical rather than a radiological hazard." (NUREG-1140) the hazards are due to the reaction products of UF_6 which include HF burns to lung tissue and uranium chemical toxicity. Lethal exposures to HF or UO_2F_2 would be necessary before radiation doses would become significant. Therefore, no consideration of radiation dose is necessary.

The NUREG-1140 analysis is conservative and includes consideration of Department of Transportation (DOT) and Environmental Protection Agency (EPA) recommendations for spills of hazardous materials. It considers both typical meteorological conditions which are likely to exist at the time of a potential accident, and unlikely worst-case meteorological conditions. It also considers potential exposures at various distances from the release based upon an individual being exposed at the plume centerline for the entire duration of the incident with no attempt to escape. This analysis has been adopted to define the necessary scope of the onsite and offsite emergency response plans for the Sequoyah Facility. The NUREG-1140 analysis is, therefore, incorporated herein by reference as an independent analysis of the potential worst-case accident scenario and its possible consequences. Using this worst-case accident as the basis for the scope of the offsite plan insures appropriate preparedness for any accident of less significance.

NUREG-1140 concludes that evacuation to a distance of one mile from the release would be recommended _if possible_ relative to both HF and UO_2F_2. This would "avoid acute fatalities and serious injuries for worst-case conditions and transient kidney injury under more typical conditions." NUREG-1140 recognizes, however, that a cylinder rupture would occur abruptly without warning, and the release would be of short duration. These circumstances severely limit the time available for evacuation of the nearest rural neighbors. Therefore, to insure maximum protection, the recommended public protection action in the event of a major release is for residents within a one-mile radius of the plant to take shelter in their residences and close outside ventilation. Residents at greater distances (two to three miles) would not require similar protection. However, under worst-case wind conditions these residents can avoid the potential for irritation by taking shelter.

To support this recommended action, immediate notification of residents within a one-mile radius of the active plant area is necessary. Notification of residents within a two-mile radius is advisable and within a three-mile radius is desirable for low wind conditions.

The warning and notification systems include sirens which cover up to three miles from the plant; automatic telephone contact for residents within two miles; and telephone and police radios for communications with response agencies. Commercial radio emergency information is also included.

This one-mile primary area and up to a three-mile advisory area is consistent with the approach presently being implemented at Department of Energy (DOE) facilities which handle UF_6 cylinders.

In addition to the NUREG-1140 analysis, the observations and analysis of the January 4, 1986 accident (NUREG-1189) and the NRC Environmental Assessment of the facility (NUREG-1157) have been considered. These documents are generally consistent with the conclusions of NUREG-1140.

Specifically, NUREG-1189 suggests that offsite public health impacts were minimal and involved only temporary irritation. No significant or lasting ecological harm was identified. The evidence to date indicates that significant impacts of the January 4, 1986 accident were limited to the immediate plant vicinity. Offsite impacts were noticeable at temporary irritant levels out to slightly over one mile.

In summary, the rupture of a hot 14-ton product cylinder in an outdoor area is the worst-case accident. The analysis described in NUREG-1140, NUREG-1189, and NUREG-1157 indicates that public protection would be needed in a one-mile radius of the plant, but temporary irritation could occur out to two to three miles for unlikely low wind speed conditions. Therefore, the emergency response plan has adopted a one-mile primary protection area with a three-mile advisory area for warning and notification for the public to take shelter in the event of a major emergency at the plant.

The occurrence of a UF_6 cylinder rupture is a General Emergency Classification and would be detected visually by shift operators. All Contingency Response Organizations and warning systems would be fully activated for such an occurrence.

2. Fire in the Solvent Extraction Circuit

A fire in the solvent rework section of the Solvent Extraction building might involve the combustion of several thousand gallons of hexane. A fire in the solvent extraction area of the building could involve the pumper-decanters containing uranium loaded solvent. The solvent could be dumped onto the curbed concrete pad and continue to burn. The fire would be detected by the several heat sensors installed in the area. The sensors would then automatically activate an alarm and the water-foam deluge system. The fire would normally be suppressed by the automatic water-foam deluge system but, assuming failure of this system, the natural uranium carried out in the smoke would be largely confined to the building, plating out with the soot particulates on all surfaces contacted. Traces of uranium carried out with the smoke would be expected to be deposited in the vicinity of the building. Measurable uranium deposition beyond the site boundary is unlikely (NUREG-1157). The expected consequences of the fire would be the creation of a localized cleanup problem with operational losses rather than a potential environmental impact. This event would be handled as a Site Area Emergency and the Onsite Contingency Response Organization would be activated.

3. <u>Ammonia (NH3) Valve Leak or Line Breakage</u>

Ammonia is stored onsite in tanks. No catastrophic failure of tankage can be expected, therefore a leaking valve or transfer line failure is postulated to be the maximum credible accident (NUREG-1157). Should a release occur at an ambient temperature of 80°F, about 20% of the NH3 would flash to vapor resulting in a release rate of approximately 34 kg/min. This incident would be detected visually by shift operators and reported to the Senior Shift Supervisor.

NUREG-1157 presents an independent conservative analysis which concludes that noticeable irritation for a brief exposure would not extend beyond about one-half mile. The potential risks were therefore judged to involve discomfort without any permanent damage. This incident would be classified as an Alert and the Onsite Contingency Response Organization would be activated.

4. <u>Acid Spill</u>

Aqueous HF, H2SO4, and HNO3 are corrosive acids that, if spilled, could cause impacts onsite until neutralized and cleaned up. There is no potential for such spills causing offsite consequences. A major spill would be classified as an Alert. These spills are visually detected by shift operators and reported to the Senior Shift Supervisor. The spills would be neutralized and the area cleaned up by shift personnel.

5. <u>Pigtail Leak</u>

The connecting and disconnecting of the pigtail and cylinder during loading of the cylinder could cause a minor UF_6 release. The UF_6 would be hydrolyzed to UO_2F_2 and HF (small white puff). The airborne concentrations might exceed 10 MPC in the immediate vicinity of the leak; if so, this event would be considered an unusual event. Most activities involving pigtails are conducted within confined areas which greatly limits the release to the general plant area. Even without confinement such leaks are small and quickly controlled so that there is no realistic potential for offsite consequences. The event would be detected visually by the shift operators and reported to the Senior Shift Supervisor. After eliminating the problem, the area would be decontaminated by shift personnel assisted by health physics technicians.

6. <u>Spill of Dry Uranium Compounds</u>

Most of the incoming uranium concentrate (normally U_3O_8 is received in 55 gallon drums). This material is sampled, dissolved in HNO_3, thermally decomposed to UO_3, reduced to UO_2 and then hydrofluorinated to UF_4 and finally fluorinated to produce UF_6. There is a potential for spillage of low specific activity solids during sampling, transporting or maintenance activities. No off-site consequences would be expected. Airborne concentrations from a moderate spill would be classified as an Unusual Event. The incident would be visually detected by shift operators and reported to the Senior Shift Supervisor. The spill would be promptly contained and affected areas decontaminated by shift personnel with assistance of health physics technicians.

	TLV –* 8 HR. TWA	TLV –** 15 MIN. STEL	IMMEDIATELY DANGEROUS TO LIFE OR HEALTH (IDLH)	OBSERVABLE EFFECTS TO HUMANS:
AMMONIA	25 ppm 18 mg/m^3	35 ppm 27 mg/m^3	500 ppm 360 mg/m^3	50 ppm (36 mg/m^3) – NASAL DRYNESS 134 ppm (96 mg/m^3) – UPPER RESPIRATORY TRACT IRRITATION 2500 – 6500 ppm (1800 – 4680 mg/m^3) – DYSPNEA, BRONCHOSPASM, CHEST PAIN, PULMONARY EDEMA 10,000 ppm (7,200 mg/m^3) – MILD SKIN IRRITATION 30,000 ppm (21,600 mg/m^3) – SKIN BURNS
CHLORINE	1 ppm 3 mg/m^3	3 ppm 9 mg/m^3	25 ppm 75 mg/m^3	0.02 – 0.2 ppm (0.06 – 0.6 mg/m^3) – ODOR THRESHOLD 0.5 ppm (1.5 mg/m^3) – NASAL IRRITATION 5 ppm (15 mg/m^3) – UPPER RESPIRATORY TRACT IRRITATION
FLUORINE	1 ppm 2 mg/m^3	2 ppm 4 mg/m^3	25 ppm 50 mg/m^3	
HEXANE	50 ppm 180 mg/m^3	NOT AVAILABLE	5,000 ppm 18,000 mg/m^3	5,000 ppm (18,000 mg/m^3) – DIZZINESS 35,000 – 40,000 ppm (126,000 – 144,000 mg/m^3) – CONVULSIONS, DEATH 64,000 ppm (230,000 mg/m^3) – PULMONARY ARREST

* THE THRESHOLD LIMIT VALUE–TIME WEIGHTED AVERAGE (TLV–TWA) – THE TIME–WEIGHTED AVERAGE CONCENTRATION FOR A NORMAL 8–HOUR WORKDAY AND A 40–HOUR WORKWEEK, TO WHICH NEARLY ALL WORKERS MAY BE REPEATEDLY EXPOSED, DAY AFTER DAY, WITHOUT ADVERSE EFFECT.

** THRESHOLD LIMIT VALUE–SHORT TERM EXPOSURE LIMIT (TLV–STEL) – THE CONCENTRATION TO WHICH WORKERS CAN BE EXPOSED CONTINUOSLY FOR A SHORT PERIOD OF TIME WITHOUT SUFFERING FROM 1) IRRITATION, 2) CHROMIC OR IRREVERSIBLE TISSUE DAMAGE, OR3) NARCOSIS OF SUFFICIENT DEGREE TO INCREASE THE LIKELIHOOD OF ACCIDENTAL INJURY, IMPAIR SELF–RESCUE OR MATERIALLY REDUCE WORK EFFICIENCY, AND PROVIDE THAT THE DAILY TLV–TWA IS NOT EXCEEDED.

CHEMICAL EXPOSURE GUIDE
TABLE 3 – 1

4.0 CONTINGENCY RESPONSE ORGANIZATION

4.1 Normal Plant Organization

The Sequoyah Facility has a formal organizational structure for both normal and off-normal (back shifts, holidays, and weekends) hours. Figure 4-1 is a block diagram of the Sequoyah Fuels Corporation organization and illustrates levels of responsibility within the facility. A full personnel complement is available Monday through Friday during the day shift. Figure 4-2 shows the shift organization which comprises the normal personnel complement during back shifts, holidays, and weekends. Initial emergency response duties are the responsibility of this group during off-normal hours.

Management of the normal operating organization is provided by
* a Senior Vice President or Vice President, and managers who direct facility activities in the areas of:

Operations
Maintenance
* Health and Safety
Engineering
* Environmental
Process Laboratory
Procedures and Training

Should one of these permanently assigned individuals be absent, the positional responsibilities are delegated to another competent individual.

The Senior Shift Supervisor is in the immediate onsite position of authority and responsibility for the safe and proper operation of the facility. He is responsible for the initial evaluation of any abnormal situation and for directing the appropriate response. If an abnormal situation falls within the realm of the emergency classification system described in Section 3 of this Plan, the Senior Shift Supervisor will declare the event at the appropriate classification level. The Senior Shift Supervisor will then assume the position of Onsite Emergency Director. For events classified at the Alert level and above, upon arrival of the Senior Vice President (or alternate), and following an adequate briefing, the Senior Shift Supervisor will turn over the responsibilities of Onsite Emergency Director in accordance with the applicable Contingency Plan Implementing Procedure (CPIP).

	TLV –* 8 HR. TWA	TLV –** 15 MIN. STEL	IMMEDIATELY DANGEROUS TO LIFE OR HEALTH (IDLH)	OBSERVABLE EFFECTS TO HUMANS:
HYDROGEN FLUORIDE	3 ppm 2.5 mg/m^3	6 ppm 5 mg/m^3	20 ppm 16 mg/m^3	
HYDROGEN SULFIDE	10 ppm 14 mg/m^3	15 ppm 21 mg/m^3		
NITRIC ACID	2 ppm 5 mg/m^3	4 ppm 10 mg/m^3	100 ppm 250 mg/m^3	
NITROGEN DIOXIDE	3 ppm 6 mg/m^3	5 ppm 10 mg/m^3	50 ppm 100 mg/m^3	
SULFURIC ACID	1 mg/m		80 mg/m^3	

* THE THRESHOLD LIMIT VALUE–TIME WEIGHTED AVERAGE (TLV–TWA) – THE TIME–WEIGHTED AVERAGE CONCENTRATION FOR A NORMAL 8–HOUR WORKDAY AND A 40–HOUR WORKWEEK, TO WHICH NEARLY ALL WORKERS MAY BE REPEATEDLY EXPOSED, DAY AFTER DAY, WITHOUT ADVERSE EFFECT.

** THRESHOLD LIMIT VALUE–SHORT TERM EXPOSURE LIMIT (TLV–STEL) – THE CONCENTRATION TO WHICH WORKERS CAN BE EXPOSED CONTINUOSLY FOR A SHORT PERIOD OF TIME WITHOUT SUFFERING FROM 1) IRRITATION, 2) CHROMIC OR IRREVERSIBLE TISSUE DAMAGE, OR3) NARCOSIS OF SUFFICIENT DEGREE TO INCREASE THE LIKELIHOOD OF ACCIDENTAL INJURY, IMPAIR SELF–RESCUE OR MATERIALLY REDUCE WORK EFFICIENCY, AND PROVIDE THAT THE DAILY TLV--TWA IS NOT EXCEEDED.

CHEMICAL EXPOSURE GUIDE
TABLE 3 – 1

e. Ensure that all significant actions and events are documented.

* Following notification of an alert or higher event, the Senior Vice President (or alternate), will proceed to the Control Room. After a comprehensive briefing on the status of the facility, potential or actual onsite and offsite hazards, and the state of the Contingency Plan implementation, he will assume the responsibilities of Onsite Emergency Director from the Senior Shift Supervisor. The Onsite Emergency Director will continue implementation of the Contingency Plan and relevant CPIP's, and, as appropriate:

a. Assess and verify the situation and assure that appropriate mitigating and corrective actions are underway.
b. Review the initial event classification and alter the classification, if appropriate.
c. Continue the assessment of the actual or potential onsite and/or offsite hazard.
d. Continue the notification process.
e. Augment the onsite response organization with additional personnel as required.
f. Establish additional communications as necessary and provide current status information to offsite authorities.
g. Ensure that all appropriate implementing procedures are being executed and that all significant events and actions are documented.

4.2.2 Operations Coordinator

The Operations Coordinator reports to the Onsite Emergency Director. His responsibilities include:

a. Supervise the Senior Shift Supervisor and the operating crew.
b. Supervise the execution of assigned CPIP's.
c. Supervise the facility Fire and Rescue Team.
d. Coordinate post-event assessment.

4.2.3 Hazards Assessment and Control Coordinator

The Hazards Assessment and Control Coordinator reports to the Onsite Emergency Director. His responsibilities include:

4.2 Onsite Contingency Response Organization

The Sequoyah Facility has a formal Onsite Contingency Response Organization, including provisions for direction and coordination of response resources during normal and off-normal hours. Figure 4-3 illustrates the Onsite Contingency Response Organization, and Table 4-1 shows major functional responsibilities as related to members of the organization.

4.2.1 Onsite Emergency Director

The Onsite Emergency Director has overall responsibility for execution of the Contingency Plan. During emergency conditions, the Senior Shift Supervisor will initially assume this position, until relieved by the Senior Vice President (or alternate), in accordance with the applicable CPIP. The Senior Shift Supervisor will normally go to or remain in the Control Room unless it is necessary that he leave the Control Room to perform necessary assessment, corrective, or protective actions. The order of succession for the position of Onsite Emergency Director is as follows:

1. Senior Vice President
2. Manager, Operations
3. Manager, Engineering
4. Manager, Health and Safety

*

The position of Onsite Emergency Director carries with it the authority to commit whatever resources and actions are necessary to mitigate the situation.

The Senior Shift Supervisor, acting as Onsite Emergency Director, will perform the following actions:

a. Identify, verify the existence of, and initially classify the emergency as an Unusual Event, Alert, Site Area Emergency, or General Emergency.
b. Activate the Onsite Contingency Response Organization as appropriate, and initiate appropriate measures to mitigate the event.
c. Determine if releases of radioactive and/or hazardous materials have occurred, and, if so, assess the potential onsite and/or offsite hazards involved.
d. Initiate notification of appropriate offsite agencies and response groups.

4.2.7 Senior Shift Supervisor

The Senior Shift Supervisor reports to the Operations Coordinator. His responsibility is to continue to direct plant systems operations from the Control Room. Under the Operations Coordinator's supervision, he will direct operational activities to mitigate conditions on affected systems and/or areas of the facility, and to ensure unaffected systems and areas are maintained in a stable and safe condition.

4.2.8 Assembly & Support Center (ASC) Supervisor

The ASC Supervisor reports to the Administration and Security Coordinator. His responsibilities include:

a. Conduct personnel accountability activities at the ASC.
b. Supervise personnel at the ASC and dispatch individuals to augment the response effort as requested by the Administration and Security Coordinator.

4.2.9 Emergency Communicator

The Emergency Communicator receives direction from the Onsite Emergency Director for communications functions, but is administratively supervised by the Technical Support Coordinator. His responsibilities include:

a. Implement initial notification of response personnel and offsite agencies.
b. Provide information updates to offsite agencies.
c. Provide the communications link with offsite response centers.

4.2.10 Emergency Teams

The facility has three types of emergency teams with specific response assignments and specialized response training. These teams are:

Fire and Rescue Team - under the direction of the Operations Coordinator.

* Monitoring Team - under the direction of the Hazards Assessment and Control Coordinator.

a. Assess hazards from radiation and/or hazardous material releases to onsite and offsite personnel and make recommendations to the Onsite Emergency Director for mitigating, corrective and protective actions.
b. Supervise monitoring teams onsite, and, if necessary, offsite.
c. Ensure that adequate protective measures are taken by personnel performing emergency duties.
d. Supervise any required personnel or facility decontamination activities.
* e. Maintain facility security and access control during and after the event.
f. Support efforts on the areas of fire control, search and rescue, first aid, and post-event assessment.

4.2.4 Damage Control and Repair Coordinator

The Damage Control and Repair Coordinator reports to the Onsite Emergency Director. His responsibilities include:

a. Direct the activities to repair equipment damaged during the course of the event.
* b. Supervise First Aid efforts.
c. Support efforts in the areas of hazard survey and assessment, facility decontamination, and post-event assessment.

4.2.5 Technical Support Coordinator

The Technical Support Coordinator reports to the Onsite Emergency Director. His responsibilities include:

a. Supervise the Emergency Communicators.
b. Provide engineering and technical support to the Onsite Emergency Director.
c. Support efforts in hazard survey and assessment and post-event assessment.

4.2.6 Administration Coordinator

The Administration Coordinator reports to the Onsite Emergency Director. His responsibilities include:

a. Supervise personnel accountability and evacuation activities.
b. Supervise record-keeping and documentation activities.
* c. Support communications efforts.
d. Request augmentation personnel as needed from the Assembly and Support Center (ASC).

a. Offsite Response Organization:

The Offsite Response Organization, shown in Figure 4-4, is comprised of key individuals. During a Site Area Emergency or General Emergency, these individuals man the Offsite Response Center (ORC). The ORC is a near-site response center located in the Carlile Training Center, about one mile East of the facility. The Offsite Response Organization is headed by the Offsite Emergency Director. The Offsite Emergency Director is responsible for coordinating the overall corporate response to the event. This position will be filled by the Vice President, Business Development, or a designated alternate. The Offsite Response Organization is composed of four functional groups:

- Environmental Assessment
- Technical Support
- Administration and Logistics
- Public Information

Each group is headed by an individual with expertise in the applicable field. The function of the Offsite Response Organization is to: 1) perform offsite environmental and hazard monitoring/assessment, 2) provide technical, administrative and logistical support to the onsite response effort, and 3) provide communications and liaison with corporate management, offsite agencies and response groups, and the media.

b. General Atomics Emergency Organization:

Certain General Atomics personnel assigned to the San Diego office have responsibilities for the compliance oversight of the Sequoyah Facility under normal and/or emergency situations. This group of individuals, designated as the General Atomics Emergency Organization, has pertinent expertise in nuclear engineering and manufacturing, administration, public information, radiological health and safety, chemical safety, industrial hygiene, and environmental assessment. The function of the Emergency Organization is to support the post-accident assessment and recovery actions at the Sequoyah Facility site. To effectively carry out these functions, the group is led by a chairman designated by the President of Sequoyah Fuels Corporation. In addition to performing the above-mentioned functions, the Emergency Organization performs the following:

* *First Aid Team* - under the direction of the Damage Control and Repair Coordinator.

4.2.11 *Activation of the Onsite Contingency Response Organization*

The degree of activation of the Onsite Contingency Response Organization varies with the classification level of the event. The Onsite Emergency Director also exercises some judgment as to the degree to which the on-shift organization will be augmented 1) by calling in off-shift personnel at the Unusual Event and Alert levels, and 2) by the types and numbers of augmentation personnel called in at the Site Area and General Emergency levels. Activation will generally occur as stated below:

Unusual Event -	Assumption of Onsite Emergency Director duties by the Senior Shift Supervisor in the Control Room. Activation of on-shift personnel based upon the specific event.
Alert -	Full activation of the Onsite Contingency Response Organization. Activation of the Onsite Emergency Center (OEC).
Site Area Emergency - & General Emergency	Full activation of onsite and offsite response organizations. Activation of all onsite and offsite response centers. Recall of additional personnel based upon actual or anticipated need.

4.3 *Offsite Assistance*

4.3.1 *Offsite Response*

* Certain Sequoyah Fuels Corporation personnel are assigned Offsite Response Organization duties at the Site Area Emergency and General Emergency levels.

4.4 Coordination with Offsite Agencies

The facility reports the occurrence of events as required directly to State and local officials and to the U.S. Nuclear Regulatory Commission (NRC), Region IV, during the day shift, or to the NRC Emergency Operations Center, Washington, D.C., during back shifts, weekends, and holidays. Certain chemical releases or spills, which fall within the reporting criteria of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), or the Superfund Amendments and Reauthorization Act (SARA), Title III, are promptly reported to the National Response Center and to state and local response organizations, as required. If conditions warrant, assistance will be requested from the following organizations:

4.4.1 Sequoyah County Civil Defense

Location: Sallisaw, OK, approximately 15 miles east of the facility.

a. Activates Emergency Operations Center, time and conditions permitting.
b. Establishes emergency communications links with Muskogee County Civil Defense and other offsite emergency protective response agencies.
c. Assists in coordination of emergency access control.
* d. Notifies Coast Guard, Union Pacific Railroad, and other entities requiring special emergency protective response actions.
e. Provides/coordinates sheltering and corresponding needs of evacuees, stranded motorists, etc.
f. Notifies Oklahoma Civil Defense Agency and provides status updates information.
g. Notifies appropriate County officials.

* - Provides assistance and advice to the Offsite Emergency Director when requested.
- Procures, coordinates, and directs supplemental response resources, both from within and outside the corporation.

4.3.2 Medical Treatment Facilities and Transportation

Sequoyah County Memorial Hospital, Sallisaw, approximately * 17 miles from the plant, and Sparks Regional Medical Center in Fort Smith, approximately 40 miles from the plant, will be utilized for treatment of personnel who cannot be treated in the facility First Aid Room. Physicians and staff personnel at the above two hospitals and the other physicians in Oklahoma City and the local area are available and aware of the chemical hazards, contamination control measures, and required treatment for exposures resulting from a UF_6 release or other hazardous chemical accident.

A fully-equipped ambulance is maintained at the Sequoyah Facility. The hospitals will be contacted over the commercial telephone system to advise them of transport of injured/contaminated personnel.

4.3.3 Police Assistance

During and after an emergency, the local Police Departments in Sallisaw, Vian, Gore, and Webbers Falls, and the Oklahoma State Highway Patrol, can be called upon for security, access, and traffic control assistance. Initial notification of the police dispatch center will be provided by a dedicated line commercial telephone to avoid the potential for spectator interference during the initial response phase, while traffic control is being established.

Subsequently, radio communications will be established. The Sequoyah Facility has a radio system tuned to the local police frequency to allow communications during an emergency to the 24-hour police dispatch center at the Sequoyah County Sheriff's office in Sallisaw. This arrangement will allow mobilization of all local, county, and state police resources as well as other designated response agencies. Since all police agencies can use this frequency, communication will be possible continuously with all police agencies during an emergency. This radio system is backed up by the commercial telephone system.

c. Provides communication assistance and coordination in cooperation with Civil Defense.
d. Notifies appropriate County officials.

4.4.5 <u>Muskogee County Sheriff's Office</u>

Location: Muskogee, OK, approximately 25 miles northwest of the facility.

a. Provides back-up assistance to other law enforcement agencies, if needed.
b. Notifies appropriate County officials.

4.4.6 <u>Gore Police Department</u>

Location: Gore, OK, approximately 2.5 miles northwest of the facility.

a. Controls/diverts traffic on U.S. Highway 64 southeast of Gore away from the affected area.
b. Notifies City officials.

4.4.7 <u>Vian Police Department</u>

Location: Vian, OK, approximately 5 miles east of the facility.

a. Controls/diverts traffic on U.S. Highway 64 west of Vian away from the affected area.
b. Notifies City Officials.

4.4.8 <u>Webbers Falls Police Department</u>

Location: Webbers Falls, OK, approximately 3 miles west of the facility.

a. Provides back-up assistance to Gore Police Department for access/traffic control, security, or evacuation functions if needed.
b. Notifies City officials.

4.4.9 <u>U.S. Coast Guard Station</u>

Location: Robert S. Kerr Lock and Dam, approximately 15 miles southeast of the facility.

Controls/diverts river traffic on Arkansas River Navigation System away from the affected areas.

4.4.2 Muskogee County Civil Defense

Location: Muskogee, OK, approximately 25 miles northwest of the facility.

a. Establishes communications links and coordinates emergency response actions with Sequoyah County Civil Defense and the Sequoyah Facility emergency organization.
b. Activates the Emergency Operations Center staff if time permits and/or accident scenario merits such action.
c. Establishes communications links between the Emergency Operations Center and other emergency response agencies in County.
d. Provides back-up assistance to Sequoyah County for access control and/or evacuation functions.
e. Notifies appropriate County officials.

4.4.3 Oklahoma State Highway Patrol

Locations: Dispatch Headquarters - Muskogee, OK, approximately 25 miles northwest of the facility. Troop Headquarters - Sallisaw, OK, approximately 15 miles east of the facility.

a. Controls access on Interstate 40 interchanges during accident.
b. Provides back-up assistance to other law enforcement agencies if needed.

4.4.4 Sequoyah County Sheriff's Office

Location: Sallisaw, OK, approximately 15 miles east of the facility.

a. Controls access to affected area by blocking county/local road systems leading into the area. Reroutes traffic away from affected area.
b. Provides back-up assistance for security, and/or evacuation functions if necessary.

4.4.13 <u>Oklahoma State Health Department - Pollution Control Discharge Report Center</u>

Location: Oklahoma City, OK, approximately 150 miles west of the facility.

Notifies the public if a liquid release poses a problem to the drinking water system.

4.4.14 <u>National Response Center</u>

Location: Washington, D.C.

Alerts EPA and other cognizant government agencies of chemical and waste releases in order that coordinated response efforts and assistance can be provided.

* 4.4.10 Sallisaw Fire/Rescue Service

Location: Sallisaw, OK, approximately 15 miles east of the facility.

a. During major emergencies these services will be under the supervision of the Fire Chief of the City of Sallisaw. Overall coordination, in terms of response role, will remain with the Civil Defense Executive Group and Civil Defense Director.
b. Provides back-up assistance to Sequoyah Facility emergency organization and/or other offsite emergency response agencies, if required.

4.4.11 Sequoyah County Health Department

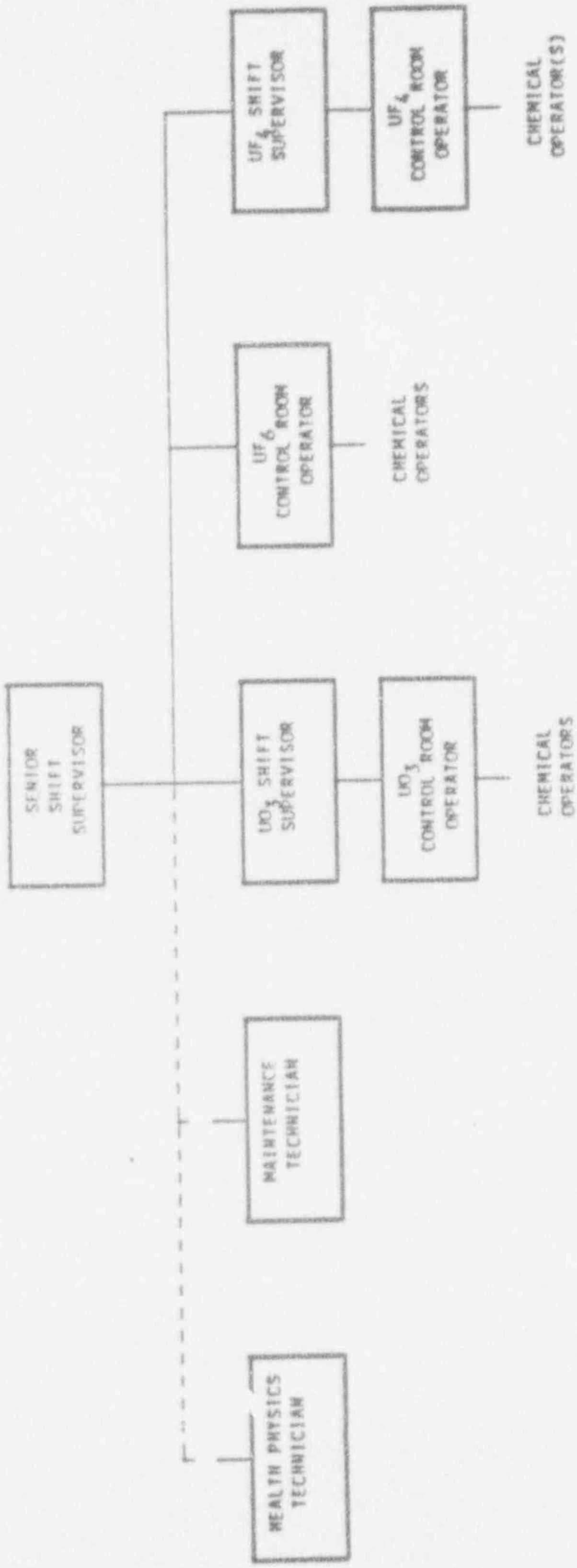
Location: Sallisaw, OK, approximately 15 miles east of the facility.

a. Advises hospitals/medical personnel of accident type, anticipated casualties, and health-related information.
b. Coordinates with Muskogee County Health Department and Oklahoma State Health Department.
c. Issues accident-related health advisories to public media.
d. Alerts County Medical Examiner's Office, coordinates casualty removals.
e. Tests for contamination of drinking water supplies, crops, livestock, and other consumables having possible contact with any hazardous material release.
f. Provides nursing assistance, counseling, and special assistance needs to elderly, handicapped,. and emergency response workers.
g. Conducts post-accident survey in affected areas to identify any immediate health affects and gather samples for analysis.

4.4.12 Oklahoma State Health Department - Radiological Group

Location: Oklahoma City, OK, approximately 150 miles west of the facility.

Assists in evaluating extent of release and counseling on matters associated with public health, cleanup, and restoration involving radioactive or hazardous materials.



NORMAL SHIFT ORGANIZATION

FIGURE 4 - 2

SEQUOYAH FACILITY

OPERATING ORGANIZATION

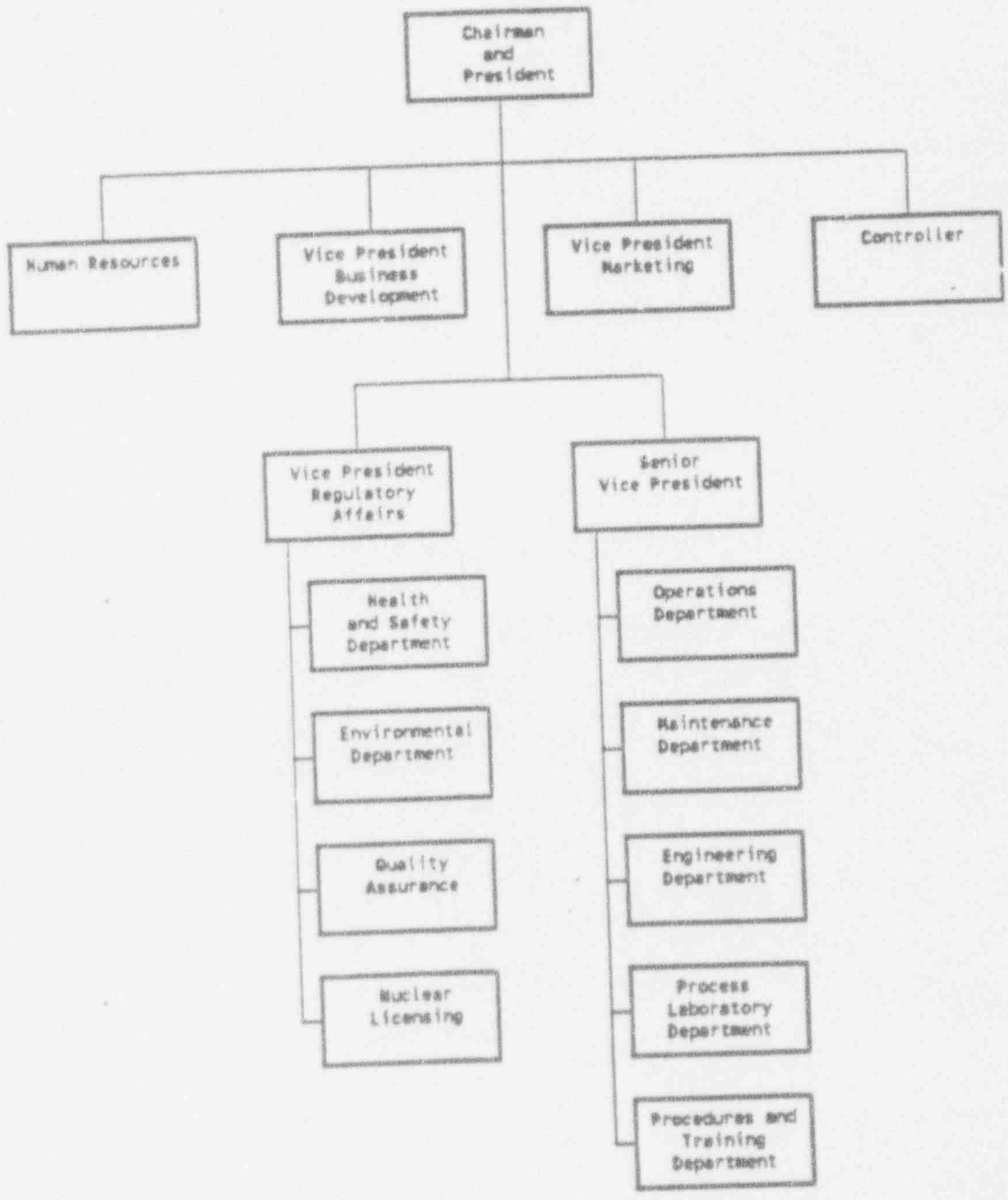
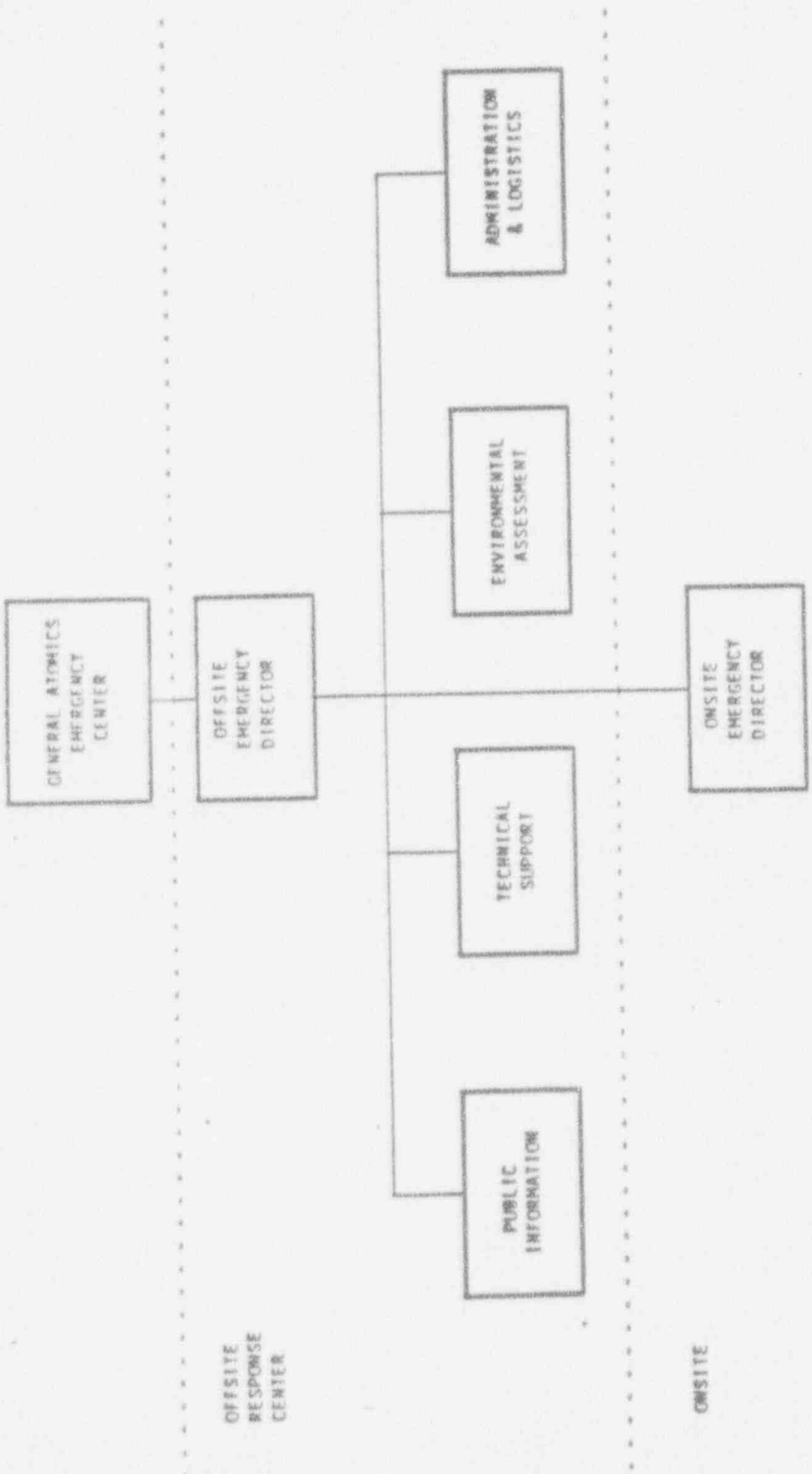


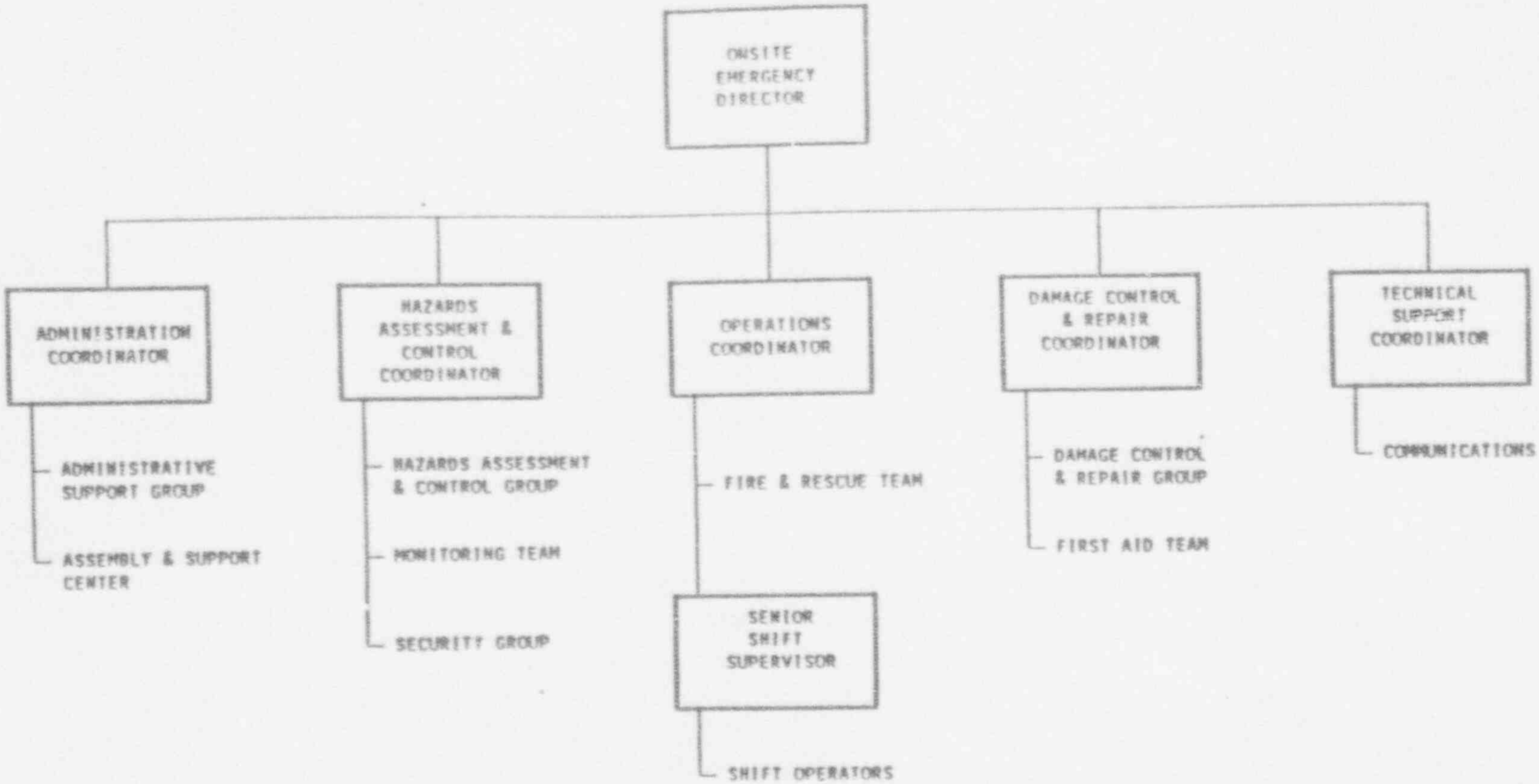
FIGURE 4 - 1

* Revised



OFFSITE RESPONSE ORGANIZATION

FIGURE 4 - 4



ONSITE CONTINGENCY RESPONSE ORGANIZATION

FIGURE 4 - 3

1

IMAGE EVALUATION TEST TARGET (MT-3)

150mm

6"

1

IMAGE EVALUATION TEST TARGET (MT-3)

150mm

6"

1

IMAGE EVALUATION TEST TARGET (MT-3)

150mm

6"

	ONSITE EMERGENCY DIRECTOR	OPERATIONS COORDINATOR	HAZARDS ASSESSMENT & CONTROL COORDINATOR	DAMAGE CONTROL & REPAIR COORDINATOR	TECHNICAL SUPPORT COORDINATOR	ADMINISTRATION COORDINATOR	SENIOR SHIFT SUPERVISOR
DIRECTION & CONTROL	P	S	S				
PLANT SYSTEMS OPERATIONS		P					S
HAZARD SURVEY & ASSESSMENT			P	S	S		
FIRE CONTROL		P	S				
RESCUE OPERATIONS		P	S				
FIRST AID			S	P			
PERSONNEL DECONTAMINATION			P				
SECURITY & ACCESS CONTROL			P				
REPAIR & DAMAGE CONTROL				P			
RECORD KEEPING						P	
PERSONNEL ACCOUNTABILITY			S			P	
FACILITY DECONTAMINATION			P	S			
COMMUNICATIONS					P	S	
POST-EVENT ASSESSMENT		P	S	S	S		

P - Primary
S - Support

FUNCTIONAL RESPONSIBILITIES

5.0 RESPONSE MEASURES

As described in Chapters 2.0 and 3.0, safeguards are provided throughout the Sequoyah Facility processes and procedures to ensure a safe operation. Recent modifications provide further assurance that a major accident (such as the rupture of a UF_6 cylinder or a fire) resulting in a significant airborne release of potentially harmful chemicals is very unlikely to occur. However, if such an accident should happen, mitigative, corrective, and protective actions must be well planned and rapidly implemented. Sufficient time is not likely to be available for complicated calculations of dose projections or complex decision-making related to protective action. Therefore, response measures have been developed and personnel trained to assure expeditious action to protect employees and the public and to minimize environmental consequences from any of the four classifications of abnormal occurrences that could take place at the Sequoyah Facility.

5.1 Activation of Contingency Response Organization

Primary and alternate activation notification systems provide assurance of a 24 hour per day notification capability. Notification of on-shift and onsite personnel will routinely be accomplished by the facility public address system. Backup capability is provided by the Operator-Control Room FM radio system and the facility commercial telephone system. Offsite notification of members of the Onsite Contingency Response Organization during back shifts, weekends, and holidays will be performed using an automatic commercial telephone system. The alternate means of notification will be the existing commercial telephone system. Notification of the Offsite Response Organization, key corporate personnel and offsite support groups and agencies will occur using the same methods.

An Emergency Call List has been established as an attachment to the Contingency Plan Implementing Procedure (CPIP) for each emergency classification level. Each call list provides the names of those positions, organizations, and agencies to be contacted for each specific classification level. Telephone numbers are found in Emergency Notification Books located in the Control Room, at the Carlile Training Center, and in the North and South Guard House.

5.1.1 Unusual Event

Upon declaration of an Unusual Event, the Senior Shift Supervisor assumes the Onsite Emergency Director role, and the on-shift response organization is activated. The Control Room is the principal response center. The Emergency Call List for Unusual Event directs notification of the Senior Vice President, or his designated alternate. *

5.1.2 Alert

Upon declaration of an Alert, the Emergency Call List Alert is executed and the Onsite Contingency Response Organization is fully activated. The Offsite Response Organization is placed on standby alert status. The US Nuclear Regulatory Commission and the Hazardous Materials Emergency Response Commission of Oklahoma will be notified. The Onsite Emergency Center (OEC) and the Assembly and Support Center (ASC) are manned and activated. Once the Senior Shift Supervisor is relieved as Onsite Emergency Director, the OEC becomes the principal response control center. An offsite notification message is composed, and offsite notifications are made.

5.1.3 Site Area Emergency

Declaration of a Site Area Emergency is followed by execution of the Emergency Call List - Site Area Emergency and full activation of both the Onsite Contingency Response Organization and the Offsite Response Organization. The U.S. Nuclear Regulatory Commission, the Hazardous Materials Emergency Response Commission of Oklahoma, and the Sequoyah County Sheriff's Office dispatcher will be notified. The dispatcher in turn notifies other local offsite agencies. The OEC and ASC are manned and activated, and the Offsite Response Center (ORC) is manned and activated upon arrival of Offsite Response Organization personnel. The OEC is the principal onsite response control center for the onsite response effort, and the ORC is the principal offsite response center for 1) performing offsite environmental and hazard assessment, 2) providing support for the onsite response effort, and 3) providing communications and liaison with offsite agencies and response groups, and the media.

5.1.4 General Emergency

Response to the declaration of a General Emergency is generally the same as a Site Area Emergency. The one substantial difference is that the Offsite Emergency Notification System (which includes the offsite siren system and the automatic telephone system) is activated.

5.0 RESPONSE MEASURES

As described in Chapters 2.0 and 3.0, safeguards are provided throughout the Sequoyah Facility processes and procedures to ensure a safe operation. Recent modifications provide further assurance that a major accident (such as the rupture of a UF_6 cylinder or a fire) resulting in a significant airborne release of potentially harmful chemicals is very unlikely to occur. However, if such an accident should happen, mitigative, corrective, and protective actions must be well planned and rapidly implemented. Sufficient time is not likely to be available for complicated calculations of dose projections or complex decision-making related to protective action. Therefore, response measures have been developed and personnel trained to assure expeditious action to protect employees and the public and to minimize environmental consequences from any of the four classifications of abnormal occurrences that could take place at the Sequoyah Facility.

5.1 Activation of Contingency Response Organization

Primary and alternate activation notification systems provide assurance of a 24 hour per day notification capability. Notification of on-shift and onsite personnel will routinely be accomplished by the facility public address system. Backup capability is provided by the Operator-Control Room FM radio system and the facility commercial telephone system. Offsite notification of members of the Onsite Contingency Response Organization during back shifts, weekends, and holidays will be performed using an automatic commercial telephone system. The alternate means of notification will be the existing commercial telephone system. Notification of the Offsite Response Organization, key corporate personnel and offsite support groups and agencies will occur using the same methods.

* An Emergency Call List has been established as an attachment to the Contingency Plan Implementing Procedure (CPIP) for each emergency classification level. Each call list provides the names of those positions, organizations, and agencies to be contacted for each specific classification level. Telephone numbers are found in Emergency Notification Books located in the Control Room, at the Carlile Training Center, and in the North and South Guard House.

5.1.1 Unusual Event

Upon declaration of an Unusual Event, the Senior Shift Supervisor assumes the Onsite Emergency Director role, and the on-shift response organization is activated. The Control Room is the principal response center. The Emergency Call List for Unusual Event directs notification of the General Manager.

* Revised

5.2.3 General Emergency

For events in the General Emergency class, onsite assessment actions will generally be performed as in Alert and Site Area Emergency above. Offsite hazards assessment and monitoring (if required) will be performed initially by the Hazards Assessment and Control Coordinator. The offsite monitoring function will be taken over by members of the Offsite Response
* Organization upon arrival at the Offsite Response Center.

5.2.4 Example Assessment Actions

Example assessment actions are listed in Table 5-1 for each event and classification in Section 3.2.

5.2.5 Assessment Functions

A preliminary hazards assessment will be performed by the Hazards Assessment and Control Coordinator and his group, which includes health physics and industrial safety personnel. The purpose of this quick assessment is to rapidly estimate onsite and offsite consequences, and to determine areas that may be involved.

a. Determine the Magnitude and Constituents of Releases

A preliminary estimate of the magnitude and chemical constituents of releases is determined procedurally by analyzing the initiating event (as determined by best available information) with respect to release data from studies of actual or postulated accidents. This method is supplemented and verified by the use of installed plant instrumentation and alarms, as well as portable detection and measurement instrumentation.

b. Chemical Hazard Assessment

The preliminary hazards assessment is determined by factoring meteorological data into the release data determined in the preceding paragraph. This determination is made procedurally, by use of tabular data giving airborne concentrations of released chemicals at given distances downwind for various wind speeds. These estimated concentrations are subsequently compared to Threshold Limit Values to complete the preliminary hazards assessment.

* Revised

5.2 Assessment Actions

5.2.1 Unusual Event

For events in the Unusual Event class, assessment actions will be performed by the shift operating crew. Shift personnel may be assisted by other available personnel, or augmentation personnel may be called in by the Senior Shift Supervisor if deemed necessary. The Shift Health Physics Technician will perform onsite monitoring in accordance with the appropriate implementing procedures, if the event involves the spill or release of radioactive or hazardous materials. Security personnel will assess the nature and extent of any security compromises. Operating personnel will determine the magnitude and extent of events such as fires, explosions, or natural phenomena. Damaged plant equipment or components will be examined by the shift maintenance technician and shift operating personnel to determine the extent of the damage. The Senior Shift Supervisor will make use of available information to assess potential effects on the safe operability of the plant.

5.2.2 Alert and Site Area Emergency

* For events in the Alert class, assessment actions will be performed initially by the shift operating crew. Assessment functions will be taken over by appropriate members of the Onsite Contingency Response Organization as they arrive on the scene. If a spill or release of radioactive or hazardous materials is involved, the Hazards Assessment and Control Coordinator will direct onsite monitoring activities to determine the nature and extent of any personnel hazards for protective action considerations and will assess the status and potential consequences of any breach or compromise of security. The Operations Coordinator will determine the nature and magnitude of the potential threat involved in events such as fires, explosions, or natural phenomena. Damage to plant equipment or components will be assessed by the Damage Control and Repair Coordinator. The Administration Coordinator will conduct required personnel accountability activities. The Onsite Emergency Director will make use of available information to assess potential or actual effects on the safe operability or shut down of the plant.

* Revised

Example corrective actions are listed in Table 5-2 for each event and classification in Section 3.2.

5.4 Protective Actions

Protective actions for personnel onsite will be taken when an event has occurred, or may occur, which could result in hazardous airborne concentrations of chemicals or dry uranium compounds, or such other situations as fires and explosions, where personnel safety is threatened. The activation of fire alarms, evacuation signals, public address announcements, etc., will alert onsite personnel to hazardous conditions and inform them of actions to be taken. Such actions may include evacuating an area, donning protective equipment, assembling emergency teams, or reporting to assembly centers.

5.4.1 Evacuations

When chemical hazards or fire result in excessive risk to personnel, the Onsite Emergency Director will consider evacuating personnel from affected areas in accordance with the following evacuation schemes:

a. Local or Plant Evacuation: Evacuation of localized areas within the facility or the entire plant. The immediate response by personnel is to evacuate to the designated Assembly and Support Center (ASC), as directed over the plant public address system. The primary ASC location is the facility lunchroom with alternate ASC locations being the South Guard House, the Depleted UF_4 Facility and the Carlile Training Center. Personnel accountability and contamination monitoring procedures are implemented, as applicable.

b. Site Evacuation: Evacuation of all non-essential personnel from the site. Immediate response by personnel is to evacuate to an offsite ASC designated by the Onsite Emergency Director. Personnel accountability and contamination monitoring procedures are implemented, as applicable. Site evacuation will only be ordered if it can be effected without exposing evacuating personnel to the release plume. The primary evacuation route will be through the South Gate. The alternate route will be from the parking lot around the backside of the site through the North gate.

c. Radiological Dose Projection

Several factors indicate against the value of radiological dose projection activities during a release at the Sequoyah Facility.

- The licensed material is natural uranium, which, when inhaled or ingested, represents a much greater chemical toxicity hazard than a radiation hazard.

- The most severe postulated accidents for this facility occur for relatively short durations, with little or no warning, and have limited effects offsite for all but the most extremely conservative meteorology. Thus, it is unlikely that there would be time for an involved offsite dose projection and protective action recommendation sequence.

- Scarce assessment resources are better utilized in analyzing serious chemical hazards potentially present during an emergency.

d. Offsite Monitoring

During the initial phase of an emergency, Sequoyah Facility personnel will be responsible for any necessary offsite monitoring. As augmentation of the response organization progresses, at the Site Area or General Emergency classifications, personnel from the Offsite Response Organization will assume offsite monitoring responsibilities upon their arrival at the ORC. Offsite monitoring will be coordinated with offsite monitoring teams from the local state and federal agencies. The ORC will then act as a clearinghouse for the receipt and analysis of offsite monitoring data.

5.3 Corrective Actions

Corrective actions are specified for postulated events in various Contingency Plan Implementing Procedures (CPIP's), Emergency Procedures. Corrective actions are managed by the Onsite Emergency Director and the appropriate group coordinator. Corrective actions are undertaken by teams of well-prepared and trained specialists. Each shift has personnel assigned to the
* Fire and Rescue Team and the First Aid Team.

* Revised

sampling, along with respiratory protection and access controls, will be utilized as appropriate to limit personnel exposure to airborne radioactivity and chemical hazards.

In order to enhance the exposure control process and to provide dosimetry for an expanded number of people, dosimetry vendors are available to expedite the shipment of extra dosimetry devices.

5.4.5 Contamination Control

The Hazards Assessment and Control Coordinator is responsible for minimizing ingestion or inhalation of radioactive materials during an emergency. Personnel, instruments and equipment will be monitored at an access control point. Decontamination will be effected when needed and when practicable. Personnel decontamination is covered in Section 5.4.5 and decontamination facilities are described in Section 6.5.1. Equipment which cannot be decontaminated will be retained within the controlled area or be controlled through a conditional release process. Release levels and protective action guidelines for contaminated personnel and equipment have been established in accordance with regulatory criteria and appear in facility health physics procedures.

Reentry into affected areas will be a controlled evolution. Surveys will be performed and areas posted or decontaminated. Environmental samples will be obtained and analyzed. Positive access control will be maintained over the site area as necessary, and affected onsite areas will be restored to acceptable conditions prior to relaxation of controls.

5.4.6 Aid to Affected Personnel

Provisions have been made to assist personnel who are injured and/or exposed to radiation or hazardous materials. Personnel onsite will be trained in first aid and radiation protection procedures. First aid and decontamination facilities are available onsite, and necessary transportation services are also available. * Emergency teams such as the Fire and Rescue and First Aid Teams will assemble and render necessary assistance, or be deployed in search and rescue efforts.

* Revised

5.4.2 Accountability

Implementation of personnel accountability will be considered by the Onsite Emergency Director when there is uncertainty as to the identity and the number of people affected. Usually, though, it will be conducted in conjunction with an evacuation.

All persons responding to the emergency will be accounted for by the Onsite Emergency Director. All others will be accounted for at the ASC. Should there be any persons missing and/or suspected of needing help, the Onsite Emergency Director will initiate search and rescue activities.

5.4.3 Use of Protective Equipment and Supplies

In general, the use of protective clothing and respiratory protective equipment is governed by normal facility operating procedures. The Onsite Emergency Director or Hazards Control and Assessment Coordinator will make decisions on the use of appropriate protective equipment during a declared emergency.

All employees are trained in the use of emergency escape respirators. All members of the Onsite Contingency Response Organization who are able to medically qualify are trained in the use of Self-Contained Breathing Apparatus (SCBA). Individuals not qualified to use SCBA are prohibited from using these and will not be permitted to re-enter or remain in immediately dangerous to life or health (IDLH) atmospheres. Individuals directing the efforts of respirator users during an emergency are trained in respiratory protection.

The location and inventory of emergency protective equipment and supplies are discussed in Sections 6.6 and 6.7.

5.4.4 Emergency Exposure Control

Due to the low specific activity of natural uranium, the licensed material at the Sequoyah Facility does not constitute a significant external radiation dose hazard with respect to the EPA Protective Action Guides under emergency conditions. However, normal external exposure monitoring and controls will be maintained under all conditions. Increased air sampling and bioassay organizations. Injured personnel transported to offsite medical facilities while in a contaminated condition will normally be accompanied by an individual who is qualified in radiological monitoring. This individual will stay in attendance and assist medical personnel in maintaining radiological controls until the patient has been stabilized and decontamination of hospital facilities is satisfactorily completed. The individual escorting the patient will take along survey instruments and other support equipment, as necessary.

Contaminated patients transported to an offsite medical facility should be placed in a separate area upon arrival. This should be considered a controlled zone. Upon release of the patient from the zone it will be sealed until surveyed, decontaminated and cleared by health physics personnel. All hospital equipment and personnel in the zone will be surveyed and decontaminated before release.

a. First Aid: Emergency first aid and medical treatment will be given to injured personnel. Shift personnel, trained in first aid, will be available onsite on a 24-hour per day basis and will assist personnel either at the scene of the accident or in the First Aid Room. The priority for aid to contaminated/injured personnel shall be as follows:

- First aid to personnel with serious injuries.
- Decontamination of personnel.
- Care of minor injuries.
- Determination of internal contamination by bioassay and whole body counting.
- Follow-up treatment.

b. Decontamination: Attempts shall be made to decontaminate affected personnel as soon as practicable; however, first aid or removal of the individual from a hazardous environment shall take precedence over these efforts. Upper release limits for personnel decontamination are found in facility health physics procedures and are consistent with regulatory criteria.

All personnel leaving the controlled access area will be monitored for contamination. During emergencies, all personnel onsite will, when practicable, be monitored for contamination before being allowed to leave the site. Personnel found to be contaminated will undergo decontamination under the direction of health physics personnel. Measures will be taken to prevent the spread of contamination. Such measures will include isolating affected areas, placing contaminated personnel in "clean" protective clothing before moving, and decontaminating affected personnel, their clothing, and equipment prior to release.

c. Medical Transportation: A fully-equipped ambulance is available at the facility for transporting injured personnel, who may also be radiologically contaminated, to offsite medical treatment facilities.

d. Offsite Medical Treatment: Arrangements for medical treatment of personnel from the Sequoyah Facility have been made through agreement with offsite

f. Loss of site electrical power for greater than 15 minutes.

- Start up and verify operation of vital equipment on emergency power.

- Contact the electric company to restore normal power.

- Prepare to shut down each system if loss of power is to be for an extended period of time.

g. Transportation of a contaminated injured individual to an offsite medical facility.

- Administer first aid necessary to sustain life and maximize the comfort of the individual.

- Move the injured individual to the ambulance.

- Notify hospital and transport injured individual to the hospital.

- Minimize the spread of contamination as much as practicable.

* h. Security threat: suspected minor breach of security (e.g., persons on company property outside of the Protected Area attempting unauthorized entry of the Protected Area).

- Dispatch security personnel to problem location.

- Inform offsite authorities as appropriate.

* i. Natural phenomenon experienced (e.g., tornado sighting in vicinity, earthquake of sufficient strength to be felt only).

- Terminate all nonessential work.

- Get production processing to a point where critical systems can be idled.

j. Other hazards experienced (e.g., aircraft crash onsite, onsite explosion with no significant damage).

- Provide medical and other types of assistance, as required.

- Inspect facility for damage.

- Repair any damage found.

TABLE 5-1

EXAMPLE CORRECTIVE ACTIONS

UNUSUAL EVENT

* a. Minor release of airborne radioactive materials that cannot be secured by the immediate actions of operations personnel.

- Isolate the system from which the release is occurring.

- Repair the source of the release as soon as possible.

- Clear the atmosphere in the release area as soon as possible.

* b. Spill of dry uranium compound with significant levels of airborne radioactive material not confined to the immediate area of the spill.

- Stop spill or loss as soon as possible.

- Vacuum up dry material spills and scrub the affected area.

* c. Loss of critical engineering safety or fire protection features.

- Repair as soon as possible.

- Increase operational surveillance of affected areas.

* d. Fire resulting in minor property damage. Fire is quickly extinguished.

- Utilize fire hose station equipment to control fires from upwind location.

* e. Loss of critical indicators, annunciators or alarms.

- Repair as soon as possible.
- Increase operational surveillance of affected areas.

* Revised

e. Security compromise: confirmed ongoing breach of security (e.g., trespassers presently inside the Protected Area)

- Notify site management of ongoing security breach.
- Notify local police of security breach.
- Apprehend and control trespassers, if possible, or monitor activities.
- Keep trespassers away from vital plant areas.
- Repair fence at point of intrusion, if necessary.

f. Natural phenomenon experienced (e.g., tornado touchdown onsite, earthquake causing structural damage to buildings).

- Shut down process equipment affected.
- Inspect facility for damage.
- Repair damage found.

g. Other hazards experienced (e.g., onsite explosion causing structural or equipment damage).

- Provide medical and other types of assistance, as required.
- Inspect facility damage.
- Repair damage found.

SITE AREA EMERGENCY

* a. Large UF_6 release (cylinder plug or valve leaking within or outside the plant building). Airborne concentrations expected to exceed 1 MPC at an offsite environmental monitoring station.

- Stop the leak, if at all possible, by physical means such as plug, tape, freezing, etc.
- Repair the source of the leak.

* Revised

ALERT

* a. Significant release of airborne radioactive materials with airborne concentrations expected to exceed 1 MPC at the site boundary for an extended period.

   - Isolate the source of release by closing adjacent valves.
   - Secure ventilation if appropriate.
   - Repair the source of the leak as soon as possible.
   - Clear the atmosphere in the release area as soon as possible.

* b. Fire resulting in significant property damage. Fire is extinguished within 15 minutes with no loss of critical engineered safety features.

   - Use local area fire extinguishers.
   - Use fire hose station equipment to control fires.
   - Open all unnecessary electrical breakers and valve off feed materials.

c. Significant potential for breach of retention pond basin embankment due to natural phenomena.

   - Make emergency repairs on dike as appropriate.
   - Increase pond surveillance.

d. Anticipated demonstrator activity or planned activity of a militant group.

   - Notify site management of situation.
   - Notify local police of situation.
   - Monitor demonstrator activities.

f. Security breach: imminent loss of physical control of the facility.

- Notify site management of security breach.
- Notify local police of security breach.
- Monitor trespasser activities.
- Shutdown production processing and secure as many areas and processes as possible.
- Protect vital areas of the plant.

GENERAL EMERGENCY

a. Major UF_6 release. Rupture of one cold trap or one hot cylinder with a substantial portion of the contents being released.

- Stop the leak, if possible, by physical means such as plug, tape, freezing, etc.
- Direct a large volume of water at the leak using a fire hose with the nozzle set in the fog position to cool the container and knock down the UO_2F_2 and HF.
- Cover the leaking area with wet towels or other wetable fabric, if possible.
- Neutralize the water being used to cool the leak.
- Start any emergency ventilation available.

* b. Major release of anhydrous hydrofluoric acid or anhydrous ammonia.

- Stop the release.
- Direct a large volume of water at the HF release using a fire hose with the nozzle set in the fog position to knock down the HF.

c. Control Room and/or site evacuation.

- Shut down production processing from local control panels as possible.

b. Major loss of U_3O_8 dry powder (tornado resulting in release of drummed feed material to the unrestricted area).

- Barricade and post affected area.

- Begin decontamination operations as soon as possible.

* c. Large release of anhydrous hydrofluoric acid or anhydrous ammonia.

- Stop the release.

- Repair the source of the release.

- Reduce the system or vessel pressure below atmospheric, if possible.

- Start any emergency ventilation available.

d. Any major fire affecting the operability or safe shutdown of the plant.

- Use fire hose station equipment and fire monitors to control the fire.

- Activate the fire foam system for fires in the SX Building.

- Open all unnecessary electrical breakers and valve off feed materials.

e. Retention basin failure with uncontrolled liquid release offsite.

- Perform emergency repairs to stop the release.

- Survey the extent of the contamination.

- Decontaminate the affected area.

* Revised

TABLE 5-2

EXAMPLE PROTECTIVE ACTIONS

UNUSUAL EVENT

* a. Minor release of airborne radioactive materials that cannot be secured by the immediate actions of operations personnel.

- Ventilate area prior to entry if practicable. Put on proper protective gear to respond.
- Evacuate all personnel from the area of the release.
- Secure medical attention for unprotected, exposed personnel.
- Isolate and clean contaminated areas as soon as possible.
- Submit special bioassay samples for exposed personnel.

* b. Spill of dry uranium compound with significant levels of airborne radioactive material not confined to the immediate area of the spill.

- Put on proper protective equipment to respond.
- Isolate and clean contaminated areas as soon as possible.
- Submit special bioassay for exposed individuals.

* c. Loss of critical engineering safety or fire protection features.

- Monitor for chemical release resulting from loss of packing and seal purges.
- Shut down all systems that require emergency cooling water if unavailable.
- Wear respiratory protection in process areas if vacuum systems or exhaust fans are inoperable.

d. A major fire causing extensive facility damage.

- Use fire hose station equipment to control the fire.
- Activate the fire foam system for fires in the SX Building.
- Open all unnecessary electrical breakers to the area affected.
- Valve off feed materials, vent and drain tanks as possible.

e. Security breach: loss of physical control of the facility or sustained damage to vital areas/systems at the facility due to sabotage.

- Notify site management of loss of control of facility.
- Notify local police of loss of control of facility.
- Shutdown as many operations as possible.
- Protect plant personnel from harm.

- Terminate all non-essential work.

- Get production processing to a point where the systems can be placed in an idling status.

- Have non-essential personnel move to a safe place within the facility.

j. Other hazards experienced (e.g., aircraft crash onsite, onsite explosion with no significant damage).

- Don appropriate protective equipment to respond (includes respirators).

ALERT

* a. Significant release of airborne radioactive materials with airborne concentrations expected to exceed 1 MPC at site boundary for extended periods.

- Evacuate all personnel from the area of the release.

- Secure first aid and/or medical attention for exposed, unprotected persons.

- Put on proper protective equipment to respond.

- Ventilate areas prior to entry.

- Isolate and clean contaminated areas as soon as possible.

- Submit special bioassay samples for exposed personnel.

- Conduct onsite and, if deemed necessary, offsite monitoring.

* b. Fire resulting in significant property damage. Fire is extinguished within 15 minutes with no loss of critical engineered safety features.

- Don protective fire fighting gear to respond (includes respirators).

- Upon extinguishment, set a reflash watch.

c. Significant potential for breach of retention basin embankment due to natural phenomena.

- Use a life line when working or walking on the sloped banks to prevent falling into the ponds.

- Wear appropriate protective gear.

* Revised

* d. Fire resulting in minor property damage. Fire is quickly extinguished.

   - Don protective and fire fighting gear when responding.

e. Loss of critical indicators, annunciators or alarms.

   - Monitor special activities or any work associated directly or indirectly with lost indicators, annunciators or alarms.

f. Loss of site electrical power for greater than 15 minutes.

   - Wear full-face respirators in process areas in the event of power loss due to shutdown of vacuum systems and exhaust fans.

   - Take special care to prevent personal injury resulting from reduced visibility due to marked reduction in lighting during a power outage.

g. Transportation of a contaminated injured individual to an offsite medical facility.

   - Don protective clothing and respirators as required by the situation.

   - Rescue of the victim and first aid takes precedent over fire fighting, etc.

* h. Security threat: suspected minor breach of security (e.g., persons on company property outside the Protected Area attempting unauthorized entry of the Protected Area).

   - No actions

i. Natural phenomenon experienced (e.g., tornado sighting in vicinity, earthquake of sufficient strength to be felt only).

* Revised

- Assemble emergency equipment and personnel upwind of the release.

- Put on proper protective equipment to respond.

- Request offsite assistance from the Highway Patrol, Sheriff, etc.

- Conduct onsite and, if necessary, offsite monitoring.

- Isolate and clean contaminated areas.

- Submit special bioassay samples for exposed personnel.

- Conduct personnel account bility to account for everyone onsite.

b. Major loss of U_3O_8 dry powder (tornado resulting in release of drummed feed material to the unrestricted area).

  - Wear respiratory protection to respond.

  - Isolate and clean contaminated areas.

* c. Large release of anhydrous hydrofluoric acid or anhydrous ammonia.

  - Ventilate area prior to re-entry.

  - Evacuate all personnel from the area of the release, including nearby buildings.

  - Secure first aid and/o r medical attention for exposed, unprotected persons.

  - Assemble emergency equipment and personnel upwind of the release.

  - Put on proper protective equipment to respond.

  - Request offsite assistance from the Highway Patrol, Sheriff, etc.

  - Conduct onsite and, if necessary, offsite monitoring.

* Revised

d. Anticipated demonstrator activity or planned activity of a militant group.

- Monitor perimeter and keep gates closed.

e. Security compromise: confirmed ongoing breach of security (e.g., trespassers presently inside the Protected Area)

- Notify management and alert employees onsite.

f. Natural phenomenon experienced (e.g., tornado touchdown onsite, earthquake causing structural damage to facility buildings.)

- Terminate all non-essential work
- Get plant production processing into an idling status.
- Have non-essential personnel move to a safe place within the facility.

g. Other hazards experienced (e.g., onsite explosion causing structure or equipment damage affecting facility operation).

- Don appropriate protective equipment to respond (includes respirators).
- Evacuate affected areas.
- Conduct personnel accountability if number of people affected in unknown.

SITE AREA EMERGENCY

* a. Large UF_6 release (cylinder plug or valve leaking within or outside the plant building). Airborne concentrations expected to exceed 1 MPC at an offsite environmental monitoring station.

- Ventilate area prior to re-entry.
- Evacuate all personnel from the area of the release, including nearby buildings.
- Secure first aid and/or medical attention for exposed, unprotected persons.

- Activate the Emergency Notification System.
- Ventilate area prior to re-entry.
- Evacuate all personnel from the area of the release including nearby buildings, or the entire facility if the situation warrants.
- Secure first aid and/or medical attention for all exposed, unprotected persons.
- Request offsite assistance from Highway Patrol, Sheriff, etc.
- Assemble emergency equipment and personnel upwind.
- Put on proper protective equipment to respond.
- Conduct onsite and offsite monitoring.
- Conduct personnel accountability to account for all persons onsite.
- Isolate and clean contaminated areas.
- Submit special bioassay samples for exposed personnel.
- Calculate an offsite hazards projection.

* b. Major release of anhydrous hydrofluoric acid or anhydrous ammonia.

- Activate the Offsite Emergency Warning System.
- Ventilate area prior to re-entry.
- Evacuate all personnel from the area of the release including nearby buildings, or the entire facility if the situation warrants.
- Secure first aid and/or medical attention for all exposed, unprotected persons.
- Request offsite assistance from Highway Patrol, Sheriff, etc.
- Assemble emergency equipment and personnel upwind.
- Put on proper protective equipment to respond.

- Isolate and clean contaminated areas.

- Submit special bioassay samples for exposed personnel.

- Conduct personnel accountability to account for everyone onsite.

d. Any major fire affecting the operability or safe shutdown of the plant.

   - Use lifelines and SCBA's in areas containing heavy smoke.

   - Ventilate area prior to entry.

   - Minimum of two persons on entry team and one standby person if SCBA-equipped.

   - Conduct personnel accountability.

   - Evacuate affected areas of the facility.

   - Don protective fire-fighting gear to respond (includes respirators).

e. Retention basin failure with uncontrolled liquid release offsite).

   - Use a life line when working or walking on the sloped banks to prevent falling into the ponds.

   - Initiate a sampling schedule of the environment to determine the impact of the spill.

f. Security breach: imminent loss of physical control of the facility.

   - Notify management to alert employees onsite.

   - Evacuate non-essential personnel from site.

GENERAL EMERGENCY

a. Major UF_6 release. Rupture of one cold trap or one hot cylinder with a substantial portion of the contents being released.

6.0 EQUIPMENT AND FACILITIES

The Sequoyah Facility has specific facilities, equipment, and supplies designated for use during an emergency. Response centers are established to act as control, communications, and assembly centers during an event. Communications systems provide the vital capability to transmit and receive information throughout the course of the emergency. Facilities are designated for use in post-accident assessment, first aid, and personnel decontamination. Emergency monitoring equipment is available to effectively monitor releases.

6.1 Response Centers

6.1.1 Control Room

The Control Room is located on the second floor of the Process Building, and is the initial control center for directing the onsite response effort to an event. The Control Room is sealed to prevent entry of external contamination from the Process Area. Automatic dampers located in the air supply ducts close when smoke is sensed at the inlets. The Control Room contains those controls, instruments, and communications equipment necessary for operation of the plant under both normal and emergency conditions. Access to the Control Room is controlled by the Senior Shift Supervisor. During a declared emergency, the personnel within the Control Room shall be limited to the operating shift complement, support personnel authorized access by the Senior Shift Supervisor, the Operations Coordinator, the Onsite Emergency Director, and a representative of the Nuclear Regulatory Commission (NRC).

6.1.2 Onsite Emergency Center

The Onsite Emergency Center (OEC) is located in the Control Room. However, should habitability problems arise, the Onsite Emergency Director may decide to move the OEC to the Carlile Training Center (offsite). The OEC becomes the principal onsite center for direction and control of the onsite response effort once the
* Senior Vice President (or alternate) assumes Onsite Emergency Director duties from the Senior Shift Supervisor. The OEC serves as the primary communications center for the facility during an

* - Conduct onsite and offsite monitoring.

- Conduct personnel accountability to account for all persons onsite.

- Isolate and clean contaminated areas.

- Submit special bioassay samples for exposed personnel.

- Calculate an offsite hazards projection.

c. Control Room and/or Site Evacuation.

- Activate the Offsite Emergency Warning System.

- Evacuate all non-essential personnel offsite.

- Conduct personnel accountability.

d. A major fire causing extensive facility damage.

- Activate the Offsite Emergency Warning System.

- Life lines should be used in areas containing heavy smoke.

- Minimum of two persons and one standby person per entry team if SCBA-equipped.

- Evacuate affected areas of the facility or the entire site if situation warrants.

- Conduct personnel accountability.

- Don fire fighting protective gear to respond (includes respirators).

e. Security breach: loss of physical control of the facility or sustained damage to vital areas/systems at the facility due to sabotage.

- Activate the Offsite Emergency Warning System.

- Notify management to alert employees onsite.

- Evacuate all non-essential personnel offsite.

- Conduct personnel accountability.

6.2 Site Access Control

During a declared emergency, site access control shall be maintained by the Hazards Assessment and Control Coordinator and security personnel. Access to the site by other than designated Sequoyah Fuels Corporation response personnel must be approved by the Onsite Emergency Director or the Offsite Emergency Director (after informing the Onsite Emergency Director.) Special identification cards will be used to designate individuals authorized access during an emergency.

6.3 Communications Equipment

6.3.1 Communications Systems

Normal communications at the facility are provided by a private automatic telephone system (PABX).

An Operator-Control Room FM radio communications system consists of a base station in the Control Room and portable, two-way sets carried by operators. The Operator-Control Room radio system is supplied from emergency power. An ample supply of portable units is stored in the Control Room. These units are also used as Emergency Team radios.

The facility public address system is used in conjunction with the air horn signal system to alert employees and direct them away from hazardous areas. These two systems comprise the Onsite Emergency Notification System. The air horn signal alerts personnel to an emergency condition. Ther information is passed over the public address system concerning protective actions and evacuation routes. Activation of the air horn signal system also automatically shuts down the ventilation supply fans for the administration, laboratory, and change room areas, and the Control Room.

Both the air horn and the public address signal systems are activated from the Control Room or the South Guard House. Additionally, the air horn signal is automatically activated by the Solvent Extraction emergency. From the OEC, the Onsite Emergency Director and key coordinators provide technical and administrative support to the Senior Shift Supervisor in the Control Room and direct assessment and corrective action response efforts onsite.

6.1.3 Assembly and Support Center

The Assembly and Support Center (ASC) is an onsite or offsite assembly area where facility personnel without specific response assignments report in a declared emergency. Personnel accountability procedures are executed from the ASC, and the ASC serves as a resource pool of skilled personnel available to the Onsite Emergency Director as required. One principal and several alternate locations are designated to serve as ASC's, depending upon habitability. The principal ASC is the facility lunchroom. Alternate ASC's include the South Guard House, the UF_4 Building, and the Carlile Training Center.

6.1.4 Offsite Response Center

The Offsite Response Center (ORC) is located in the Carlile Training Center, about one mile east of the facility. This building serves as the center for the management of overall response operations, both onsite and offsite. The ORC serves as the coordination center for communications and liaison with Federal, State, and local officials as well as offsite response and support groups. Offsite radiological and environmental assessment activities are directed and coordinated from the ORC. Additionally, when fully staffed, the ORC provides technical and logistical support to the onsite response effort as required. Finally, the ORC contains a public information center, which serves as a briefing room and waiting area for members of the media. During a declared emergency, access to the ORC, and specific areas within it, is controlled by the Offsite Emergency Director.

6.1.5 Corporate Emergency Center

* When an emergency is declared at the Site Area or General Emergency level, an Emergency Center will be activated at the General Atomics' San Diego office. This center will be staffed by management, technical, and communications personnel. Communications equipment includes a commercial telephone system.

reference documents are available. Offsite environmental assessment personnel are located in the ORC. Offsite emergency monitoring equipment and supplies are stored at the ORC.

6.5 Onsite Medical Facilities

6.5.1 First Aid Room

The First Aid Room contains the following facilities, equipment, and supplies:

- Standard first aid supplies as recommended by the American Red Cross.
- HF acid treatment supplies.
- Oxygen resuscitation equipment.

* 6.5.2 Health Physics Lab

- Portable and laboratory type radiation detection instrumentation.
- Portable air sampling equipment.

6.5.3 Ambulance

A fully-equipped ambulance is maintained onsite for transport of injured personnel to offsite medical facilities. In addition to medical equipment and supplies, it contains self contained breathing apparatus and protective clothing.

6.6 Emergency Monitoring Equipment

6.6.1 Liquid Effluent Monitors

There are two liquid effluent monitoring systems. They are:

a. A continuous sampler is used to monitor the facility liquid effluent. The discharge point is regulated by an EPA discharge permit (NPDES) for chemical components and for radioactive material by NRC regulations.

b. Facility surface water run-off following periods of rainfall is monitored by proportional samplers installed at run-off points.

* Revised

Building sprinkler foam system. The air horn signal system is backed up by 24 VAC emergency battery power. The public address system is backed up by 120 VAC supplied by an emergency generator.

* The Emergency Notification System, comprised of the offsite siren and automatic telephone systems, is used to alert the offsite public to take protective actions in the event of a General Emergency at Sequoyah Facility. The system is activated from the Control Room or the South Guard House, either by, or at the direction of, the Onsite Emergency Director (Senior Shift Supervisor until relieved). The automatic telephone system is designed to provide backup to the offsite sirens, and both are activated simultaneously.

The offsite sirens are powered by offsite AC power with the control circuit powered by site AC power backed up by emergency generator-supplied power. The automatic telephone system operates independently of site electrical power. The offsite system is backed up by both offsite emergency battery and diesel generator supplied power.

6.3.2 Response Center Communications Scheme:

Figure 6-1 provides an example of primary and alternate communications methods among the various response centers, as well as the means available to communicate with plant operators, other facility personnel, and the offsite public.

6.3.3 Surveillance Testing

Emergency communications equipment that is not otherwise in normal use will be operationally checked monthly, and after each use. The Contingency Plan Coordinator ensures that operational checks are properly performed and documented.

6.4 Assessment Team Facilities

Onsite assessment personnel are located in the OEC. The OEC may be moved to alternate locations if habitability problems arise (6.1.2). During normal conditions, the OEC area (Control Room) is adjacent to the facility engineering offices. Therefore, a comprehensive library of plant procedures, plant drawings, and

- Standard First Aid Supplies as recommended by the American Red Cross and HF acid treatment supplies including but not limited to:

  Alcohol, Rubbing
  Bacitracin Ointment USP
  Adhesive bandages, assorted sizes
  Compresses (sterile assorted sizes)
  Cotton Balls
  First Aid Spray
  Hydrogen Peroxide
  Labstix #28810 (Test for pH, Protein, Glucose and Blood in urine)
  Cotton Swabs
  Roll of Gauze (assorted sizes)
  Surgical Scissors
  * 2.5% Calcium Gluconate Gel
  Adhesive Tape

- Bioassay Sampling Supplies.

- Fire Extinguishers:
  Dry chemical, CO_2; pressurized water, and Halon (laboratory).

- A Water Supply with a water spray hose and other decontamination supplies (soap, wash rags, brushes, towels and clean clothing).

- Barricade rope, multipurpose radiation warning signs with inserts and tape.

- A Tool Kit containing screw drivers, pliers, assorted crescent wrenches, masking tape, flash lights with spare batteries, and knives

- A Copy of the Contingency Plan, CPIP's, and Emergency Procedures.

* Revised

6.6.2 Air Monitors

Air sampling monitor stations that would be used to assess concentrations of material (radiological and chemical) being released to the unrestricted area are:

a. Protected area fence line samplers located at each of the cardinal points of the compass.

b. Offsite air samplers are located in areas of higher population densities, at the nearest residence, and also at the point of maximum downwind concentration based on available meteorological history.

6.6.3 Meteorological Monitors

Facility meteorological measurement systems are comprised of wind speed and direction equipment located at an elevated position on the Main Process Building roof. The data this equipment provides are recorded on a strip chart recorder in the Control Room.

6.6.4 Portable Monitoring Equipment and Emergency Equipment

* Portable monitoring equipment and supplies are stored at strategic locations onsite and offsite. These locations are: 1) the Emergency Response Equipment Room, 2) the North Guard House, 3) the South Guard House, and 4) the Carlile Training Center. Each location has the following equipment available:

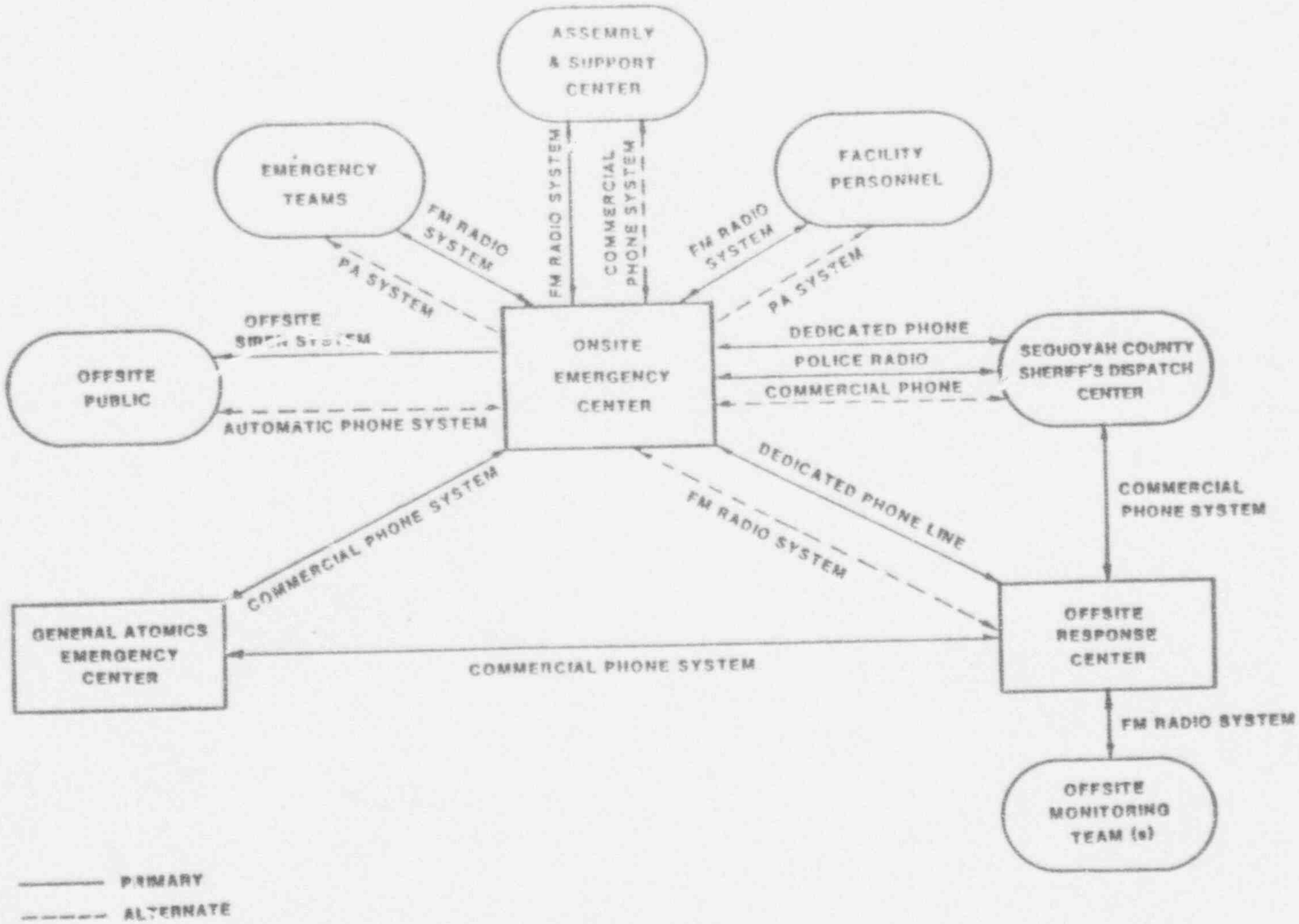
- Portable Radiation Survey Instruments:
  * Alpha Detection Instrument: Range: 0-500 K cpm; Efficiency: 30% Beta-Gamma G-M Survey Instrument: Range: 0-500 K cpm; Gamma Sensitivity: 3000 cpm per mR/hr; Beta efficiency: 10%

- Self Contained Breathing Apparatus:
  * Two each in the North Guard House, the South Guard House, the Carlile Training Center, and the Emergency Response Equipment Room.

- Anti-Contamination Clothing:
  (hoods, coveralls, shoe covers, PVC gloves and rain suits).

- Portable Air Sampling Equipment:
  * (North Guard House and South Guard Houses only, have 12VDC samplers; Emergency Response Equipment Room and Carlile Training Center have A.C. samplers).

* Revised



RESPONSE CENTER
COMMUNICATIONS SCHEME
FIGURE 6-1

6.6.5 Health Physics Pickup Truck

The Health Physics Pickup Truck can be equipped with a portable A. C. generator to power air sampling equipment.

6.7 Additional Emergency Equipment

In addition to the previously described equipment, the following additional emergency equipment is available:

- Critical locations in the process and cylinder handling areas have emergency escape respirators that may be used for escape under emergency conditions.

* - The Emergency Response Equipment Room (MCC #3) contains protective fire fighting equipment (boots, helmets self contained breathing apparatus, bunker coats and gloves), face shields, safety lanyards and acid suits for use under severe HF conditions.

- The Control Room has self-contained breathing apparatus with extra air bottles and a copy of the Contingency Plan and CPIP's.

7.0 MAINTENANCE OF PREPAREDNESS

A constant state of contingency preparedness is maintained at the Sequoyah Facility through sound management and administrative controls. The maintenance program is comprised of three distinct but closely related efforts: 1) periodic review and revision of the Contingency Plan, Contingency Plan Implementing Procedures (CPIP's), and facility Emergency Procedures; 2) a comprehensive Contingency Plan training program for all facility employees, with performance-based training for those individuals having specific response assignments; and 3) a program of periodic drills to exercise and evaluate the Plan. Changes to the Contingency Plan and CPIP's that affect offsite agencies will be implemented in coordination with those agencies.

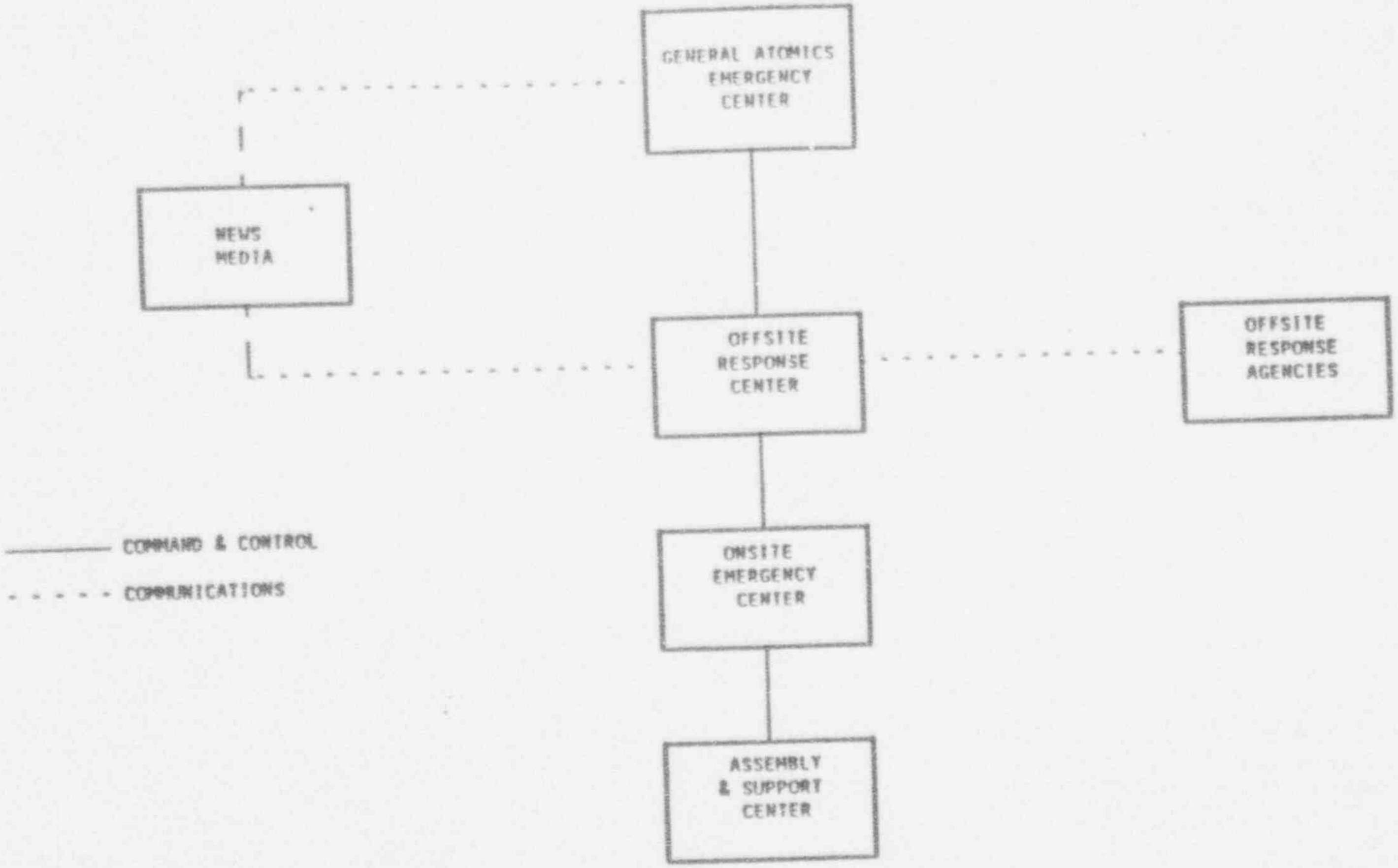
7.1 Contingency Plan and Procedures

A Contingency Plan Coordinator is assigned to ensure the periodic review and update of the Contingency Plan, CPIP's, and related Emergency Procedures. He will ensure that all proposed changes are reviewed by key individuals responsible for implementation of affected areas of the Plan. Any disagreement or uncertainty with respect to duties, responsibilities, action levels, and actions that are to be taken by each group or individual will be addressed with the Contingency Plan Coordinator. The final authority for matters relating to onsite response will be the General Manager. The final authority for matters involving offsite response will be the President, Sequoyah Fuels Corporation. *

7.2 Training

The facility Training Program is designed to train all facility personnel and members of the Onsite Contingency Response Organization in the safe handling of uranium and hazardous materials, as well as the effective operation of systems and equipment at the Sequoyah Facility. The training consists of both classroom instruction and in-plant training in four basic program elements: (1) Radiation and Chemical Safety, (2) Plant Operations, (3) Equipment Operations, and (4) the Contingency Plan, Emergency Procedures, and CPIP's.

* Revised



RESPONSE CENTER

COMMAND, CONTROL, & COMMUNICATIONS

FIGURE 6 - 2

Medical support personnel at offsite medical treatment facilities will receive initial and annual refresher training as described in Table 7-5.

7.3 Exercises and Drills

In order to maintain proficiency in emergency response, periodic exercises and drills will be conducted to test all or part of the overall contingency response capability at the Sequoyah Facility. The Contingency Plan Coordinator is responsible for implementing the exercise and drill program.

An exercise is designed to measure the integrated capability and a major portion of the elements of the Contingency Plan. An exercise will be conducted biennially (every two years). SFC will cooperate with offsite response groups should they desire to participate in this exercise. The exercise will be accomplished through a formal, detailed scenario, using observation and control personnel. A post-exercise critique will be conducted, deficiencies identified, and remedial action responsibility assigned.

A drill is a supervised instruction period to test, develop, and maintain skills in emergency response. Drills will be conducted as follows:

a. Communications drills are held monthly. Communications systems not used daily will be tested.
* b. Three fire drills are conducted per year.
c. A medical emergency drill involving a contaminated victim is conducted annually.
d. A radiological monitoring drill is conducted annually.
e. Onsite hazards control and assessment drills are conducted semi-annually for liquid and airborne releases.

During drills and exercises, dedicated emergency equipment and supplies will be used.

7.4 Review and Updating of the Plan and Procedures

The Contingency Plan, CPIP's, and Emergency Procedures will be reviewed and updated as required on an annual basis. The review will be coordinated by the Contingency Plan Coordinator and changes will be reviewed by the Plant Operations Review Committee and approved by the Senior Vice President. In addition to the annual review, this Plan will be reviewed whenever changes occur in processes, kinds of materials processed, facility organization, or other key factors affecting response

All facility employees receive initial and annual refresher General Employee Training on the Contingency Plan and their actions and responsibilities. Members of the Onsite Contingency Response Organization and Offsite Response Organization receive initial and annual refresher training on the Contingency Plan and assigned CPIP's. Members of the Emergency Teams receive initial and annual refresher training on the Contingency Plan and assigned CPIP's and Emergency Procedures. Additionally, members of the First Aid Team will be qualified at the level of the Red Cross Multi Media Course or equivalent.

Annual refresher training will cover the same course content as the initial training, and will include additional information based upon new regulatory or industry experience. Refresher training is anticipated to take approximately one half the class room time required for initial training, due to the students higher initial knowledge level gained from init'al training and from the drill and exercise program.

* Tables 7-1 through 7-5 outline the initial Contingency Plan Training Programs for 1) all Sequoyah Facility employees, 2) members of the Onsite Contingency Response Organization, 3) offsite response personnel and, 4) offsite medical support personnel. Retraining is conducted annually as required to cover Plan or procedure changes. Training of Fire and Rescue, and First Aid Team members is covered in Table 7-6. The Contingency Plan Coordinator will work with the facility Training Coordinator to ensure that all required personnel are trained and certified competent. Where substantive changes in the Plan or implementing procedures are involved, affected personnel are notified of the nature of the changes prior to implementation, training courses are updated within 30 days, and retraining is scheduled and accomplished, if required, as soon as practicable.

The offsite response groups, including health department personnel will be offered initial instruction and annual retraining in the areas of the Contingency Plan which affect their ability to respond to an emergency when needed. These areas will include, as applicable:

1 - Notification procedures
2 - Expected participation
3 - Basic radiation and chemical protection
4 - Emergency organization

TABLE 7-1

CONTINGENCY PLAN TRAINING

FOR ALL FACILITY EMPLOYEES

Contingency Plan Introduction

Contingency Response Organization

Classification of Events

Notification and Employee Responsibilities

Protective Actions

Personnel Accountability

Drills and Tests

capability. This Plan and the CPIP's will be reviewed annually plus or minus 3 months by regulatory compliance personnel. Changes in the Contingency Plan will be communicated to the NRC within six months of implementation.

7.5 Maintenance of Emergency Equipment and Supplies

The equipment, instrumentation, and supplies available for use in an emergency are described in Section 6. To insure that these will be available and functional when needed, the following schedule for maintenance and inventory checks will be adhered to:

* a. Radiation detection instruments will be operationally checked monthly and calibrated semi-annually or when repaired.

b. Protective breathing equipment and protective clothing will be checked monthly.

c. Inventory of instruments, protective clothing and devices, and emergency supplies will be performed, at a minimum, quarterly.

d. Auxiliary lighting will be checked quarterly.

Equipment and supplies will be replaced immediately if missing, and or if used in an actual emergency or a drill, will be repaired as soon as possible if found deficient. Where practicable, seals will be used on emergency equipment and supplies to provide for deterrence and detection of tampering. The Contingency Plan Coordinator will be responsible for ensuring the above checks are conducted within the required schedule, and documented.

* Revised

	CONTINGENCY PLAN OVERVIEW	NOTIFICATION	PERSONNEL PROTECTION METHODS & EQUIPMENT	COMMUNICATIONS METHODS & EQUIPMENT	ASSIGNED CPIP'S	RELATED CPIP'S
ONSITE EMERGENCY DIRECTOR & SENIOR SHIFT SUPERVISOR	X	X	X	X	X	X
OPERATIONS GROUP	X		X	X	X	X
HAZARDS ASSESSMENT & CONTROL GROUP	X		X	X	X	X
DAMAGE CONTROL & REPAIR GROUP	X		X	X	X	X
ADMINISTRATION & SECURITY GROUP	X		X	X	X	X
TECHNICAL SUPPORT GROUP	X		X	X	X	X
ASSEMBLY & SUPPORT CENTER SUPERVISOR	X		X	X	X	X
EMERGENCY COMMUNICATOR	X	X	X	X	X	X
RESCUE & ASSISTANCE TEAM	X		X	X	X	X
FIRST AID TEAM	X		X	X	X	X
FIRE FIGHTING TEAM	X		X	X	X	X

ASSIGNED TRAINING FOR THE

ONSITE CONTINGENCY RESPONSE ORGANIZATION

TABLE 7 - 3

TABLE 7-2

ONSITE CONTINGENCY PLAN TRAINING PROGRAM

Contingency Plan Overview

- Classification
- Organization
- Response Measures
- Facilities and Equipment
- Contingency Plan Maintenance
- Records and Reports
- Recovery
- Postulated Accidents

Notification

- Onsite
- Offsite

Personnel Protection Methods and Equipment (Classroom)

Communications Methods and Equipment

Assigned CPIP's

TABLE 7-5

TRAINING FOR OFFSITE

MEDICAL SUPPORT PERSONNEL

Basic Radiation Training

Contamination Control Methods and Practices

Personnel Decontamination

Triage of Contaminated, Injured Victims

Protocol for the Emergency Care of Radiation Accident Victims

Chemical Injuries

Material Safety Data Sheets

Table 7-4

OFFSITE RESPONSE ORGANIZATION

Contingency Plan Overview

- Classification
- Organization
- Response Measures
- Facilities and Equipment (Offsite)
- Contingency Plan Maintenance
- Records and Reports
- Recovery
- Postulated Accidents

OfFsite Response Center Familiarization

Communications Methods and Equipment

Assigned CPIP's

8.0 RECORDS AND REPORTS

8.1 Records of Incidents

Comprehensive incident records will be kept to document any emergency declared in accordance with the requirements of this Plan. These records will be sufficiently detailed to provide for post-event analysis and documentation. The retention time for each record described in this section will be in accordance with corporate policy and applicable regulations.

Upon declaration of an emergency, an Emergency Log will be implemented and maintained by the Onsite Emergency Director or his designee until the emergency is terminated and closed out. Additional information will be documented by other means, such as operational logs, survey reports, and procedure checklists. This documentation will provide the following types of information:

a. The emergency classification and the time of declaration.
b. A description of the event, including the cause, if known.
c. Implementation and completion times for significant response actions, such as:

   - Notification
   - Activation of response personnel and facilities
   - Evacuation
   - Personnel accountability
   - Emergency teams dispatched (monitoring, fire and rescue, first aid, etc.)
   - Mitigation and corrective activities

d. Meteorological data (where a release has occurred or is anticipated).
e. Augmentation of the emergency organization.
f. Offsite support assistance requested and received.
g. Descriptions of personal injuries, or plant/equipment damage.
h. The extent to which response equipment was used.
i. Radiological survey and effluent data.
j. Offsite notification dates, times, personnel, and organizations contacted.

Specific assignments of responsibility for the maintenance of each type of record are made in the implementing procedures for this Plan.

TABLE 7-6

FIRE FIGHTING AND FIRST AID TRAINING

General Employee Training

Fire Fighting:

Basic Fire Fighting Techniques

Types ar ่ Uses of Fire Extinguishers

Fire Fighting Techniques using Fire Extinguishers

First Aid:

Basic Principles

CPR

Heimlich Maneuver

First Aid Treatment for Shock, Heat Stroke, Burns, Fractures, etc.

Transporting Injured Persons

Emergency Team Training

Fire Fighting:

Protective Equipment

Facility Fire-Fighting Equipment

Special Facility Fire Situations

First Aid:

First Aid Team Responsibilities

Emergency First Aid Equipment

First Aid Treatment for Chemical-Related Injuries

Red Cross Multi Media First Aid Course (or equivalent)

c. Site Area Emergency:

* - Hazardous Materials Emergency Response Commission of Oklahoma
- Sequoyah County Sheriff's Office (then notify other offsite agencies)
- U.S. Nuclear Regulatory Commission
- Onsite Contingency Response Organization (activate)
- Offsite Response Organization (activate)

d. General Emergency:

- Activate Emergency Notification System
* - Hazardous Materials Emergency Response Commission of Oklahoma
- U.S. Nuclear Regulatory Commission
- National Response Center
- Sequoyah Memorial Hospital
- Sparks Regional Medical Center
- Onsite Contingency Response Organization (activate)
- Offsite Response Organization (activate)

8.3.2 Contingency Plan Implementation Reports

The following reports will be made:

a. Unusual Event - A written summary filed in the facility records system within 30 days.

b. Alert - Verbal summary followed by a written summary within 48 hours.

c. Site Area Emergency and General Emergency - Briefing followed by a written summary within 24 hours to offsite agencies.

8.3.3 U.S. Nuclear Regulatory Commission (NRC)

The following notification and reports will be made to the NRC in accordance with Sequoyah Facility Operating Procedure, "Reporting Requirements."

a. Immediate Notification:

The NRC will be immediately notified of events covered in 10 CFR 20. 403(a). During normal working hours, notification will be made to the Administrator, Region IV. At all other times, notification will be made to the NRC Emergency

8.2 Records of Preparedness Assurance

Records will be kept on file at the Sequoyah Facility that confirm the maintenance of preparedness to respond to contingencies as described in Section 3.2. These will include the following:

a. Training Records - Include names of individuals, course material, duration of instruction, and test results.

b. Records documenting drills and exercises - Include scenarios, the results of critiques, and commitment to make needed changes.

c. Inventory records - Include the types, quantities and locations of emergency equipment and supplies.

d. Records documenting maintenance, surveillance, and testing of emergency equipment and supplies.

e. Records documenting reviews and updates of the Contingency Plan and CPIP's.

8.3 Reporting

8.3.1 Notification

Upon declaration of an event under this Plan, the Onsite Emergency Director will direct the Emergency Communicator to make the following notifications using the communications systems described in Section 6.3.

a. Unusual Event:

* - Senior Vice President (or alternate)

b. Alert:

- Hazardous Materials Emergency Response Commission of Oklahoma
- U.S. Nuclear Regulatory Commission
- Onsite Contingency Response Organization (activate)
- Offsite Response Organization (standby alert)

9.0 Recovery

9.1 Re-Entry

In the event that an emergency at the Sequoyah Facility results in conditions that cause the site or affected areas of the plant to be evacuated, re-entry will be made subject to the following conditions:

a. Due to the low specific activity of natural uranium, personnel exposures are not expected to approach the exposure guidelines for emergency workers or lifesaving activities. Therefore, re-entry may be made using proper protective clothing, equipment and monitoring instrumentation, without imposition of special external radiation exposure limits.

b. Re-entry into areas where potentially hazardous conditions still exist or are suspected will be made only to save human life or to limit release of hazardous materials.

c. The re-entry decision shall be made by the Onsite Emergency Director based upon the best available information.

The re-entry team will utilize protective clothing and equipment as specified by the Hazards Assessment and Control Coordinator, and will maintain communications with emergency command and control personnel throughout the re-entry.

9.2 Plant Restoration

Upon termination of the event and closeout of the emergency, the Recovery Organization (Figure 9-1) will commence recovery operations. A damage assessment will be made that will include:

a. A thorough survey of the nature and extent of damage to facility structures, equipment and components.

b. An assessment of the potential for further releases of radioactive or hazardous material.

During or immediately following the assessment, the President of Sequoyah Fuels Corporation will decide whether the magnitude of the damage requires implementation of a Recovery Organization (Figure 9-1).

Operations Center in Washington, D.C. Notification may be made by telephone, telegram, mailgram or facsimile. A written follow-up report will be made as required.

b. Twenty-Four Hour Notification:

The NRC will be notified within 24 hours of events covered in 10 CFR 20.403(b). Notifications will be made in the manner described in the preceding paragraph.

c. Thirty Day Written Report:

A written report will be submitted to the NRC of events covered in 10 CFR 20.405. The report will be sent to the US NRC, Document Control Desk, Washington, D.C., with a copy sent to Region IV, Arlington, TX.

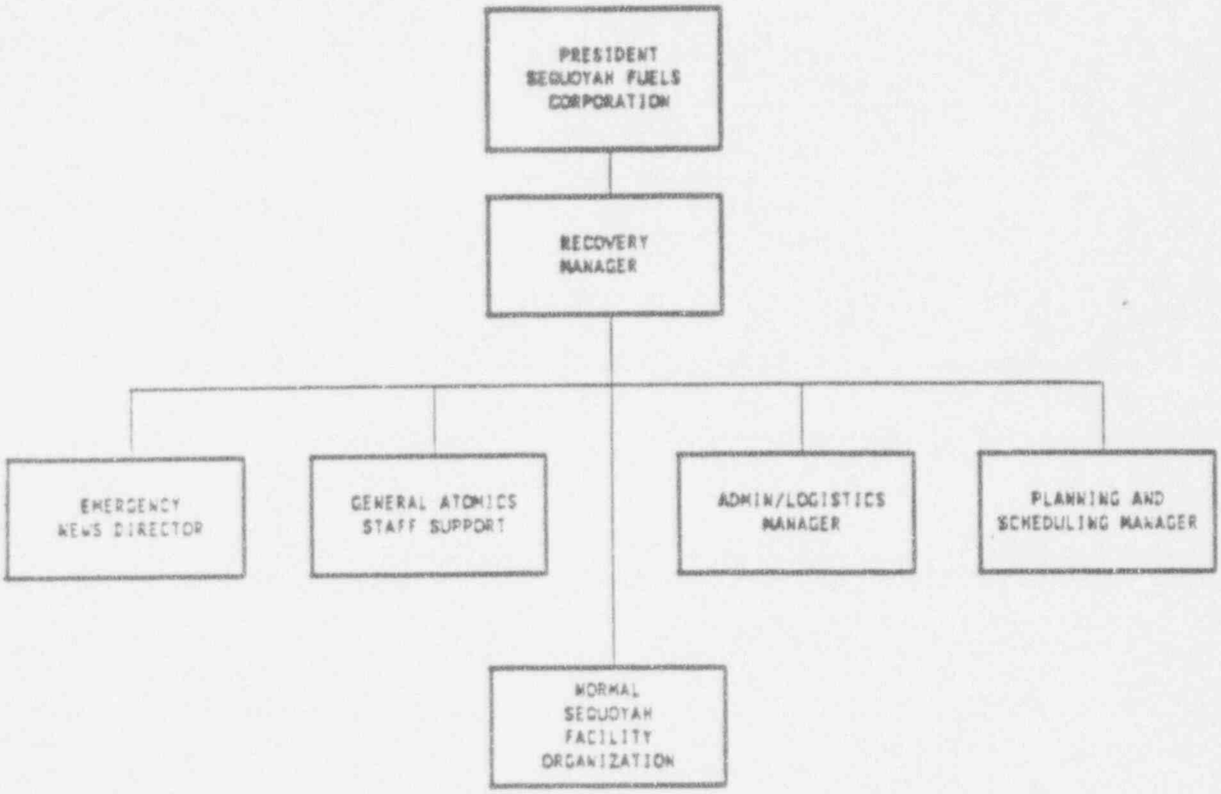
8.3.4 <u>National Response Center</u>

Release of reportable quantities of hazardous substances (as specified by 40 CFR 302) will be reported by telephone to the National Response Center in accordance with Sequoyah Facility Operating Procedures.

*

8.3.5 <u>Hazardous Materials Emergency Response Commission of Oklahoma</u>

Offsite release of reportable quantities of hazardous substances (as specified by SARA Title III) will result in emergency notification of the Hazardous Materials Emergency Response Commission of Oklahoma and local response agencies.



TYPICAL RECOVERY ORGANIZATION

FIGURE 9 - 1

Upon completion of the assessment, the following corrective actions shall be taken:

a. A survey of contaminated areas and implementation of contamination control measures as necessary.

b. Development and implementation of an action plan to check and restore to normal operation safety systems and equipment, such as radiation monitoring equipment, respiratory protection equipment, alarm systems, fire protection systems, etc.

c. An inventory will be made of emergency equipment and supplies. Items will be restocked as necessary.

After the above actions are completed to the extent practicable, and the plant is deemed to be in a stable, cold shutdown
* condition, the Senior Vice President may declare that the plant is safely restored.

9.3 Resumption of Operations

Once the facility is declared restored to a safe, stable condition, an investigation will be conducted to determine the cause of the incident. Decontamination operations shall be conducted and surveys performed to ensure that contaminated areas are restored within applicable limits. An engineering check shall be made of facility systems to assure that all parameters are as required for restart. Once required corrective actions have been completed and concurrence from
* regulatory agencies obtained, if required, the Senior Vice President will declare the resumption of normal operations.

APPENDIX B

Typical Contingency Plan Implementing Procedures

Organization
Contingency Response Organization

* <u>Activation</u>
Recognition and Classification of an Emergency
Unusual Event
Alert
Site Area Emergency
General Emergency
* Activation of Assembly and Support Center (ASC)
Offsite Response Center Activation and Operation

<u>Assessment</u>
* Hazard Assessment and Projection
Onsite Monitoring
Offsite Monitoring

<u>Protective Actions</u>
* Emergency Exposure Control and Respiratory Protection
Emergency Evacuation
Rescue and Assistance

* Emergency Contamination Control and Decontamination
Emergency Personnel Monitoring
Personnel Accountability
Traffic and Access Control

* <u>Communications, Documentation, and Records</u>
Communications During an Emergency
Record-Keeping and Documentation During an Emergency
Reports

<u>Recovery</u>
Re-Entry
Transition to Recovery

* <u>Administrative</u>
Onsite Contingency Response Organization
Offsite Response Organization
Contingency Training Program
Drills and Exercise Program
Emergency Equipment and Supplies
Contingency Plan Maintenance

APPENDIX A

REFERENCES

1. Sequoyah Fuels, Corporation, Sequoyah Facility License SUB-1010, Docket No. 40-8027, Revised August, 1986.

2. U.S. Nuclear Regulatory Commission, Standard Report and Content for Radiological Contingency Plans for Fuel Cycle and Materials Facilities, January 1981, NUREG-0762.

3. U.S. Nuclear Regulatory Commission, Standard Review Plan for the Review of Radiological Contingency Plans for Fuel Cycle and Materials Facilities, June 1981, NUREG-0810.

4. U.S. Nuclear Regulatory Commission, A Regulatory Analysis on Emergency Preparedness for Fuel Cycle and Other Radioactive Material Licencees, June 1985, NUREG-1140.

5. U.S. Nuclear Regulatory Commission, Environmental Assessment for Renewal of Special Nuclear Material License No. SUB-1010, Docket No. 40-8027, Sequoyah Fuels Corporation, August 1985, NUREG-1157.

6. U. S. Nuclear Regulatory Commission, Rupture of Model 48Y Cylinder and Release of Uranium Hexafluoride, February 1986, NUREG-1179.

7. U.S. Nuclear Regulatory Commission, Assessment of the Public Health Impact from the Accidental Release of UF6 at the Sequoyah Fuels Corporation of Gore, Oklahoma, March 1986, NUREG-1189.

8. U.S. Code of Federal Regulations, Part 10 - Energy.

9. U.S. Code of Federal Regulations, Part 40 - Environment.

APPENDIX C

LETTERS OF AGREEMENT

CONTINGENCY PLAN

FOR

SEQUOYAH FACILITY,

SEQUOYAH FUELS CORPORATION

GORE, OKLAHOMA

DOCKET NO. 40-8027

SOURCE MATERIAL LICENSE NO. SUB-1010

Revision No. 10, 04/91

0309S

[redacted]

Attachment 12

SEQUOYAH FUELS
CORPORATION

April 8, 1991

Certified Mail
Return Receipt Requested

Charles J. Haughney, Chief
Fuel Cycle Safety Branch
Division of Industrial and
Medical Nuclear Safety, NMSS
U.S. NUCLEAR REGULATORY COMMISSION
Washington, D.C. 20555

RE: License SUB-1010; Docket No. 40-8027
Contingency Plan - Revision No. 10

Dear Mr. Haughney:

In conformance with Sequoyah Facility License SUB-1010, Sequoyah Fuels Corporation (SFC) submits six (6) copies of Revision No. 10 to the Sequoyah Facility Contingency Plan for NRC review. The Contingency Plan has been revised to reflect organizational changes. The enclosed revision to the Plan has been reviewed and approved as required by the subject license and does not decrease the response effectiveness of the Contingency Plan. To facilitate your review, all changes are indicated by an asterisk in the left hand margin.

Also enclosed with this letter is a revision to Chapter 8 of SUB-1010 to show the date of Revision No. 10 the Contingency Plan. This revision is indicated by a bar mark in the left hand margin.

Should you have any questions concerning either of these revisions, you may contact me at 918/489-3207 at your earliest convenience.

Sincerely,

Lee Lacey

Lee R. Lacey
Vice President
Regulatory Affairs

LRL:nv

Enclosures as stated

xc: K. E. Asmussen, General Atomics
A. Bill Beach, NRC Region IV

PDR ADOCK 04008027
PDR

77

RETURN 1 ~~396~~ SS RE: 8861-N
40-8027
PDR | LPDR

SEQUOYAH FUELS CORPORATION

P O BOX 610 • GORE OKLAHOMA 74435

Attachment 14

December ~~21~~, 1988

RECEIVED

Certified Mail
Return Receipt Requested

Mr. Leland C. Rouse, Chief
Fuel Cycle Safety Branch
Division of Industrial and
Medical Nuclear Safety, NMSS
U. S. NUCLEAR REGULATORY COMMISSION
Washington, D.C. 20555

RE: License SUB-1010; Docket No. 40-8027
Contingency Plan Revisions

Dear Mr. Rouse:

In conformance with Sequoyah Facility License SUB-1010, Sequoyah Fuels Corporation submits six (6) copies of Revision No. 5 to the Sequoyah Facility Contingency Plan for NRC review. The Contingency Plan has been revised to reflect recent organizational and administrative changes in Sequoyah Facility License due to a change in corporate ownership, authorized by NRC in Amendment No. 22, issued October 28, 1988. The enclosed revision to the Contingency Plan has been reviewed and approved as required by subject license and does not decrease the response effectiveness of the Contingency Plan.

To facilitate your review, all changes are indicated by an asterisk in the left hand margin. Enclosure 1 to this letter contains a list of the revised pages, and pages that are to be replaced.

You will note that some pages have been included which do not contain any revisions. We recently converted the text of the Contingency Plan to a different word processing program which resulted in a reformatting of the text. These additional pages provide continuity to the revised pages.

FEE NOT REQUIRED
Does Not Decrease Effectiveness

DF04
1/1

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C PDC

25046

Should you have questions concerning any of these changes, please contact me at your earliest convenience.

Sincerely,

Scott P. Knight

Scott P. Knight
Vice President
Administration

SPK:JTC:nv

Enclosures as stated (6 copies)

cc: R. D. Smith, NRC, Region IV - URFO
K. E. Asmussen, General Atomics

Attachment 15

SEQUOYAH FUELS CORPORATION

May 7, 1986

RECEIVED
MAY - 9 1986

Mr. Robert Martin
U.S. Nuclear Regulatory Commission
Region IV
611 Ryan Plaza Drive
Arlington, Texas 76011

RE: License SUB-1010
Docket 40-8027

Dear Mr. Martin:

By letter dated January 9, 1986, the Sequoyah Fuels Corporation committed not to restart the UF_6 process plant at the Sequoyah Facility without the concurrence of the NRC. SFC also voluntarily undertook a number of commitments as a result of the January 4th accident, all of which were summarized in your Confirmation of Action letter dated January 17, 1986. As described below, SFC will have complied fully with those commitments by May 22, 1986.

In addition, SFC has engaged in an extensive program of remedial steps designed to minimize the possibility of any recurrence of the January 4th accident, and to provide additional assurance that the Facility will operate safely and effectively. Those steps were undertaken with the knowledge and the assistance of NRC staff. Based upon that program, SFC expects the Facility to be ready for restart on May 22, 1986, or shortly thereafter. Accordingly, SFC now requests the NRC to concur in the Facility's restart on May 22, 1986, or as soon thereafter as the equipment modifications described below have been completed.

I
The Commitments Described
in the January 17th Letter

Your letter dated January 17, 1986, listed six commitments made by SFC in connection with the January 4th accident. By May 22, 1986, all of those commitments will have been complied with fully by SFC.

1.. Metallurgical testing of the ruptured cylinder.

In accordance with its commitment, on January 27, 1986 SFC submitted a plan to the NRC for detailed metallurgical testing of the ruptured cylinder. NRC reviewed and approved the plan and the independent testing laboratory selected to perform the testing on February 10, 1986.

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The final report describing their comprehensive investigation was published by the testing laboratory on April 23, 1986 and copies were mailed to NRC staff and consultants on that date.

2. Scale testing plan.

In accordance with its commitment, SFC submitted a plan to the NRC for detailed testing and examination of the Facility's filling and accountability scales on January 21, 1986. NRC approved the plan, and the detailed examination was completed on January 28, 1986. Results of the examination were provided to the NRC by mail following the February 4, 1986 date of reporting. In addition, the north filling scale at the Facility was subsequently certified accurate to within its design accuracy of 0.1%.

Although not required by the commitment described in your January 17th letter, SFC will also complete extensive modifications to the Facility's cylinder filling area by May 22, 1986, or shortly thereafter. Those modifications include important improvements in the methods for filling and weighing cylinders designed to prevent overfilling. Those improvements are more fully described below in Part II Section 4.

3. Cold trap operating procedure.

In accordance with its commitment, SFC submitted procedures to the NRC on March 24, 1986 to drain the Facility's cold traps and to maintain the operability of the secondary cold traps. NRC approved the procedures on April 4, 1986 and with NRC's concurrence, the cold traps were drained. Purging of the system was completed, again based upon procedures reviewed and approved by the NRC on April 11, 1986. Construction of modifications to the Facility's drain stations is now underway.

4. Disposition of decontamination waste water.

In accordance with its commitment, SFC submitted a report to the NRC on alternative methods for the disposition of decontamination waste water, and NRC approved the alternative selected by SFC. Subsequent laboratory work identified an improved alternative, which SFC submitted to the NRC on April 21, 1986, together with appropriate implementing procedures. The new option was verbally approved by NRC on April 25, 1986 and uranium recovery is underway.

5. Receipt of yellowcake and transport of UF_6.

By letter dated April 23, 1986 NRC authorized SFC to resume the scheduled receipt, sampling and storage of uranium ore concentrates at the Sequoyah Facility. The Facility began receiving yellowcake on April 24, 1986.

By separate letter dated April 23, 1986 NRC authorized SFC to ship those UF_6 cylinders which are in inventory and to return empty uranium ore concentrate drums and slurry trailers to uranium producers. Shipping of previously filled UF_6 cylinders was started on May 5, 1986.

6. Periodic radiological contamination surveys.

In accordance with its commitment, SFC submitted a plan to the NRC for periodic radiological contamination surveys. The plan was approved by the on-site team, and appropriate surveys have subsequently been conducted in accordance with the plan. A letter dated April 23, 1986 provides status of actions and requests NRC permission to discontinue this augmented program.

II
SFC's Restart Program

As you are aware, SFC has not limited its efforts since January 4th to the commitments described in your January 17th letter. To the contrary, SFC has undertaken an extensive and substantial program of remedial steps designed to minimize the possibility of any recurrence of the January 4th accident and to provide additional assurance that the Facility will operate safely.

In connection with those steps, SFC has met several times with NRC staff to explain details of the remedial work and to report progress. The work has benefitted by assistance from the staff and the close cooperation of state and local agencies and officials. Certain of those steps were designed by SFC to prepare for the safe and orderly restart of the Facility. Other steps, described in Part III of this letter, form part of SFC's continuing long-term program to maintain and enhance the safety and effectiveness of the Facility's operations. As described more fully below, the restart program is now in active progress, and the Facility will be ready for restart on May 22, 1986, or shortly thereafter.

1. Managerial Oversight

SFC has instituted a number of organizational measures to increase managerial oversight and quality assurance of the Facility's operation. New positions have been authorized and highly qualified individuals recruited to fill these positions. Within the last six months appointments include:

S. D. Emerson, General Manager, Sequoyah Fuels Operations

W. L. Utnage, General Manager, Sequoyah Facility

L. R. Lacey, Manager, Safety, Industrial Hygiene and Health Physics

J. V. Marler, Manager of Operations

[illegible] Knight, Manager of Administration and Services

G. M. Barton, Training Coordinator

L. M. Baber, Electrical Engineer

In addition, reporting to Mr. Marler are three new production area managers: G. Jackson, L. Tharp and M. Chilton. All these individuals demonstrate the requisite technical background, the industrial experience, and the managerial expertise needed for their responsibilities. Attachment A is a brief statement of personnel education and experience for the new appointments.

To further enhance our facility organization and to provide SFC upper management an independent assessment of plant operations we have added the position of Manager of Quality Assurance. This individual will report to the General Manager, Sequoyah Facility and will be responsible for developing the facility program and procedures to assure that all operations and safety-related activities are conducted in accordance with approved procedures and in a safe manner. D. R. Swaney, with over 30 years experience in the nuclear industry at both Sequoyah Fuels and Mallinckrodt, was recently named to this position.

In addition, senior management in Oklahoma City, including Kerr-McGee's independent corporate licensing and compliance staff, has committed to exercise increased oversight and supervision.

The creation of the new positions, filled with highly-qualified individuals, is further evidence of our commitment to operate Sequoyah Facility in a safe and effective manner and to protect the health and safety of the workers and the general public.

2. Operating and Administrative Procedures

SFC has undertaken a comprehensive review and revision of the Facility's operating and administrative procedures. The operating procedures are being updated, supplemented and clarified as necessary to provide clear and detailed instructions regarding all important aspects of the Facility and its operation. The operating procedures will be completely revised and republished prior to May 22, 1986, to permit the timely retraining of appropriate employees prior to restart.

3. Retraining

The Facility's employees are highly experienced in the performance of their duties. Nonetheless, SFC has undertaken a substantial and continuing retraining program to recertify that the employees are fully qualified to perform their responsibilities safely and in accordance with the Facility's operating procedures. A new training facility has been established, and training personnel assigned to it. By May 22, 1986, all of the personnel necessary to restart and operate the Facility will have been retrained and recertified to perform their duties.

4. Equipment Modifications

SFC is making significant modifications to the Facility's drain stations to provide additional protection against the overfilling of UF_6 cylinders. The modifications include two sets of scales, each with duplicate weight readouts at the loading station and in the Facility's control room. Other changes are designed to lessen the risk of operator error, to help prevent overfilling, and to protect against injury.

The cylinder filling station is being remodeled to improve safe cylinder handling. The entire filling area is being isolated in a confinement room, with the operator's control panel located outside the room, to prevent any leak that might occur during the filling process from threatening either the operator or other plant areas. The filling scale, which was implicated in the January 4th accident, is being converted from mechanical to digital readout. This will permit duplicate weight monitoring and recording at both the loading station and the Facility control room. An interlock system will automatically close the filling valves when the cylinder's prescribed weight is reached. To provide backup protection, the valves will also automatically close in the event of any power failure.

To prevent improper placement on the scale, a safety switch will ensure that the cylinder cart is accurately positioned before filling can begin. The cart will be effectively immobilized during filling, but, even if it were to move, the safety switch would automatically halt the filling process. The carts will have their own scales, which will again provide duplicate readouts at the operator station and in the control room. The cart's scale, like the filling station scale, will be interlocked with the filling valves to provide automatic protection against overfilling.

The modifications to the UF_6 filling stations and SFC's revised UF_6 handling procedures are more fully set forth in SFC's submission regarding license condition 11, dated April 20, 1986. Attachment B to this letter is a set of confidential engineering drawings of the system before and after modification.

In combination, these modifications will provide multiple layers of protection against any recurrence of the January 4th accident. They will substantially lessen the risk of operator error, help to prevent overfilling, and protect against injury if a leak or other problem were to occur. SFC expects the modifications described above to be complete by May 22, 1986.

5. Emergency preparedness

SFC has undertaken a comprehensive reevaluation of both its on-site contingency procedures and its off-site emergency measures. With respect to the on-site plan, SFC expects shortly to submit for NRC review revisions of the Facility's Contingency Plan, reflecting significant equipment and procedural improvements. The revisions increase the plan's clarity and facilitate employee training in appropriate emergency response with respect to both radiological and non-radiological incidents.

With respect to off-site emergency procedures, SFC has worked closely with state and local agencies and officials to improve and expand the Facility's emergency response program. With their assistance, SFC has prepared a comprehensive program to provide timely warning of any emergency to nearby residents, and to instruct residents in the proper emergency responses. A copy of SFC's off-site emergency preparedness program will be submitted to the NRC prior to May 22, 1986. Among other steps, the program includes carefully-positioned sirens capable of providing warnings of any emergency to nearby residents. The sirens will be installed prior to May 22, 1986. By May 22 or promptly thereafter, the sirens will be supplemented by an automatic telephone system to provide recorded safety instructions to residents within two miles of the plant and by a radio system to provide immediate communications with police and other appropriate response agencies. Local residents will be periodically instructed in emergency procedures, and drills of the system will be conducted as appropriate in cooperation with local agencies.

SFC's revised off-site emergency program has been prepared with the assistance of highly-qualified outside consultants. Copies of the consultants' reports have already been provided to the NRC. Those reports confirm that the program is well-designed to provide timely and meaningful warnings of any emergency to nearby residents, and to assist those residents in taking appropriate protective measures. A letter of endorsement of the plan's scope has been provided by the Director of the Oklahoma Civil Defense Office.

6. Summary

SFC's restart program provides an appropriate basis for the orderly recommencement of the Facility's operations on May 22, 1986. We believe our actions have been fully responsive to the causes of the January 4th accident, as identified by the NRC investigation and by SFC's analysis. We believe the many modifications made to the facility will greatly minimize the possibility of any recurrence of the January 4th accident, and should reaffirm our commitment to the public, SFC's employees and the Commission that the Facility's operations will be conducted safely and effectively.

III
Long-term Reevaluation Programs

In addition to the restart program described above, SFC has undertaken an extensive program of continuing measures to assure that, after restart, the Facility's operations will remain safe and effecive, and that its procedures will reflect the best practices in the nuclear fuels industry. In particular, SFC has retained two teams of outside experts to review important aspects of the Facility's operations to assist SFC in determining if additional long-term changes or improvements should be considered. SFC is evaluating their recommendations to determine to what extent they may appropriately be implemented. SFC is also supplementing the experts' analyses by its own evaluation of the Facility's processes. These steps further illustrate SFC's commitment to assure that the Facility's operations will continue to be conducted safely and effectively.

Conclusion

SFC is prepared to meet with you and members of your staff to provide more details on this restart request.

SFC requests that NRC concur in the restart of the Sequoyah Facility on May 22, 1986, or as soon thereafter as the modifications described above are completed.

Sincerely,

J. G. Randolph

J. G. Randolph, President
Sequoyah Fuels Corporation

/jlm
Attachments

Attachment 16

SEQUOYAH FUELS CORPORATION
SUB-1010
40-8027

November 17, 1992

Licensee staff (Harlan) called the Region IV office and the NRC Operations
Center to notify NRC of an event which was taking place at the time.

Harlan reported to Kasner (at approximately 9:20 a.m.) that SFC declared an Unusual Event at 8:50 CST. The UE was declared in response to a digester "boil over" identified in the UF6 process area. At the time of the initial report, it was not known which digester was involved. At 9:12 a.m., the event status was upgraded to a Site Area Emergency due to NOX vapors which had filled the UO3 and UF6 process areas and entered the control room. Harlan reported that the control room and both the UF6 and DUF4 facilies had been evacuated, and that personnel were routed to the Carlisle Training Center as required under the licensee's emergency contingency plan.

Harlan stated that a visible plume was seen exiting the main process building through the roof (probably exhaust fans) and had moved over the NW corner of the building toward the west facility boundary. He stated that the plume dissipated visibly within approximately 10 minutes. At the time of the release, the wind was coming from a S-SE direction. Licensee staff initially suspected that the digestor had overflowed and that the nitric solution had reacted with the stainless steel plates below. Nitric oxide (NO) was the suspected constituent of the plume, although the licensee had not yet confirmed whether any source material was involved. (This was unlikely given the chemical form of the material.)

In response to questions regarding potential health effects and offsite effects, Harlan noted that there were no known injuries at the time and that offsite effects had not yet been determined. Harlan noted that he would report back after an initial assessment had been done by H&S techs who were preparing to enter the MPB. The control room operators were in the plant at that time.

At approximately 10:15 and 10:30, Harlan briefed Kasner again with updated information. (During the interval between the first and second contact with Harlan, L. Franklin notified the NRC Ops center. Jaudon, Kasner, and Bates participated in this conversation and a later discussion between NRC staff. NRC staff present during the call included Ken Brockman, J. Gilliland, M. Tokar, R. Cunningham, J. Greeves)

The second and third updated reports confirmed that the Site Area Emergency was terminated at approximately 9:52 a.m. based upon

Draeger tube samples taken in areas of the plant. Harlan also noted that H&S staff had pulled all fixed air samplers within the UF6 facility and as well as the fence-line and environmental monitors. H&S techs did not note any appreciable source material on the filter papers taken from inside the plant in the vicinity of the digestors, but sample analysis was not complete at the time. Harlan stated that the problem involved the #3 Digestor which had just been repaired. according to Harlan, the nature of the repair involved replacement.of a steam coil (used to heat the nitric acid/YC slurry and to sustain the reaction). Harlan stated that initail information given to him indicated that they were prepairing for first-use of the digestor following the maintenance work, and that as operators began to add feed material, a "violent" reaction occurred. This information had been provided by L. Tharp, according to Craig. Harlan stated that the inspection port was the suspected release point for NOX vapors escaping the digestor. (At this time, we suspected that the reaction rate resulted in overpressurization of the digestor, forcing vapors out of the port. Normally, the digestors are under a slight vacuum since piping carries the NOX vapors from the digestors out to the NOX scrubber. This vacuum is very small, and is usually .5-1 inch H20.)

Harlan later stated that a small amount of liquid was observed on the floor, indicating that some of the solution/slurry had exited from the port. Initial analyses of fixed air sample filters from the roof area and a sample head located approximately 20 feet from the digestion area revealed Unat airborne concentrations of 1.3 (1-2) and 12 MPC. (NOTE: These values were an initial analysis for sample filters which had been in place since 11:30 pm - 1200 am on 11/16-17. Therefore, depending on the release duration, the actual MPC concentrations seen during the release would be much greater.. Additionally, grab samples were taken by H&S techs upon entry (Hi Vol., 10 min. collection period) and were later determined to show "no unusual" levels of Unat.

Notifications provided by the licensee included siren activation, and outside contact with local schools and other public groups by F. Bennett and R. Adkisson.

At the time of these calls, SFC was continuing to evaluate personnel who had exited the restricted portion of the facility without personal monitoring, and had not yet identified any personnel contamination. One staff member was examined for convulsions, but this was later determined to be the result of other problems. (Later, the occupational RN determined that the girl's hyperventilation was the result of her concern about her husband who was working at the soil station at the time of the release. She was uncertain of his whereabouts.)

A NOX cloud was visualized traveling in a NW direction from the plant, and eventually moved over Gore. Tom Blachley drove to Gore and collected Draeger tube samples from ground level while the plume was moving overhead. The initial results did not reveal anything above MDL (? Craig didn't know exactly what they were looking for, NO_2 or NO.)

NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064

Attachment 29

DEC 30 1992

Mr. Lance Hughes, Director
Native Americans for a
Clean Environment
P.O. Box 1671
Tahlequah, Oklahoma 74465

Dear Mr. Hughes:

This letter refers to your letter of December 9, 1992, requesting a response to several questions regarding the Sequoyah Fuels Corporation (SFC). We have reviewed your letter and have provided a response to each of your questions based upon the information available to us at this time. As was explained during a conversation on December 22, 1992, between you and Mr. G. M. Vasquez and Ms. L. L. Kasner of this office, information relative to some of your questions may not have been reviewed recently through our inspection efforts at the Sequoyah facility.

In addition to the information provided in the attachment to this letter, Mr. Vasquez and Ms. Kasner also discussed with you the Region IV inspection efforts undertaken during the previous 2-3 weeks to review the licensee's progress in implementing corrective actions as described in SFC correspondence dated December 8, 14, and 22, 1992. As was noted during this conversation, our recent inspection efforts have been focused on verifying that the safety-related problems identified during the Augmented Inspection Team's review of the November 17, 1992, event have been addressed. In addition to the specific corrective actions developed by SFC in response to the inspection findings, inspectors have reviewed the licensee's response to three additional items identified by NRC as restart issues. The licensee's actions were described in SFC correspondence dated December 14 and 22, 1992.

Should you have additional questions after reviewing the attachment to this letter, we will be pleased to discuss them with you.

Sincerely,

L. J. Callan, Director
Division of Radiation Safety
and Safeguards

Enclosure:
As Stated

~~9301120274~~ 488

ATTACHMENT

A. Outstanding Deficiency Reports

SFC modified the deficiency reporting system several months ago to implement improvements in the system and to ensure prompt investigation and followup of safety issues identified and reported by its staff. At that time, all deficiency reports were converted to condition reports, which is the current reporting system. Under the current system, reports may document safety-related issues, noncompliance by licensee personnel, administrative problems identified by licensee personnel, and other matters which are not of regulatory concern.

Although NRC inspectors have reviewed incidents and findings reported through this system, their review has not been focused on the total number of outstanding condition reports and was instead focused on significant or safety-related incidents and events and the actions taken in response by the licensee. Therefore, at this time NRC does not have information regarding the total number of outstanding condition reports or the fraction which specifically involve the DUF4 facility. The staff's efforts in reviewing condition reports generated by the licensee has been selective because, as noted above, some of the reports do not contain information regarding safety issues or issues associated with regulatory requirements.

NRC inspectors have reviewed several condition reports initiated by licensee personnel which did apply to the November 17 event as well as the corrective actions taken by the licensee in response to the problems reported via this system. In addition to condition reports submitted by licensee personnel documenting problems identified both during the event and in subsequent reviews, NRC requested that the licensee consider other issues that were not captured or documented in the condition reporting system. Specifically, NRC requested that the licensee broaden the initial definition of "operator work-around" issues to include operational practices which were not considered in the initial review. The licensee modified the definition as described in SFC letter dated December 22, 1992, and implemented a formal Operational Deviation Program. This program, and the licensee's initial review of operational deviations, was reviewed as part of our recent inspection prior to authorizing restart of the DUF4 facility.

NRC inspectors have confirmed that the maintenance and design related issues initially identified by the licensee following the November 17 event, as documented in SFC condition reports, have been resolved. In addition, inspectors have reviewed issues associated with operational practices which were not limited to equipment failures, but also involved adherence to prescribed process parameters or activities that were not governed by procedure. The inspectors have confirmed that appropriate corrective measures have been implemented and that the practices have been proceduralized where required.

recurrence of the specific violation or of similar occurrences. If the licensee's proposed corrective action is found deficient, either because the true root cause of the violation was not identified or the proposed corrective actions are not comprehensive enough, then the licensee has been requested to provide additional information based on the staff's review.

E. Enforcement Matters

The principle issue involved in the March 16, 1990, Enforcement Conference was the failure of licensee management to promptly report an event that met certain reporting thresholds defined in NRC regulations. The root cause of the January 22, 1990, event was investigated, the licensee's corrective actions were reviewed, and this issue has been closed.

In the case of the November 17 event, licensee management responded appropriately and notified NRC as required. Therefore, NRC does not believe that similar reporting concerns exist a' this time.

F. Future Licensing Actions

NRC did consider the potential impact on staffing levels as a result of the licensee's recent decision to terminate UF6 conversion services. Based upon reviews of the staffing required to support DUF6 reduction operations and discussions held with licensee management regarding proposed staffing reductions, NRC has determined that the licensee has maintained an adequate level of staffing to support restart of the DUF4 facility. Therefore, NRC did not require that the license be amended to formalize a commitment from the licensee regarding staffing levels prior to authorizing restart of the DUF4 facility.

NRC does not prescribe minimum staffing levels for its fuel cycle licensees. Human resources required to fully support licensed operations is considered a performance-based issue and is reviewed through routine inspection of the licensee's programs. NRC will continue to focus attention on this issue as the licensee's current staff is reduced in conjunction with termination of activities at the Sequoyah facility.

In an unrelated matter, the reference in your letter to a document called "Standards of Adequacy" is in error. Mr. Callan, in response to a question from you at a public meeting, mentioned that NRC regulates to a standard of licensee performance that provides for adequate protection of the public's health and safety. This regulatory standard could allow licensees to continue to conduct licensed activities even if they do not always achieve the attention to detail and the high standard of compliance which the NRC expects. In no case, however, will licensees who cannot achieve and maintain adequate levels of protection be permitted to conduct licensed activities. A more complete discussion of this regulatory approach can be found in 10 CFR Part 2.I.

B. Engineering Upgrade Program

The engineering upgrade program discussed in previous SFC correspondence was not yet fully developed at the time that SFC announced its intent to discontinue UF6 conversion services. However, several actions had been taken by the licensee to review SFC's current engineering program to determine (1) how the document system could be improved, (2) how to expedite the reduction of "backlogged" engineering projects, and (3) to develop formal policies for the engineering department. SFC had also initiated several projects focused on improving waste stream controls and had repaired piping structures in the solvent extraction building to prevent leaking and potential contamination of the area.

During our most recent review of SFC's engineering program, which was completed during the October 1992 team inspection, there were no major projects identified for the DUF4 facility. The principle projects planned at that time were improving the archiving system for plant system design documents, and projects planned to improve SFC's waste stream controls. None of these projects were directly focused on the DUF4 facility.

C. Emergency Response Training

At this time, NRC does not know the exact date of the last emergency response drill at the Sequoyah facility or the individuals who participated in the drill. NRC does not normally monitor or participate in emergency exercises at fuel cycle facilities. However, SFC is required to conduct emergency exercises at prescribed frequencies.

As a result of weaknesses identified in the licensee's response to the November 17 event, SFC has modified certain of its Contingency Plan Implementing Procedures to include more detailed instruction in personnel evacuation, personnel contamination monitoring, personnel accountability, and control of ventilation within the facility during an event. In addition, SFC has modified the implementing procedure that specifies event classification to include additional examples of releases of hazardous materials. The procedures have been reviewed by licensee personnel to ensure that the examples referenced in the procedures include the appropriate hazardous chemicals found at the Sequoyah facility. NRC inspectors have reviewed the procedure modifications and have determined that the issues identified during the inspection have been satisfactorily addressed.

D. Open Items Related to the DUF4 Facility

NRC has reviewed the licensee's proposed corrective actions as described in SFC correspondence for problems identified as open items as well as those identified in Notices of Violation issued to the licensee. At this time, some of the items have not yet been formally closed in inspection documentation.

However, in the initial review of the licensee's response, NRC staff does evaluate whether the proposed corrective action will be sufficient to prevent

SEQUOYAH FUELS

RE: 9347-N

[redacted]

Attachment 30

March 30, 1993

Certified Mail
Return Receipt Requested

Ms. Elinor G. Adensam, Acting Chief
Licensing Branch
Division of Fuel Cycle Safety
and Safeguards, NMSS
U.S. NUCLEAR REGULATORY COMMISSION
Washington, D.C. 20555

RE: Emergency Plan Withdrawal

Dear Ms. Adensam:

In accordance with discussions between Craig Harlin and Pam Bennett of Sequoyah Fuels' staff and Merri Horn of NMSS staff, SFC submits this request to withdraw its Emergency Plan approval request, originally submitted March 30, 1990. SFC will continue to comply with the Contingency Plan cited in Chapter 8 of its NRC license. The Contingency Plan provides an organized and methodical approach for emergency response and addresses a spectrum of emergency conditions postulated for this type of facility.

Because the UF6 conversion facility is no longer in operation and because the DUF4 facility will be shut down in July, it would be impractical to begin implementation of a new Emergency Plan and the required retraining. SFC has a fully approved Contingency Plan in place, which provides a level of emergency response comparable to the proposed Emergency Plan and provides for the protection of the health and safety of facility employees and members of the general public in the vicinity of the Sequoyah Facility. Ongoing activities at SFC continue to reduce the risk of hazards exposure at the facility, providing further support of this request.

NF01

RE: 91125-VP

[redacted]

Attachment 17

SEQUOYAH FUELS
CORPORATION

July 2, 1991

Certified Mail
Return Receipt Requested

Frank Thornton
Chief of Police
VIAN POLICE DEPARTMENT
P. O. Box 687
Vian, OK 74962

Dear Chief Thornton:

By letter dated January 12, 1990, Sequoyah Fuels Corporation (SFC) submitted a draft copy of its Emergency Plan for your review and comment. The Emergency Plan was a major revision to the existing Sequoyah Facility Contingency Plan, which was required in order to comply with current NRC regulations.

SFC submitted the original Emergency Plan to the Nuclear Regulatory Commission (NRC) for approval in March, 1990, and subsequently made revisions to the plan in May, 1990, July, 1990, and May, 1991, to incorporate changes necessitated by a company reorganization, and also in response to comments received from the NRC.

As a result of the revisions made to the proposed Emergency Plan, SFC is requesting that you again review the enclosed Plan and provide comments. To facilitate your review, all changes have been bar-marked in the left hand margin. Please return any written comments to me by September 2, 1991. Comments must be clearly written, specific, and received by the above date to receive full consideration.

Please note that the existing Sequoyah Facility Contingency Plan is still in effect, and will remain so until the new Emergency Plan is fully approved and implemented. Should you have any questions, please contact me at 918/489-3207. Thank you for your participation in this important review process.

Sincerely,

Lee R. Lacey
Vice President
Regulatory Affairs

LRL:nv

Hwy. 10 & I-40 P.O. Box 610 Gore, Oklahoma 74435 Telephone (918) 489-5511 Facsimile (918) 489-5620 (918) 489-2291

Docket 40 8027
License SUB-1010

Attachment 18

MAY 2 7 1993

Mr. John Dietrich, Vice President
Technical Services
Sequoyah Fuels Corporation
P. O. Box 610
Gore, Oklahoma 74435

Dear Mr. Dietrich:

SUBJECT: EMERGENCY PLAN WITHDRAWAL (TAC NO L21692)

This letter acknowledges your March 30, 1993, letter withdrawing your Emergency Plan approval request. The Emergency Plan was originally submitted March 30, 1990, and revised May 18, 1990, July 20, 1990, and June 2, 1992. The staff agrees that it would be impractical to implement a new emergency plan at this time since Sequoyah Fuels Corporation (SFC) is ceasing production operations. Therefore, the staff has terminated its review of your Emergency Plan. SFC will be expected to comply with its approved Contingency Plan.

SFC has also requested an exemption from the biennial exercise requirement contained in the current Contingency Plan (Plan). The rationale SFC provides for this request is that SFC, in essence, satisfied the intent of the exercise requirement when facility personnel responded to the November 17, 1992, chemical release and that it is inadvisable to use limited resources to conduct the drill. SFC believes the request will not compromise the Plan's effectiveness. The staff agrees that SFC need not conduct the biennial exercise for the following reasons. Since SFC has already terminated uranium hexafluoride operations, the accident potential is considerably reduced. SFC will also cease uranium tetrafluoride operations no later than July 31, 1993, further reducing the accident potential. Therefore, the staff finds SFC's request to be reasonable and accordingly grants the exemption from the biennial exercise requirement in the Plan.

Sincerely,
Original Signed By
Charles W. Emeigh, Acting Chief
Licensing Branch
Division of Fuel Cycle Safety
and Safeguards, NMSS

Distribution (Control No. 3F0S) *See previous concurrence
Docket No. 40-8027
MAdams
SGagner, OPA
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JGreeves
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OFC	FCEB:*		FCLB:*		FCLB:*		Region IV:*	
NAME	MHorn		VTharpe		MTokar		JCallan	
DATE	4/29/93		4/29/93		4/30/93		5/18/93	
OFC	FCLB*		OGC*					
NAME	CEmeigh		RFonner:					
DATE	5/19/93		5/20/93					

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064

Attachment 19

AUG 5 1992

Docket No. 40-8027
License No. SUB-1010

Sequoyah Fuels Corporation
(Subsidiary of General Atomics)
ATTN: James J. Sheppard
President
P.O. Box 610
Gore, Oklahoma 74435

Gentlemen:

SUBJECT: NRC INSPECTION REPORT NO. 40-8027/92-16 (NOTICE OF VIOLATION)

This refers to the special, announced inspection conducted by Mr. G. Michael Vasquez of this office on June 25 through July 2, 1992. The inspection included a review of activities authorized by NRC Source Materials License No. SUB-1010, and the continued operation of the Sequoyah Fuels Corporation (SFC) facility. At the conclusion of the inspection, the findings were discussed with members of your staff. The enclosed NRC Inspection Report No. 40-8027/92-16 documents the results of the inspection.

The inspection was an examination of activities conducted under the license as they relate to radiation safety and to compliance with the Commission's rules and regulations and the conditions of the license. The inspection consisted of selected examinations of procedures and records, interviews of personnel, and observation of activities in progress.

Based on the results of this inspection, certain of your activities appeared to be in violation of NRC requirements, as specified in the enclosed Notice of Violation (Notice). The first violation involved a repeat violation of 10 CFR 20.207, regarding the discovery of contaminated scrap metal by an SFC Health & Safety technician in an unrestricted area. However, the inspector noted that the contaminated scrap metal was found inside a fenced area on SFC's property, and not readily accessible to the general public. Three other violations were identified relating to failure to follow procedures: (1) SFC failed to keep an unrestricted area gate locked or in attendance in violation of Procedure G-111, "Access to Restricted Areas and Controlled Access Areas"; (2) SFC failed to implement the requirements of Procedure G-194, "Excavation, Trenching, and Well Drilling," when no pre-job survey was performed prior to a contract worker excavating dirt in the unrestricted area; and (3) SFC operations staff violated Procedure G-304, "Hazardous Work Permits," by violating a provision of Hazardous Work Permit (HWP) No. 3402, and by working in an area where conditions had changed which made personnel protection inadequate.

Because certain of your activities appeared to be in violation of NRC requirements, you are required to respond to this letter and should follow the

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instructions specified in the enclosed Notice when preparing your response. In your response, you should document the specific actions taken and any additional actions you plan to prevent recurrence. After reviewing your response to this Notice, including your proposed corrective actions and the results of future inspections, the NRC will determine whether further NRC enforcement action is necessary to ensure compliance with NRC regulatory requirements.

We are concerned that your controls to ensure that contaminated materials are not released to unrestricted areas were not fully effective and resulted in a repeat violation. Therefore, you should include in your response a description of additional measures to be taken to prevent recurrence.

In addition, two unresolved items were also identified. The first related to a potential violation of 10 CFR 20.201 in that air sampling may not have been adequate to determine worker exposures to airborne concentrations (reference Section 3.2); and the second to the potential that a worker in an unrestricted area, who began excavating dirt (with a backhoe) that was later shown to be contaminated, may not have been trained in accordance with 10 CFR 19.12 (reference Section 3.3).

We note that the nature of the findings during this inspection period indicated the good progress SFC has made in its H&S program, as demonstrated by the fact that H&S technicians prevented unsafe situations, sometimes by stopping work (reference Sections 3.1, 3.2, and 3.3). At the same time, these findings indicated that in some cases other parts of the SFC facility staff did not consistently demonstrate the slow conservative approach to facility activities that inspectors have observed during earlier periods of the phased startup. Examples of this performance is indicated in Section 3.2 of the inspection report in regard to the poor planning and execution of a hazardous work permit and in Section 3.3 relating to the failure to execute the requirements of an excavating permit. SFC senior managers appeared to also be concerned about the nature of recent events and were continuing their evaluations at the conclusion of the inspection. We note that in each of these events SFC management demonstrated a self-critical approach and identified the problems. We will continue to assess your corrective actions during future inspections.

The inspector was also concerned that SFC had no leak detection mechanisms above the fluorination towers and the fluorine cell room. Leaks in both areas occurred during this inspection period, and in both cases SFC personnel had to rely upon observation or smell to detect the leaks. Although SFC personnel had previously recognized this situation and had submitted deficiency reports, this situation had not been corrected by the end of this inspection period. The inspector noted that the previous inspection identified a similar concern after a leak of hydrogen fluoride in the east vaporizer room (reference NRC Inspection Report 40-8027/92-15 dated July 20, 1992).

We were encouraged to find that General Atomics' Board of Directors had recently approved an engineering upgrade program for SFC that would be implemented in a matter of weeks. Plans included a 4-month project with additional engineers and equipment to: (1) reduce the backlog of engineering requests, design change authorizations, and deficiency reports, (2) improve configuration management and records, and (3) input piping and instrument drawings, critical to the process, on computer-assisted design software. SFC planned to start the project with a team of four contracted senior engineers and a team leader, and planned to eventually recruit additional engineers to replace the contractors.

This also acknowledges receipt of SFC's June 16, 1992, letter regarding the Quality Assurance (QA) Upgrade Program. The inspector verified that SFC's QA program is progressing as stated. This also acknowledges your reports of June 26 and July 2, 1992, pursuant to the March 13, 1992, Order Modifying License.

Lastly, we make note of the June 25, 1992, site familiarization tour for Mr. James L. Milhoan, Regional Administrator, NRC Region IV. Attached is a copy of the agenda and SFC presentation materials associated with the tour.

The response directed by this letter and the enclosed Notice are not subject to the clearance procedures of the Office of Management and Budget as required by the Paperwork Reduction Act of 1980, Pub. L. No. 96.511.

In accordance with 10 CFR 2.790 of the Commission's regulations, a copy of this letter and the enclosed inspection report will be placed in the NRC Public Document Room.

Should you have any questions concerning this inspection, we will be pleased to discuss them with you.

Sincerely,

L. J. Callan, Director
Division of Radiation Safety
and Safeguards

Enclosures:
1. Appendix A - Notice of Violation
2. Appendix B - NRC Inspection Report
   40-8027/92-16
3. Appendix C - SFC Handouts for Site Familiarization Tour

cc: Oklahoma Radiation Control Program Director

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Harmon, Curran & Tousley
2001 S Street, N.W., Suite 430
Washington, D.C. 20009

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Attorney for Cherokee Nation
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112 State Capitol Building
Oklahoma City, OK 73105-4894

Newman & Holtzinger, P.C.
ATTN: Maurice Axelrad
1615 L Street, N.W., Suite 1000
Washington, D.C. 20036

General Atomics
ATTN: R. N. Rademacher
Vice President, Human Resources
P. O. Box 85608
San Diego, CA 92138

APPENDIX A

NOTICE OF VIOLATION

Sequoyah Fuels Corporation (SFC)
Gore, Oklahoma

License No. SUB-1010
Docket No. 40-8027

During an NRC inspection conducted on June 25-July 2, 1992, violations of NRC requirements were identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," 10 CFR Part 2, Appendix C, the violations are listed below:

A. 10 CFR 20.207(a) requires that licensed materials stored in an unrestricted area be secured from unauthorized removal from the place of storage.

License Condition 9 authorizes use of licensed material in accordance with the statements, representations, and conditions contained in Chapters 1 through 8 of the license renewal application dated August 23, 1985, as supplemented. Section 3.3.4.7 of the application requires, in part, that items and equipment released from the facility for unrestricted use meet the release criteria and conditions specified in NRC's "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material."

These guidelines limit maximum acceptable fixed surface alpha contamination of natural uranium to 15,000 dpm/100 cm^2, and removable alpha contamination of natural uranium to 1,000 dpm/100 cm^2. Further, footnote F of the Guidelines states that the average and maximum radiation levels associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/hr at 1 centimeter and 1.0 mrad/hr, respectively, measured through not more than 7 milligrams per square centimeter of total absorber.

Contrary to the above, on June 27, 1992, SFC discovered contaminated metal scraps in an unrestricted area that were not secured from unauthorized removal from the place of storage. Specifically, contaminated metal scraps were discovered in a dumpster in an unrestricted area, with maximum fixed surface contamination levels of 280,000 dpm/100 cm^2 of alpha activity, maximum removable alpha contamination of 12,000 dpm/100 cm^2, and beta-gamma dose rates of 45 mrad/hr.

This is a repeat violation.

This is a Severity Level IV violation (Supplement IV).

B. License Condition 9 authorizes use of licensed material in accordance with the statements, representations, and conditions contained in Chapters 1 through 8 of the license renewal application dated August 23,

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1985, as supplemented. Section 2.2 of the license renewal application, states, in part, that the Manager, Health and Safety (H&S), shall be responsible for developing and implementing programs, procedures, and guidance in the functional area of health physics.

1. Section 4.2.1 of Procedure G-111, "Access to Restricted Areas and Controlled Access Areas," requires that all unrestricted area gates shall be kept locked except during each entry and exit process, or when an individual is posted at the gate for the purpose of providing positive access control.

   Contrary to the above, on June 30, 1992, an SFC manager discovered that an unrestricted area gate was unlocked and no individual had been posted at the gate for the purpose of providing positive access control.

   This is a Severity Level IV violation (Supplement VI).

2. Section 4.1 of Procedure G-194, "Excavation, Trenching, and Well Drilling," states, in part, that an individual be assigned to constantly monitor the restrictions and work conditions set forth in the excavation, trenching, or well drilling permit. The appropriate permit dated May 21, 1992, and issued for the new administrative building parking lot, required pre-job surveys and periodic surveys by the Health and Safety department.

   Contrary to the above, in June 1992, an individual did not monitor restrictions and work conditions set forth in the excavation, trenching, or well drilling permit for the new administrative building parking lot dated May 21, 1992, on two occasions. Specifically, on June 24, a pre-job survey by the Health and Safety department was not performed prior to dirt moving activities (removing a sidewalk and excavating dirt). Also, in June 1992 dirt moving activities occurred with no pre-job survey and no periodic surveys south of the new outdoor water fountain.

   This is a Severity Level IV violation (Supplement VI).

3. Section 1.5.4.D of Procedure G-304, "Hazardous Work Permits," states, in part, that workers (performing the work described on a Hazardous Work Permit [HWP]) are responsible for performing the work in accordance with the HWP. Further, Section 3.6 of the same procedure states, in part, that work may not continue or resume if conditions have changed which could make the personnel protection equipment or clothing inadequate until the area has been verified or a new HWP is issued and approved.

   Contrary to the above, on June 24, 1992, during work associated with HWP No. 3402, operations personnel did not perform work in accordance with the HWP when they resumed work without constant

Appendix B

U. S. NUCLEAR REGULATORY COMMISSION

Region IV

NRC Inspection Report No. 40-8027/92-16

License No. SUB-1010

Licensee: Sequoyah Fuels Corporation (SFC)
P. O. Box 610
Gore, Oklahoma 74435

Facility Name: Sequoyah Facility

Inspection At: Gore, Oklahoma

Inspection Conducted: June 25 - July 2, 1992

Inspector: G. Michael Vasquez, Region IV

Approved: Charles L. Cain 8/4/92
Charles L. Cain, Chief, Nuclear Materials Inspection Section — Date

Inspection Summary

Inspection Conducted June 25 - July 2, 1992 (Report No. 40-8027/92-16)

Areas Inspected: Special, announced inspection of SFC's phased restart activities including operations, radiation and industrial safety, and management controls.

Results: During this inspection, four violations were identified. The first was a repeat violation of 10 CFR 20.207(a) regarding SFC personnel finding contaminated scrap metals in a dumpster in the unrestricted area, but still within a fenced area on licensee property. Three more violations related to failures to follow procedures: (1) a failure to keep unrestricted area gates locked, (2) a failure to perform a pre-job survey and periodic surveys in compliance with a digging permit, and (3) failures to adhere to HWP procedural requirements.

Furthermore, two unresolved items were identified. The first involved a potential procedure violation of 10 CFR 20.201 in that air sampling may not have been adequate to determine worker exposures (Section 3.2). And the second involved a potential violation of 10 CFR 19.12 in that a backhoe operator, moving dirt that was later shown to be contaminated, may not have been trained as required (Section 3.3).

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coverage by Health and Safety technicians. This HWP required Health and Safety staff presence at all times during the work. Further, the operators worked in an area where conditions had changed that made the personnel protection equipment or clothing inadequate.

This is a Severity Level IV violation (Supplement VI).

Pursuant to the provisions of 10 CFR 2.201, Sequoyah Fuels Corporation is hereby required to submit a written statement or explanation to the Regional Administrator, Region IV, with a copy to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555, within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation" and should include for each violation: (1) the reason for the violation, or, if contested, the basis for disputing the violation, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken to avoid further violations, and (4) the date when full compliance will be achieved. If an adequate reply is not received within the time specified in this Notice, an order may be issued to show cause why the license should not be modified, suspended, or revoked, or why such other action as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time.

Dated at Arlington, Texas
this ay of 1992

Also, the inspector was concerned that SFC had no leak detection mechanisms above the fluorination towers and the fluorine cell room. Leaks in both areas occurred during this inspection period, and in both cases the inspector noted that SFC personnel had to actually observe or smell the leaks to discover them.

Also during this period, SFC informed the inspector that General Atomics' Board of Directors had approved expenditures for an engineering upgrade program for SFC that would be implemented in a matter of weeks. Plans included four additional engineers and a team leader, new equipment, and would: (1) reduce the backlog of engineering requests, design change authorizations, and deficiency reports, (2) improve configuration management and records, and (3) input piping and instrument drawings, that are critical to the process, on computer-assisted design software.

DETAILS

1. PERSONS CONTACTED

John Ellis, Senior Vice President
*John Richardson, former (acting) Vice President, Regulatory Affairs
*John Dietrich, Vice President, Regulatory Affairs
*Scott Munson, Manager, Health and Safety (H&S)
*Larry Silverstein, Manager, Maintenance and Engineering
Bill Coleman, General Atomics (GA) Quality Assurance (QA) Director
Frank Warner, (GA) Director of Manufacturing & Product Support
*Larry Tharp, Uranium Hexafluoride (UF6) Area Manager
Tom Kruppa, Uranium Trioxide (UO3) Area Manager
Steve Lambson, Depleted Uranium Tetrafluoride (DUF4) Area Manager
*Bill Reid, (consultant) Licensing Engineer
Mike Dunlap, QA Manager (Acting)
*Reggie Cook, Controller
*Ron Adkisson, Vice President, Business Development
Tom Riggs, Process Engineer
Frank Dum, Process Engineer
Louis Wells, UF6 Area Shift Supervisor
Bill Bradley, UF6 Area Shift Supervisor
Leroy Reid, UF6 Area Shift Supervisor
Jerry Clapp, UO3 Area Shift Supervisor
Kathy Jones, DUF4 Shift Supervisor
Euless Youngblood, DUF4 Shift Supervisor
Mike Celitti, H&S Supervisor (Acting)
Dan Lewis, H&S Supervisor
Phillip Frost, Supervisor, Waste Management
Don Latham, Sequoyah Oversight Team (SOT)
Jerry Stroud, Administration Department
Gilbert Smith, Wiloham Construction
Randy Rogers, Rogers Construction

*Denotes individuals present at the exit briefing on July 2, 1992.

The inspectors also communicated with other site personnel during the course of the inspection.

2. OPERATIONS ACTIVITIES (88020)

During the inspection period, SFC production continued but was somewhat limited due to equipment problems. The first stage of the "B" line of the hydrofluorination system was down due to a suspected crack in the reactor that may have caused elevated uranium concentrations at the release point on the roof. SFC maintenance began its activities to inspect the reactor but had not completed its activities at the conclusion of the inspection. In the DUF4 plant, a plug in a cooling screw required a brief suspension of facility operations. Also, problems with insufficient heating from electrical heat tracing on the off-gas scrubber line caused restrictions from the cleanup reactors to the off-gas blower. The net result was to limit fluorination tower operations.

In addition, some events caused system shutdowns for brief periods of time, and the circumstances surrounding some of the events caused some concerns. These are described below.

2.1 Operational Events

On June 27, 1992, SFC had a fluorine leak in the fluorine cell room. The leak was believed to occur from a lockout valve while recycle valve No. 700 was being repaired. However, the concern (identified by SFC QA) was that no leak detection system was installed in the cell room. During this event, the fluorine gas leaked from the cell room to the outdoors and through the air condition system intake to the control room. The first indication of the leak that SFC had was when control room operators smelled the fluorine in the control room.

Also on June 27, at about 6:00 pm, during activities associated with removing contaminated dirt (see Section 3.3) south of the new administration building, a telephone cable was severed that prevented phone service outside the facility. In response, SFC operations staff were able to obtain a cellular phone from one of its managers and provided the NRC Operations Center the phone number. The phone service was restored at about 11:30 pm.

On June 29, 1992, at approximately 6:25 pm, SFC declared an Unusual Event because of a UF6 leak from the fluorination towers. (This is also documented in SFC's July 2, 1992, report to NRC pursuant to the March 13, 1992, Order Modifying License.) Since SFC has no leak detection systems above the towers, the leak was first observed by a guard at the south gatehouse. The guard announced on the radio that smoke was coming out of the main process building and told the control room that they should check the nitrogen oxygen (NOX) emission system. Operations personnel immediately began inspecting areas in the plant and found that instead of a problem with the Nox system, UF6 was leaking from the top of the bellows of the No. 3 fluorination tower, which is located on the third level. The roof fans pulled the cloud out of the building and released it outdoors, where the cloud quickly dissipated.

As soon as the leak was observed, SFC personnel appeared to respond appropriately by declaring an Unusual Event, shutting down affected systems, and by restricting access to the third and fourth levels in the main plant. Health & Safety (H&S) personnel took air samples and performed removable contamination surveys in the area and on the roof. H&S technicians also analyzed air samplers that routinely monitor roof fan exhausts and analyzed "fence line" air samples also. An operator, wearing appropriate respiratory protection, inspected the tower and observed a hole in the bellows at the top of the tower. The senior shift supervisor also notified SFC management. The Unusual Event was declared terminated at 6:35 pm.

Initial data from three roof fans that indicated the highest releases showed released airborne activities of 3.1E-10, 1.6E-10, and 131.2E-10 microcuries of uranium per cubic centimeter of air (uCi/cc). The unrestricted area maximum permissible concentration (MPC) is 5.0E-12 uCi/cc; therefore, these values represented multiples of 62, 32, and 2,624 times the MPC. After a half hour decay (to assess the amount of short-lived, naturally occurring activity), the activity remained essentially constant. After a two hour decay, the maximum fenceline sample indicated 0.46 MPC, less than SFC's action level of 1.0 MPC. Surveys for removable contamination on the roof indicated maximum values of 369 disintegrations per 100 square centimeters (dpm/100 cm^2) of beta activity and 205 dpm/100 cm^2 of alpha activity, which were below SFC's action levels for controlled access areas. Later surveys for removable contamination in the area of the fluorination tower indicated maximum values of 30,000 dpm/100 cm^2 of beta activity and 6,000 dpm/100 cm^2 of alpha activity. As a result, SFC posted the tower as a controlled access area and began decontamination efforts.

After the senior shift supervisor could not contact the NRC inspector at his hotel room, SFC management decided to telephone the NRC Operations Officer (at NRC's headquarters office), even though the event was not reportable under NRC regulations. SFC management instructed the senior shift supervisor to inform the operations officer as soon as radiological data was available. However, while waiting for the sample analyses, the inspector unexpectedly returned to the site, and SFC management notified the NRC inspector rather than the operations officer.

During a staff meeting in which this event was reviewed, SFC senior managers noted that pinhole leaks in the bellows of the fluorination towers had caused leaks in the past, but none of the holes had been this large. Further, senior managers were informed that in the past SFC had not attempted to predict these failures but had taken actions to reduce the frequency of leaks. Senior SFC managers encouraged the operations staff to review the history of the bellows so that, in the future, SFC will prevent further UF6 releases of this type. SFC's evaluations were ongoing at the conclusion of this inspection. The inspector noted this as an example of SFC senior managers' efforts to improve facility operations.

Also during the staff meeting, the inspector noted that the SFC president informed his managers that he was concerned about the number and nature of recent events. He stressed that their standards of formality and attention to detail must be met and that the management team must ensure it. The president noted employees' efforts and stated that they also need to anticipate problems and fix them before they occur.

2.2 Cross-Training on the DUF4 Plant

Previously, on June 6, 1992, a senior shift supervisor failed to recognize three safety alarms on the Operator Interface Unit (OIU) for the DUF4 Plant (reference NRC Inspection Report 40-8027/92-14 dated June 30, 1992). As an immediate corrective action, SFC required certain DUF4 operations personnel to

ATTACHMENT 2
Page 1 of 5

[redacted]

Attachment 20

INITIAL NOTIFICATION MESSAGE

☑ Sequoyah County Sheriff (Emergency Notification Book, Tab D)

Person Contacted Rick [illegible] Time 0930 EC Initials [illegible]

☑ Hazardous Materials Emergency Response Commission of Oklahoma (Emergency Notification Book, Tab D)

Person Contacted [illegible] Time 09[illegible] EC Initials [illegible]

☑ USNRC Emergency Operations Center (Emergency Notification Book, Tab D)

Person Contacted Bill [illegible] Time 0937 EC Initials [illegible]

☑ National Response Center (Emergency Notification Book, Tab D)

Person Contacted Erin Stewart Time 09:45 EC Initials Dem.
Report # 145-196

This is ___ at the Sequoyah Facility near Gore,
(name)

Oklahoma. We have declared a Site Area Emergency at 09:10 11-17-92. We have an ~~(actual/imminent)~~ off site release of nitric acid fumes consisting of nitrogen oxides that are dispersing rapidly release of
(time/date)

(Ammonia/Hydrogen Fluoride/Uranium Hexafluoride/Uranium-Yellowcake).

> **For Ammonia or HF Only:**
>
> This substance is an extremely hazardous substance in accordance with 40 CFR 302 (a).

The release started at 08:50 (AM/PM) and lasted approximately 30 minutes
(time) (duration)

(hrs/min). ~~The estimated quantity of the release is ___ Kg.~~
No quantity has been determined at this point.

Attachment 21

DATE: 11-17-92

STATION CALL SIGN:

STATION I.D.	UNIT OR STATION	TIME	NATURE OF CALL
33	50	0751	10-8
37	50	0751	10-8
38	50	08:23	10-8
907	50	0856	10-6 O/of Veh.
907	50	09:01	10-8
26	50	10:28	10-8
26	50	10:45	10-8 10-19 to [illegible]
903	50	11:02	10-6 T.S. [illegible]
903	50	11:04	10-8
903	50	11:16	10-6 [illegible]
907	50	11:31	10-6 [illegible]
903	50	12:20	10-6 [illegible]
907	50	12:24	10-6 T.S. [illegible]
38	50	12:25	10-6 [illegible]
902	50	12:32	10-6 Ron's
38	50	12:54	10-8
902	50	12:54	10-8
912	50	13:08	10-8
50	38	13:08	10-19 [illegible]
38	50	13:20	10-97
907	50	13:25	10-6 P.D.
108	50	13:45	10-14 x1 from [illegible]
908	50	13:54	10-8
108	50	14:01	10-14 x1 [illegible]
38	50	14:08	10-97
912	50	14:14	10-6 [illegible]
912	50	14:39	10-8
38	50	14:49	10-14 x1 [illegible]
38	50	14:57	10-97
38	50	15:03	10-14 [illegible]
U-4	50	16:36	10-26 [illegible]

DISPATCHER: Crutchfield

NOTARY PUBLIC IN AND FOR STATE OF OKLAHOMA CUYAHOGA COUNTY

True Copy of Dispatchers Log

Sharon G Bluman
Notary Public

My Commission Expires 2-10-97

Attachment 22

OFF-SITE EMERGENCY MANAGEMENT PLAN
SEQUOYAH URANIUM CONVERSION FACILITY
GORE, OKLAHOMA
JUNE 1, 1989
REVISION #1

Out of Date 5-17-93

CONTROLLED COPY # [redacted]

SC5001

PAGE

APPENDICES: OFF-SITE EMERGENCY MANAGEMENT PROCEDURES FOR SEQUOYAH FACILITY

Appendix B

Sequoyah County Sheriff's Office

Co.Comm 5539

1.0 PURPOSE

The purpose of this procedure is to direct the actions of the Sequoyah County Sheriff's Office for response to emergencies at the Sequoyah Fuels Corporation facility near Gore, Oklahoma (Sequoyah Facility).

2.0 SITUATION

In the event of an emergency at the Sequoyah Facility which may affect the off-site area, control of traffic access to the area will be activated. Access control will be done by diverting east-bound traffic on U.S. 64 southeast of Gore, west-bound traffic on U.S. 64 west of Vian, east-bound traffic on I-40 at the Biscuit Hill exit and west-bound traffic on I-40 at the Vian exit, away from the affected area. Access control assignments are shown on Attachment A.

Notification of an emergency at the Sequoyah Facility will be provided to the dispatch center at the Sheriff's Office either on (1) the hot-line telephone or (2) the police radio frequency. Notifications will be provided for either (1) a SITE AREA EMERGENCY or (2) a GENERAL EMERGENCY. Notification messages will be either (1) an INITIAL NOTIFICATION MESSAGE or (2) a FOLLOW UP MESSAGE.

3.0 PROCEDURES

The following actions are to be taken by the Sheriff's dispatch center operator or other Sheriff's Office personnel present upon receipt of a message from the Sequoyah Facility by telephone or radio:

11-17-92 3.1 INITIAL NOTIFICATION MESSAGE - SITE AREA EMERGENCY

9:20 AM date/time 1) Use the Sequoyah Facility INITIAL NOTIFICATION MESSAGE form to take the information given.

9:36 AM date/time 2) Contact the County Sheriff or alternate and give the message information. O. 775-9155 H. 773-8373

date/time 3) If requested by the Sequoyah Facility, dispatch two (2) Sheriff's Office vehicles or request dispatch of two (2) State Highway Patrol vehicles to "ACTIVATE ACCESS CONTROL POINTS AT THE HIGHWAY 10/I-40 INTERCHANGE AND THE HIGHWAY 10/U.S. 64 INTERSECTION."

9:35 date/time 4) Contact the County Civil Defense Director or alternate and give the message information. 427-5665 or 427-6424

SPD-42

9:37 ate/time

5) Contact the County Health Department Director or alternate and give the message or information. — O. 775-6201 or H. 696-7469 or Alternate - 775-6670

SPD-14

9:39 ate/time

6) Contact the Oklahoma Highway Patrol and give the message information. — 683-3256

7) No further action required. Standby for additional information

3.2 INITIAL NOTIFICATION MESSAGE- GENERAL EMERGENCY

ate/time

1) Use the Sequoyah Facility - INITIAL NOTIFICATION MESSAGE form to take the information given.

SPD-27

ate/time

2) Contact the County Sheriff or alternate and give the message information. — O. 775-9155 or H. 773-8373

SPD-14

ate/time

3) Contact the Oklahoma Highway Patrol and give the message information. Also give the message "ACTIVATE ACCESS CONTROL AT THE VIAN EXIT AND BISCUIT HILL EXIT ON I-40". — 683-3256

SPD-36

ate/time

4) Contact the Gore Police Department and give the message information. Also give the message "ACTIVATE ACCESS CONTROL ON U.S. 64 SOUTHEAST OF GORE". — 489-5963

SPD-37

te/time

5) Contact the Vian Police Department and give the message information. Also give the message "ACTIVATE ACCESS CONTROL AT THE VIAN EXIT OF 1-40 WITH FIRST AVAILABLE OFFICER. ACTIVATE ACCESS CONTROL ON U.S. 64 WEST OF VIAN WITH SECOND AVAILABLE OFFICER." — 773-5724

SPD-38

ate/time

6) Contact the Warner Police Department (through Muskogee County EMS) and give the message "ACTIVAGE ACCESS CONTROL AT THE BUSCUIT HILL EXIT OF I-40 UNTIL STATE HIGHWAY PATROL ARRIVES". — O. 463-2696 or H. 464-2372

SPD-39

ate/time

7) Contact the Webbers Falls Police Department and give the message "ACTIVATE ACCESS CONTROL AT THE BISCUIT HILL EXIT OF I-40 UNTIL STATE HIGHWAY PATROL ARRIVES." — O. 464-2631 or H. 989-5427

ate/time

8) Dispatch other available police units should any of the police departments be unavailable to activate their assigned access control points.

SPD-42

ate/time

9) Contact the County Civil Defense Director or alternate and give the message information. — 427-5665 or 427-6424

__________ date/time

10) Contact the County Health Department Director or alternate and give the message information. — O. 775-6201, H. 696-7469, Alternate - 775-6670 SPD-43

__________ date/time

11) Confirm the activation of all access control points with the police units dispatched.

__________ date/time

12) If directed by the Sequoyah County Health Department or Sequoyah County Civil Defense, provide instructions for traffic diversion including either I-40 opem US-64 closed, HIGHWAY 10 closed at I-40, or I-40 closed, US-64 open, HIGHWAY 10 closed at US-64, or other pattern, as directed.

__________ date/time

13) Request dispatch of two (2) Oklahoma Patrol vehicles to activate access control on HIGHWAY 10 when the "ALL CLEAR" message is received and before deactivating other access control points. — 683-3256 SPD-14

__________ date/time

14) Deactivate all access control points except on HIGHWAY 10 when "ALL CLEAR" message is received.

__________ date/time

15) Deactivate access control points on HIGHWAY 10, only when directed to do so by the Sequoyah County Health Department or Sequoyah County Civil Defense.

3.3 FOLLOW UP MESSAGE - SITE AREA EMERGENCY

__________ date/time

1) Use the Sequoyah Facility FOLLOW UP MESSAGE form to take the information given.

__________ date/time

2) Contact the County Sheriff or alternate and give the message information. — SPD 27 O. 775-9155 or H. 773-8373

__________ date/time

3) Contact the County Civil Defense Director or alternate and give the message information. — SPD-42 427-5665 or 427-6424

__________ date/time

4) Contact the County Health Department Director or alternate and give the message information. — SPD-43 O. 775-6201 or H. 696-7469, Alternate - 775-6670

__________ date/time

5) Contact the Oklahoma Highway Patrol give the message information. — SPD-14 683-3256

__________ date/time

6) Deactivate access control points on HIGHWAY 10, only when directed to do so by the Sequoyah County Health Department or Sequoyah County Civil Defense.

7) No further action required. Standby for additional information.

3.4 FOLLOW UP MESSAGE - GENERAL EMERGENCY

______ ate/time	1) Use the Sequoyah Facility FOLLOW UP MESSAGE form to take the information given.	SPD-27
______ ate/time	2) Contact the County Sheriff or alternate and give the message information.	O. 775-9155 or H. 773-8373
______ date/time	3) Contact the County Civil Defense Director or alternate and give the message information.	SPD-42 427-5665 or 427-6424
______ ate/time	4) Contact the County Health Department Director or alternate and give the message information.	SPD 43 O. 775-6201 or H. 696-7469 Alternate - 775-6670
______ ate/time	5) Contact the Oklahoma Highway Patrol and give the message information.	SPD-14 683-3256
______ ate/time	6) Contact all County and local police dispatched to access control points and give pertinent information from the message form.	
______ date/time	7) If directed by the Sequoyah County Health Department or Sequoyah County Civil Defense, provide instructions for traffic diversion including either I-40 open, US-64 closed, HIGHWAY 10 closed at I-40 or I-40 closed, US-64 open, HIGHWAY 10 closed at US-64 or other pattern, as directed.	
______ date/time	8) Request dispatch of two (2) Oklahoma Highway Patrol vehicles to activate access control on HIGHWAY 10 when the "ALL CLEAR" message is received and before deactivating other access control points.	SPD-14 683-3256
______ date/time	9) Deactivate all access control points except on HIGHWAY 10 when "ALL CLEAR" message is received.	
	10) Deactivate access control points on HIGHWAY 10, only when directed to do so by the Sequoyah County Health Department or Sequoyah County Civil Defense.	
	11) Standby for additional information from the Sequoyah Facility.	

Attachment 23

Mrs. Ruth Ann Roark
Administrator

Sequoyah Memorial Hospital

SMH

P.O. Box 505
213 E. Redwood
Sallisaw, Oklahoma 74955
(918) 775-4484

August 8, 1990

Reau Graves
President, Sequoyah Fuels Corporation
P. O. Box 610
Gore, OK 74435

Dear Mr. Graves:

Discussion has been held with representatives from Sequoyah Fuels Corporation concerning our hospital's possible role in providing emergency services to the employees of your company and the general population neighboring your plant.

Sequoyah Memorial Hospital, its staff, and medical attendings are available to provide care for both conventional and radiation injuries. We have appropriate facilities to provide the necessary services.

We understand that training for our personnel and that some equipment modifications and medical supplies may be necessary for treatment of contaminated patients.

Sincerely,

Ruth Ann Roark

Ruth Ann Roark, Administrator
Sequoyah Memorial Hospital

RAR/lje

SEQUOYAH FUELS

Attachment 24

RE: 92145-N

May 26, 1992

Dkt: 40-8027
Lic: SUB-1010

Mr. Robert D. Martin
Regional Administrator
U.S. NUCLEAR REGULATORY COMMISSION
Region IV
611 Ryan Plaza Drive, Suite 1000
Arlington, Texas

Dear Mr. Martin:

Sequoyah Fuels Corporation (SFC) wishes to provide information relating to our arrangement with the Sequoyah Memorial Hospital in regard to a recent implication that data regarding cancer diagnoses and cancer deaths was being suppressed or changed due to an arrangement between SFC and the hospital or hospital employees.

SFC has a Letter of Agreement with the Sequoyah Memorial Hospital to provide support in the event of an emergency, pursuant to our Contingency Plan. As a part of this agreement, SFC provides annual training under the Contingency Plan to certain employees of Sequoyah Memorial Hospital with regard to their response during an emergency. This training encompasses both radiological and chemical training for the site specific type of occurrances which could occur at SFC. SFC has a similar agreement with Sparks Regional Medical Center in Fort Smith, Arkansas.

This agreement is informal and there is no contractual agreement between SFC and Sequoyah Memorial Hospital. SFC has no other agreements or contracts with Sequoyah Memorial Hospital.

Please contact me if there is any additional information which we can provide regarding this subject.

Sincerely,

James J. Sheppard
President

9206040253 920526
PDR ADOCK 04008027
C PDR

92-0786

IE-58
III.C

Attachment 25

SEQUOYAH FUELS CORPORATION

April 23, 1992

Certified Mail
Return Receipt Requested

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

RE: License No. SUB-1010; Docket No. 40-8027
Incident of April 4, 1992
10 CFR 40.60 Report

Gentlemen:

Attached is Sequoyah Fuels Corporation's (SFC) written report regarding the corresponding notification made by SFC on April 4, 1992.

If there are any questions regarding this report, please contact me 918/489-3207.

Sincerely,

John D. Richardson
Vice President
Regulatory Affairs

JDR:nv

Attachment

xc: Robert D. Martin, NRC Region IV

Cert No P558 894 630

NF01 1/1

9205040264 920423
PDR ADOCK 04008027
C PDR

6. <u>The extent of the exposure of individuals to radiation or radioactive materials</u>:

None.

SEQUOYAH FUELS

RE: 9368-N

[redacted]

Attachment 26

May 3, 1993

Certified Mail
Return Receipt Requested

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

RE: License No. SUB-1010; Docket No. 40-8027
Notification of April 3, 1993
10 CFR 40.60 (c)(2) Report

Gentlemen:

Pursuant to the requirements of 10 CFR 40.60 (c)(2), attached is Sequoyah Fuels Corporation's (SFC) 30 day follow-up written report regarding the corresponding notification made by SFC on April 3, 1993.

If there are any further questions regarding this report, please contact me at (918) 489-3207.

Sincerely,

Craig L. Harlin
for John S. Dietrich
Vice President
Technical Services

JSD/TWR:lh

Attachment

xc: James L. Milhoan, NRC Region IV

Cert # P 401 832 360

NF01

5. <u>Corrective actions taken or planned and the results of any evaluations or assessments:</u>

The initial corrective action taken was to identify the problem which was carried out by SFC and Cross Telephone. By Saturday evening, the problem was attributed to the telephone system, but Cross was not able to identify the specific cause.

On Monday morning, Cross Telephone identified a problem with their computer system that controlled SFC's offsite sirens and telephone notification system. The problem was immediately rectified. SFC then conducted a test of the offsite emergency warning system to ensure operability of the system and identify any additional problems. The test was conducted three separate times and each time, the system functioned properly.

The cause of the problem with Cross Telephone's computer system is not known. The telephone activity printout from the monthly test on April 3 showed the system being activated twice within a 15 second time period. It was suspected that this was the cause of the computer system problem.

This hypothesis was checked during the monthly test of the offsite emergency warning system conducted May 1, 1993. The system activation button was pressed twice within 15 seconds; however, no problems resulted. The telephone notification systems and the offsite sirens worked correctly during the test.

6. <u>The extent of the exposure of individuals to radiation or radioactive materials:</u>

Not Applicable.