Docket File
50-146

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

June 6, 1996

Mr. G. A. Kuehn, Jr.
Program Director SNEC Facility
GPU Nuclear Corporation
2574 Interstate Drive
Harrisburg, Pennsylvania 17110

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION (TAC NO. M94823)

Dear Mr. Kuehn:

We are continuing our review of your Decommissioning Plan and related documents for Amended Facility License No. DPR-4 for the Saxton Nuclear Experimental Corporation Facility which you submitted on February 16, 1996, as supplemented on April 17, 1996. During our review of your request, questions have arisen for which we require additional information and clarification. Please provide responses to the enclosed request for additional information within 45 days of the date of this letter. In accordance with 10 CFR 50.30(b), your response must be executed in a signed original under oath or affirmation. Following receipt of the additional information, we will continue our evaluation of your request.

At the time of Decommissioning Plan submission you requested that our review of the Plan be completed by October 1996. Our original schedule was developed with consideration of your request and was based on your planned submission date of March 22, 1996, for the Environmental Report and Decommissioning Technical Specifications. However, you were not able to meet your scheduled submission date. Because of this our schedule has been impacted. Although we will attempt to meet your requested schedule, to prevent additional slippage, it is important for you to submit comprehensive answers to our questions no later than the requested response date. We anticipate additional questions will be forthcoming concerning your technical specifications dated May 17, 1996.

DF01 1/1

This requirement affects nine or fewer respondents and, therefore, is not subject to Office of Management and Budget review under P. L. 96-511.

If you have any questions regarding this review, please contact me at (301) 415-1127.

Sincerely,

Original signed by:

Alexander Adams, Jr., Senior Project Manager
Non-Power Reactors and Decommissioning
Project Directorate
Division of Reactor Program Management
Office of Nuclear Reactor Regulation

Docket No. 50-146

Enclosure:
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Saxton Nuclear
Experimental Corporation

Docket No. 50-146

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ENCLOSURE

REQUEST FOR ADDITIONAL INFORMATION

SAXTON NUCLEAR EXPERIMENTAL CORPORATION FACILITY

DECOMMISSIONING PLAN

DOCKET NO. 50-146

If the response to a question requires changing the Decommissioning Plan or Environmental Report, please submit updated plan or report pages showing the revision number and use a line in the margin to indicate the area of change. Some information is repeated in the Decommissioning Plan and Environmental Report. If a question asked about one document changes information in both documents, please update both documents.

Decommissioning Plan Questions

1. Page 2-2, Section 2.1.2 - There is a mention of high ground water. Please discuss any safety implications of this condition as it might relate to the dismantlement, decontamination, and eventual site restoration of the Saxton Nuclear Experimental Facility (SNEF).

2. Page 2-2, Section 2.1.2 - The Saxton Nuclear Experimental Corporation (SNEC) has studied and submitted to NRC in the past information on the degradation of the SNEF steel shell. Please summarize the results of the most recent information you possess on degradation of the SNEF steel shell.

3. Page 2-3, Section 2.1.2, Second paragraph - There is mention of concern about the flood plain. Please discuss any safety implications of this condition as it might relate to the dismantlement, decontamination, and eventual site restoration of the SNEF.

4. Page 2-5, Table 2.1-1 - Please give more details about the information on which this table is based. Discuss major assumptions, for example, which radionuclides would lead to the majority of the predicted doses, and how much of the doses would be caused by external exposures and how much by internal body burdens.

5. Page 2-6, Section 2.2 - The report mentions additional detailed engineering and planning here and in other places. Please give a projected schedule for NRC's receiving that information for review.

6. Page 2-8, First full paragraph - Scabblers and CO2 blasters may not be familiar terms to most people and should be described in an appropriate place in the Decommissioning Plan. Also, the last sentence states that use of water will be minimized. Does this imply that water will not be used for dust control purposes? Please clarify.

7. Page 2-9, Number 4) - You refer to radiological characterization of portions of systems to ensure that release criteria have been met. How does this differ from radiological surveys to ensure that release criteria have been met?

8. Page 2-10, Paragraph A.1. - You discuss work instructions. Are these general instructions or developed specifically for each job?

9. Page 2-10, Paragraph A.2. - Please provide a discussion on your plans for draining contaminated water from piping and proposed methods for handling the liquid.

10. Page 2-10, Paragraph A.4. - There is a general need for more detail on the radiological control program. An example is noted here. Please provide more information on contamination barriers, catch basins, and use of continuous airborne monitors, giving more details of the plans, including filters and other means of controlling radioactive materials or preventing releases from enclosures to occupied areas.

11. Page 2-10, Paragraph A.4. - A number of places were noted where qualifying language is used unnecessarily, thus detracting from the value of the commitment. An example is noted here. The Decommissioning Plan should contain a firm commitment on the utilization of the listed controls with a "will be employed" rather than "may be employed." Another example appears on page 2-15 under "Concrete Shield Wall." The last sentence begins with "If applicable, ..." Should not contaminated rubble always be processed as radwaste?

12. Page 2-12, Number 4. - Discuss removal procedures for "inaccessible piping" including methods and radiological status and impact. How will the integrity of structures disturbed to remove piping be ensured?

13. Page 2-13 - There is mention of piping meeting the release criteria. Discuss the methods to be used to relate radiation survey results or measurements to the release criteria. Give details of the basis for setting thresholds on go/no go limits.

14. Page 2-14 - Do you anticipate that you will be able to remove all contaminated and activated components that do not meet the release criteria before demolition of the containment vessel (CV) or will some components and areas be unaccessible until the CV is demolished? If some areas must wait until demolition to be surveyed, please discuss your procedures for accomplishing this.

15. Page 2-14 - How will you ensure that unacceptable amounts of radioactive material will not be present next to and under the CV structure left on site?

16. Page 2-21 - Please provide estimated dose rates expected to be experienced by personnel during removal of the reactor vessel, pressurizer, and steam generator and during the packaging activities for each vessel. How were these determined? What are the predominant isotopes? Also, specify expected dose rates around each vessel after it has been packaged for transport to the disposal facility. Discuss ALARA considerations related to the removal of these vessels. Please discuss in detail how the reactor vessel (and steam generator and pressurizer, if lifted out the CV roof) will be lifted from the CV. Provide information such as crane type and set up to be used and safety precautions to prevent dropping of components.

17. Page 2-22 - Please provide more details on methods and procedures to be used in the removal and replacement of the section of the CV to permit removal of the reactor vessel. What special precautions will be employed to ensure that these actions will be accomplished safely? Will the use of a covering on the new CV opening affect releases assumed for evaluated accident scenarios?

18. Page 2-23, First paragraph - Explain "fixed or contained within a plastic barrier?"

19. Page 2-23, Section 2.2.1.4.4 - In referring to 10 CFR Part 71, please provide evidence that the quality assurance requirements of Part 71.101 have been approved.

20. Page 2-25, Section 2.2.1.4.5 - How confident are you that the roadway structures, bridges, etc., along the proposed transportation route (both in Pennsylvania and South Carolina) will accommodate the weight and dimensions of the reactor vessel? Has the proposed route been defined and evaluated? If so, please identify all potential problem areas and describe anticipated resolution requirements, including the need for coordination with the duly constituted entities or authorities holding jurisdiction over the structures.

21. Page 2-28, Table 2.2-1 - Please give the bases for and assumptions used in developing this table.

22. Page 2-30, Section 2.3 - Please provide a description of the qualifications, experience, and responsibilities of individuals in positions important to the management of the decommissioning activities. Also, please describe the administrative controls to be used to ensure adequate health and safety protection for work to be performed by contractors, and plans for ensuring that the contractors are adequately qualified and experienced on the subject of radiation safety.

23. Page 2-36, Section 2.4 - Please provide more details on the proposed training for staff and contractor personnel involved in the decommissioning activities, including qualifications of the personnel expected to perform the training. Please provide a copy of your training program.

24. Page 3-6, Section 3.1.2 - Please provide a copy of the Saxton Site Characterization Plan (6575-PLN-4520.06) with updates, and a copy of the Saxton Characterization Report, Reference 11.

25. Page 3-9, Section 3.1.2.2 - You refer to using RESRAD to determine release criteria. Is this to meet proposed future release criteria? If so, please discuss how you will meet current release criteria.

26. Page 3-9, Section 3.1.2.2 - You discuss possible adjustment of the volume of activated concrete that will be removed. When will this adjusted volume estimate be available?

27. Page 3-10, Section 3.1.2.3 - Explain "10 CFR Part 61 type analysis," in relation to the data presented.

28. Page 3-10, Section 3.1.2.4 - Have you verified that the disposal site you intend to use will accept the TRU waste discussed in this section?

29. Page 3-11, Table at top of page - Because septic tank B contains radioactive material, discuss the potential for concentrations in sludge in the tank, and for seepage into the surrounding soil. Also, give data for soil and flora samples in the effluent pathways.

30. Page 3-11, Section 3.1.2.5 - The activation discussed was apparently calculated. Please compare with relevant confirmation measurements.

31. Page 3-12, Section 3.1.2.6, Last paragraph - Give explicit EPA criteria, and compare with NRC criteria for the same conditions. Please provide a copy of Reference 12, Saxton Site Remediation Report.

32. Page 3-13, Paragraph 1 - Examination of Figure 3.1-11 indicates that the well in which tritium has been periodically detected (GEO-5) is the most easterly of all SNEF monitoring wells. A comparison of Figure 3.1-11 with figure 1, Saxton Site Plan, in the Final Release Survey of Reactor Support Buildings, dated April 1990, indicates this well is approximately 25 feet west-southwest of the site of the former Rad Waste Disposal Facility. Inasmuch as GEO-5 is somewhat closer to this structure than to the Rad Waste Disposal System tunnel, what is the basis for assuming that the tunnel is the source of the tritium? Explain why the existing wells are sufficient to (a) define the extent of the contaminated zone, (b) determine whether substantially higher concentrations of tritium or other radionuclides exist within the contaminated zone, and (c) identify the most probable source of the tritium and any other radionuclide detected.

33. Page 3-16, Table 3.1-1 - This table contains some operating events that occurred at the SNEF. Did any of these events or any other event that occurred during operation of the SNEF result in contamination outside the SNEF fence? If so, what action was taken and what are your plans to ensure that these areas are considered during decommissioning.

34. Page 3-37, Section 3.2, RADIATION PROTECTION - The potential for inhalation of radioactive materials in particulate form will probably represent the major radiological health hazard for workers who will perform the dismantlement and decontamination tasks. Therefore, a comprehensive description of the respiratory protection program should be provided in the Decommissioning Plan that includes the types of respiratory protection available for use, examples of how each type is expected to be utilized, and the guidelines that will be employed to determine the appropriate type of protection to be required. Please address the type of respiratory protection anticipated during dismantlement activities that might be expected to generate airborne activity, such as scabbling, CO2 blasting, or removal of embedded contaminated piping.

35. Page 3-37, Section 3.2.1 - Please provide a copy of the SNEC Radiation Protection Plan, 6575-PLN-4542.01. Who would make a determination that an alternative procedure is "equivalent" to this Plan and what criteria would be used to determine that an alternative is "equivalent?" Please provide a copy of the Saxton facility ALARA procedure.

36. Page 3-37, Section 3.2.1, Radiological Controls Program - With regard to the need for assessing internal radiation exposure for those workers that are to be assigned to any activities on the dismantlement and decontamination of the Saxton facility that may present a radioactivity inhalation or ingestion hazard, please discuss your plans for conducting wholebody counts prior to, during and following these activities.

37. Page 3-44, Section 3.2.1 - Please provide a copy of the Offsite Dose Calculation Manual.

38. Page 3-47, Section 3.3.2.1 - Please provide more information on design of the temporary filtration systems referenced in this section, and on the HEPA filtration system to be provided for the Decommissioning Support Building. Also, discuss methods to be employed for testing all HEPA filters. Please provide diagrams and descriptions of operation of the complete decommissioning ventilation system including radiation monitors, alarm or automatic action setpoints and automatic or manual actions.

39. Page 3-47, Section 3.3.2.1 - This section discusses the use of continuous air monitors (CAM), if necessary. How will the decision be made to use a CAM instead of a portable air sampler? What actions will be taken if a CAM alarms? Will the CAMs be able to turn off the ventilation system if conditions warrant?

40. Page 3-49, Section 3.3.2.3, Last paragraph - How and when will changes to the Decommissioning Plan be submitted?

41. Page 3-50, Section 3.3.2.3 (1), (2), and (3) - Will external shielding be required to allow these large components to be shipped intact? Discuss protection of the public from these radiation sources.

42. Page 3-50, Section 3.3.2.3 (1) and (2) - Please specify how the vessels will be sealed prior to shipment. Also, please describe the purpose and characteristics of the proposed concrete/grout.

43. Page 3-50 to 53, Section 3.3.2.3 - Offsite vendor, offsite processor, offsite volume reduction facility, etc. are mentioned several times. Please explain in more detail who and where these offsite facilities may be, something about their qualifications and experience, including their authorization to possess by-product radioactive material, and the planned subsequent disposition of the materials and components.

44. Page 3-51, Section 3.3.2.3 (3) - What criteria will be used to decide on the need for filling the pressurizer with grout?

45. Page 3-51, Section 3.3.2.3 (4) - This section indicates that some components may be decontaminated on-site. What criteria will determine if a component is decontaminated on-site or sent off-site? What methods of decontamination will be employed on-site and where will these activities take place?

46. Page 3-54, Section 3.3.2.5 - You discuss using information from the characterization report to determine the field processes that will be used to remove radioactive material. When will these determinations be made and how will NRC be informed of these decisions?

47. Page 3-55, Section 3.3.2.6 - Here it is stated that large components will be removed and prepared for shipment as soon as practicable, but on pages 3-51 and 3-52, there are comments that suggest these large components could be used as shipping containers for smaller components and debris. Please explain in more detail what is planned.

48. Page 3-61, Third paragraph - Please provide a description of the vendor supplied stations noted here including their capabilities, methods of operation, decontamination solutions expected to be used, the need for contaminated solution storage tanks, etc.

49. Page 3-63, Section 3.3.4 - Please provide additional detail on the new opening that will be made in the CV for access from the decommissioning support building. How large is the opening? Will there be a way to seal this opening when not in use?

50. Page 3-65, Table 3.3-2 - For the waste classification of components listed on this table to be determined at a later time, when will this determination be made? What is your estimate of these components at this time?

51. Page 3-68, Section 3.4, ACCIDENT ANALYSES - Was the accidental release of the contents of a radioactive liquid waste storage tank analyzed? What is the maximum quantity and concentration of contaminated liquid expected to exist on site during decommissioning activities? Please provide a bounding accident analysis for the failure of a liquid waste vessel.

52. Page 3-68, Section 3.4, ACCIDENT ANALYSES - Please provide the bases or information sources for the radionuclide mixtures assumed for the source terms for each of the accidents summarized in this section.

53. Page 3-68, Section 3.4, ACCIDENT ANALYSES - Please analyze another accident scenario in which it is assumed that the reactor vessel is dropped from the maximum lift height outside the CV during the removal sequence, or describe your rationale for not considering this accident.

54. Page 3-68, Section 3.4, ACCIDENT ANALYSES - Please address the potential health impact for on-site personnel of each of the accidents analyzed in this section.

55. Page 3-68, Section 3.4.1, Introduction - Was the second sentence intended to imply that the calculated whole body doses presented for each accident described in Section 3.4 are total effective dose equivalent (TEDE) values? Please clarify. Also, please provide a description of the inhalation dose calculations for each accident scenario analyzed.

56. Page 3-70, Section 3.4.1.1 - With respect to plans for filling the resin vessel with grout prior to lifting, will the grout and resin be mixed or is the purpose of the grout just to fill the void?

57. Page 3-71, Section 3.4.1.2 - The release fraction of 1.5×10^{-4} used in the accident scenario for a combustible waste fire was based on the combustion of a relatively small volume of waste (one cubic meter) contaminated with uranium. It is expected that the larger volume of waste assumed in the accident scenario would generate higher temperatures, resulting in a higher release fraction. Also, the use of uranium to simulate the behavior of most of the radionuclides assumed in this scenario is questionable. Comparisons with the methodology described in DOE-HDBK-3010-94 also suggests that the release fractions calculated by you are lower than might be expected. Please provide a more representative basis for the release fraction assumed for this accident scenario. Also, please provide the bases for the radionuclide inventory assumed for this analysis and explain why it should be considered representative of the wastes described.

58. Please analyze a fire in the CV or decommissioning support building. Please describe the fire protection plan to be in place for decommissioning.

59. Page 3-73, Section 3.4.1.4, Surface contamination - (a) Justify the method and assumption used to estimate the surface contamination for segmenting a pipe; (b) explain the form of the equation for total activity generated near the bottom of the page; (c) explain the basis of the 208 microcuries per gram; (d) show which radionuclides contribute the major part of the dose; and (e) this dose is approximately the same as that computed for the "maximum credible event." Please explain the stated conclusion that the event of Section 3.4.1.1 bounds all other potential events.

60. Page 3-77, Section 3.4.1.6 - You discuss filter banks being ruptured during this accident. It appears that the number of filters used comes from reference 14. How many filters will be in use at Saxton and what is the results of the analysis using Saxton information?

61. Page 3-78, Section 3.4.1.8 - Do you plan to install any emergency lighting in the CV to allow for exit in the case of power loss?

62. Page 3-80, Section 3.4.1.9 B. - As decommissioning activities progress, what is the CV response to flooding of the SNEC site as related to structural response and buoyancy?

63. Page 4-1, Section 4.1.1 - With respect to the use of the RESRAD code in general, please describe the assumptions employed in the various calculations, the pathways assumed, the limiting pathways, and projected annual dose rates and/or body burdens of internal radionuclides. Where experimental data are required, discuss the source of those data, and the range of validity and applicability to the Saxton facility and site.

    Describe in detail your analyses that ensure that the proposed release criteria are met, including projections for the next 1000 years, as applicable, following unrestricted release.

64. Page 4-2, Section 4.1.1 - Please clarify the last sentence of this section.

65. Page 4-2, Section 4.1.2 - The release criteria for surface contamination meet applicable NRC guidance. However, please address specific release criteria for materials and components containing neutron induced radioactivities, and the bulk free flowing materials already noted.

66. Page 4-3, Section 4.2, FINAL SURVEY METHODOLOGY - Natural and enhanced background radiation is mentioned. Exactly what is meant by enhanced?

67. Section 5.0 - The remaining cost of decommissioning the SNEF is $22.2 million (1995 dollars). Does this cost include activities to be performed after license termination such as demolition of the CV and site restoration? You indicate that trust fund collections are continuing at the annual rate of $2.5 million and that any shortfall prior to full collection will be made up from GPU operating funds. For how many more years will trust fund collections be made? Assuming four more years of collection leaves a shortfall of $4.1 million. However, the regulations require that licensees have the full amount of decommissioning funds in external trusts at some point in the decommissioning process and cannot rely on internal funding. Please indicate how you will meet the regulations in 10 CFR 50.75 and 50.82 for decommissioning funding. Please note that earnings on the money in the trust fund can be used to compensate for the shortfall and that only funding for activities prior to license termination need to be considered.

68. Please briefly describe your industrial safety program for SNEF decommissioning.

69. Please briefly describe any emergency planning you will have in place for SNEF decommissioning.

70. Please provide a dose estimate for members of the public during SNEF decommissioning activities. Please consider someone at the site boundary and at the nearest residence to the SNEF.

SNEC Decommissioning Environmental Report Questions

71. Page 5-1, Section 5.1 - Please discuss the potential impact on the local transportation conditions of increased commuter traffic and movement of materials in and out of the SNEF as a result of decommissioning activities.

72. Page 5-2, Section 5.3 - Please make specific comparisons between local and/or State of Pennsylvania requirements and the SNEC Soil Erosion and Sedimentation Control Plan.

73. Page 5-2, Section 5.4 - Please describe the SNEC radiological effluents, both liquid and airborne, and their controls in more detail, to provide sufficient bases for evaluation of effectiveness. Please include information about the assumed parameters, scenarios, and methods used to estimate projected doses to the public. Provide comparisons between projected doses and regulatory limits.

74. Page 5-4, Section 5.5, First Paragraph - Please provide more detail on plans for processing contaminated water expected to be generated during decontamination of the SNEF, including that currently contained in the CV pipe tunnel. What is the range of radionuclide concentrations that has been measured in this water? What is the planned pathway for water that is to be released to the environment? In view of the high groundwater level as discussed on page 5-5, has consideration been given to use of a dewatering system in order to lower the groundwater level and thus minimize or eliminate infiltration during decontamination of the pipe tunnel?

75. Page 5-5, Top Paragraph - What volume of tritium contaminated water is currently in the CV sump? Where are the other principal sources of tritium and what are the volumes of each? What are the planned release pathways for this water?

76. Page 5-5, Second Paragraph - Please provide your best estimate of contamination levels on the inner surfaces of the pipe tunnel. Also, please provide a copy of Reference 29.

77. Page 5-6, Section 5.7 - The validity of the assessment of the radiation exposure of members of the public, which appears to be based solely on estimates contained in the NRC's Generic Environmental Impact Statement

(GEIS) (NUREG-0586) and a comparison of the volume of waste assumed to be shipped from the reference test reactor and the volume expected to be generated by the SNEF, is questionable. In fact, the second paragraph of Section 3.1 of the GEIS states that site-specific assessments will be required for the environmental report submitted with the application for license modification prior to decommissioning a specific facility. Please provide an independent assessment of the integrated radiation exposure of members of the public or demonstrate that each of the important parameters in the dose calculation for the SNEF decommissioning is bounded by the parameters assumed by Battelle Pacific Northwest Laboratories for the reference test reactor dose calculations used in the GEIS.

78. Page 7-4, Section 7.4 - The environmental report discusses both the aerial surveys and "comprehensive soil monitoring and sampling work." Can you compare the results of these two methods, and are they consistent? Please give specific values for Cs-137 deduced from the aerial surveys. Please give details of the analyses that project doses to occupants of the SNEC site, pre-remediation, now, and in the future.

79. Page 7-5, Last paragraph - Please provide a copy of References 7, 9, 10, and 11 and describe the rationale used in positioning the two bedrock wells. How well has the direction of groundwater flow been established in the bedrock aquifers? Has any radioactive contamination been detected in either of these wells that could be attributed to SNEC activities?

80. Page 7-6, First Paragraph - Please provide a description of the gas displacement sampler and how it is used to monitor significant fractures and bedding planes. Is there a means of isolating these zones in boreholes MW-1 and MW-2? Please describe the #1 Morie Filter Pack material in the bottom 25 feet of each borehole as depicted in Figure 7.5-1. Also, is there any use being made of groundwater from the overburden zone above bedrock in the vicinity of the SNEF?

81. Page 7-6, Second Paragraph - Is the detection of tritium in GEO-5 noted in this paragraph the only incidence in which radioactive material has been detected in the overburden monitoring wells? Describe the analytical methods used to detect and measure the concentration of radioactive material in water samples collected in the overburden as well as the bedrock, including the sensitivity or minimum detection limit of the instrumentation used.

82. Page 7-6, Third Paragraph - You state that soil sampling is conducted on an as needed basis. Please give some examples of when this sampling would be conducted.

83. Pages 7-7, 7-8, Section 7.6 - In accordance with discussions during the site visit on May 9, 1996, please submit the SNEC plan for the final radiological survey, including methods to provide and ensure consistency and compliance with release criteria.