DOCKET: 70-1257

LICENSEE: Siemens Power Corporation, Richland, WA

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR LICENSE AMENDMENT REQUEST DATED MAY 19, 1999

1.0 INTRODUCTION

1.1 Background

The Nuclear Regulatory Commission (NRC) staff has evaluated the environmental impacts of Siemens Power Corporation (SPC) selling ammonium nitrate/ammonium hydroxide solution, containing up to 1 ppm of uranium, as fertilizer. This Environmental Assessment (EA) has been prepared pursuant to the Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508) and NRC regulations (10 CFR Part 51) which implement the requirements of the National Environmental Policy Act (NEPA) of 1969. The purpose of this document is to assess the environmental consequences of the proposed license amendment.

The SPC facility at Richland, Washington, is authorized under SNM-1227 and Washington State Materials License No. WN-1062-1 to possess nuclear materials for the conversion of uranium hexafluoride (UF_6) to uranium dioxide (UO_2), and to fabricate and assemble nuclear fuel assemblies for light-water reactors. The SPC operation uses a dry conversion process to convert UF_6 to UO_2 powder. The UO_2 powder is pressed into pellets, which are sintered and then loaded into fuel rods. The fuel rods are placed into storage and are withdrawn as needed and fabricated into fuel assemblies.

Until recently, SPC had three wet ammonium diuranate (ADU) processes in operation; two major ADU conversion lines, and a smaller but similar process, the Miscellaneous Uranium Recovery System (MURS). The ADU process (also referred to as wet conversion) was used as the sole conversion process at SPC until 1997 when they began dry conversion. Currently, one ADU line has been removed, and the other ADU line and MURS are only used for scrap recovery. SPC currently recovers ammonium hydroxide from its ADU process effluent and surface impoundment (lagoon) treatment effluent for internal recycle or sale as fertilizer. This recovery is accomplished by its Ammonium Recovery Facility (ARF). Because all UF_6 is now processed by dry conversion, the need to recycle ammonium hydroxide has been drastically reduced. SPC is requesting the authorization to release the effluent from the ADU process and MURS without processing them through the ARF. SPC proposes a release limit of 1 ppm uranium which is equivalent to 3 pCi/mL activity, the sewer release limit for uranium as specified in 10 CFR 20. SPC expects that this ammonium hydroxide/ammonium nitrate solution would be used in the manufacture of ammonia fertilizer and they plan to sell approximately 540,000 gallons per year.

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1.2 Review Scope

In accordance with 10 CFR Part 51, this EA serves to (1) present information and analysis for determining whether to issue a Finding of No Significant Impact (FONSI) or to prepare an Environmental Impact Statement (EIS); (2) fulfill the NRC's compliance with the National Environmental Policy Act (NEPA) when no EIS is necessary; and (3) facilitate preparation of an EIS if one is necessary. Should the NRC issue a FONSI, no EIS would be prepared and the license amendment would be granted.

1.3 Proposed Action

The proposed action is to amend NRC Materials License SNM-1227 to include, as an authorized activity, the unrestricted commercial release of ammonium nitrate/ammonium hydroxide solution containing up to 1 ppm uranium.

1.4 Need for Proposed Action

The proposed action would allow the licensee to sell the ammonium nitrate/ammonium hydroxide solution directly (i.e., without processing through the ARF) for fertilizer. Sale of the ADU effluent solution would (1) decrease the amount of effluent discharged to the City of Richland wastewater treatment plant, (2) recycle the nitrates into a useful product, and (3), by decreasing the processing load on ARF, allow quicker emptying and phase-out of SPC's surface impoundments under their EPA and State of Washington consent decree. Under the terms of the consent decree, SPC will empty, decommission, and remove their six lagoons by the year 2006. To meet this requirement, SPC will install wastewater treatment equipment into a new containment building attached to the existing ARF Building. The new equipment will include two new waste tanks, two tanks for the regeneration of existing final ion exchange columns, and a new ion exchange column. The new waste tanks will eliminate the concern of any possible leaks or emissions to the environment from the lagoons. A separate amendment request to authorize installation and operation of the new equipment is currently under review by the NRC.

1.5 Alternatives

The alternatives available to the NRC are:

1. Approve the license amendment request as submitted; or
2. Deny the amendment request.

2.0 AFFECTED ENVIRONMENT

The following sections contain a summary of the affected environment at and near the SPC site. A full description of the site and its characteristics is given in the 1995 Environmental Assessment for the Renewal of the NRC license for SPC.

2.1 Location and Land Use

The Siemens Power Corporation (SPC) facility is located on a 131-hectare site just inside the northern boundary of the City of Richland in Benton County, Washington. The site consists of 36 buildings plus various outside facilities. The uranium handling and processing facilities are located within a restricted 21.5-hectare area. The facility is located within a 2,470-hectare land parcel known as the Horn Rapids Triangle, which was part of the U.S. Department of Energy's (DOE) Hanford Site until 1967 when it was annexed to the City of Richland. The Horn Rapids Triangle is bounded to the north by Horn Rapids Road, to the south by the Horn Rapids Irrigation Ditch, to the east by the DOE1100 Area, and on the southeast by the Port of Benton Skypark and Richland Airport. Most developed land within a 16 kilometer radius of the site is used for agriculture, light industry, or residences.

2.2 Geology, Soils, and Seismicity

The site region is characterized as a semi-arid desert of generally flat terrain except for wind-formed ridges from 1.5 to 9 meters high. The site is located between the Columbia and Yakima Rivers at an elevation of 114 meters above mean sea level (MSL). At their closest points, the nominal elevations of the Columbia and Yakima Rivers are approximately 107 and 113 meters MSL, respectively. Basalt flows more than 3,000 meters thick underlie the Pasco basin. Unconsolidated silts, sands, and gravels of the Ringold and Hanford Formations, totaling tens to hundreds of feet in thickness, overlie the basalts. The depth to basalt below the SPC site has not been determined.

The distribution and intensity of historical earthquakes indicate that the Columbia Plateau is an area of moderate seismicity. Seismic activity above magnitude 3.0 on the Richter scale has occurred in this region, but activity above magnitude 3.5 is most commonly found around the northern and western portions of the Columbia Plateau, with a few events occurring along the border between Washington and Oregon.

2.3 Water Resources

Surface Water

Primary surface water features associated with the SPC site are the Columbia and Yakima rivers. The confluence of the Yakima and Columbia rivers is located about 5 kilometers south of Richland and about 8 kilometers south of the SPC site. The Columbia River in the vicinity of the site is classified as Class A (excellent) which requires that industrial uses of this water be compatible with other uses including drinking water, wildlife, and recreation. The water is used for irrigation, power generation, municipal water supplies, transportation, fishing, and water sports. The primary source for water in Richland and at the SPC site is from the Columbia River. There is no storm water runoff from the facility to water bodies, rivers, streams or the municipal sewer system. Surface water runoff from the plant is very limited because of the desert environment and percolation into the soil.

Ground Water

There are three distinct aquifer systems that underlie the SPC site. The deepest aquifer consists of highly productive water-bearing zones within thick basalt flows. A confined aquifer occurs in silt, gravel and sand layers in the lower portion of the Ringold Formation which

overlies the basalt. An unconfined aquifer system, consisting of the sands and gravels in the Hanford Formation and in the upper portion of the Ringold Formation, is the shallowest aquifer and the one that is monitored by the SPC site.

2.4 Meteorology and Air Quality

The SPC site region has a dry, continental climate with large temperature variations between winter and summer caused by mountain ranges to the west and the orientation of the Rocky Mountains. The prevailing wind on the site is from the southwest. Severe weather in the area consists of wind, thunderstorms, and occasionally a tornado.

Air quality at the site is good - within the air quality standards set by EPA and the State of Washington.

3.0 EFFLUENT RELEASES AND MONITORING

3.1 Monitoring Program

Monitoring programs at the SPC facility comprise effluent monitoring of air and water and environmental monitoring of various media (air, soil, vegetation, and groundwater). This program provides a basis for evaluation of public health and safety impacts, for establishing compliance with environmental regulations, and for development of mitigation measures if necessary. The monitoring program is not expected to change as a result of the proposed action.

3.2 Effluents

Gaseous, liquid, and solid wastes are produced at the SPC site. These wastes are categorized as low-level radioactive, nonradioactive, hazardous, or mixed wastes. A description of each of these waste categories, control strategies, and an estimate of release quantities is provided in the 1995 Environmental Assessment for the Renewal of the NRC license for SPC.

Each of the effluent streams is monitored at or just prior to the point of release. SPC has a set of action levels for both gaseous and liquid effluent streams. Results from the radiological effluent monitoring program are reviewed quarterly by the plant's As Low As Reasonably Achievable (ALARA) Committee and reported annually to the Siemens Health and Safety Council to determine trends in effluent releases; to determine if effluent controls are being properly used, maintained and inspected; and to determine if effluents could be reduced using the ALARA concept. Results from the monitoring program are also reported in the semiannual effluent reports submitted to the NRC.

The amendment request is expected to have no impact on the gaseous and solid waste released from the site.

The proposed activity should reduce the amount of liquid effluent released to the sewage system. All SPC facility process water containing uranium or potentially hazardous chemicals is treated in a lagoon system before it is released to the Richland sewage treatment system. The wastewaters are generated primarily from the conversion process, but include etch room

wastewater, laundry wastewater, incinerator scrubber wastewater, and the analytical laboratory wastewater. The lagoon system is designed to manage the uranium, fluoride, and ammonia which are the primary hazardous constituents in the wastewaters. Sanitary wastewater from the office complex, outlying rest rooms, and the non-contact cooling water are mixed with the lagoon system effluent before release to the Richland sewage system. Water treated in the Richland sewage system is released to the Columbia River. SPC expects that the sale of the ADU effluent solution would lower the volume of sewage and the amount of nitrate discharged to the City of Richland wastewater treatment plant. The volume reduction of releases to the sewer is expected to be 9000 gallons per day. This estimate is based on a 12 week production period and the total annual sale of 540,000 gallons. The reduction in the amount of nitrates released will ultimately vary between 215 and 430 pounds per day, depending on scrap reprocessing rates.

4.0 ENVIRONMENTAL IMPACTS OF PROPOSED ACTION AND ALTERNATIVES

4.1 Public Health

The risk to human health was evaluated for the use of this mixture as fertilizer. By prior licensing action, the NRC authorized SPC to sell ammonium hydroxide containing up to 0.05 ppm uranium. In its analysis, SPC showed that its recovered ammonium hydroxide, if applied as a fertilizer, would add an extremely small fraction of activity over the naturally occurring uranium already in the soil. The proposed action would increase the uranium concentration to 1 ppm and include ammonium nitrate in the solution. The increase in uranium concentration is the result of the effluent no longer being processed through the ARF. SPC claims that the use of the ammonium hydroxide/ammonium nitrate solution would be similar to the use of recycled ammonium hydroxide when used as a fertilizer. The solution would be injected below the top three inches of soil. Using the soil application rates previously obtained from Walla Walla Farmers Co-op in Kennewick, Washington of 30 to 40 pounds of nitrogen per year, if the solution were applied every year for 10 years, and if none were removed via leaching, erosion, or other natural processes, it would result in an activity of 7.8×10^{-3} pCi/g in the top 3 inches of soil. Uranium concentrations in Franklin County soil, as reported in the Hanford Site 1997 Environmental Report, Table 4.6.1 for all isotopes of uranium, averaged 0.50 pCi/g for 1997. The increase in uranium concentration caused by application of fertilizer containing 1 ppm of uranium is insignificant when compared to the background concentration.

A computer simulation using RESRAD was performed using the default input parameters and the conservative resident farmer scenario. The dose to the resident farmer was calculated to be 0.5×10^{-3} mrem/yr, a small fraction of the 25 mrem/yr allowable dose in 40 CFR 190.10.

Occupational Health

Worker dose was considered also. Occupational exposure pathways, such as inhalation and external exposure to a worker (a Siemens employee or a fertilizer distributor) standing next to a vat of ammonium hydroxide/ammonium nitrate solution, were determined to be insignificant.

4.2 Water Resources

The NRC staff has determined that the proposed amendment will not impact the quality of water resources. A computer simulation using RESRAD was performed using the default input parameters and the soil concentrations expected from the application of the fertilizer. Conservative assumptions were made during the analysis. No significant dose (less than .01 mrem/yr) was calculated from the water pathway (or any other pathway), indicating that the contamination of groundwater or surface water will be insignificant.

4.3 Air Quality, Demography, Biota, Cultural and Historic Resources

The NRC staff has determined that the proposed amendment will not impact air quality, demography, biota, or cultural or historic resources.

4.4 Alternatives

The action that the NRC is considering is approval of an amendment request to a Materials license issued pursuant to 10 CFR Part 70. The amendment would approve the sale of ammonium nitrate/ammonium hydroxide solution for use as fertilizer. The alternatives available to the NRC are:

1. Approve the license amendment request as submitted; or
2. Deny the amendment request.

Based on its review, the NRC staff has concluded that the environmental impacts associated with the proposed action do not warrant denial of the license amendment. There are no significant environmental impacts associated with the proposed action, and therefore alternatives with equal or greater impacts need not be evaluated. In addition, the approval of the amendment request will decrease the impacts to the sewage system because less material will be released to the sewer for treatment. The staff considers that Alternative 1 is the appropriate alternative for selection.

5.0 AGENCIES AND PERSONS CONTACTED

The NRC staff contacted representatives from the State of Washington Department of Health.

6.0 REFERENCES

Siemens Power Corporation(SPC), 1999, Letter from J.B. Edgar to NRC dated May 19, 1999.

SPC, 1999, Letter from J.B. Edgar to NRC dated November 3, 1999.

U.S. Nuclear Regulatory Commission (NRC), June 1995, "Environmental Assessment for Renewal of Special Nuclear Material License SNM-1227."

7.0 CONCLUSIONS

Based on an evaluation of the environmental impacts of the amendment request, the NRC has determined that the proper action is to issue a FONSI in the Federal Register. The NRC staff considered the environmental consequences of the unrestricted commercial release of

Siemens to coordinate w/ local authorities

ammonium hydroxide/ammonium nitrate and determined that the release of this material will have no significant effect on public health and safety or the environment.

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