

# Siting Considerations for the Canister Shipping Facility at the Defense Waste Processing Facility at the Savannah River Site (U)

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Aiken, SC 19808

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# **Siting Considerations for the Canister Shipping Facility at the Defense Waste Processing Facility at the Savannah River Site (U)**

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## Executive Summary

A site screening process was undertaken in support of the proposed Canister Shipping Facility (CSF) in S Area of the Savannah River Site. Operational constraints provided a strong incentive to locate the proposed facility near the existing Glass Waste Storage Building (GWSB). Consequently, a limited area was examined for obvious environmental conflicts and constraints within the current boundaries of S Area. The existing data did not reveal any environmental conflicts or issues that would preclude placing the CSF within the boundaries of S Area, and near to the (GWSB). Additional geotechnical characterization will be required to support design.

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(Source: Site Development Map, WSRC E&GIS)

## Introduction

The siting of new facilities at the Savannah River Site requires the consideration of multiple factors and can require the resolution of conflicts when suitable construction sites are limited. Additionally, different facility types have different requirements that must be considered (e.g. nuclear vs. non-nuclear; administrative vs. production). Some of these facility siting considerations are unique to the SRS because of its status as a DOE facility and the rigorous requirements for safety, security and environmental protection associated with the site.

In response to the need to develop a rigorous, repeatable and defensible process for siting new facilities at the SRS, the Savannah River Technology Center developed a facility siting process. This process provides a mechanism to optimize the siting of new facilities, while minimizing the potential impacts to the environment, and reducing the probability of projects being impeded by certain avoidable regulatory obstacles (Wike 1995). Through this process, the facility project team specifies the requirements for the facility and applicable and relevant data are utilized to identify appropriate land parcels that would be suitable for the facility.

While the full process is appropriate for new facilities that are not constrained by proximity to other existing facilities, a modified process can be used to screen potential sites when serious constraints are imposed. Such constraints may require the new facility be near an existing facility because they have related missions, or need to share specific infrastructure attributes. In these situations, the facility siting process works to screen environmental (including geotechnical) issues that would necessitate excessive mitigation or relocating of the facility.

Such is the case for the proposed Canister Shipping Facility (CSF) in S Area. The proposed facility has a relatively small foot-print and has a mission associated with the existing GWSB. Consequently, there is a strong incentive to locate the new facility nearby the existing facility to optimize the utilization of equipment and expertise. To facilitate the early design work associated with this facility, the project team requested that the Environmental Sciences and Technology Department of SRTC perform a site screening on areas near the existing GWSB (Bldg. 250-S) to determine whether conditions existed that would preclude construction of the Canister Shipping Facility in S-Area.

## Requirements and Assumptions

The initial step in siting a new facility or evaluating a proposed facility location is to determine the requirements for the facility. This information is primarily provided by the facility project team. The CSF project team had several specific requirements and preferences, while other criteria are more

generic in nature as representing potential impediments to implementing the project. The following requirements and assumptions were made for siting the CSF:

- Locate within a 1000 ft radius of Bldg. 250-S
- Facility foot-print is approximately 150 ft by 400 ft (includes clearance around actual building)
- Topographic gradient (slope) for Shielded Canister Transport (SCT) operation no greater than 3° from Bldg. 250-S
- Utility infrastructure to S Area is adequate for CSF without major upgrades
- Facility construction to a depth of 25 ft below existing floor level of Building 250-S
- Facility not within 0.5 mi of capable fault
- Facility will not result in adverse impacts to endangered species
- Facility will not result in adverse impacts to jurisdictional wetlands

### Analysis

The preferred location for the CSF is generally to be as close to the existing Bldg 250-S as is reasonable. Consequently, the evaluation was focused on locations within the S-Area fence. In addition to the existing facilities in this area, the project team also identified several areas where other facilities are currently planned, and consequently should be avoided in evaluating the CSF. The approximate locations of these facilities (identified as 'Reserved' and 'Glass Waste Storage Building Number 2') are shown in Figure 1. Two potential locations for the CSF are also identified

Figure 2 shows the existing infrastructure of S Area. Utility and infrastructure lines are abundant in S Area and the relatively modest requirements of the CSF should be adequately supported by the existing supplies with relatively modest modification. Additionally, the candidate areas indicated in Figure 1 appear to have relatively little conflict with existing subsurface infrastructure that would require relocation. As design progresses, the presence and location of subsurface structures must be confirmed.

Construction activities can be impeded by shallow groundwater and subsurface geotechnical features. The Site Geotechnical Services (SGS) Department evaluated subsurface conditions in S Area using existing data (Appendix A). The depth to the water table in S Area is 35-40 ft below ground level. Consequently, construction to a depth of 25 ft below floor level of the GWSB (or approximately 10 feet below existing grade) should not encounter saturated conditions that would require dewatering. Additionally, existing data confirm that there are no capable faults on the Savannah River Site.



Detailed geotechnical characterization will be required at this site prior to the initiation of more detailed design for the CSF.

Evaluation of ecological resources in and near the candidate CSF sites confirmed that the area is fully developed. There are no threatened or endangered species in the areas evaluated, nor are any endangered species expected to utilize this area for foraging or other activities. Consequently, negligible impacts are expected for threatened and endangered species. Similarly, there are no jurisdictional wetlands within the S Area fence. However, sensitive wetland and aquatic resources exist down gradient from the candidate locations and rigorous erosion control measures must be practiced during construction of the CSF.

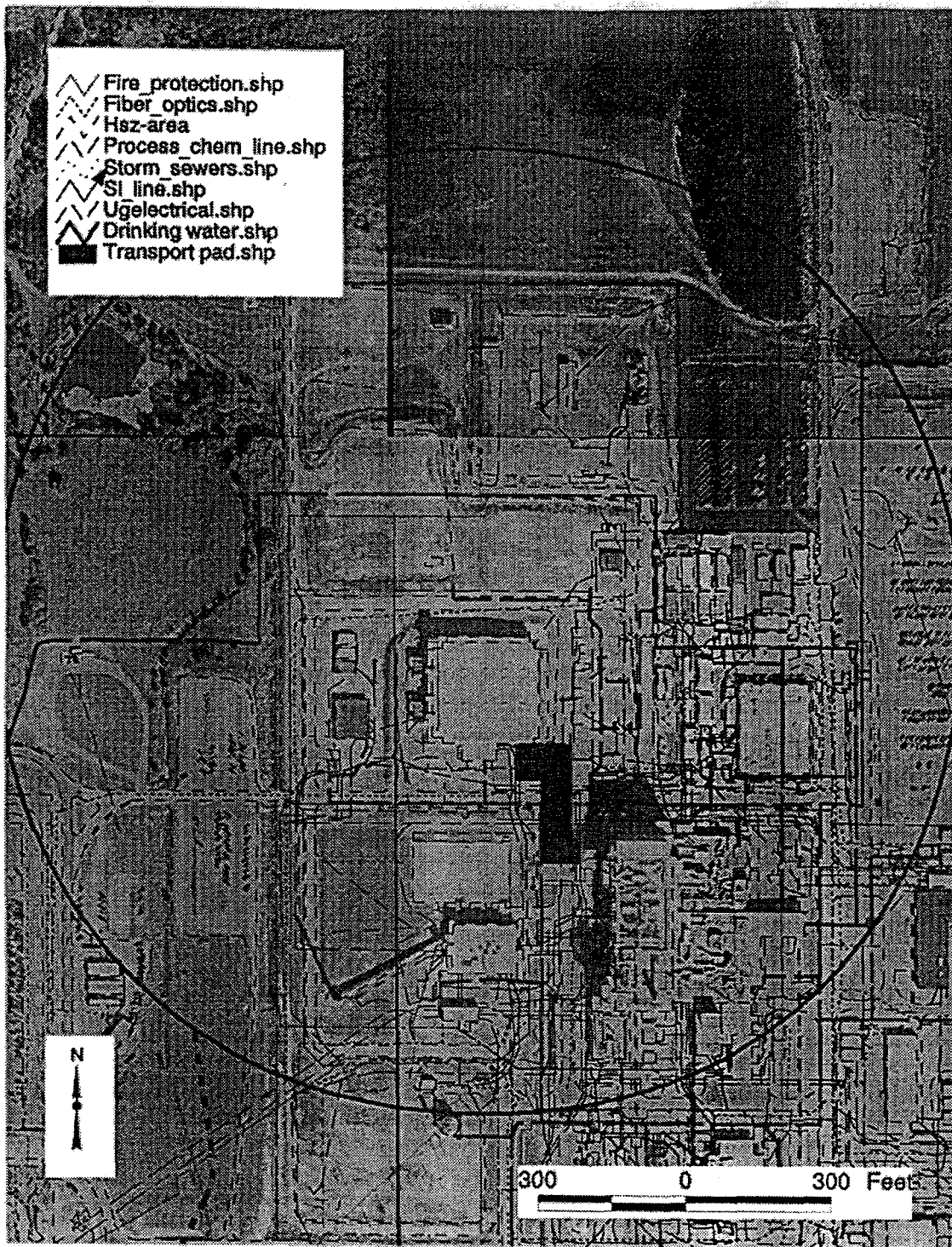
#### **Additional Considerations**

In addition to the stated assumptions, other considerations were made. Additional information regarding geotechnical, hydrogeological, geological and general environmental parameters is supplied in Appendix A. Safeguards and security, emergency preparedness, and firefighting capabilities are all assumed to be sufficient for the entire S-Area and could accommodate any additional loading from the proposed facility. Other than concerns about siltation and erosion control stated above, preliminary observation by EST personnel did not reveal any additional ecological concerns related to the construction of the CSF. Finally, NEPA concerns related to the facility could probably be addressed with a Supplemental Analysis to the existing DWPF Environmental Impact Statement. Additional, more detailed, ecological and geotechnical characterization may be required to support the NEPA assessment.



Aerial View of Proposed CSF Locations.

Figure 1. Source: USFS 3/96. Digital Photogrammetric Image



View of Proposed CSF With Infrastructure Overlay.

Figure 2. Source: Site Development Map, WSRC E&GIS

## References

Wike, L. Facility Siting as a Decision Process at The Savannah River Site. WSRC-RP-95-664. Westinghouse Savannah River Company, Aiken South Carolina. 1995.



April 9, 1998

PECD-SGS-98-065

TO: Lynn Wike

FROM: Doug Wyatt, 730-2B, (952-6939)

**Canister Shipping Facility, Preliminary Geotechnical Screening, Rev. 0 (U)**

The following criteria were evaluated by the Site Geotechnical Services Department as preliminary screening data for the Canister Shipping Facility (CSF). The documents listed under the reference section were reviewed in some detail. A field visit was performed to verify that current site conditions were similar to the original site conditions as described in the documents. There is a considerable amount of high quality geological and geotechnical information available for much of the area within the 1000' radius. In summary, there are no obvious "show-stoppers" that would prevent the continued siting of the Canister Shipping Facility.

**Assumptions**

1. Ultimate location of the CSF would be within the circle defined by a 1000' radius centered on GWSB #1 (attached figure).
2. The geotechnical and geological characterization performed for the DWPF facility define conditions that are similar for the area within the 1000' radius.
3. Siting criteria for the CSF are similar to those for other S-Area facilities.

**Environmental**

A search of routine well data in the GIMS database for the background wells associated with S-Area and the DWPF suggests that there are tritium levels above Drinking Water Standards (DWS) underlying the proposed site in monitoring wells SBG-1, and the SCA well series (the DWPF canyon monitoring wells). The tritium values within well SBG-1 have been fairly constant (averaging 21 pCi/ml), with only minor fluctuations since February, 1988. Tritium levels within the SCA well series have random fluctuations in tritium values above the DWS. These elevated tritium values are thought to be associated with historical H-Area operations and may be local background levels.

### **Hydrogeological**

The average depth to the unconfined "water-table" aquifer is approximately 35-40 feet centered within the 1000' radius. Water table depths are greatest to the southeast and decrease to the northwest. Groundwater flow directions are generally to the north and northwest, towards Upper Three Runs Creek.

### **Geological**

There are no known capable faults within the boundaries of the Savannah River Site. There are deep-seated, historical faults, within the crystalline basement underlying the area of the 1000' radius. Shallow sediments within the 1000' radius vary in character according to the depositional environment associated with the Upland Formation. There are known soft zone or carbonate features defined in the existing geotechnical data. There were several potential buried channels defined in the original geotechnical studies. None of these features were sufficient to preclude construction of existing S-Area facilities.

### **Geotechnical**

The geotechnical evaluations for the DWPF Facility were conducted within a portion of the area of the 1000' radius. General soils and structural mechanics data were obtained. There are no known geotechnical problems defined by these data that affected construction of DWPF related facilities.

### **References**

D'Appolonia, 1982, Balance of Plant Geotechnical Report, Defense Waste Processing Facility, 200-S Area, Savannah River Plant, South Carolina, Project 76-372.

DuPont, 1982, Preliminary Safety Analysis, Defense Waste Processing Facility, Volume 4 of 4, DPST-82-675.

Appendix B  
WESTINGHOUSE SAVANNAH RIVER COMPANY  
INTER-OFFICE MEMORANDUM

SRT-EST-98-0239

MARCH 13, 1998

TO: JANE CARTER, 707-C

FROM: JOHN GLADDEN, 773-42A

DWPF Canister Shipping Facility Assumptions

The following is a list of assumptions are submitted for your consideration relative to the proposed DWPF Canister Shipping Facility.

1. The proposed facility is preferably to be located within a 1000 ft radius of the existing 250-S building to facilitate use of the current canister transporter.
2. The topographic gradient (elevation change) from Bldg. 250-S to the proposed facility should be no more than 0.5%.
3. The building footprint for the proposed facility is approximately 110 ft by 150 ft with an additional 140 ft clearance along each side for access, providing an overall facility footprint of approximately 400 ft by 150 ft.
4. The facility will be constructed to a depth of approximately 25 ft below grade of GWSB floor and it is not planned to dewater the subsurface. Therefore, the site must have a water table at least 25 ft deep below ground level. Water supply from existing sources will be sufficient for all purposes including fire fighting requirements.
5. The facility will not be constructed within 0.5 miles of a known fault.
6. The facility will not be constructed in an area that will result in adverse consequences for Threatened or Endangered Species.
7. The facility will not be constructed in an area known to contain jurisdictional wetlands.
8. Process and domestic water services in the area are adequate to support the new facility.

9. Other utility feeds into the area (e.g. power, steam, etc) are adequate to support the new facility.



## Appendix B

MARCH 16, 1998 CSF CORE TEAM REVIEW OF SRT-EST-98-0239

TO: JOHN GLADDEN, 773-42A

FROM: JANE CARTER, 704-66S

### DWPF Canister Shipping Facility Siting Assumptions

The following list of assumptions are submitted for your consideration relative to the proposed DWPF Canister Shipping Facility.

1. The proposed facility is preferably to be located within a 1000 ft radius of the existing 250-S building to facilitate use of the current canister transporter (excluding known areas reserved for future expansion).
2. The slope that the SCT must transit to the CSF interface shall not exceed 3∞.
3. The building footprint for the proposed facility is approximately 110 ft by 150 ft with an additional 140 ft clearance along each side for access, providing an overall facility footprint of approximately 400 ft by 150 ft.
4. The facility will be constructed to a depth of approximately 25 ft below the operating floor level of the GWSB and it is not planned to dewater the subsurface.
5. The facility will not be constructed within 0.5 miles of a capable fault.
6. The facility will not be constructed in an area that will result in adverse consequences to Threatened or Endangered Species.
7. The facility footprint and support systems will not be constructed in an area known to contain jurisdictional wetlands.
8. Process and domestic water services in the area are adequate to support the new facility.
9. Utility feeds into the area (e.g. power, steam, water, etc) are adequate to support the new facility.