Restoration Services, Inc.

RSI/PORTS-224
Revision 0

Roadmap for Addressing NERC Standard Compliance at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky

Portsmouth / Paducah Project Office

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

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Restoration Services, Inc.

CONCURRENCES/APPROVAL

Roadmap
for
Addressing NERC Standard Compliance
at the
Paducah Gaseous Diffusion Plant,
Paducah, Kentucky

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ACRONYMS

BA	Balancing Authority
BES	Bulk Electric System
CDMS	Compliance Data Management System
D&D	Decontamination and Demolition
DOE	U.S. Department of Energy
DP	Distribution Provider
DUF_6	Depleted Uranium Hexafluoride
EEI	Electric Energy Inc.
EPAct 2005	Energy Policy Act of 2005
ERCOT	Energy Reliability Corporation of Texas
FERC	Federal Energy Regulatory Commission
FPA	Federal Power Act
GDP	Gaseous Diffusion Plant
ICC	Illinois Commerce Commission
IROL	Interconnection Reliability Operating Limit
KPSC	Kentucky Public Service Commission
kV	kilo-Volt
LGE/KU	Louisville Gas and Electric/Kentucky Utilities
LN	Local Network
LSE	Load Serving Entity
MVA	mega volt ampere
MW	megawatts
NERC	North America Electric Reliability Corporation
O&M	Operations and Maintenance
OATi	Open Access Technologies, Inc.
OATT	Open Access Transmission Tariff
OVEC	Ohio Valley Electric Corporation
PA	Planning Authority
PGDP	Paducah Gaseous Diffusion Plant
PM	Preventative Maintenance
POC	Point of Contact
PORTS	Portsmouth Gaseous Diffusion Plant
RC	Reliability Coordinator
RFC	Reliability First Corporation (RFirst)
RRO	Regional Reliability Organization
SCADA	Supervisory Control and Data Acquisition
SCE&G	South Carolina Electric and Gas
SERC	South Eastern Reliability Corporation
SOL	System Operating Limit
SRS	Savannah River Site
SWPA	South West Power Administration
TADS	Transmission Availability Data System
TO	Transmission Owner
TOP	Transmission Operator
TVA	Tennessee Valley Authority
UFLS	Under-frequency Load Shedding
USEC	United States Enrichment Corporation
UVLS	Under-Voltage Load Shedding

EXECUTIVE SUMMARY

Based on the soon to be official revision to the North American Electric Reliability Corporation (NERC) Bulk Electric System (BES) definition and a mandate to impart regulatory consistency, the U.S. Department of Energy (DOE) Paducah Gaseous Diffusion Plant (PGDP) will be required to become compliant with all applicable NERC standards for its BES assets and operations, likely by August 2014. One of the four DOE Paducah Switchyards is shown in figure ES-1. The only implementable alternative to building a DOE compliance program that could be implemented in the available time is the total divestiture of the PGDP BES assets to a regional power company like the Tennessee Valley Authority or the Electric Energy Incorporated (EEI). Divestiture through a lease analogous to the DOE - Savannah River Site divestiture to South Carolina Electric and Gas is considered a viable option only if the switchyards and related operations are returned to the DOE through de-lease from the United States Enrichment Corporation (USEC).

Rearrangement through downsizing and rightsizing of facilities in a fashion that results in a radial feed configuration not requiring NERC certification is feasible, but not implementable in the time frame available. It would involve the participation of the power company stakeholders, an extensive set of electrical system studies, and significant government funding. Also it would not likely be implemented prior to USEC de-lease of the BES facilities.

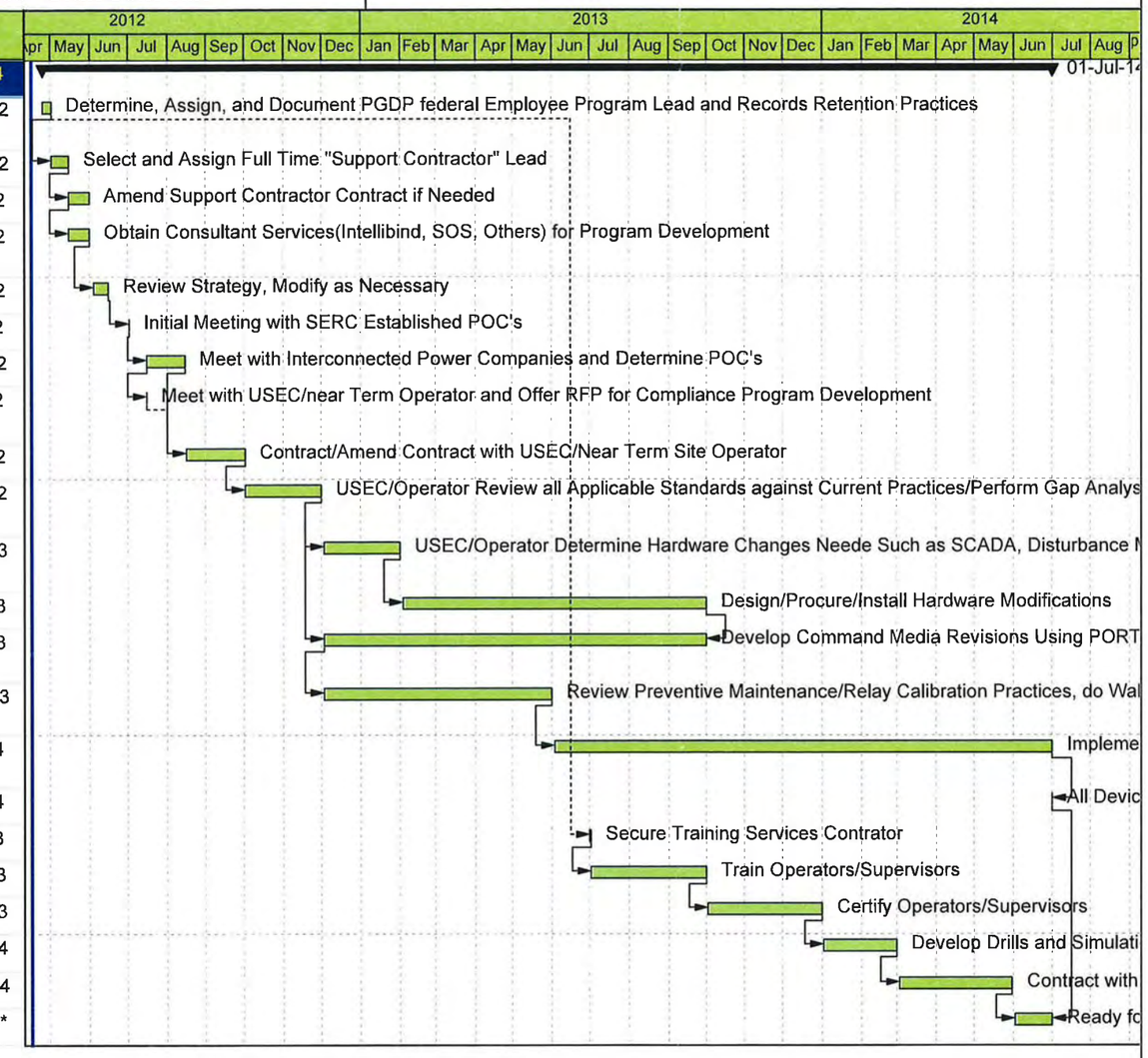
Considering the complexity and uncertainty surrounding the de-lease from USEC, a plan for developing a compliance program is supplied in this report that can be completed by August 2014 at an estimated cost of $2 – $3 Million. The schedule is summarized in figure ES-2. It will require a cooperative agreement with USEC, until the BES facilities are returned to DOE. Implementation will also require a fundamental resetting of the purpose for which the DOE BES facilities continue to exist.

Figure ES-1. One of Four DOE Paducah Switchyard Facilities

PGDP NERC Compliance - Draft Schedule

Data Date: 16-Apr-12

Activity ID	Activity Name	Orig Dur	Rem Dur	% Compl	Start	Finish
Compliance Process Steps		549	549		25-Apr-12	01-Jul-14
COMP0001	Determine, Assign, and Document PGDP federal Employee Program Lead and Records Retention Practices	5	5	0%	25-Apr-12*	01-May-12
COMP0002	Select and Assign Full Time "Support Contractor" Lead	10	10	0%	02-May-12	15-May-12
COMP0003	Amend Support Contractor Contract if Needed	12	12	0%	16-May-12	01-Jun-12
COMP0004	Obtain Consultant Services(Intellibind, SOS, Others) for Program Development	12	12	0%	16-May-12	01-Jun-12
COMP0005	Review Strategy, Modify as Necessary	10	10	0%	04-Jun-12	15-Jun-12
COMP0006	Initial Meeting with SERC Established POC's	1	1	0%	02-Jul-12	02-Jul-12
COMP0007	Meet with Interconnected Power Companies and Determine POC's	23	23	0%	16-Jul-12	15-Aug-12
COMP0008	Meet with USEC/near Term Operator and Offer RFP for Compliance Program Development	1	1	0%	16-Jul-12	16-Jul-12
COMP0009	Contract/Amend Contract with USEC/Near Term Site Operator	32	32	0%	16-Aug-12	01-Oct-12
COMP0010	USEC/Operator Review all Applicable Standards against Current Practices/Perform Gap Analysis	41	41	0%	02-Oct-12	30-Nov-12
COMP0011	USEC/Operator Determine Hardware Changes Neede Such as SCADA, Disturbance Monitor, Time Syncing Hardware	42	42	0%	03-Dec-12	01-Feb-13
COMP0012	Design/Procure/Install Hardware Modifications	168	168	0%	04-Feb-13	01-Oct-13
COMP0013	Develop Command Media Revisions Using PORTS Procedures as Applicable	210	210	0%	03-Dec-12	01-Oct-13
COMP0014	Review Preventive Maintenance/Relay Calibration Practices, do Walk Down of all BES Protective Relay Systems	125	125	0%	03-Dec-12	31-May-13
COMP0015	Implement New Calibration/Testing Frequencies, Items Included, and Records Upgrades	272	272	0%	03-Jun-13	01-Jul-14
COMP0016	All Devices and Systems Current	1	1	0%	01-Jul-14	01-Jul-14
COMP0017	Secure Training Services Contrator	1	1	0%	01-Jul-13*	01-Jul-13
COMP0018	Train Operators/Supervisors	64	64	0%	02-Jul-13	01-Oct-13
COMP0019	Certify Operators/Supervisors	61	61	0%	02-Oct-13	31-Dec-13
COMP0020	Develop Drills and Simulations Required by Standards	40	40	0%	02-Jan-14	28-Feb-14
COMP0021	Contract with Reliability Coordinator for Services	64	64	0%	03-Mar-14	30-May-14
COMP0022	Ready for Declaration of Compliance	22	22	0%	02-Jun-14	01-Jul-14*



Critical Remaining Work | Remaining Work | Milestone
Critical Activity | Current Bar Labels | Summary

TASK filter: All Activities

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Figure ES-2

PDGP NERC Compliance – Draft Schedule
Primavera chart

1. INTRODUCTION

1.1 History

On August 14, 2003, some 55 million people in eight states and Canada had their electricity supply disrupted for as long as four days. An approximate 65,000 megawatts (MW) produced by 531 generators including 19 nuclear plants tripped off line in a cascading fashion causing what became the largest blackout of the Bulk Electric System (BES) - power grid in US history and the second largest in the world. An estimated $7 – $14 billion in damage occurred. The Energy Policy Act of 2005 (EPAct2005) was passed by congress that modified the Federal Power Act (FPA) with provisions to create a system of regulatory compliance and oversight to prevent a reoccurrence of this event. In this law, the Federal Energy Regulatory Commission (FERC) provided for (empowered) the North American Electric Reliability Corporation (NERC) to establish mandatory standards and performance expectations that if followed would accomplish this goal. It also provided for the creation of eight Regional Reliability Organizations (RRO's) for the purpose of assuring through enforcement that these standards with their requirements are being complied with by those entities that could have an impact on North America's power grid. A map of these regions is shown as Figure 1.

NERC undertook a process of defining what constituted an entity that could have an impact on the grid. Through a public rule making process NERC settled on the following:

An entity that owns/operates an integrated transmission element associated with the Bulk Power System 100 kV and above, or lower voltage as defined by the Regional Entity necessary to provide for the reliable operation of the interconnected transmission grid; or an entity that owns/operates a transmission element below 100 kV associated with a facility that is included on a critical facilities list that is defined by the Regional Entity.

Figure 1- NERC Regions

This rule gave significant latitude to the RRO's to include or exclude entities from the definition and the need to be in compliance with the standards. For the U.S. Department of Energy (DOE) owned/United States Enrichment Corporation (USEC) leased Portsmouth Gaseous Diffusion Plant (PORTS) and its 345 kV (kilo-volt) switchyard(s), Reliability First Corporation (RFC or RFirst) the RRO for PORTS, determined that PORTS should be included. It also concluded that DOE PORTS should be registered as a Transmission Owner (TO), a Transmission Operator (TOP), a Distribution Provider (DP), and a Load Serving Entity (LSE) under the NERC Functional Model[1] and thus satisfy the standards' requirements on

[1] Reference : www.nerc.com/files/Functional_Model_V5_Final_2009Dec1.pdf

schedule (eg. in compliance by 10/1/2007). Subsequent challenges by DOE to this involuntary inclusion on the registry up through and including appeals to FERC were denied[2].

Inexplicably, the DOE owned/USEC leased Paducah Gaseous Diffusion Plant (PGDP) with its 4 – 161 kV switchyards and 15 transmission lines was not compelled by its RRO (South Eastern Reliability Corporation – [SERC]) to become compliant even though it met the 100 kV definition and is strongly interconnected with the Western Kentucky grid. (See attachment A, for the Paducah area electrical arrangement and interconnections). During a presentation to DOE on March 8, 2012, the Tennessee Valley Authority (TVA) indicated that as many as 50 of its customers (including PGDP) would now fall under the new definition and be required to register and become compliant.

1.2 New BES Definition

On November 18, 2010, FERC ordered NERC to revise the BES definition to:

- Remove any ambiguity,
- Add clarity,
- Establish consistency in the fundamental definition across all of NERC, and
- Provide for an exception process that is consistent across all of NERC.

An industry wide drafting team created a revised definition which has been approved by NERC's board of trustees and has been filed with FERC and awaits their concurrence. Concurrence/approval is likely and expected during the summer of 2012, with implementation/compliance expected 24 months after FERC approval. The new definition states as follows:

Bulk Electric System (BES): Unless modified by the lists shown below, all Transmission Elements operated at 100 kV or higher and Real Power and Reactive Power resources connected at 100 kV or higher. This does not include facilities used in the local distribution of electric energy.

Inclusions:

- I1 - Transformers with the primary terminal and at least one secondary terminal operated at 100 kV or higher unless excluded under Exclusion E1 or E3.

- I2 - Generating resource(s) with gross individual nameplate rating greater than 20 MVA (Mega Volt Ampere) or gross plant/facility aggregate nameplate rating greater than 75 MVA including the generator terminals through the high-side of the stepup transformer(s) connected at a voltage of 100 kV or above.

- I3 - Black-Start Resources identified in the Transmission Operator's Restoration Plan.

- I4 - Dispersed power producing resources with aggregate capacity greater than 75 MVA (gross aggregate nameplate rating) utilizing a system designed primarily for aggregating capacity, connected at a common point at a voltage of 100 kV or above.

- I5 - Static or dynamic devices (excluding generators) dedicated to supplying or absorbing Reactive Power that are connected at 100 kV or higher, or through a dedicated transformer with a high-side voltage of 100 kV or higher, or through a transformer that is designated in Inclusion I1.

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[2] On 4/19/2012 FERC ruled on remand from a 2008 challenge by DOE that PORTS should not be an LSE and ordered OVEC be placed on the registry as the LSE for DOE Load.

Exclusions:

- E1 - Radial systems: A group of contiguous transmission Elements that emanates from a single point of connection of 100 kV or higher and:

  a) Only serves Load,

  b) Only includes generation resources, not identified in Inclusion I3, with an aggregate capacity less than or equal to 75 MVA (gross nameplate rating), and

  c) Where the radial system serves Load and includes generation resources, not identified in Inclusion I3, with an aggregate capacity of non-retail generation less than or equal to 75 MVA (gross nameplate rating).

Note – A normally open switching device between radial systems, as depicted on prints or one-line diagrams for example, does not affect this exclusion.

- E2 - A generating unit or multiple generating units on the customer's side of the retail meter that serve all or part of the retail Load with electric energy if: (i) the net capacity provided to the BES does not exceed 75 MVA, and (ii) standby, back-up, and maintenance power services are provided to the generating unit or multiple generating units or to the retail Load by a Balancing Authority, or provided pursuant to a binding obligation with a Generator Owner or Generator Operator, or under terms approved by the applicable regulatory authority.

- E3 - Local networks (LN): A group of contiguous transmission Elements operated at or above 100 kV but less than 300 kV that distribute power to Load rather than transfer bulk power across the interconnected system. LN's emanate from multiple points of connection at 100 kV or higher to improve the level of service to retail customer Load and not to accommodate bulk power transfer across the interconnected system. The LN is characterized by all of the following:

  a) Limits on connected generation: The LN and its underlying Elements do not include generation resources identified in Inclusion I3 and do not have an aggregate capacity of non-retail generation greater than 75 MVA (gross nameplate rating);

  b) Power flows only into the LN and the LN does not transfer energy originating outside the LN for delivery through the LN; and

  c) Not part of a Flowgate or transfer path: The LN does not contain a monitored Facility of a permanent Flowgate in the Eastern Interconnection, a major transfer path within the Western Interconnection, or a comparable monitored Facility in the Energy Reliability Corporation of Texas (ERCOT) or Quebec Interconnections, and is not a monitored Facility included in an Interconnection Reliability Operating Limit (IROL).

- E4 - Reactive Power devices owned and operated by the retail customer solely for its own use.

Note - Elements may be included or excluded on a case-by-case basis through the Rules of Procedure exception process.

1.3 Applicability to PGDP

The new BES definition will likely classify PGDP as a BES element or facility because:

- Is receiving voltage is greater than 100 kV,
- It operates terminal equipment greater than 100 kV (Figure 2),
- It is not a radial system and cannot easily be one as currently configured,
- The "loop flow" through the switchyards constitutes transfer of bulk power across the interconnected system, and
- It is a direct interconnection between four balancing areas.

1.4 Consequences of BES Classification

Based on the rationale that was used by Reliability First (RFirst) at Portsmouth and NERC's desire to have consistency among the regions, it is likely that PGDP will also be classified as a TO, TOP, and DP. The applicability of DP categories may potentially be waived for PGDP since there is not a Centrifuge Project or other Non-Governmental benefactor of the sites power. Since there are few requirements that are exclusive to DP and not incumbent on a TO or TOP, the consequences of waving these are minimal. For this discussion, it is assumed PGDP will be registered the same as PORTS.

The first and foremost consequence of being placed on the compliance registry is the need to establish and demonstrate compliance with as many as 100 discrete performance or programmatic requirements. A current list of standards that will potentially apply to PGDP is shown as Table 1. Dependant on nuances of the PGDP hardware system design, a few of these may not be applicable. The standards are designed to assure reliability of the BES and generally are not concerned with the plant's load. Therefore, priorities, terminology, nomenclature, and processes will generally be foreign to the gaseous diffusion operations personnel. This will require a significant re education and re orientation of personnel if they are to successfully operate under the new structure.

Figure 2. 161 kV Switchyard (Typical)

Table 1. Applicable NERC Standards to PGDP (April 2012)

Ref #	Standard #	Standard Title	Relevant Category		
			DP	TO	TOP
1	BAL-005-.2b	Automatic Generation Control			x
2	CIP-001-2a	Sabotage Reporting		x	
3	CIP-002-3	Critical Cyber Asset Identification		x	x
4	CIP-003-4	Security Management Controls		x	x
5	CIP-004-4	Personnel and Training		x	x
6	CIP-005-4a	Electronic Security Perimeter(s)		x	x
7	CIP-006-4d	Cyber Security — Physical Security of Critical Cyber Assets		x	x
8	CIP-007-4	Systems Security Management		x	x
9	CIP-008-4	Incident Reporting and Response Planning		x	x
10	CIP-009-4	Recovery Plans for Critical Cyber Assets		x	x
11	COM-001-1.1	Telecommunications		x	
12	COM-002-2a	Communications and Coordination		x	
13	EOP-001-0.1b	Emergency Operations Planning		x	
14	EOP-003-2	Load Shedding Plans		x	
15	EOP-004-1	Disturbance Reporting		x	
16	EOP-005-2	System Restoration Plans		x	
17	EOP-008-1	Plans for Loss of Control Center Functionality		x	
18	FAC-001-1	Facility Connection Requirements		x	
19	FAC-002-1	Coordination of plans for new generation, transmission, and end users		x	
20	FAC-003-2	Transmission Vegetation Management Program		x	
21	FAC-008-3	Facilities Ratings Methodology		x	
22	FAC-009-1	Establish and Communicate Facility Ratings		x	
23	FAC-014-2	Establish and Communicate System Operating Limits (SOLs)			x
24	INT-004-2	Dynamic Interchange Transaction Modifications			x
25	IRO-001-2	Reliability Coordination – Responsibilities and Authorities			x
26	IRO-004-2	Reliability Coordination –Operations Planning			x
27	MOD-001-1a	Available Transmission System Capacity		x	
28	MOD-008-1	TRM Calculation Methodology		x	
29	MOD-010-0	Steady State Data for Transmission System Modeling and Simulation		x	
30	MOD-012-0	Dynamic Data for Transmission System Modeling and Simulation		x	
31	NUC-001-2.1	Nuclear Plant Interface Coordination		x	x
32	PER-001-0.2	Operating Personnel Responsibility and Authority		x	
33	PER-002-0	Operating Personnel Training		x	

Ref #	Standard #	Standard Title	DP	TO	TOP
34	PER-003-1	Operating Personnel Credentials			x
35	PER-005-1	System Personnel Training			x
36	PRC-001-1.1	System Protection Coordination			x
37	PRC-004-2.1a	Analysis and Mitigation of Transmission and Generation Protection System Misoperations	x	x	
38	PRC-005-1b	Transmission and Generation Protection System Maintenance and Testing	x	x	
39	PRC-007-0	Assuring Consistency with Regional Under-frequency Load Shedding (UFLS) Program Requirements	x	x	x
40	PRC-008-0	Implementation and Documentation UFLS Equipment Maintenance Programs	x	x	
41	PRC-009-0	Analysis and Documentation UFLS Performance Following an Under-frequency Event	x	x	x
42	PRC-010-0	Technical Assessment of the Design and Effectiveness of Under-Voltage Load Shedding (UVLS) Program	x	x	x
43	PRC-011-0	UVLS System Maintenance and Testing	x	x	
44	PRC-015-0	Special Protection System Data and Documentation	x	x	
45	PRC-016-0.1	Special Protection System Misoperations	x	x	
46	PRC-017-0	Special Protection System Maintenance and Testing	x	x	
47	PRC-018-1	Disturbance Monitoring Equipment Installation and Data Reporting		x	
48	PRC-021-1	UVLS Program Data	x	x	
49	PRC-022-1	UVLS Program Performance	x	x	
50	PRC-023-1	Transmission Relay Load-ability	x	x	
51	TOP-001-1a	Reliability Responsibilities and Authority	x		x
52	TOP-002-2.1b	Normal Operations Planning			x
53	TOP-003-1	Planned Outage Coordination			x
54	TOP-004-2	Transmission Operations			x
55	TOP-005-2a	Operational Reliability Information			x
56	TOP-006-2	Monitoring System Conditions			x
57	TOP-007-0	Reporting SOL and IROL Violations			x
58	TOP-008-1	Response to Transmission Limit Violations			x
59	VAR-001-2	Voltage and Reactive Control			x

Based on the PORTS experience, the following is a partial list of actions or activities that will likely be required for PGDP to become compliant and maintain compliance:

- As many as a hundred (100) requirements from the approximately fifty nine (59) standards have to be verbatim imbedded into command media (i.e. procedures and long-term standing orders).
- A gap analysis must be performed to determine needed changes.

- Operators and supervisors must be trained and regularly retrained on the new procedures.
- Operators and/or supervisors must become NERC certified through the passing of a national exam for power operators (pass rate currently about 60%) that must be passed for personnel to operate.
- Must register the Paducah plant for its functional model categories – likely TO, TOP, DP.
- Potentially must pass a functional audit by SERC to be certified as a TOP.
- Must self-assess through a gap analysis process, self-certify and mitigate any noncompliance likely through the Open Access Transmission Information System (OATi) Web Compliance Data Management System (CDMS) system.
- Must begin the reporting all transmission system outages to the national electronic (Web) Transmission Availability Data Base (WebTADS).
- Develop and implement a formal Vegetation Management program.
- A technical basis document must be developed that reconstitutes the facilities original and current technical basis.
- Must establish a facility ratings methodology and determine and publish facility ratings.
- Determine system operating limits (SOL's) and possibly IROL'S.
- Conduct a cyber security/critical facilities assessment with the intent of becoming exempt from CIP-003 through 009. Paducah's more integrated into the grid than PORTS and may not be considered or determined to be exempt.
- Set up and publish a hierarchy of command that documents the authority flow down for cyber security.
- Develop and publish an interconnection requirements document.
- Develop a catalog of all BES that will become under compliance.
- May require upgrading BES switchyards Preventative Maintenance (PM) program and records to include all relaying, control wiring, batteries, battery chargers, and control switches that are relied upon to protect the BES based on industry standard frequencies. A catalog of these items is a must.
- May be required to become compliant and maintain full documented compliance with the new PM program.
- Determine primary and secondary compliance contacts for communicating with the regulator.
- Establish a contract with a reliability coordinator (RC) for their services. The RC will require adding telemetry facilities, if they don't already exist, to provide status of all BES, components and load flows/tie line flows to your balancing authority and reliability coordinator.
- Establish primary and secondary communications systems that are independent and redundant to the Balancing Authority (BA) and RC. These must be diversely routed and tested.
- Conduct drills and simulations of emergency situations as prescribed by several standards.
- Submit hourly, monthly, seasonal, yearly, 10 year actual and projected demand data to the Planning Authority (PA).
- Develop and supply on request steady state and dynamic system modeling data (usually just impedances of all the lines meets this need).
- Participate in regional transmission planning meetings (probably TVA) and supply DOE plans in a timely manner.
- Agree to subordinate all non-emergency maintenance evolutions to system needs as prescribed by the RC.
- Periodically audit and self-certify compliance / noncompliance on selected standards the regulator may select.
- Assign personnel accountability for performing the above actions and monitoring/managing progress.
- Anticipate and budget for fines and penalties for inevitable noncompliances if sovereign immunity of DOE is voided for this purpose. (Pending FERC case with South West Power Administration –

Table 2. Base Penalty Amount Table

The following lists the Base Penalty amounts corresponding to combinations of violation risk factor and violation severity factor.

	Violation Severity Level							
Violation Risk Factor	Lower		Moderate		High		Severe	
	Range Limits		Range Limits		Range Limits		Range Limits	
	Low	High	Low	High	Low	High	Low	High
Lower	$1,000	$3,000	$2,000	$7,500	$3,000	$15,000	$5,000	$25,000
Medium	$2,000	$30,000	$4,000	$100,000	$6,000	$200,000	$10,000	$335,000
High	$4,000	$125,000	$8,000	$300,000	$12,000	$625,000	$20,000	$1,000,000

NOTE: This table describes the amount of penalty that could be applied for each day that a violation continues, subject to the considerations of Section 3.21 regarding frequency and duration of violations.

2. OPTIONS AND APPROACH

There are four primary options for moving forward with this issue. The first is to resist the requirement using technical and legal challenges to the need for registration and compliance. The second is to divest the DOE facilities to an already compliant entity such as a neighboring power utility. The third option is to become compliant with the NERC standards. The fourth option is to significantly reconfigure the PGDP switchyard facilities after Gaseous Diffusion Plant (GDP) shutdown to allow them to be exempt from compliance. There are advantages and disadvantages to each approach with the best approach likely being a combination of options.

2.1 Resist, Challenge, Claim Exemption

This approach is analogous to the path PORTS initially attempted. It was to resist, protest, and otherwise claim exemption. There is a process included in the new definition initiative by NERC that now appears to recognize through performance studies such as load flow, short circuit, transient stability analysis the potential minimal impact possible with some entities. However, considering the four balancing areas (control areas) that are interconnected through 15 transmission line ties at the PGDP facilities, five TVA generators directly connected to DOE facilities, and the extensive loop flow currently or potentially (with a GDP shutdown) passing through the facilities, exempting the DOE PGDP switchyards would likely be a reach too far if it's even technically feasible. Considering that the PORTS challenge to involuntary registration was essentially defeated at FERC and studies demonstrating no significant impact at PGDP would also be unconvincing to FERC, this approach is not recommended initially but should be reserved for when and if significant facility downsizing and reconfiguration are achieved.

2.2 Divest and Delegate Facilities and Compliance Responsibilities

The second approach would be to seek a FERC filed delegation agreement with TVA, Electric Energy Inc. (EEI), or Louisville Gas and Electric/Kentucky Utilities (LGE/KU) for one or more of them to assume responsibility for the switchyards as part of a facility lease arrangement. The lease holder would by contract be responsible for assuring the facilities and their operations are compliant, would be responsible for mitigating any noncompliances, would be liable for any fines and penalties, and would provide Operations and Maintenance (O&M) and modifications. The lease holder would conversely receive full benefit of the DOE's switchyard asset for their commercial system operations and have DOE as a wholesale customer. It is likely that they would include the cost of operating, maintaining and assuring compliance of the facilities into their Open Access Transmission Tariff (OATT). The costs would then be equitably spread among all commercial transmission customers that receive power scheduled (wheeled) through the DOE facility. This approach was the preferred option for PORTS and was pursued up through and including an executed letter of intent with The Ohio Valley Electric Corporation (OVEC). OVEC later rescinded their desire to attempt such an undertaking as a result of unrelated financial risk issues.

Advantages:

- An experienced NERC certified and procedures based power company would be operating the facilities under a long-term lease[3] and regulatory delegation agreement.
- If properly designed and executed, the integration of DOE facilities into a larger system would likely enjoy significant cost of operation advantages.
- The new operator would follow commercial health and safety rules instead of DOE regulations.
- The new operator would modernize based on economics resulting in improved facilities.
- DOE would be removed from the inherently non-governmental function of running a large power system.
- The general public would benefit from the massive investment DOE has made in the GDP switchyard facilities by not requiring electricity rate increases to cover replacement facilities.

Disadvantages:

- The entity operating the facilities would be profit driven and likely charge DOE a service charge for the long-term power it requires from the facilities. This however, would likely be significantly less than the current or projected cost of O&M of the entire facility.
- Divesting a Government asset is not a straightforward undertaking. It may require a competition among the eligible entities if there are multiple expressions of interest.
- The existing leaseholder (USEC) would have to surrender their lease on the facilities.
- The unionized USEC workforce currently engaged in O&M of the facilities would have to be dispositioned (the new entity may choose to absorb some of them but likely not all).
- Any radiological contamination present would have to be removed or else the new operator would have to have a radiological controls program or be supplied such service from the DOE.
- Access to the facilities and security fencing would likely need modified to eliminate the need for the new operators to cross the limited security areas of DOE and have security clearances.

[3] A similar arrangement has been successfully implemented at Savannah River and could serve as a model for PGDP.(See Attachment B)

2.3 DOE Starts on Path/Achieves Compliance

This was the approach finally settled on at PORTS after OVEC rescinded their interest in a lease/delegation approach and the RFC initiated enforcement actions against DOE including an on-site audit. DOE was left without choice but to contract the facility lease holder (USEC) with help from other contractors and subcontractors to mitigate any noncompliances with the standards requirements. Also included was help to sustain an audit and stand up a robust compliance program. DOE, using a support contractor, had previously identified the majority of the areas of noncompliances through the self report/ self certify process with RFC. USEC conducted an additional gap analysis evaluating existing programs against standard requirements. Together, they constituted a gap analysis which served as the basis for determining mitigating actions required. It unfortunately also served as the basis for RFC to seek enforcement and penalty.

Advantages:

- DOE leads the industry by example in seeking compliance.
- DOE negotiates the necessary time to let the site future become clearer so as to better optimize the long-term outcome.
- Existing O&M personnel continue to be utilized.
- Maintain a positive relationship with the regulator while assuring the power industry stakeholders that their continued use of the DOE facilities will not be jeopardized.
- Compliance cost can be spread over two years.
- Long lead time items such as operator certification and training can be accomplished in time for likely deadline of summer 2014.
- A trained and compliant operation will likely result in improved and more reliable operations because of the enhanced rigor achieved with compliance and associated surveillances of ongoing operations.
- DOE has more leverage to deal with utilities since timing is no longer as critical.
- DOE gets ahead of the forces that drive decisions.

Disadvantages:

- Costs of compliance estimated at $2 – $4 million rough order of magnitude (ROM) with yearly $1 million cost to maintain.
- Ongoing training burden and management of compliance will require additional staff.
- DOE focus shifted from its core missions.
- Largely dependent on USEC cooperation and reasonableness as long as they hold the facility lease. This could become part of conditions for future lease negotiations.
- May achieve partial or total compliance only to have the divestiture alternative succeed with the compliance efforts wasted.

2.4 Modify Facilities

Depending on the timing of the return of the facilities to DOE from USEC and the prerequisite shutdown of the GDP, an accelerated program of reconfiguration intended on the site becoming a radial feed could be undertaken. It is feasible to reroute all ongoing DOE loads to a single switchyard (analogous to the PORTS approach) and shutdown the other three. TVA, EEI, and LGE/KU would be forced/encouraged to also mount an accelerated construction program to reroute/reconnect transmission lines around DOE facilities or build replacement facilities appropriately sized. This would totally relieve DOE of the regulatory compliance burden but would require enormous unplanned and unscheduled investment be made by DOE, TVA, EEI, LGE/KU in the near term. If feasible, and committed to by all parties, it might

be grounds for a stay of enforcement of compliance requirements by the SERC to allow a more protracted time to execute.

Advantages:

- No ongoing compliance costs.
- DOE substantially out of power business.
- Best long-term solution for DOE.
- Lowest long-term O&M costs.
- Most energy efficiencies.
- Yards ready for Decontamination and Decommissioning (D&D).

Disadvantages:

- Will require substantial investments by all parties (government and private).
- Extensive planning studies will be needed for utilities to determine best configuration.
- Potentially considered hostile to TVA, EEI, LGE/KU ratepayers.
- Might be challenged by Kentucky Public Service Commission (KPSC) and Illinois Commerce Commission (ICC).
- Will compete for limited D&D funds.

2.5 Overall Approach

2.5.1 Contact/Communicate/Coordinate with SERC

The first step no matter what approach is taken should be to establish a point of contact (POC) with and meet with SERC. This is to better understand how they intend to implement the new BES definition mandate and what is the likely time line. Since there are some 50 entities in the TVA footprint alone in this same situation and likely several times that many in the overall SERC area. There are many questions that should be discussed such as:

- What implementation assistance is SERC planning?
- Will there be training seminars given?
- What about pre-compliance reviews and best management practices to share?
- What does SERC like and not like? DOE-PGDP must learn the approach SERC will take in regulating the newly registered entities including DOE.
- What is SERC's advice on the approach taken for DOE to satisfy the requirements (divestiture, modification, compliance)?
- Does SERC have example delegation agreements that could be modeled by DOE?
- Will SERC utilize the mitigation process in NERC's rules of procedure to drive compliance?

Based on the presentation made March 8, 2012, to DOE, TVA intends to offer a "streamlined conveyance process". What this ultimately means in unclear. It is unlikely that TVA will absorb any compliance responsibility but may help coordinate transfer of responsibilities.

The initial contact with SERC should happen as soon as possible and is strongly urged to be sooner than later. It is also suggested that DOE-PGDP become a member of SERC. As a member it can participate in the decision making process and procedures development.

2.5.2 Engage DOE legal and Real Estate Resources

This is necessary to determine the preferred method of divesting the BES facilities. This is not a simple straight forward process. The case study from Savannah River, while somewhat dated, is supplied as Attachment B. A discussion with DOE-Savannah River Site (SRS) about the current experience could prove insightful as to the long range consequence of the approach. A definitive set of requirements and steps should be developed that if followed will result in a legal and supportable divestiture. Items needing resolution include: the need for a procurement competition, and, residual commitments from past contracts between TVA, EEI and DOE or USEC. DOE legal should discuss potentially drafting a lease agreement in order to prepare for the alternative to lease the facilities to TVA, EEI, or LGE/KU.

This is a DOE activity that can move ahead as soon as possible. A negative outcome would remove the divestiture option from further consideration.

2.5.3 Determine Strategy for USEC Involvement

USEC's advertised position[4] for PGDP is currently to cease operations after expiration of their power contract in May 2012. How this relates to surrendering the lease on the switchyard facilities is unknown and speculative. Based on the PORTS experience, a more timely and orderly compliance would have been achieved with earlier engagement of USEC. A benefit PGDP should enjoy that will serve to drive down costs of compliance is that PORTS procedures (USEC developed and DOE owned) can be supplied now as DOE property to PGDP that embeds the necessary language for compliance. The cost of new procedures can substantially be reduced. Any contract with USEC should not include all new procedures. There will be significant training time and costs for individuals destined to be NERC certified operators. No matter what the outcome of the USEC question, the individuals now engaged in the BES operation will substantially continue to be the ones engaged in the BES operation in the future. Training them now will not be wasted.

After contracting with USEC and/or its near term successor, training and certification of salaried personnel should begin immediately.

Note: Waiting for ultimate resolution of the USEC question could delay this function until it is too late to meet the two year window for compliance preparation.

2.5.4 Engage a NERC Standards Professional Training/Consulting Organization

There are three main reasons for doing this. The first is that the nomenclature, terminology, and thought processes required for compliance will be foreign to the majority of the personnel currently performing the operations. A jump start of the training process is required that will not only train the operations personnel, but also train the training resources needed to support the long-term maintenance of the compliance program. The second reason is that there are mandatory retraining requirements that must be satisfied yearly to retain certification that must be administered by a NERC accredited training organization. Morphing the plant training department and records system to accomplish this is an expense that can be postponed with the contracted approach. The third reason is that many organizations have gone through this transition already and there are "best practices" to embrace if known about. The PORTS experience has found the advice from such an organization invaluable in dealing with the regulator and in becoming adequately sensitized to the entire process.

[4] USEC 2011 Annual report, page 4, April 2012

Several consulting/training companies that have helped guide other organizations through this transition are available to assist. DOE should establish a contract with one as soon as possible to advise and train management and operating personnel.

2.5.5 Engage the Connected Power Companies

TVA, EEI, LGE/KU, and potentially Big Rivers are all stakeholders in this process. While TVA may present as the spokesman for all entities, each of them has one or more interconnection with the DOE facilities (see attachment A) that must currently be continued for the reliability of their commercial operations. DOE cannot unilaterally sever any of these connections without extensive study and legal agreements with the parties. Items needing resolved include: long-term needs for maintaining connections, alternatives that could reasonably be embraced that would allow disentanglement, and what ultimate system configuration could be devised outside or inside of the DOE footprint. These discussions will establish the basis for a long-term vision for the site's electrical grid that can likely be aided by DOE's near term actions. These discussions will also be crucial to planning the sites D&D process[5].

Meetings with each connected power company should be conducted as soon as possible. Any DOE reconfigurations after plant shutdown should be consistent with and support a long range vision for site BES configuration.

2.5.6 Prepare NERC Implementation Project Plan

Develop a resource loaded work schedule that covers all tasks identified in the gap analysis and other reviews that must be accomplished in order to be compliant by summer 2014. A P6 or primavera schedule will work nicely for this. Most of the required tasks have been delineated in section 1.4 of this report and presented in a draft project plan as figure ES-2. A similar vehicle was crucial to PORTS accomplishing the entire menu of tasks in a short time frame. While PORTS achieved compliance in approximately one year from the time the project was undertaken in earnest, a two year planning window would have been far better and less disruptive to other site missions. The project plan is also an excellent vehicle for periodic reporting to management.

Projectizing this activity will increase the likelihood that all activities will be accomplished by the deadline.

2.5.7 Assign Responsibility and Accountability

As the transmission system owner, SERC and NERC will hold the DOE entirely accountable for compliance. An organizational plan that shows authority flow down from the Manager of PPPO should be established. Similarly, augmented or federal staff assigned to oversee and implement the program must be appropriately identified, tasked, and resourced to achieve success. There are NERC standards that require a clear line of accountability identified and documented. Such a system from the inception will make the achievement of compliance more likely. There is a significant amount or reporting associated with achieving/maintaining compliance that will likely be conducted through a secure computer portal. Control of the rights to access the portal for DOE or on their behalf must be established and compulsory digital certificates purchased and installed on authorized computers to allow this to happen.

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[5] Future use or reuse of the site through reindustrialization should not preclude removal of BES assets. The existing equipment is oversized, obsolete, with its useful life expended so as to not constitute a significant asset for future development. The true reindustrialization asset at PGDP is system interconnectivity on or near the site that will remain with the power companies.

3. PROJECT PLAN AND TIMING

3.1 Assumptions

There are several key dates that are in flux that require assumptions be made as to when events will occur. The first date pending is when will FERC rule on the NERC filed request to approve the new BES definition and revised rules of procedure. Secondly, when will it be implemented? TVA has speculated it will be mid-summer 2012. For this plan, an August 1, 2012, date is assumed with a twenty four month period for implementation. When will USEC shutdown the GDP is the second key date. Based on USEC's annual report, this is projected as May 31, 2012. The next key date is, when USEC will return the leased switchyard facilities to DOE. For this study, this is projected as either August 31, 2012, or beyond the time frame of implementation (i.e. USEC will not return the switchyard facilities or will return them outside the planning period of this effort. Based on recent developments concerning possible tails recycle work requiring continued operation of the cascades, this is considered the most likely situation). Based on the PORTS experience, the need for safety basis revisions, the lack of an alternative approach, and the uncertainties surrounding de-lease, the recommended course of action for DOE is to seek compliance at this time.

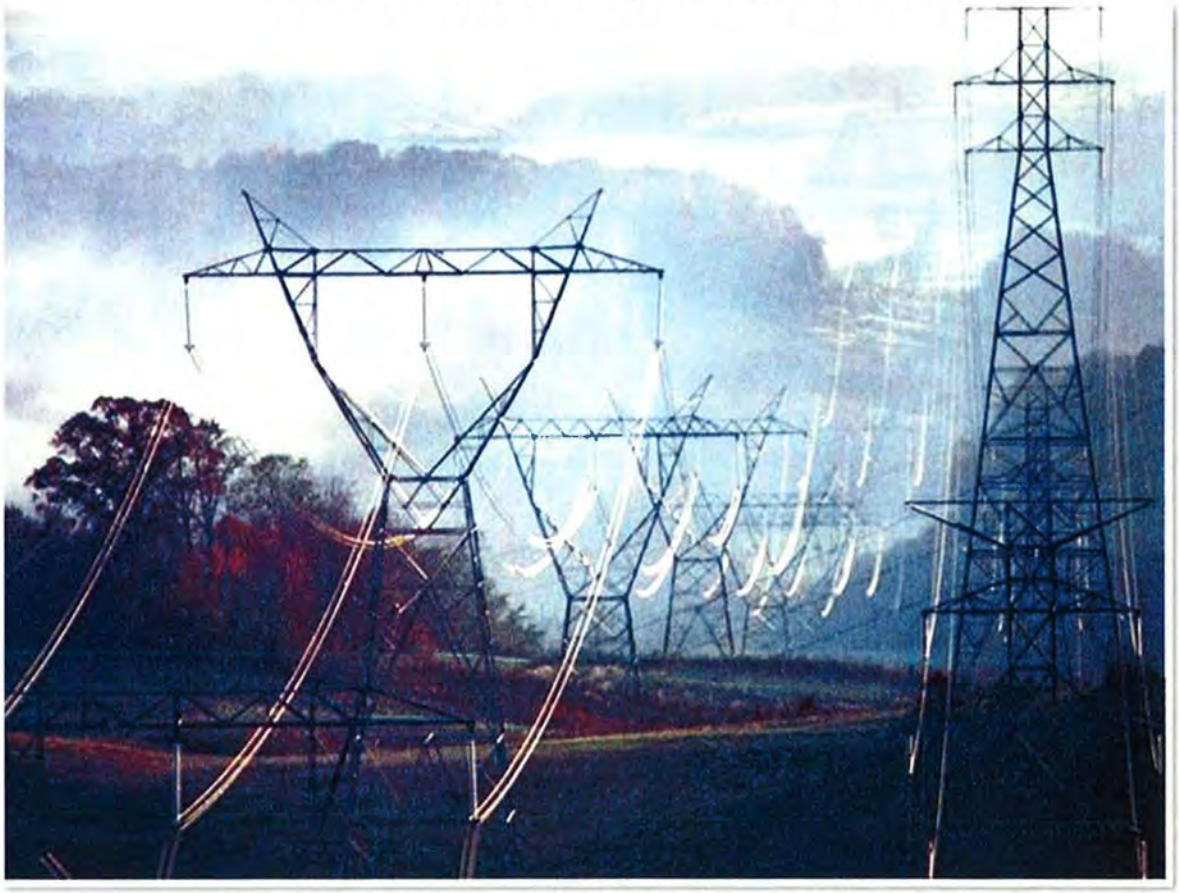
3.2 Compliance Process Steps

The following are envisioned as the critical steps and dates to achieve:

1) Determine, assign, and document PGDP Federal Employee program lead and records retention practices by 6/1/2012.
2) Select and assign full time "Support Contractor" lead by 6/1/2012.
3) Amend support contractor contract if needed by 6/1/2012.
4) Obtain consultant services (Intellibind, Systems Operations Success (SOS), others) for program development by 6/1/2012.
5) Review strategy, modify as necessary by 6/15/2012.
6) Initial meeting with SERC establish POC's by 7/1/2012.
7) Meet with interconnected power companies and determine POC's (TVA, EEI, LGE/KU, Big Rivers) as early 7/15/2012 through 8/15/2012.
8) Meet with USEC/near term operator by 7/15/2012 and contract for compliance program development.
9) Contract/amend contract with USEC/near term site operator by 10/1/2012.
10) USEC/operator review of all applicable standards against current practices. Perform gap analysis and needed command media and other revisions by 12/1/2012.
11) USEC/operator determine hardware changes needed such as Supervisory Control and Data Acquisition (SCADA), Disturbance Monitor, Time Syncing Hardware, Voice Recording Capability, Sequential Events Recorder, Communications Lines to RC and interconnected power companies by 2/1/2013.
12) Design/procure/install hardware modifications sometime between2/1/2013 and 10/1/2013.
13) Develop command media revisions using PORTS procedures as applicable sometime between 12/1/2012 and 10/1/2013.
14) Review preventive maintenance/relay calibration practices, do walk-down of all BES protective relay systems, develop catalog of BES components, and determine needed upgrades to PM/calibration program sometime between 12/1/2012 and 6/1/2013.
13) Implement new calibration/testing frequencies, items included, and records upgrades sometime between 6/1/2013 and7/1/2014.
14) All devices and systems current by 7/1/2014.

15) Secure training services contractor by 7/1/2013.
15) Train Operators/ Supervisors sometime 7/1/2013 and 10/1/2013.
16) Certify operators/supervisors sometime10/1/2013 and 1/1/2014.
17) Develop drills and simulations required by standards by 3/1/2014.
18) Contract with Reliability Coordinator for Services by 6/1/2014.
19) Conduct final readiness style review or assessment by 6/15/2014
20) Ready for declaration of compliance by7/1/2014.

Figure 3. TVA High Voltage Transmission Corridor



4. LONG RANGE CONFIGURATION

4.1 Situation

Like the PORTS switchyards, substantial downsizing, elimination, combinations, etc. are possible that can drive down O&M costs to DOE for the remainder of the sites existence. From a servicing of site load perspective, three of the four yards could be eliminated almost immediately by rerouting critical load 13.8 kV feeders to unneeded breakers in the remaining switchyard. It is conceivable that the incoming transmission line configuration interconnection with DOE could be simplified sufficiently to result in the DOE becoming a radial feed without the need for compliance with NERC standards. However, every existing switchyard has at least one interconnection to one of the four power companies. These inter balancing authority tie lines cannot be eliminated without significant studies to determine: short circuit duties on off-site and on-site breakers, load flow paths for a myriad of contingencies, affect on system and interconnection operating limits, affect on power angle and voltage stability, and transient stability. Assuming a satisfactory configuration can be designed that provides for the need of all parties, it is likely that a substantial construction project rerouting several transmission lines, installation of new right sized power company owned switching stations, and approvals from state and federal regulators will be required. Determining an equitable process for sharing of costs for these multi-million dollar modifications will also be quite problematic considering the drivers and beneficiaries for doing them. Nevertheless, a long range vision for the site's power grid assets should be developed to serve as a guide or vision for future BES asset downsizing projects.

4.2 Path Forward

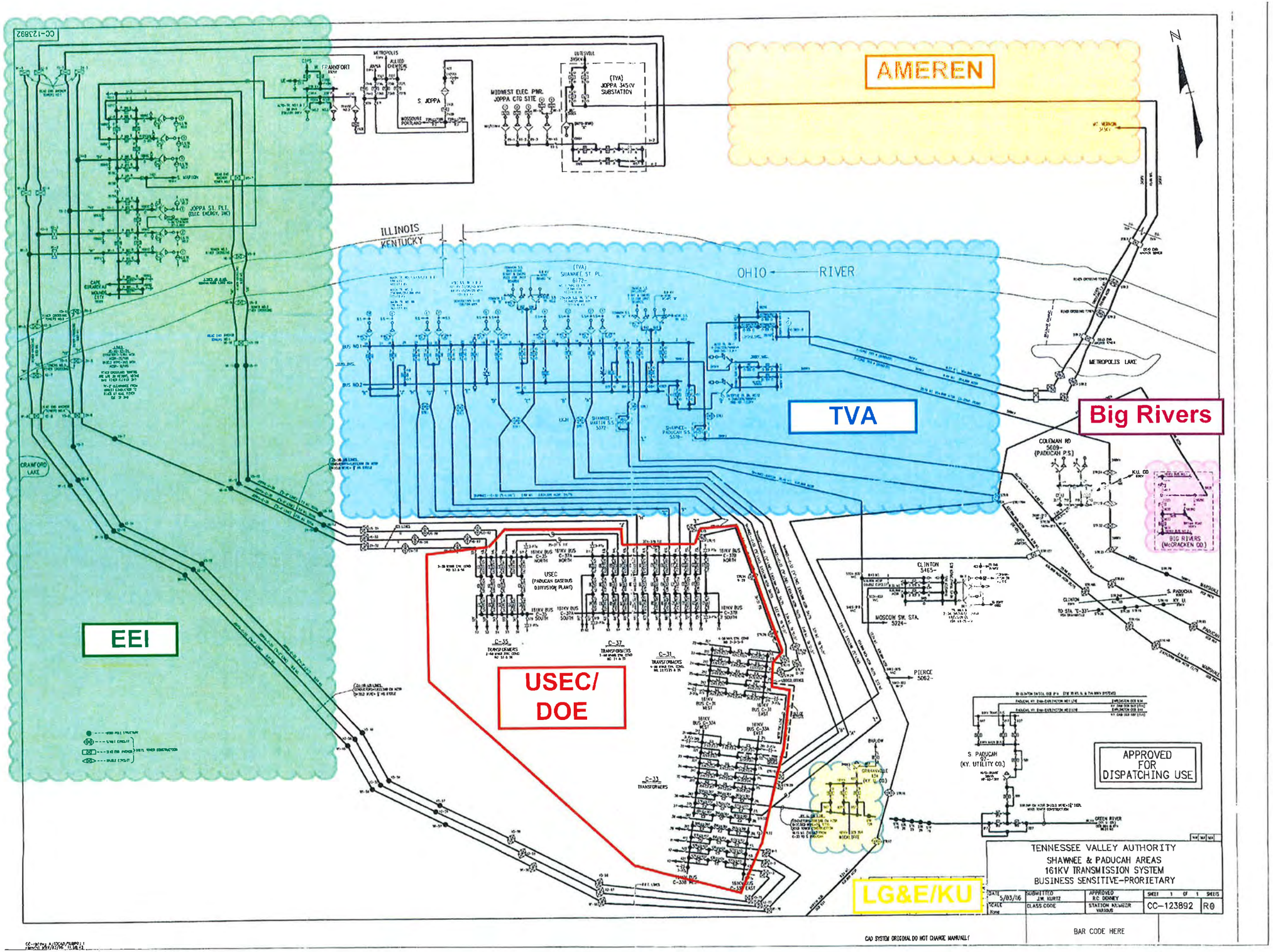
Power system configuration planning is not a task that the DOE or its support contractors can competently perform. It is suggested that TVA as the regions "PA" be approached to lead a multi-company team including DOE to determine the end game for the PGDP facilities. Criteria for DOE requirements should be supplied in advance by DOE that will describe near term and long-term power demands for its remaining missions. An estimate of needed reliability levels (likely low) and any governmental projections for site reuse (also likely none) should be provided. Expected remaining power requirements for the site as it prepares for D&D, ramps up Depleted Uranium Hexafluoride (DUF_6) operations, and winds down GDP activities should be attempted based on most likely scenarios. The team should be able to return a range of viable options that take into account all stakeholders needs, equitable cost sharing by stakeholders, and are total cost and schedule optimized.

4.3 Implementation

Final configuration is somewhat speculative but will likely involve a single operating DOE substation operated from two radial BES feeds with an open disconnect or breaker between them. It will likely have 13 transmission line either abandoned or reconnected through small non DOE switching stations that contain necessary tie line metering and line protective equipment.

It is highly unlikely if not impossible that all required modifications can be accomplished by July 2014, to allow DOE to be free of the requirement for compliance with NERC standards. Implementation schedules must be driven by funding availability among the stakeholders and other related system changes (potential shutdown of Shawnee Steam Plant, addition of combined cycle or peaking gas turbine generation throughout the systems, other impending transmission system changes, etc.). This will stretch the implementation out over most of a decade or more. If most if not all of the DOE BES facilities were to be divested to the other stakeholders, this could conceivably be a non-DOE issue.

ATTACHMENT A: SHAWNEE AND PADUCAH AREAS 161 KV TRANSMISSION SYSTEM


AMEREN
TVA
Big Rivers
EEI
USEC/
DOE
LG&E/KU
ILLINOIS
KENTUCKY
OHIO RIVER
APPROVED
FOR
DISPATCHING USE
TENNESSEE VALLEY AUTHORITY
SHAWNEE & PADUCAH AREAS
161KV TRANSMISSION SYSTEM
BUSINESS SENSITIVE-PRORIETARY
CC-123892
R0
BAR CODE HERE
CAD SYSTEM ORIGINAL DO NOT CHANGE MANUALLY

ATTACHMENT B: DOE SAVANNAH RIVER DIVESTITURE CASE STUDY AND LEASE

Case Study 8: Privatization of Power Facilities at Savannah River Site

Background

The DOE Savannah River Site (SRS), near Aiken, South Carolina, has a 70-megawatt electric- and steam-generating powerhouse, more than 100 miles of electrical transmission lines, and 16 substations. These facilities were built in the early 1950s for power supply. Westinghouse Savannah River Company (WSRC) is the current management and operating contractor for the site.

The Effort

In late 1994, the DOE Savannah River Operations Office determined that the lowest cost for power to the site could be obtained through the privatization of onsite power production and transmission facilities. Privatization also would eliminate the need for an upgrade to the existing plant, a project that had been authorized for a total project cost of $91 million. In this case, the effort included aspects of two types of privatization—namely asset transfer and contracting out.

As the utility with legal territorial rights in this area, South Carolina Electric and Gas Company (SCE&G) was the only company from which DOE could purchase retail electricity. *Therefore, a sole-source procurement action was pursued.* Privatization was accomplished through a utility contract that included a 10-year lease for the site's 484–D Powerhouse, supporting facilities, and steam pipelines, and a 40-year lease for transmission facilities and substations. Both leases were executed under the authority of section 161g of the Atomic Energy Act.

Based on the results of the first year of the contract, DOE projects that cost reductions for power and steam will exceed $150 million over a 10-year period. The management contractor projected a loss of 150 to 200 jobs; however, SCE&G would employ about 50 of these employees.

Current Status

The actual transfer of facilities to SCE&G occurred on October 1, 1995, and the necessary environmental permits were transferred shortly thereafter. Transfer of occupational safety and health jurisdiction was problematic. The State of South Carolina did not want to assume jurisdiction, and it took 7 months to work out the details of transfer to the Federal Occupational Safety and Health Administration (OSHA).

The first 3 months of billing for electricity and steam by SCE&G was approximately $5.4 million less than would have been billed by WSRC using fiscal year 1994–95 actual costing rates. The actual realized savings will be somewhat less due to direct transition costs and the general and administrative overhead costs of the management contractor, which cannot be fully eliminated. However, DOE expects actual savings to grow as transition activities are completed and overhead is reduced.

Lessons Learned

One of the lessons learned in privatizing the powerhouse at Savannah River is that if a potential privatization involves external regulation, the Department's Office of Environment, Safety and Health and appropriate regulatory agencies must be notified and engaged very early in the privatization process.

Another lesson learned is that failure to properly communicate the Department's intentions to organized labor, which had been employed in the maintenance of the facility for many years, has strained local labor relations.

A third lesson learned concerns the applicability of the Davis-Bacon Act (see Key Legal Authorities, at the end of this chapter). The Department has taken the position that this privatization is an acquisition of utility services and not a contract to operate a powerhouse. The powerhouse is leased to SCE&G, who may choose to utilize the D-Area powerhouse to meet its contract obligations; however, SCE&G's obligation to provide steam and electricity to the Savannah River Site is independent of the D-Area powerhouse lease. Because the utility service contract with SCE&G does not contain requirements for construction work, the Davis-Bacon Act does not apply.

DEPARTMENT OF ENERGY LEASE
Transmission Facilities and Substations
Savannah River Site

NO. DE-RO09-95SR18531

THIS LEASE, made on behalf of the United States, between the Department of Energy, hereinafter referred to as DOE, and the South Carolina Electric & Gas Company an electric utility company operating under South Carolina Code of Laws, Section 58-27-620, hereinafter referred to as SCE&G.

WITNESSETH:

That DOE by the authority of Section 161g of the Atomic Energy Act as amended, 42 U.S.C. 2201(g), and for the consideration set forth, hereby leases to the SCE&G certain tract(s) of real property situated at the Savannah River Site (SRS), in Aiken, Barnwell, and Allendale County, South Carolina constituting the following parcels:

Substations and Transmission Facilities, as described in Exhibit A, herein after referred to as the Transmission Facilities.

(said parcels of real property being collectively referred to from time to time as the "property"); together with all and singular the rights and appurtenances pertaining to such property, including such easements, rights-of-way, privileges, facility utilization rights and appurtenances, including:

(i) all improvements, structures and fixtures now constructed and completed or under construction with respect to and situated on the property and

(ii) Rights-of-way and easements to land associated with Substations and Transmission Facilities.

c. In addition, DOE assigns and transfers to SCE&G for its use in operating the Facilities during the Lease Term its rights in and to the following:

(i) Inventory and Equipment, unique to the operation of the leased facilities in Exhibit A, including transformers described in Exhibit B

(ii) Permits, to the extent assignable;

(iii) Any and all assignable warranties and/or guaranties relating to the Property or any portion thereof; and

All of the foregoing items other than the Real Property are hereinafter collectively called the "Personal Property." The Real Property and the Personal Property shall be collectively hereinafter referred to as the "Property."

THIS LEASE is granted subject to the following terms and conditions:

1. TERM

a. This lease is granted for a term of ***forty (40) years***, beginning October 1, 1995 or the effective date of the Utility Contract, Contract No. DE-AC09-95SR18531, whichever is later.

b. Except for cancellation in accordance herewith as to portions of the Transmission Facilities, the rights granted hereby shall be canceled upon the completion of the Lease Term. SCE&G agrees, upon any such termination (partial or in whole) or upon completion of the Lease Term, to quit and surrender the Facilities or the portion affected thereby and that all title and interest in the facilities shall vest in the DOE free and clear of the encumbrance of this Agreement.

c. During the Lease Term, SCE&G shall have complete control over the Facilities and their operation which shall be operated pursuant to SCE&G's policies, practices and procedures, and all Governmental Requirements applicable to SCE&G. It being understood that SCE&G operations as contemplated hereunder will not subject it to DOE's orders or oversight, except as may be expressly stated herein, or as later negotiated between the parties.

d. Personal property, inventory, parts, and equipment related directly to the operation and maintenance of leased facilities will be made available to SCE&G. Transformers to be included in the lease are described in Exhibit B. Accountable property and installed equipment will be itemized in Exhibit C.

2. CONSIDERATION

a. SCE&G shall pay rental in advance to the United States in the amount of $150,000 annually, payable by a credit on DOE's utility bill in the month that the lease payment is due. After the first year, the lease payment shall be escalated at 3.5% per year. If DOE discontinues purchase of utilities from SCE&G prior to the completion of the lease term, SCE&G shall make payment to the order of the Finanace and Accounting Officer, Savannah River Operations Office, P.O. Box A, Aiken S.C. 29802.

b. All rent and other payments due under the terms of this lease must be paid on or before the date they are due in order to avoid the mandatory sanctions imposed by the Debt Collection Act of 1982, (31 U.S.C. Section 3717). This statute requires the imposition of an interest charge for the late payment of debts owed to the United States; an administrative charge to cover the costs of processing and handling delinquent debts; and the assessment of an additional penalty charge on any portion of a debt that is more than 90 days past due. The provisions of the statute will be implemented as follows:

(1) The United States will impose an interest charge, the amount to be determined by law or regulation, on late payment of debts. Interest will accrue from the due date. An administrative charge to cover the cost of processing and handling each payment will also be imposed.

(2) In addition to the charges set forth above, the United States will impose a penalty charge of six percent (6%) per annum on any payment, or portion thereof, more than ninety (90) days past due. The penalty shall accrue from the date of the delinquency and will continue to accrue until the debt is paid in full.

(3) All payments credited will be applied first to any accumulated interest, administrative and penalty charges and then to any unpaid rental or other payment balance. Interest will not accrue on any administrative or late payment penalty charge.

c. Until the SCADA system modifications are complete, not to exceed 18 months, SCE&G shall have access to the SRS dispatcher, via direct telephone line, who will dispatch power per SCE&G instructions.

3. NOTICES

Any notice required or permitted to be delivered hereunder shall be in writing, signed by the party giving such notice or its attorney at law, and shall be deposited in the United States mail, postage prepaid, registered or certified mail, return receipt requested, personally delivered or sent by express courier, addressed to the party to whom such notice is sent at the addresses set forth below:

DOE: US Department of Energy
P.O. Box A
Aiken, SC 29802

with copies to: US Department of Energy
Assistant Manager, Engineering and Projects
P.O. Box A
Aiken, SC 29802

SCE&G: Mr. Mitchell S. Tibshrany, Jr.
Vice President
South Carolina Electric & Gas Co.
1426 Main Street. 14th Floor
Columbia, SC 29218

with copies to: Mr. Belton T. Zeigler
General Counsel
South Carolina Electric & Gas Co.
1426 Main Street. 10th Floor
Columbia, SC 29218

4. AUTHORIZED REPRESENTATIVES

Except as otherwise specifically provided, any reference hereinto "the Government's contracting officer", "Manager", shall include their duly authorized representatives. "Manager" means the Manager of the Savannah River Operations Office. Any reference to "SCE&G" shall include any of SCE&G's, subcontractors, assignees, transferees, successors and their duly authorized representatives.

5. APPLICABLE LAWS AND REGULATIONS

SCE&G shall comply with all Federal, State, county and municipal laws, ordinances and regulations applicable to all leased property as are applicable to SCE&G in the operation of its transmission facilities. SCE&G shall be responsible for obtaining all necessary permits. SCE&G shall be liable for permit excursions and violations of its operating permits from the effective date of this lease and shall be responsible for all fines, penalties and damages resulting from noncompliance with these requirements beginning from the date of execution of this lease.

6. CONDITION OF PROPERTY

SCE&G acknowledges that it has inspected the property, knows its condition, and understands that the same is leased without any representations or warranties except as set forth in this lease and the contract, without obligation on the part of the United States to make any alterations, repairs, or additions thereto.

7. TRANSFERS AND ASSIGNMENTS

Without prior written approval of the Manager, SCE&G shall neither transfer nor assign this lease, nor sublet the property or any part thereof, nor grant any interest, privilege or license whatsoever in connection with this lease. Failure to comply with this condition shall constitute a noncompliance for which the lease may be revoked immediately by the Manager. DOE will respond within 60 days to SCE&G written requests under this section. This section shall not apply to transfers, subletting, or subcontracting to companies or entities wholly owned by SCANA Corporation, the parent company of SCE&G.

8. DOE RIGHT TO SERVICE VIA THE PROPERTY

a. The parties recognize and agree that the substations and Transmission Facilities described in Exhibit A have been constructed to serve the electrical loads of DOE at the Savannah River Site (SRS). This includes the transmission lines that serve SRS and which have

been dedicated to the sole use of SRS under the terms of Contract DE-AC09-89SR18095 between SCE&G and DOE dated November 8, 1989.

b. Through the term of this lease, SCE&G agrees to operate and maintain the transmission facilities to the same standard as SCE&G owned transmission facilities. At the conclusion of contract DE-AC09-95SR18531, the Government agrees to negotiate a maintenance fee for SCE&G's continued maintenance of the transmission facilities. The Transmission Facilities are to be used first to serve the electrical loads of SRS, recognizing that loop flow is part of the use the transmission capacity. In the event that DOE purchases power and energy from an alternate supplier, the entire transfer capacity of these Transmission Facilities shall be dedicated first to meeting SRS loads, and SCE&G shall have the right to use any remaining capacity for its own general use.

c. If SCE&G operates the D-Area Powerhouse or any other power plant on the SRS for the purpose of providing power and energy to the SCE&G grid, and if the Transmission Facilities are inadequate, for any reason except as described below, to meet the operational requirements of SCE&G and serve DOE's electrical loads, SCE&G shall at its own expense provide all necessary expansions and upgrades of the Transmission Facilities to meet the combined requirements of DOE and SCE&G.

d. If, due to new facilities, SRS load grows beyond the capacity of the Transmission Facilities, an additional agreement will be necessary to fulfill DOE needs.

e. In the event DOE obtains power from other sources, it shall pay applicable wheeling rates only over SCE&G's portion of the transmission system.

9. DAMAGE AND CONDEMNATION

a. SCE&G shall pay and have responsibility for all insurance of the Facilities. All insurance policies shall be in such amounts as deemed proper by SCE&G.

b. If any portion of the property is damaged by fire or other casualty before the effective date, DOE shall give notice thereof to SCE&G. If the damage is in excess of $500,000 or affects the operation of the property, SCE&G may elect not to lease the property as of the effective date, DOE may elect not to lease the property or proceed to repair said damage. The effective date shall be the date the damage is repaired and the affected portion of the property becomes operational. If the damage may be repaired for a sum less than $500,000, then DOE, at DOE's option shall either repair the damage or shall make funds available for SCE&G to repair said damage and SCE&G shall proceed to so repair the damage, and this Agreement shall be effective as herein provided.

c. If after the effective date of this lease, the Transmission Facilities are destroyed or substantially damaged, SCE&G will restore the system to capacity existing on the effective date, or as otherwise agreed upon by parties.

(2) In the event either party cancels this Agreement as provided in subsection(1) above, insurance proceeds shall be paid to SCE&G and DOE in accordance with their insurable interests.

d. Condemnation.

(1) In the event that the whole of SCE&G's interest in the Facilities shall be condemned or taken in any manner, this Agreement shall forthwith cease and *cancel*.

(2) If only a portion of SCE&G's interest in the Facilities shall be condemned or taken, but in SCE&G's reasonable opinion the taking makes it economically unfeasible for SCE&G to continue to operate the Facilities in the manner immediately prior to the taking, then SCE&G, by giving ninety (90) days written notice to DOE, may *cancel* this Agreement.

(3) In the event of condemnation of SCE&G's interest in the Facilities, or any portion thereof, the provisions hereof shall not affect or limit either DOE's or SCE&G's rights to compensation for any such taking.

10. INDEMNITY

(a) SCE&G, by acceptance of this lease, agrees that it shall be liable for environmental liabilities (included but not limited to, corrective action costs, attorneys fees, consultant fees and/or expert fees) which arise during or after the term of the lease from or in connection with the release of hazardous substances in the air, soil, water, groundwater on or under the Leased Property or premises which SCE&G is allowed to use under the Lease, resulting from SCE&G's use or occupancy of the Leased property. SCE&G agrees that it shall also indemnify and hold harmless the Government, DOE, contractors of DOE, and authorized representatives of DOE, from any claims, costs or liabilities associated with the inability of SCE&G to comply with applicable environmental laws.

(b) DOE shall remain liable for any environmental liabilities (including but not limited to, corrective action costs, attorneys fees, consultant and/or expert witness fees) which arise from or in connection with the release of hazardous substances in the air, soil, water, groundwater on or under the Leased Property, or premises which the SCE&G is allowed to use under the Lease, resulting from DOE's prior use or occupancy of the Leased Property.

(c) SCE&G, by acceptance of this lease, acknowledges that during fact finding meetings DOE has made reasonable and good faith efforts to disclose all known environmental issues and problems associated with current environmental compliance status and permits. SCE&G further acknowledges that DOE has also made available any and all information requested related to environmental operations, compliance and permits. DOE makes no claims or warranties concerning current or future permit conditions imposed by the regulatory authorities nor the SCE&G's ability to obtain any environmental permits from regulatory authorities. Notwithstanding any other provisions of this lease, SCE&G shall have no responsibility or liability for hazardous substances, including radioactive contaminants, existing on the Leased Property as

of the commencement of this Lease or thereafter present on the Leased Property as a result of the actions of the Government, DOE or its authorized representatives and their contractors and subcontractors at any tier.

(d) The United States shall not be responsible for damages to property or injuries to persons which may arise from or be incident to the exercise of the privileges herein granted, or for damages to the property of SCE&G, or for damages to the property or injuries to the person of SCE&G's officers, agents, servants or employees or others who may be on the premises at their invitation or the invitation of any one of them, and SCE&G shall hold the United States harmless from any and all such claims not including damages due to the fault or negligence of the United States or its contractors.

(e) SCE&G shall not be responsible for damages to property or injuries to persons which may arise from or be incident to the exercise of the privileges herein granted, or for damages to the property of DOE not leased hereunder , or for damages to the property or injuries to the person of DOE's officers, agents, servants or employees or others who may be on the premises at their invitation of any one of them, and DOE shall hold the SCE&G harmless from any and all such claims not including damages due to the fault or negligence of the SCE&G or its contractors.

(f) These indemnities shall continue so long as SCE&G leases the property and thereafter for the applicable statute of limitations as to any environmental liability.

11. RETURN OF PROPERTY

On or before the expiration date of this lease or its cancellation, SCE&G shall vacate the property, remove the property of SCE&G, and return the facility to DOE substantially in the condition on the effective date, subject to normal wear, tear, and depreciation. If, however, this lease is canceled, SCE&G shall vacate the property, and remove said property as the Manager may designate. In either event, if SCE&G shall fail or neglect to remove said property, then, at the option of the Manager, the property shall either become the property of the United States without compensation therefor, or the Manager may cause the property to be removed and no claim for damages against the United States or its officers or agents shall be created by or made on account of such removal at the conclusion of the term. SCE&G shall be under no obligation to replace or return spare parts and consumable inventory provided under this lease which has been utilized in the normal operation of the leased facilities.

12. NON-DISCRIMINATION

The lessee shall not discriminate against any person or persons or exclude any person or persons from participation in SCE&G's operations, programs or activities conducted on the leased property, because of race, color, religion, sex, age, handicap or national origin.

13. EASEMENTS

a. This lease is subject to all existing easements, or those subsequently granted as well as established access routes for roadways and utilities located, or to be located, on the property, provided that the proposed grant of any new easement or route will be coordinated with SCE&G, and easements will not be granted which will, in the opinion of DOE, interfere with the use of the property by SCE&G.

b. Easement is hereby granted for the operation and maintenance of right of ways for substations and Transmission Facilities described in Exhibit A. SCE&G shall maintain the easements, including vegetation control. The easement shall extend 75 feet either side of the transmission lines.

c. The Government reserves the right to operate and maintain any existing utility distribution lines and pipelines which pass through the right of ways granted by easement.

d. As part of the grant of easement for transmission and substation right of ways, SCE&G will have control over said easements and shall maintain an encroachment permit system accordance with its operating procedures. All entities, including DOE will abide by the established permitting system.

14. CANCELLATION

a. That the Government may cancel this lease in whole or in part by giving sixty (60) days prior written notice by the Manager to lessee in the event SCE&G violates any of the terms and conditions of this lease and continues and persists therein for sixty (60) days after notice thereof in writing by the Manager. In lieu of cancellation for violations of the terms and conditions of this lease, the Manager may exercise any legal remedy available to the Government and may exercise any remedy available under the provisions of the lease.

b. Notwithstanding any provision to the contrary, in the event environmental liabilities render the operation of the Facilities impractical, either party shall have the option to cancel the leasehold estates and other rights granted hereby as to any portion or component of the Property at any time upon at least twelve (12) months prior written notice to the other party.

c. After the completion of contract DE-AC09-95SR18531, either party shall have the option to cancel this lease in whole or in part by giving at least a twenty-four (24) month notice. Except for the cancellation due to conditions described in 14.a and 14.b. above, if the Government cancels this lease, SCE&G shall be entitled to an equitable adjustment for unrecovered captial investments made in the transmission facilites. Additionally the Government agrees it will provide wheeling service to SCE&G over the transmission facilities under the same pricing provisions as approved by FERC.

15. RIGHT TO ENTRY AND SECURITY AND EMERGENCY MEASURES

a. SCE&G personnel will be badged for full access to the leased facilities.

b. That during certain conditions requiring additional security within the Savannah River Site, the Manager will have absolute right to control entry of personnel to the property and/or Site provided the exercise of such rights does not interfere with SCE&G's operation of the facilities unless warranted by national security concerns.

c. With regard to emergency evacuation and contingency plans, SCE&G and DOE agree to coordinate said plans and each shall designate a single point of contact.

d. General site security will be maintained by DOE in surrounding areas. DOE shall provide to SCE&G fire, EMS and HAZMAT response on an as needed and as requested basis, reimbursable basis.

e. SCE&G workers will complete General Employee Training which will not exceed 8 hours per person per year. The training will be provided by the Management and Operating (M&O) Contractor, at no cost to SCE&G.

16. FAILURE OF GOVERNMENT TO INSIST ON COMPLIANCE

The failure of the Government to insist, in any one or more instances, upon performance of any of the terms, covenants or conditions of this lease shall not be construed as a waiver or relinquishment of the Government's right to the future performance of any such terms, covenants or conditions and lessee's obligations in respect to such future performance shall continue in full force and effect.

17. NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION

a. SCE&G shall comply with any laws, regulations, conditions, or instructions affecting the activity hereby authorized if and when issued by the Environmental Protection Agency, or any Federal, State, interstate or local governmental agency having jurisdiction to abate or prevent pollution. The disposal of any toxic or hazardous wastes within the property is specifically prohibited. Such regulations, conditions, or instructions in effect or prescribed by said Environmental Protection Agency, or any Federal, State, interstate or local governmental agency are hereby made a condition of this lease. Except in accordance with the permits, SCE&G shall not discharge waste or effluent from the property in such a manner that the discharge will contaminate streams or other bodies of water or otherwise become a public nuisance.

b. SCE&G will use all reasonable means available to protect the environment and natural resources.

c. SCE&G shall cut no timber, conduct no mining operations, remove no sand, gravel, or kindred substances from the ground, commit no waste of any kind, nor in any manner substantially change the contour or condition of the property except for normal right of way and facility maintenance and construction and except as otherwise permitted.

d. Each party agrees to conduct their respective operations in such a manner so as not to materially interfere with the other party.

e. Hazardous wastes generated by SCE&G from the facilities may be temporarily stored on the facilities in accordance with SCE&G's permits. Such hazardous wastes may not, however, be permanently stored or discharged on or into the ground, except as allowed under permits specifically approved by DOE.

f. SCE&G shall not bring any wastes, hazardous or otherwise from offsite for treatment, storage or disposal within the facilities. This includes materials that are generated from other SCE&G facilities.

g. Notwithstanding the foregoing or any provision hereof, DOE shall be responsible for any and all environmental conditions caused by DOE associated with any portions of SRS on EPA's NPL list.

h. DOE shall be responsible for Environmental Liabilities that are (i) associated with asbestos in existence at the time the contract is entered into other than asbestos encountered in normal operation and maintenance of the property and (ii) PCB's contained in the relay houses, substation sites, equipment or inventory.

i. SCE&G shall not remove or disturb, or cause or permit to be removed or disturbed, any historical, archeological, architectural or other cultural artifacts, relics, remains or objects of antiquity. In the event such items are discovered on the property, SCE&G shall immediately notify DOE and protect the site and the material from further disturbance until Manager gives clearance to proceed.

j. SCE&G shall maintain, in a manner satisfactory to the Manager, all soil and water conservation structures that may be in existence upon said property at the beginning of or that may be constructed by SCE&G during the term of this lease, and SCE&G shall take appropriate measures to prevent or control soil erosion within the property. Any soil erosion occurring outside the property resulting from the activities of SCE&G shall be corrected by SCE&G as directed by DOE.

k. SCE&G shall obtain all necessary permits, licenses, certifications and/or authorizations required for construction, occupancy and operations during the term of the lease. SCE&G will obtain all required permits in the name of the SCE&G within sixty days of the commencement of the lease period. SCE&G shall abide by all Federal, state and local laws and regulations applicable to its operations. SCE&G shall ensure that its operations are fully protective of the environment and of human health and safety.

l. All solid and hazardous waste generated by SCE&G will be disposed of offsite in accordance with all applicable Federal and state environmental regulations.

m. As to matters affecting the property leased, each party shall provide to the other party, within 30 days of a spill, copies of all reports of spills of hazardous substances which are required by environmental laws and regulating agencies. For the purposes of this lease, hazardous substances means materials designated as "hazardous substance" pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 USC Section 9601 et seq. SCE&G will immediately notify DOE of its discovery of any previously unidentified contamination or waste.

n. SCE&G shall reclassify one operating and five spare transformers. If the transformers cannot be reclassified or if data provided to SCE&G by DOE concerning transformers is incorrect, SCE&G may proceed with the reclassification or return the transformer(s) to DOE.

o. SCE&G shall be responsible for maintenance and erosion control except for existing erosion areas as shown on aerial photographs dated January 1, 1995.

p. "Environmental Condition" shall mean all matters, issues or conditions known to DOE which have given rise to Environmental Liabilities or may give rise to Environmental Liabilities.

q. "Environmental Liability" or Environmental Liabilities" shall mean any claims, allegations or causes of action brought or asserted by any person or governmental entity arising from Hazardous Materials that are related to environmental or health issues which shall include but not be limited to: (i) fines, penalties, judgments, awards, settlements, compromises, losses, damages, interest, costs, reasonable fees (including reasonable attorneys' and consultants' fees), expenses and disbursements: (ii) financial responsibilities for (a) cleanup costs, including any removal, remedial or other response actions, and natural resource or property damages, and (b) any other compliance or remedial measures, including costs for additional testing, monitoring, personnel; provided, however, that all such costs or measures are required by law, court order or governmental agency, or are in settlement of a claim, demand, notice, complaint, or lawsuit by a governmental agency or private party; (iii) property damage, including diminution of property values based on a fair market value approach, whether property of DOE, SCE&G or an third party; (iv) any bodily injury, sickness, disease, disability or death to any person, including an employee of DOE, SCE&G or any third party; and (v) loss of revenues, lost production or loss of power supply.

18. SAFETY

Operation of the leased facilities shall be in accordance with all applicable commercial safety standards, State standards and Occupational Safety and Health Administration (OSHA) rules. DOE will not enter SCE&G leased facilities without prior notification unless there is an immediate threat to workers or the public. All facilities will be subject to otherwise normal State and federal inspections.

19. DISPUTE RESOLUTION

(a) DOE and SCE&G will attempt to settle any claim or controversy arising out of this lease through consultation and negotiation in good faith and a spirit of mutual cooperation. The parties agree that prompt negotiation of any dispute will be between executives who have authority to settle the controversy and who are at a higher level of management than the persons with direct responsibility for administration of this lease. Any party may give the other party written notice of any dispute not resolved in the normal course of business and must provide written notification of any demand for mediation.

(b) If these attempts to settle fail, then the dispute will be mediated by a mutually-acceptable mediator. The DOE dispute resolution specialist will assist the parties in the selection of the mediator. The mediation will be conducted in accord with the provisions of the Alternate Dispute Resolution Act. The mediator will be chosen within 30 days after written notice by one of the parties demanding mediation. Neither party to the lease may unreasonably withhold consent to the selection of mediator, and the parties will share the costs of the mediation equally. By mutual agreement, however, DOE and SCE&G may postpone mediation until completion of a specified but limited period of discovery about the dispute. The parties may also agree to replace mediation with some other form of alternative dispute resolution, such as neutral fact-finding or a minitrial.

(c) Any dispute which cannot be resolved by negotiation, mediation or another form of alternative dispute resolution within 6 months of the date of the initial demand for mediation may then be submitted to the courts for resolution. The use of alternative dispute resolution procedures will not be construed under the doctrines of laches, waiver or estoppel to affect adversely the rights of either party to pursue its legal remedies. Nothing in this section will prevent either party from resorting to judicial proceedings if (1) good faith efforts to resolve the dispute under these procedures have been unsuccessful or (2) interim relief from a court is necessary to prevent serious and irreparable injury to a party or to others.

(d) All negotiations pursuant to this section are confidential and shall be treated as compromise and settlement negotiation for purposes of applicable rules of evidence.

(e) Each party is required to continue to perform its obligations under this contract pending final resolution of any dispute arising out of or relating to this contract, unless to do so would be impossible or impracticable under the circumstances.

20. TAXES

Any and all taxes imposed by the State or its political subdivisions upon the property or interest of SCE&G in the property shall be paid promptly by SCE&G. If and to the extent that the property owned by the Government is later made taxable by State or local governments under an Act of Congress, the lease shall be renegotiated.

21. COVENANT AGAINST CONTINGENT FEES

The SCE&G warrants that no person or selling agency has been employed or retained to solicit or secure this lease upon an agreement or understanding for a commission, percentage,

brokerage, or contingent fee, excepting bona fide employees or established commercial or selling agencies maintained by SCE&G for the purpose of securing business. For breach or violation of this warranty, the United States shall have the right to annul this lease without liability or, in its discretion, to require SCE&G to pay, in addition to the lease rental or consideration, the full amount of such commission, percentage, brokerage, or contingent fee.

22. OFFICIALS NOT TO BENEFIT

No member of or delegate to Congress or resident commissioner shall be admitted to any share or part of this lease or to any benefits to arise therefrom. However, nothing herein contained shall be construed to extend to any incorporated company if this lease is for the general benefit of such corporation or company.

23. MODIFICATIONS

This lease contains the entire agreement between the parties hereto, and no modification of this agreement, or waiver, or consent hereunder shall be valid unless the same be in writing, signed by the parties to be bound or by a duly authorized representative and this provision shall apply to this condition as well as all other conditions of this lease.

24. DISCLAIMER

This lease is effective only insofar as the rights of the United States in the property are concerned; and SCE&G shall obtain any permit or license which may be required by Federal, state, or local statute in connection with the use of the property. It is understood that the granting of this lease does not preclude the necessity of obtaining a Department of Energy permit for activities which involve the discharge of dredge or fill material or the placement of fixed structures in the waters of the United States, pursuant to the provisions of Section 10 of the Rivers and Harbors Act of 3 March 1899 (33 USC 403), and Section 404 of the Clean Waters Act (33 USC 1344).

IN WITNESS WHEREOF I have hereunto set my hand by authority of the Savannah River Operations Office Manager this 8 day of August, 1995

Witness:

THIS LEASE is also executed by SCE&G this 8 day of August 1995.

SIGNATURE:

TITLE: V.P. PWR Delivery

Witness: