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Safeguards Agreement between USA and the IAEA
Subsidiary Arrangements

Facility Attachment No. 13 SALEM NUCLEAR GENERATING STATION, UNIT 1
Facility Code: UXHF / MBA Code: UXHF

Code	General Part Reference (Codes)	Agreement Reference (Articles)	~~SAFEGUARDS CONFIDENTIAL~~
1.		43(a)	**Identification of the facility**
			Facility identification code: UXHF
1.1			Name
			Salem Nuclear Generating Station Unit 1 (SNGS 1)
			Owner and Operator
			Public Service Electric & Gas Co.
1.2			Geographic location
			Salem County, New Jersey, USA
1.3			Postal address
			Public Service Electric and Gas Co. Nuclear Department P.O. Box 236 Hancocks Bridge, New Jersey 08038
1.4			Description
			The power station consists of one pressurized light water reactor. Pin removal or exchange is not normally performed.
			Main design features are as follows:
			- Reactor thermal output: 3411 MW(th)
			- Refuelling interval: normally 15-19 months
			- Number of fuel assemblies in the reactor core: 193
			- Fresh fuel storage capacity: 72
			- Spent fuel storage capacity: 1170

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Code	General Part Reference (Codes)	Agreement Reference (Articles)	~~SAFEGUARDS CONFIDENTIAL~~
1.4 (continued)			- Nominal weight of nuclear material in an assembly: 462kg - Maximum fresh fuel enrichment (U-235): 3.80 w/o - Number of assemblies normally discharged on refuelling: 72-117
1.5			Maps and plans See Design Information Questionnaire (DIQ).
2.	3.1	43, 44 46(a)	Information on the facility This facility attachment is based on the design information dated 10 October 1985, and the design information supplement provided in September 1986.
2.1		8(c)	Location of information Identical sets of the information provided on the facility are kept at the Agency, at the facility and at the USNRC Headquarters.
2.2	3.1.3	45	Changes in the information on the facility to be provided in advance With reference to the relevant paragraphs of the Design Information Questionnaire - Change in the rated thermal output for continuous operation by 20% or more; (14) - Change of the type of fuel used, e.g. introduction of mixed oxide fuel for test purposes or for routine use; (22, 23, 25) - Change of the maximum enrichments of the fuel; (23) - Change in the design of the reactor fuel; (24, 26, 27) - Installation of equipment for pin removals or exchange in assemblies for test purposes or for routine use; (13, 28) - Change in the method and/or procedure of identifying individual fuel assemblies; (31) - Change in the methods and/or equipment for refuelling and/or for handling of irradiated fuel; (41)

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2.2 (continued)

- Change influencing the access to the reactor vessel and/or its cover; (43)
- Change in the number of fuel assemblies, control elements, dummy assemblies and/or irradiation positions inside the reactor vessel; (44)
- Change in the method of storage of irradiated fuel and/or in the spent fuel storage capacity; (48)
- Installation of any dismantling, decladding or dissolution equipment; (13, 28, 51)
- Change in the nuclear material accountancy and control procedures; (55)
- Change in the access routes to the reactor area; (10)
- Change in the shipping containers and/or the routes followed by irradiated fuel within the facility; (50)
- Change in the health and safety rules and procedures affecting the conduct of inspection; (54)

Any change in other parts of the design information to be submitted when the change has been completed.

3. Safeguards measures

3.1 29 Accountancy

3.1.1 46(b) Material Balance Areas and their identification codes. The Salem Nuclear Generating Station Unit 1, UXHF, constitutes one material balance area, UXHF.

3.1.2 46(b) 90(K) Strategic points which are Key Measurement Points (KMPs), (for their specifications see Code 4.)

(a) For determination of nuclear material flow:

KMP 1 - Receipts, accidental gains and de-exemption of nuclear material;

Code	General Part Reference (Codes)	Agreement Reference (Articles)	~~SAFEGUARDS CONFIDENTIAL~~
3.1.2 (continued)			KMP 2 - Nuclear loss (burn-up) nuclear production and category change in fuel discharged from the reactor; nuclear loss (Pu-241 decay); KMP 3 - Shipments of nuclear material, withdrawals, exemptions and accidental losses; (b) For determination of physical inventory: KMP A - Fresh fuel storage and inspection area; KMP B - Reactor core; KMP C - Spent fuel storage racks and spent fuel shipping casks; KMP D - Other locations of nuclear material at the facility.
3.1.3		46(c)	Physical inventory taking Nominal timing: As soon as possible after completion of each refuelling and before the reactor is closed again. In cases of prolonged shutdowns of one year or longer, PITs shall be performed once every twelve months. Procedures: Item counting and identification. Preparation of itemized list of nuclear material including identification number, material description, quantity of nuclear material and location of each item for each inventory KMP.
3.2		29	Containment and surveillance
3.2.1		46(f) 90(S)	Strategic points for application of containment and surveillance measures - Reactor hall including reactor vessel; - Access routes to and from the reactor hall and spent fuel pool; - Fresh and spent fuel storage areas; - Any other points that might be mutually agreed.

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3.2.2		73(d) 73(e)	Installed Agency instruments and devices (a) Seals to ensure the containment of the reactor vessel; (b) Cameras for surveillance of fuel movements into or out of the reactor vessel, the reactor containment and the fresh and spent fuel storage areas; (c) Seals on shipping casks with spent fuel and other containers as applicable; (d) Seals on Agency instruments and devices; (e) Seals on containers with fuel assemblies received at the facility; (f) Seals on the reactor containment building (e.g. equipment hatches). If there is a need to break a seal or interfere with the operation of surveillance devices, the Agency shall be informed in advance and by the fastest means. This information shall include the (probable) date on which the operation will take place.
3.3	6.1	11, 35	Specific provisions and criteria for termination of safeguards on nuclear material None.
3.4	6.2	36, 37	Specific provisions for exempting nuclear material from safeguards None.
3.5	3.7, 7.1	12(a)	Specific provisions and criteria for withdrawal of nuclear material from safeguards None.

Code 4.

Agreement References (Articles): [redacted]

Specifications for Key Measurement Points

Code 4.1: KMPs for the flow of nuclear material

KMP	Inventory Change	Description of a typical batch	Description of a typical item	Source data	Mat. Descr. Code	Meas. basis
1	Receipts of nuclear material	For fuel assemblies: One fuel assembly.	One fuel assembly	For each fuel assembly: 1) Identification number; 2) Weights of total and fissile uranium, and the chemical composition; based on shipper's data.	BQ2F	N
		For small quantities of nuclear material (each less than 0.01 effective kilogram): A number of such quantities received in one calendar month from the same shipper or, if a physical inventory was taken during the month, separately before and after the time of physical inventory taking.	As appropriate	For each batch: 1) Weight of compound; 2) Weights of total and fissile uranium, and of plutonium, and the chemical composition; based on shipper's data.	As appropriate	N
	De-exemption, Accidental gain	Same as for Receipts at KMP 1 above.				
2	Nuclear production, Nuclear loss (burn-up)	For fuel assemblies: One fuel assembly.	One fuel assembly	For each fuel assembly: 1)-2) As for fuel assemblies at KMP 1 above; 3) Date of discharge; 4) Estimated burn-up of each fuel assembly (in MWD/tU);	BQ1G BQ4G	M M

Code 4.1: Nuclear Material Flow KMPs

KMP	Inventory Change	Description of a typical batch	Description of a typical item	Source data	Mat. Descr. Code	Meas. basis
2	Nuclear production, Nuclear loss (burn-up) [continued]			5) Nuclear loss of total and fissile uranium and nuclear production of total plutonium when calculated, including as of the date of discharge. 1/		
	Category change	For fuel assemblies: One fuel assembly	One fuel assembly	1) Identification number; 2) Date of discharge; 3) Weight of total and fissile uranium as of the date of discharge.	BQ1G	M
	Nuclear loss (Pu-241 decay)	For fuel assemblies: One fuel assembly.	One fuel assembly	For each fuel assembly: 1)-2) As for fuel assemblies at KMP 1 above; 3) Date of discharge and shipment; 4) Nuclear loss of total plutonium (Pu-241 decay) for each fuel assembly when calculated, including as of the date of shipment.	BQ1G BQ4G	M M
3	Shipment of nuclear material	For fuel assemblies: One fuel assembly.	One fuel assembly	For each fresh fuel assembly: 1) Identification number; 2) Weights of total and fissile uranium, and the chemical composition.	BQ2F	N

1/ If fuel assemblies discharged from the reactor are returned to the core, the values for nuclear production and nuclear loss which had been recorded for these assemblies shall be kept.

Code 4.1: Nuclear Material Flow KMPs

KMP	Inventory Change	Description of a typical batch	Description of a typical item	Source data	Mat. Descr. Code	Meas. basis
3	Shipment of nuclear material [continued]	For fuel assemblies: One fuel assembly.	One fuel assembly	For each irradiated fuel assembly: 1) Identification number; 2) Date of discharge; 3) Burn-up (MWD/tU); 4) Weights of total and fissile uranium and of total plutonium, calculated as of the date of discharge, and corrected for Pu-241 decay between the date of discharge and the date of shipment; 5) Isotopic composition of uranium and plutonium calculated for each assembly as of the date of discharge, and corrected for Pu-241 decay between the date of discharge and the date of shipment.	BQ2G	M
		For small quantities of nuclear material (each less than 0.01 effective kilogram): Any number of such quantities shipped in one calendar month to the same recipient or, if a physical inventory was taken during the month, separately before and after the time of physical inventory taking.	As appropriate	For each batch: 1) Weight of compound; 2) Weights of total and fissile uranium, and of plutonium, and the chemical composition.	As appropriate	N, M
	Exemption					
	Accidental loss/ Withdrawal	Same as for Shipment at KMP 3 above.				

Code 4.2: KMPs for the physical inventory of nuclear material

KMP	Description of a typical batch	Description of a typical item	Source data	Mat. Descr. Code	Meas. basis
A	For fuel assemblies: One fuel assembly.	One fuel assembly	For each fuel assembly: As for fuel assemblies at KMP 1 above.	BQ1F BQ2F	N N
B	For fuel assemblies: One fuel assembly.	One fuel assembly	As for fuel assemblies at KMP 1 for unirradiated fuel or as for fuel assemblies at KMP 2 on calculated values for irradiated fuel.	BQ4F BQ4G	N M
C	For fuel assemblies: One fuel assembly.	One fuel assembly	For each fuel assembly: 1) Identification number; 2) Weights of total and fissile uranium and of total plutonium calculated as of the date of discharge, and corrected for Pu-241 decay between the date of discharge and the date of shipment; 3) Date of discharge; 4) Burn-up (MWD/tU); 5) Isotopic composition.	BQ1G BQ2G	M M
A B C D	For small quantities of nuclear material (each less than 0.01 effective kilogram): Any number of such quantities.	As appropriate	For each batch: 1) Weight of compound; 2) Weights of total and fissile uranium and of plutonium.	As appropriate	N, M

Code	General Part Reference (Codes)	Agreement Reference (Articles)	~~SAFEGUARDS CONFIDENTIAL~~
5.		[illegible], 49	Records system
5.1	[illegible]	[illegible], 64	Specific provisions for accounting records
5.1.1		5[illegible](a) 98(J)	Inventory changes (for the specifications of source data see Code 4.1 above), time of recording.
			- Receipt: Upon receipt.
			- Nuclear loss (burn-up), nuclear production and category change: When calculated, including upon discharge. 2/, 3/
			- Nuclear loss (Pu-241 decay): When calculated, including upon shipment.
			- Shipment: Upon shipment.
	6.3,6.2		- Exemption/de-exemption: Upon accounting transfer of the nuclear material.
			- Accidental loss/gain: Upon establishment of the amount of material lost/gained.
	3.7, 7.1		- Withdrawal: Upon withdrawal.
5.1.2	2.1	5[illegible](b)	Measurement (item counting and identification) results used for determination of the physical inventory (for specifications of source data see Code 4.2 above), time of recording.
			- Itemized list of nuclear material quantities on inventory for each inventory KMP: Upon identification and counting of items during the physical inventory taking.
			- Itemized list of nuclear material inventory identifying changes since the physical inventory taking: Before inventory verification.

2/ Fuel removed from the reactor shall be considered as discharged if it remains out of the core after the routine refuelling shutdown is completed.

3/ If fuel assemblies discharged from the reactor are returned to the core, the values for nuclear production and nuclear loss which had been recorded

Code	General Part Reference (Codes)	Agreement Reference (Articles)	SAFEGUARDS CONFIDENTIAL
5.1.3	[redacted]	[redacted]	Adjustments and corrections, time of recording. - Shipper/receiver difference: Normally not relevant. - MUF: Normally identical to zero. - Corrections: Whenever errors have been found, with specific reference to the entry being corrected.
5.2	[redacted].2	56	Specific provisions for operating records
5.2.1		56(a)	Operating data used to establish changes in the quantities and composition of nuclear material - Location of each fuel assembly at any time; - The relevant source data with respect to nuclear loss and production, including: (a) The monthly integrated thermal power produced by the reactor; and (b) The estimated burn-up (in MWD/t of uranium) for each fuel assembly; - Date and duration of any reactor shutdown; - Date and nature of the use of fuel handling and transport equipment.
5.2.2		56(b)	Calibrations Not required.
5.2.3		56(c)	Sequence of the actions taken in preparing for and in taking the physical inventory - All physical inventory KMPs: Dates and description of the actions taken and the results obtained. - An itemized list of nuclear material inventory after completion of inventory taking by the operator but before commencement of verification by the Agency.

Code	General Part Reference (Codes)	Agreement Reference (Articles)	~~SAFEGUARDS CONFIDENTIAL~~
5.2.4		[redacted]	Actions taken in order to ascertain the cause and magnitude of any accidental or unmeasured loss – Dates and description of the actions taken and the results obtained.
5.3		[redacted]	Location and language of records At the facility in English.
5.4		[redacted]	Retention period for records Five years.
6.		[redacted]	Reports system
6.1	3.4.1	[redacted]	Specific provisions for Inventory Change Reports (ICRs)
6.1.1	10	[redacted]	Contents The recorded entries to be reported are those types specified in Code 5.1.1 above. ICRs will be completed as specified in the relevant paragraphs of Code 10, General Part. Nuclear loss, nuclear production and category change for irradiated fuel assemblies will be reported when calculated including as of the date of discharge.
6.1.2		61(a)	Timing or frequency of dispatch As soon as possible and in any event within 30 days after the end of the month in which inventory changes specified in Code 5.1.1 occurred or were established.
6.2	3.4.1	62	Specific provisions for concise notes
6.2.1		62(a)	Concise notes explaining the inventory changes – To be attached to ICRs containing data on nuclear loss and production; they are to state the burn-up in MWD/t of initial U for each fuel assembly discharged;

Code	General Part Reference (Codes)	Agreement Reference (Articles)	~~SAFEGUARDS CONFIDENTIAL~~
6.2.1 (continued)			- To be attached to ICRs to explain unusual inventory changes (such as accidental loss) and corrections. They may also be used to explain any other part of information included in reports.
6.2.2		[redacted]	Concise notes describing the anticipated operational programme; subject and time of dispatch. - Planned operations involving refuelling, fresh fuel receipts and spent fuel shipments: To be attached to each MBR (see Code 6.3.3 below) and to cover the period until the end of the next refuelling, to be updated every six months. - Precise forecasts for: a) Date of the next refuelling, physical inventory taking including date when seals are expected to be removed from the reactor; and b) Spent fuel shipments, including information about the shipping casks to be used, the extent to which they are expected to be filled: to reach the Agency at least 30 days in advance, subsequent changes as soon as known.
6.3	3.4.2	61(b),65	Specific provisions for Material Balance Reports (MBR)
6.3.1	10	65, 90(M)	MBR contents The consolidated inventory changes to be reported are those types specified in Code 5.1.1 above. MBRs will be completed as specified in relevant paragraphs of Code 10, General Part.
6.3.2	10	65, 90(M)	PIL contents - Physical inventory listings (PILs) based on the results of physical inventory taking, to be attached to MBRs. The batch data included in PILs will be based on the shipper's data on the initial nuclear material content for the fuel for unirradiated fuel assemblies or on the operator's data for irradiated fuel assemblies. PILs will be completed as specified in relevant paragraphs of Code 10, General Part.

Code	General Part Reference (Codes)	Agreement Reference (Articles)	~~SAFEGUARDS CONFIDENTIAL~~
6.3.3		[redacted]	Timing or frequency of dispatch: - As soon as possible and in any event within 30 days after the physical inventory taking under Code 3.1.3 above.
6.4	3.5.1	[redacted]	Special reports
6.4.1			Specification of incidents or circumstances requiring submission of special reports (a) Losses: One or more fuel assemblies; (b) Changes in containment: - Physical integrity of a fuel assembly as an accounting unit is accidentally broken; - Any Agency containment and surveillance device, referred to in Code 3.2.2 is interfered with or removed in the absence of Agency inspectors, unless the Agency has been informed in advance as provided.4/
6.4.2			Contents - Date when the incident occurred or circumstances were established; - Description of the actions taken in order to ascertain the cause of the event and to establish the magnitude of any loss of nuclear material; - Cause and features of the incident or circumstances;

4/ In respect of seals on shipping casks, this requirement applies only while the cask remains in the facility.

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6.4.2 (continued)			- Estimated amount of nuclear material which has been lost.
7.	4.2	[illegible]	Inspections
7.1		78,[illegible]	Mode of routine inspections
			Intermittent.
7.2		78	Applicable formula and procedure for determination of maximum routine inspection effort:
			Article 78(a) of the Agreement
7.3		[illegible]	Actual inspection effort related to routine inspection activities
			The actual inspection effort will be determined by the Agency on the basis of the relevant provisions of the Agreement to ensure the attainment of Agency safeguards objectives, assuming:
	3.1		a) Circumstances at the facility to be as described in the design information referred to in Code 2. above;
	2.		b) The continued validity of the information on the State System of accounting for and control of nuclear material, as set out in the General Part.
7.4		72,73	Indication of the scope of routine inspections under ordinary circumstances
7.4.1			General:
			- Examination of the records, verification for self-consistency;
			- Comparison of reports and records for consistency.
7.4.2			At inventory KMPs
			- Verification of the inventory by item counting, identification, integrity checks, non-destructive measurements.
			- Application, examination and removal of Agency seals.

Code	General Part Reference (Codes)	Agreement Reference (Articles)	~~SAFEGUARDS CONFIDENTIAL~~
7.4.3			At flow KMPs - Verification of inventory changes by item counting, identification, integrity checks, non-destructive measurements of fresh and irradiated fuel. - Application, examination and removal of Agency seals.
7.4.4			At strategic points for containment and surveillance - Application, examination and removal of Agency seals; - Servicing and maintenance of C/S instruments and devices; - Observation of refuelling and spent fuel removal operations.
7.4.5			During interim verification of nuclear material inventory - Item counting, identification, integrity checks, and NDA measurements (except material in core). - Application, examination and removal of Agency seals.
7.5		~~73~~(d)	Arrangements for the use by the Agency of equipment for independent measurement Specific arrangements for the use of equipment to be made as the need arises.
7.6		~~85~~,86	Persons to whom a request for any operation or for services at the facility should be addressed Vice President for Nuclear Public Service Electric and Gas Company
7.7			Contacts at the facility Manager - Nuclear Fuel Nuclear Department Salem Nuclear Generating Station, Unit 1

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7.8 [redacted] Services and charges

7.8.1	Inspection activities	Charge
	- Observation of ongoing operational activities.	None
	- Item counting and identification.	None
	- Reading of instruments relevant to measurements connected with source and process data.	None
	- NDA measurements: a) Calibration of NDA instruments;	None
	b) Verification of NDA instruments calibration through the use of standards.	None
	c) Agency NDA measurements.	None
	d) Personnel and equipment for handling nuclear material during its measurement.	None
	- Records: Examination of records including reconciliation of records and reports and establishment of updated book inventory.	None
	- Application, checking and removal of Agency seals.	None
	- Surveillance: Positioning, removal and use of Agency's surveillance devices.	None
	- Lighting, including emergency lighting to light all critical areas under surveillance.	None
	- Reviewing of surveillance records.	None
	- Other charges.	*

* Charges in connection with inspection activities not included above will be discussed as the situation arises.

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7.8.2			Services	
			- Health and safety (including e.g. protective clothing, dosimeters).	None
			- Office space.	None
			- Power supply for IAEA instruments	None
			- Means of communication (telephone, telex, cable).	R
			- Other services	**
			- Facility personnel to escort the Agency inspectors	None
7.8.3			Mode of reimbursement of the expenses charged to the Agency	
			- By cheque after receipt of the invoice by the Agency.	
7.9	2	44	Specific facility health and safety rules and regulations to be observed by Agency inspectors.	
			- As specified in paragraph 54 of the Design Information Questionnaire.	
			- The Agency inspectors will be informed at the facility by short briefings at the time of entry into the facility of any changes in health and safety rules or ad hoc rules as might be required in view of a special situation that has occurred at the facility. For health and safety reasons, inspectors will be escorted by qualified personnel.	

R Costs to be reimbursed by the Agency.

** If any specific request by the Agency for services not covered above gives rise to expenses for which reimbursement is requested from the Agency, the Agency shall be notified of the expenses before the service is performed. The Agency will only reimburse such expenses if it has confirmed its initial request and agreed in writing to the amount involved which it will reimburse.

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8.	[redacted]	30, [redacted]	**Agency statements**
8.1	[redacted]	88(a)	A summary statement will be made on the result of each inspection within 30 days of its completion.
8.2	[redacted]	88(b)	A statement on the conclusions the Agency has drawn from its verification activities in respect of the facility will be made within 60 days after the end of the month in which the Agency has verified the physical inventory. The statement will include, as appropriate, conclusions drawn from: (a) Records examination; (b) Reports to the Agency; (c) Examination of containment and surveillance results; (d) Verification of inventory changes; (e) Verification of material accountancy; (f) Verification of the quality and functioning of operator's measurement system. (g) Activities in respect of MUF, shipper/receiver differences and/or losses.