May 2, 1996

LICENSEE: Saxton Nuclear Experimental Corporation (SNEC)

FACILITY: Saxton Nuclear Experimental Facility (SNEF)

SUBJECT: SUMMARY OF MEETING BETWEEN SNEC AND THE NRC STAFF

On February 29, 1996, representatives of the NRC staff were briefed on the content of the SNEF Decommissioning Plan that was submitted to the NRC on February 16, 1996. A list of attendees is provided in Enclosure 1. Briefing material provided by the licensee is provided in Enclosure 2.

The licensee affirmed their commitment to safety during all decommissioning activities and discussed reactor vessel removal and shipment; decommissioning costs; schedule; radiation exposure estimates and the radiological controls program; radioactive waste estimates, characterization and processing; accident analysis; and decommissioning technical specifications.

The licensee discussed the shipment of the reactor vessel and the use of the vessel as a transport package. Representatives from the NRC staff responsible for transportation discussed with the licensee available options for shipping the reactor vessel. The licensee was asked to contact the NRC transportation group directly on this issue. The reactor vessel would probably be ready for shipment in late 1997 or early 1998 under the licensee's current schedule. The NRC staff would require approximately eight months to approve shipment.

The licensee stated that the environmental report and decommissioning technical specifications would be submitted to NRC on March 22, 1996.

Original signed by:

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

Docket No. 50-146

Enclosures:
As stated

cc: w/enclosures
See next page

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OGC	SWeiss	Region I
AAdams	EHylton	

PDND:LA	PDND:PM	PDND:D
EHylton	AAdams	SWeiss
5/2/96	5/2/96	5/2/96

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

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Saxton Nuclear
Experimental Corporation

Docket No. 50-146

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MEETING BETWEEN THE NRC STAFF AND SAXTON

FEBRUARY 29, 1996

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ENCLOSURE 1

MEETING BETWEEN THE NRC STAFF AND SAXTON

FEBRUARY 29, 1996

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MEETING BETWEEN THE NRC STAFF AND SAXTON

FEBRUARY 29, 1996

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Robert L. Long	VP Nucl Svcs GPU Nuclear	201-316 7484
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SNEC Facility Decommissioning Meeting NRC-Rockville, MD February 29,1996

Dr. R. L. Long - GPU Nuclear

ENCLOSURE 2

Today's Agenda

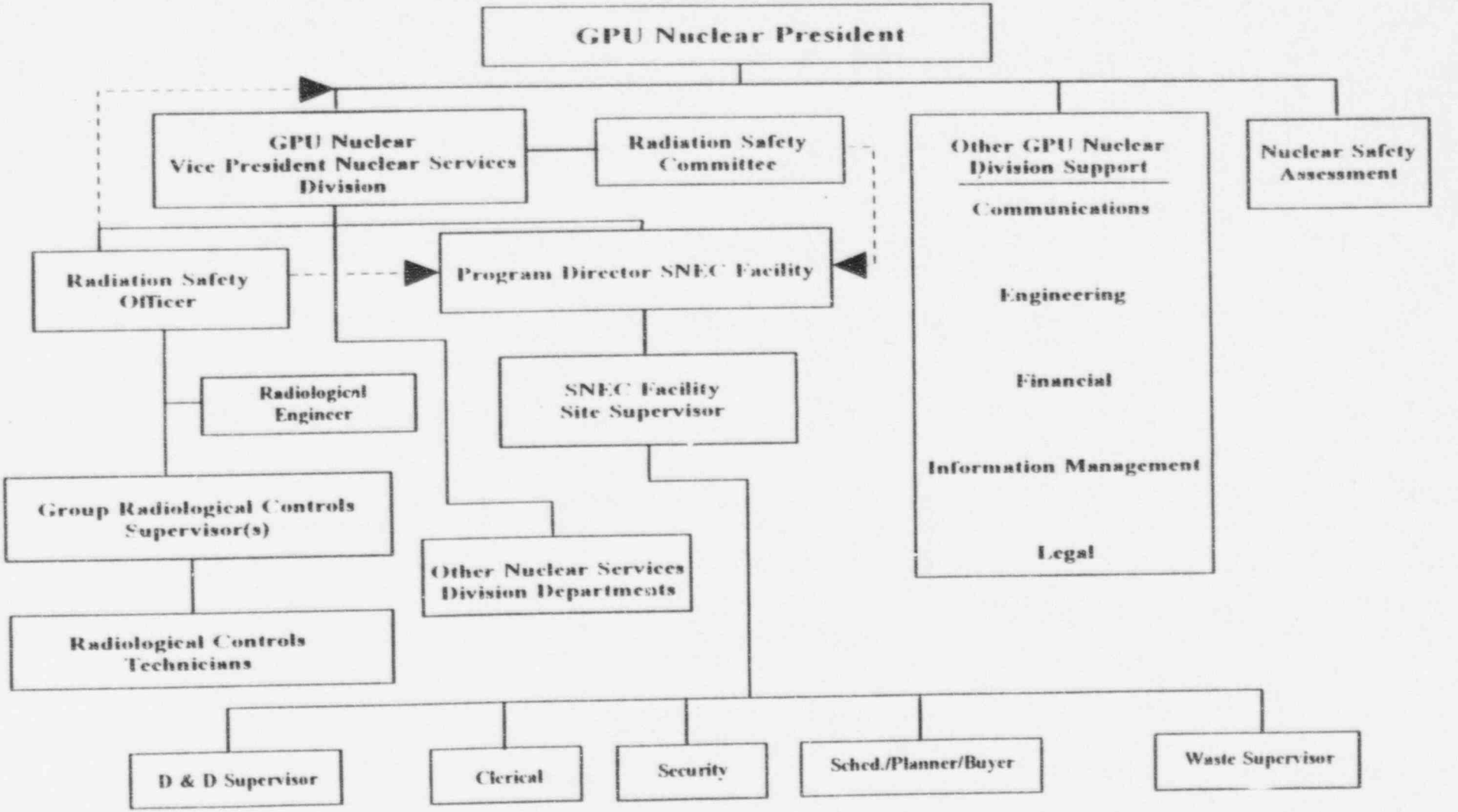
-Introduction	Dr. R. L. Long
-Decommissioning Organization	G. A. Kuehn
-Reactor Vessel Activation Analysis and Removal	A. H. Levin (TLG)
-Cost Estimate, Schedule and Exposure Estimate	G. Griffiths (TLG)
-Radiological Controls Program	A. F. Paynter
-Radwaste Estimates and Characterization Results	B. H. Brosey
-Support Facilities and Radwaste Processing	R. D. Holmes
-Accident Analysis	B. A. Parfitt
-Decommisioning Technical Specifications	W. G. Heysek
-Summary and Conclusion	G. A. Kuehn

SNEC Facility Decommissioning Organization

- GPU Nuclear will manage and oversee the project
- Strong central management
- Strong corporate level involvement
- Independent oversight and assessment
  - Nuclear Safety Assessment (NSA)
  - Radiation Safety Committee (RSC)
- Strong team with TMI-2 and/or previous SNEC facility experience

Figure 2.3-2

SAXTON ORGANIZATION - OPERATIONAL PHASE



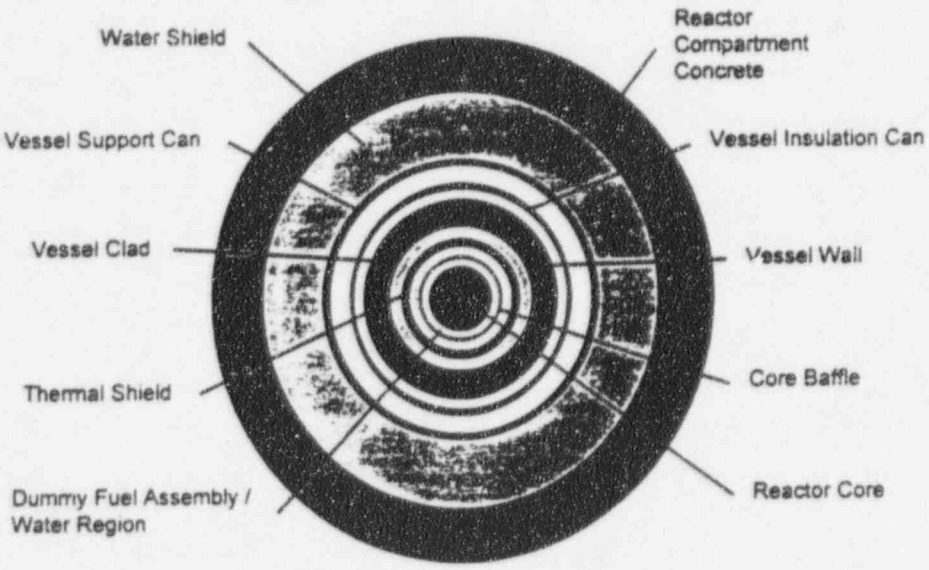
SNEC Facility Activation Analysis

Models and Results

- One-Dimensional Neutronics Model Geometry (ANISN)
  - Cylindrical Source Radial Model
  - Slab Source Axial Model
- Point Neutron Activation/Depletion (ORIGEN2)
  - Actual Plant History-Three Core Designs

FIGURE 6.2

THE SAXTON FACILITY
RADIAL COMPONENT ANISN MODEL GEOMETRY OVERVIEW



Component	Outer Radius, cm.
Core Equivalent Radius, Sectors A&B	43.921
Core Equivalent Radius, Sectors C&H	38.037
Core Equivalent Radius, Sectors D&G	31.057
Core Equivalent Radius, Sectors E&F	26.896
Dummy Assembly / Water Gap	43.921
Water Gap	44.012
Core Baffle	44.965
Water Gap	62.230
Thermal Shield	69.850
Water Gap	73.343
Vessel Clad	73.660
Vessel Wall	86.360
Vessel Insulation	97.631
Vessel Insulation Can	98.266
Air Gap	102.870
Vessel Support Can	104.140
Water Shield	223.520
Reactor Compartment Concrete Wall	269.240

SNEC Facility Activation Analysis

Models and Results (continued)

- Radionuclide Inventory (1 July 1996)
  - 1452 Curies Total:
    - 811 Curies ^{63}Ni
    - 595 Curies ^{60}Co
    - 37 Curies ^{55}Fe

SNEC Facility Activation Analysis

Models and Results (continued)

- Radionuclide Distribution:
  - Core Baffle (44%)
  - Lower Core Guide Blocks and Plate (28%)
  - Upper Core Plate (11%)
  - Thermal Shields (9%)
  - Balance (8%)

SNEC Facility Activation Analysis

Models and Results (continued)

- Activation Analysis Benchmarking
  - Point Kernel Shielding Analyses Using MICROSHIELD
  - Comparisons made to field data obtained during site characterization efforts
    - TLD Measurements (in and out of Reactor Vessel)
    - External Exposure Rate Measurements
    - Ex-Reactor Vessel samples
    - Concrete Core Bores

SNEC Facility Activation Analysis

Waste Classification

- Reactor Vessel and Internal Package overall Class C Low Level Radioactive Waste
  10 CFR Part 61.55
  - Only one item Greater-Than-Class C (GTCC) Waste
  - Lower Guide Blocks are GTCC (32)
  - Blend Lower Core Guide Blocks with other waste using factor of 10 rule.
  - Blend with lower core plate
  - Blending yields Class C Waste

SNEC Facility Activation Analysis

One-Piece Vessel Removal Scenario

- Reactor Vessel (RV) and Internals are the radioactive material
- RV has a dual purpose:
  - Also serves as a radioactive materials package
  - Only additional shielding required is to meet 49 CFR 173.441 external exposure rate requirements

SNEC Facility Activation Analysis

One-Piece Vessel Removal Scenario (continued)

- Radioactive material qualifies as LSA-III under 10 CFR 71.4
  - Overall weight of RV and internals is 5.6 E^{+7} grams
  - Overall 2.6 E^{-5} Ci/gram Specific Activity
- Less than 1 Rem/hour at three meters from core center line
  - Largest contributor to external exposure rate is RV wall , not from Internals
- Seek Vessel Qualification as IP-II

SNEC Facility Activation Analysis

Benchmarking of Activation Analysis Calculations

- Comparison to In-vessel TLD String Data
  - 10 Minute TLD exposure
  - Calculated results within 5% of measured results
- Comparison to Ex-vessel TLD String Data
  - TLD Strings at four locations (roughly N,S,E and W) six feet from RV centerline
  - Calculated results within 40% of measured result (Calculation Conservative)

SNEC Facility Activation Analysis

Benchmarking of Activation Analysis Calculations (continued)

- Comparison to external exposure rate measurements
  - Survey readings located at four locations (roughly N,S,E and W) six feet from RV centerline.
  - Calculated results within a factor of two of measured result (Calculation Conservative)

SNEC Facility Activation Analysis

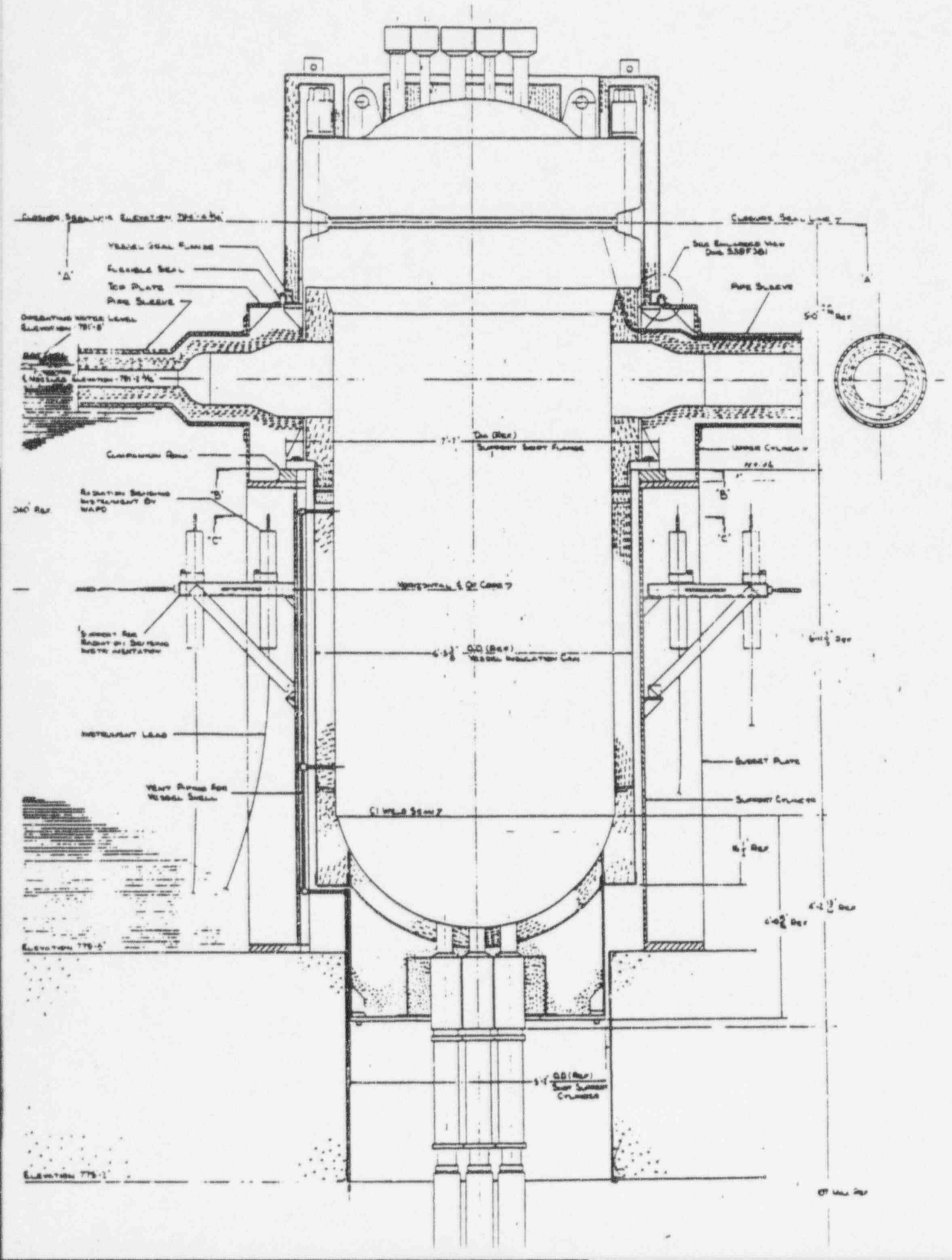
Benchmarking of Activation Analysis Calculations (continued)

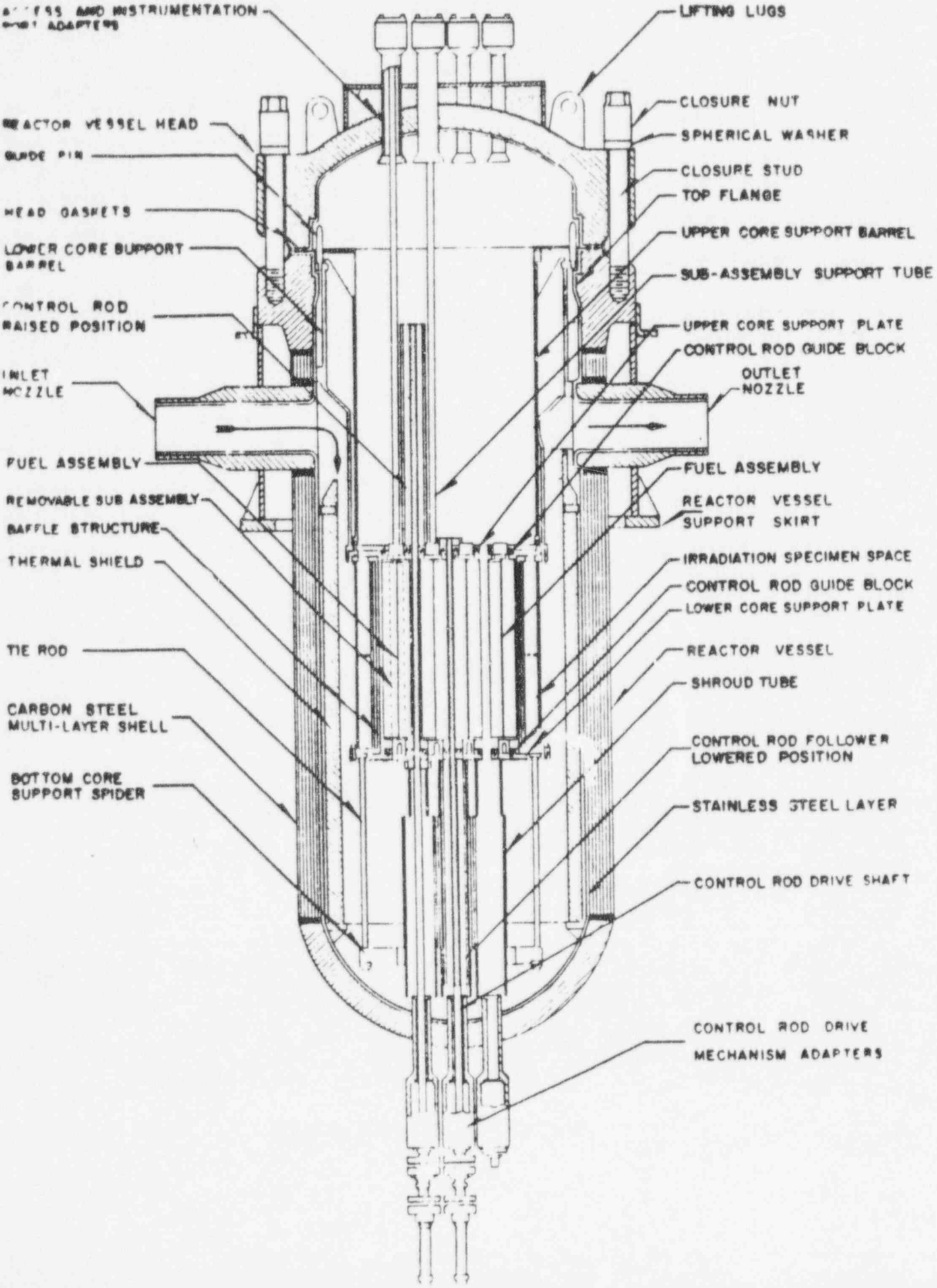
- Comparison to structural steel samples near core midplane
  - Structural stainless steel supporting Neutron Instrumentation, roughly 15" from RV Support Can
  - Part 61 analysis on steel compared to radionuclide distribution results from activation/depletion calcs.
  - Within
    - a factor of 2 for ^{60}Co
    - a factor of 4 for ^{63}Ni
    - a factor of 16 for ^{55}Fe

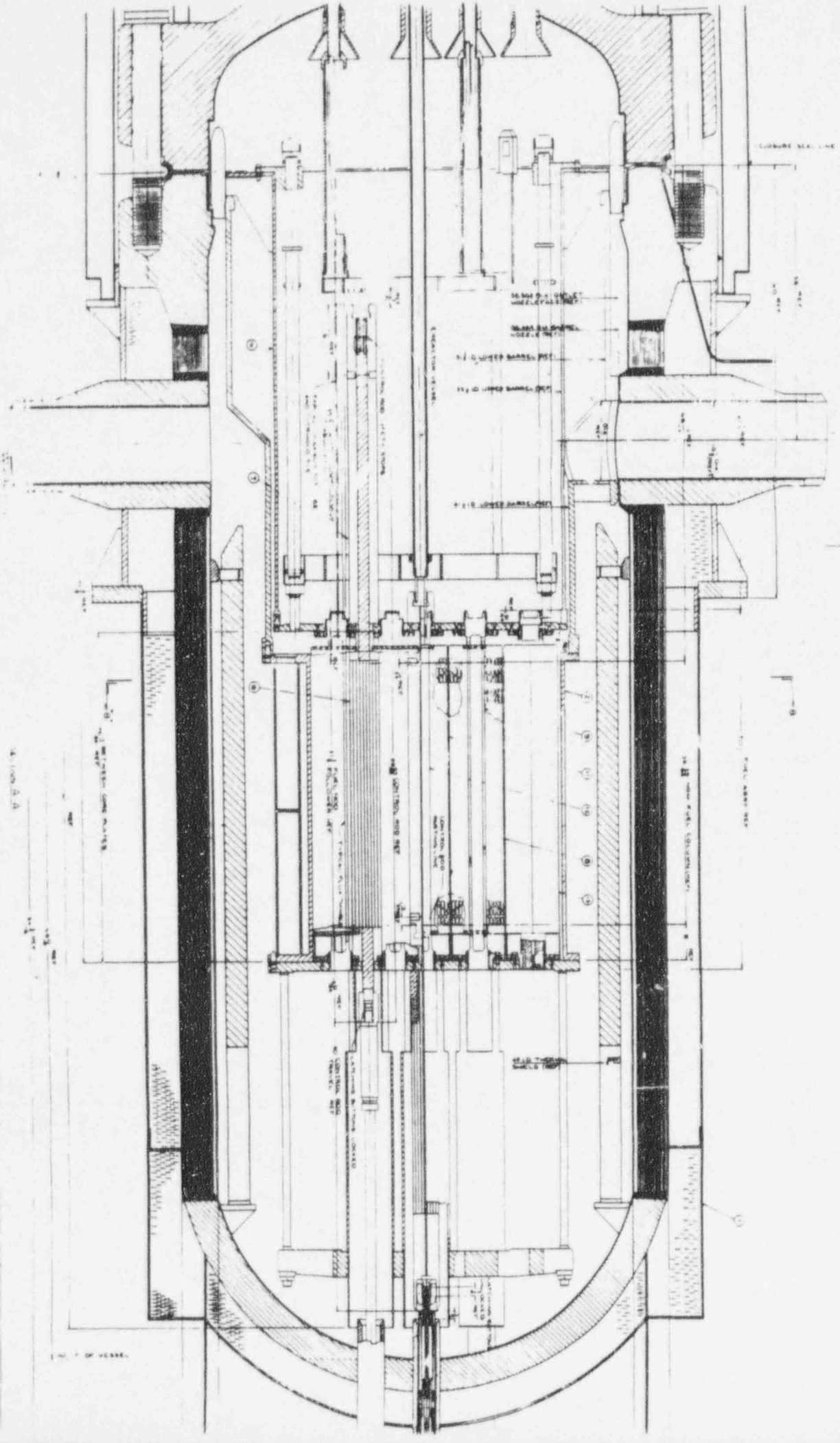
SNEC Facility Activation Analysis

Benchmarking of Activation Analysis Calculations (continued)

- Comparison to concrete boring samples and stainless steel samples from above the operating water level
  - Calculations underestimate activation by a factor of 10 to 20.
  - Likely cause - Neutron Streaming in the:
    - RV Wall
    - RV Insulation Can
    - RV Support Can Annuli


VESSEL SEAL FLANGE
FLEXIBLE SEAL
TOP PLATE
PIPE SLEEVE
OPERATING WATER LEVEL
ELEVATION - 781'-8"
'A'
'B'
'C'
INSTRUMENT LEAD
VENT PIPING FOR
VESSEL SHELL
PIPE SLEEVE
GUSSET PLATE
SUPPORT CYLINDER
ELEVATION 775'-1"


ACCESS AND INSTRUMENTATION
SHIELD ADAPTERS
LIFTING LUGS
CLOSURE NUT
SPHERICAL WASHER
CLOSURE STUD
TOP FLANGE
REACTOR VESSEL HEAD
GUIDE PIN
HEAD GASKETS
UPPER CORE SUPPORT BARREL
LOWER CORE SUPPORT BARREL
SUB-ASSEMBLY SUPPORT TUBE
CONTROL ROD RAISED POSITION
UPPER CORE SUPPORT PLATE
CONTROL ROD GUIDE BLOCK
INLET NOZZLE
OUTLET NOZZLE
FUEL ASSEMBLY
FUEL ASSEMBLY
REMOVABLE SUB ASSEMBLY
REACTOR VESSEL SUPPORT SKIRT
BAFFLE STRUCTURE
THERMAL SHIELD
IRRADIATION SPECIMEN SPACE
CONTROL ROD GUIDE BLOCK
LOWER CORE SUPPORT PLATE
TIE ROD
REACTOR VESSEL
SHROUD TUBE
CARBON STEEL MULTI-LAYER SHELL
CONTROL ROD FOLLOWER LOWERED POSITION
BOTTOM CORE SUPPORT SPIDER
STAINLESS STEEL LAYER
CONTROL ROD DRIVE SHAFT
CONTROL ROD DRIVE MECHANISM ADAPTERS



SNEC Facility Decommissioning
Cost Estimate

- The total estimated cost in 1995 dollars is $22,200,000.
- Prepared in accordance with:
  - AIF/NESP-036, "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates"
  - US Department of Energy "Decommissioning Handbook"

SNEC Facility Decommissioning

Cost Estimate (continued)

- Provided for removal of all radiological and hazardous contaminants to levels which will allow the SNEC Facility and adjacent areas to be released for unrestricted use.
- Based upon remaining inventories of equipment, building structures and site characterization data.

SNEC Facility Decommissioning

Cost Estimate (continued)

- Cost estimate is divided into 7 elements
  - Labor and related costs
  - Radwaste disposal and processing
  - Transportation
  - Specialty contractor services
  - Purchased materials and equipment
  - Installation of support facilities and systems
  - Contingency

SNEC Facility Decommissioning

Cost Estimate (continued)

- Labor related costs are based on:
  - Activity dependent and period dependent events.

SNEC Facility Decommissioning
Cost Estimate (continued)

- Activity Dependent Labor Costs are the labor costs associated with physically decontaminating, dismantling and performing radiological surveys of systems and structures. These costs are developed from:
  - SNEC Facility systems and structure inventory
  - Actual GPU Nuclear labor costs
  - Unit cost factors (Crew composition and productivity for decommissioning activities)

SNEC Facility Decommissioning

Cost Estimate (continued)

- Period Dependent Labor Costs are the labor costs associated with managing and providing support to the workforce doing the physical work. These costs are developed from:
  - Schedules to complete the project
  - Types of activities occurring during "PHASES" of the project
  - Actual GPU Nuclear labor costs
  - Size of the workforce

SNEC Facility Decommissioning

Cost Estimate (continued)

- Radwaste Disposal and Processing Costs account for the direct costs of off-site processing of waste (ie.. volume reduction) and/or the disposal of waste in a licensed burial facility. Radwaste disposal and processing is assumed to be subcontracted to licensed vendors. These costs were developed from:
  - Inventory of contaminated systems and structures
  - Waste disposal and processing costs (vendor provided)
  - Waste characteristics (ie..curie surcharges, and etc.)

SNEC Facility Decommissioning

Cost Estimate (continued)

- Transportation Costs account for the direct costs associated with transporting waste to the disposal facility or the waste processing facility. Transportation services are assumed to be subcontracted. These costs were developed from:
  - Quantities of waste material
  - Published tariffs from a nationally recognized carrier licensed to transport radioactive material
  - Actual mileage

SNEC Facility Decommissioning

Cost Estimate (continued)

- Specialty Contractor Services Costs account for the direct costs associated with providing unique decommissioning services. These services are assumed to be subcontracted. These costs include and were developed from:
  - RV and Steam Generator packaging costs
  - RV and Steam Generator heavy lift costs
  - NRC Services
  - An allowance for procuring outside consulting and review services

SNEC Facility Decommissioning

Cost Estimate (continued)

- Installation of Support Facilities and System Costs are the direct costs of contracting facilities required to support the decommissioning project. These costs are assumed to be subcontracted. These costs include and were developed from:
  - Design and construction of a temporary support building
  - Design and construction of a RV lay down area

SNEC Facility Decommissioning

Cost Estimate (continued)

- Purchased Materials and Equipment are the direct costs associated with procuring materials and equipment or ancillary services necessary to support the decommissioning project. These costs are assumed to be subcontracted or outside purchases. The costs include and were developed from:
  - Equipment rental
  - Capital equipment purchases
  - Activity-dependent and period-dependent collateral costs (TLG's experience)

SNEC Facility Decommissioning

Cost Estimate (continued)

- Contingency are the direct costs associated with resolving problems which may add to the costs of completing a project. These problems could include delays due to inclement weather, equipment or processing breakdown, late shipments from suppliers, or damaged equipment and/ or supplies in transit to the site. Contingency values have been developed from the following source:
  - AIF/NESP-036, " Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Costs Estimates"

SNEC Facility Decommissioning

Schedule

- The Decommissioning schedule is 100% integrated with the cost estimate. For planning purposes the project schedule is divided into four phases :
  - Preparation Phase
  - Operation Phase
  - Final Survey Phase
  - Site restoration Phase

SNEC Facility Decommissioning

Schedule (continued)

- Preparation Phase (1996)-Submit the decommissioning plan, receive approval to decommission SNEC Facility, procure equipment and consumables, and install temporary buildings and facilities.

SNEC Facility Decommissioning

Schedule (continued)

- Operations Phase (1997 through the middle of the 3rd quarter of 1998)-Perform decontamination, dismantlement and waste management activities to remove all hazardous and radiological contaminants.

SNEC Facility Decommissioning

Schedule (continued)

- Final Survey Phase (through the end of 1998)- Perform detailed, comprehensive and formal radiological surveys of the containment vessel and surrounding areas to verify the facility meets unrestricted release criteria.

SNEC Facility Decommissioning

Schedule (continued)

- Site Restoration Phase (First half of 1999)- Includes the NRC review and approval (independent verification) of site unrestricted release status and the completion of site restoration activities, such as demolition of clean structures and filing below grade voids.

SNEC Facility Decommissioning

Occupational Exposure Estimate

- The total estimate to complete the work is 31.8 Person-Rem.
- This is based on:
  - Actual characterization survey data results
  - Crew size, composition and types of activities
  - Applying ALARA Principles (dose reduction activities)
  - Support staff exposure
  - TLG's recent decommissioning experience

SNEC Facility Decommissioning

Radiological Controls Program

- Radiological Controls personnel will be trained similar to those personnel routinely supporting other GPU Nuclear Sites.
  - NRC approved training
  - Will meet or exceed qualification as outlined in ANSI N18.1 (1971) for their respective duties
  - Site specific training will be given as appropriate
  - Documented training records

SNEC Facility Decommissioning
Radiological Controls Program (continued)

- SNEC Facility will receive GPU Nuclear Radiological Controls Organization support:
  - Dosimetry
  - Calibrate and Maintain Radiological Instrumentation
  - Administer Bioassay Program
  - Perform audits
  - Additional technical support on an as needed basis

SNEC Facility Decommissioning

Radiological Controls Program(continued)

- All SNEC Facility Radiological Controls personnel have "Stop work" authority.
- Many Radiological Controls personnel have extensive TMI-2 Clean-up experience.
- All SNEC Facility Work Instructions (SWIs) will be reviewed by radiological controls personnel
- The Radiation Safety Officer concurrence is required on all SWI's

SNEC Facility Decommissioning

Radiological Controls Program(continued)

- The parent document for the Radiological Control Program is the SNEC Radiation Protection Plan
  - Rad Con activities are governed by implementing procedures
- Radiological work is controlled by :
  - General or routine Radiation Work Permits (RWPs)
  - Job Specific RWPs
  - Formal ALARA Reviews

SNEC Facility Decommissioning

Radiological Controls Program(continued)

- Written Radiation Work Permits (RWPs) will set the radiological safety requirements for the work force.
- They are required in:
  - Radiation Areas
  - High Radiation Areas
  - Contaminated Areas
  - Airborne Radioactivity Areas
  - Per Radiological controls personnel

SNEC Facility Decommissioning

Radiological Controls Program(continued)

- General or routine RWPs are written for tasks that are routine in nature ie.. Management inspection, routine tours simple periodic surveillances and routine radiological surveys
- Job Specific RWPs are written when more specific guidance is needed.

SNEC Facility Decommissioning

Radiological Controls Program(continued)

- ALARA Review criteria:
  - Any Task anticipated to accumulate
    1Person-Rem (TEDE) total dose or
    500 mrem to an individual
  - Any task which the dose to the skin, eyes extremities or other organs may be limiting without special controls
  - Any tasks in which the airborne concentration is expected to exceed a DAC-fraction of 50.
  - Any tasks that could cause an unmonitored radioactive release directly to the environment

SNEC Facility Decommissioning

Radiological Controls Program(continued)

- ALARA Review criteria: (continued)
  - Any task inside highly contaminated systems or components as defined by the RSO.
  - Any tasks for which the internal dose (CEDE) is expected to exceeded 500 mrem.
  - Per SNEC RSO

SNEC Facility Site Characterization

"Estimating Waste Volumes"

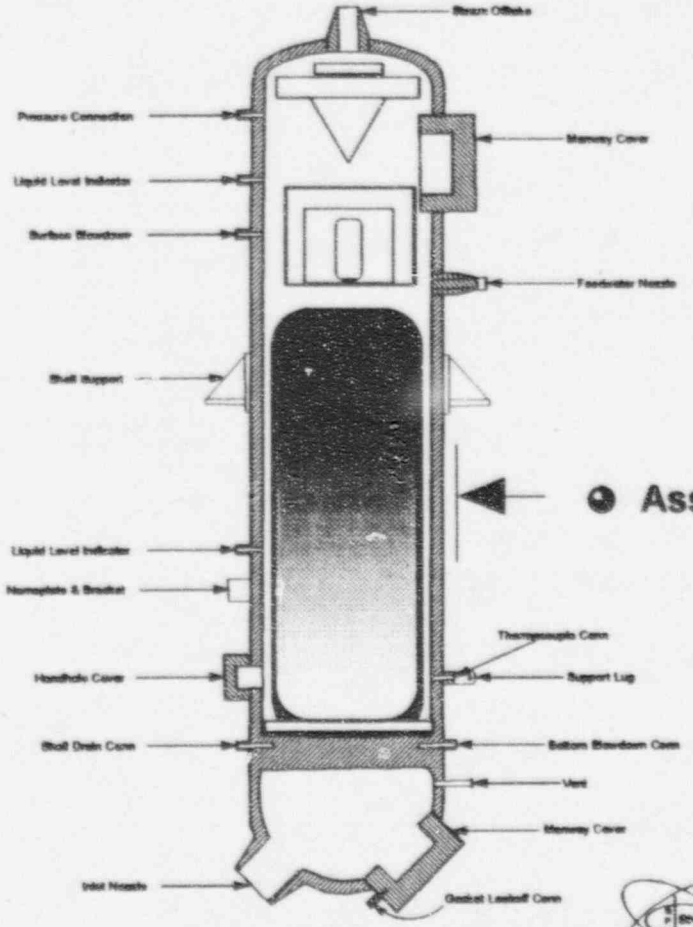
Key Waste Volume Subject Areas

- Components
- System Piping
- Concrete
- TBD,s

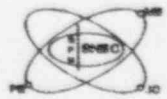
S/G Waste Stream/Source Term Information

- Three Waste Streams Were Used To Represent Source Term
  - Material Collected From Outlet Side Of Steam Generator-Inside Lower Manway
  - Material Collected From SI System-Similar To RV Internals
  - Secondary Side Material

Steam Generator Shielding Code Modeling



Steam Generator



NO SCALE

- Assumed Dose Point
  - Just beyond Insulation
  - Center Of S/G Length
  - Uses Wall Thickness As Primary Shield

S/G MS4.1 SHIELDING CODE INPUT VALUES

- Uses Average Exposure Rate Values Obtained From Survey Information
- Incorporates The Average Insulation Thickness
- Assumes A Homogeneous Internal Volume Density
- Assumes Wall Thickness Is Primary Shield

Estimate Of S/G Internal Activity

- Additional Assumptions:
  - Insulation Is Assumed to Be Al At 0.6g/cc
  - Impact Of Background Radiation Is Negliable
  - Activity Is Evenly Distributed Within S/G

Piping/Component Radiation Surveys

Piping Measurements-
Performed At 1 Foot Intervals
For Selected Sections

- **Top & Bottom Of Horizontal Piping**
- **Two Opposing Sides Of Vertical Pipe Sections**

Components - 1 Foot Intervals

- **Four Measurement Regions-90 Degrees Apart**

SNEC Facility Piping

~7,200 Linear Feet Of Piping

~260 Cubic Feet

~15 to 17 Tons

~4.5E5 Square Inches Of Internal Piping System Surface Area

~27% Is Insulated (by footage)

~13.4 Curies

TABLE 3.3-2

COMPONENT	AVERAGE ACTIVITY CONCENTRATION (uCi/cc)	AVERAGE uCi's PER 100 cm ^ 2 FOR SCO	ESTIMATED CURIES	VOLUME IN CUBIC METERS	WASTE CLASSIFICATION
AREA 1					
SHUT DOWN COOLING HEAT EXCHANGER	4.26E+00	N/A	9.00E-01	0.21	TBD
SHUT DOWN COOLING PMPS	5.93E-01	N/A	2.52E-01	0.42	Class C
CONDENSATE RETURN PUMP	3.00E-03	N/A	1.00E-04	0.03	Class A
CONDENSATE RETURN TANK	1.13E-03	N/A	1.00E-04	0.09	Class A
DISCHARGE TANK	1.35E-01	N/A	6.27E-01	4.63	Class A
DISCHARGE TANK PMPS	4.36E-02	N/A	9.00E-03	0.21	Class A
SUMP PUMPS	2.68E-01	N/A	6.70E-03	0.03	Class A
STORAGE WELL DEMIN. SUCTION FILTER	3.82E-02	N/A	3.26E-03	0.09	Class A
PURIFICATION FILTER	2.21E-01	N/A	1.00E-03	0.005	Class A
STORAGE WELL DEMIN. DISCHARGE FILTER	8.06E-02	N/A	2.54E-04	0.003	Class A
CCW PUMP FILTER	1.40E-01	N/A	3.00E-03	0.02	Class C
ROD ROOM AIR HANDLER	N/A	2.3E-02	1.50E-03	2.48	Class A
ROD ROOM VENT FAN	N/A	2.1E-02	TBD	0.03	Class A
CONTROL ROD DRIVES	N/A	1.2E-01	TBD	0.05	Class A
INSTRUMENT RACK 1	2.65E-02	N/A	3.59E-02	1.35	Class A
INSTRUMENT RACK 2	5.71E-03	N/A	7.00E-03	1.23	Class A
NEW FUEL STORAGE RACKS	N/A	3.7E-02	TBD	5.05	Class A
REACTOR HEAD INSULATION RING	N/A	3.6E-01	TBD	5.45	Class A
PUMP LEAKOFF DRAIN TANK	2.78E-02	N/A	6.60E-03	0.24	Class A
CONTAINMENT VESSEL SUMP VOLUME	7.38E-02	N/A	3.90E-02	0.53	Class A
AREA 2					
STEAM GENERATOR	6.04E+00	N/A	4.30E+01	7.12	Class C
PRESSURIZER	3.86E+00	N/A	2.47E+01	6.41	Class C
MAIN COOLANT PUMP	9.44E-02	N/A	5.00E-02	0.53	Class A
REGEN HEAT EXCHANGER	3.83E+00	N/A	3.10E+00	0.81	TBD
NON-REGEN HEAT EXCHANGER	2.15E-01	N/A	5.00E-02	0.23	Class C
INSTRUMENT RACK	4.71E-03	N/A	1.09E-02	2.32	Class A
AIR HANDLER IN OVERHEAD (see Primary)	N/A	1.1E+00	TBD	0.68	Class A
PRIMARY AIR HANDLER	N/A	1.1E+00	TBD	3.60	Class A

TBD – To Be Determined At A Later Time.
SCO – Surface Contaminated Object.

TABLE 3.3-2

COMPONENT	AVERAGE ACTIVITY CONCENTRATION (uCi/cc)	AVERAGE uCi's PER 100 cm ^ 2 (SCO)	ESTIMATED CURIES	CUBIC METERS	WASTE CLASSIFICATION
AREA 3					
STORAGE WELL HEAT EXCHANGER	3.98E-02	N/A	4.00E-03	0.10	Class A
STORAGE WELL PUMPS	4.01E-03	N/A	2.00E-03	0.50	Class A
COMPONENT COOLING HEAT EXCHANGER	9.48E-03	N/A	9.50E-03	1.00	Class A
COMPONENT COOLING STORAGE TANK	1.32E-02	N/A	1.30E-03	0.10	Class A
COMPONENT COOLING PUMPS	8.71E-03	N/A	3.70E-03	0.42	Class A
INCORE INSTRUMENT DRIVES	N/A	1.8E-01	TBD	0.93	Class A
AUXILIARY AIR HANDLER	N/A	3.6E-01	TBD	0.74	Class A
OPERATING FLOOR AIR HANDLER	N/A	6.3E-01	TBD	5.62	Class A

COMPONENT	AVERAGE ACTIVITY CONCENTRATION (uCi/cc)	AVERAGE uCi's PER 100 cm ^ 2 (SCO)	ESTIMATED CURIES	CUBIC METERS	WASTE CLASSIFICATION
AREA 4					
POLAR CRANE	N/A	8.7E-02	TBD	113.27	Class A
REFUELING BRIDGE	N/A	2.4E-02	TBD	0.68	Class A
SMALL CONTAMINATED PUMP	2.56E-03	N/A	1.00E-04	0.04	Class A
LARGE CONTAMINATED PUMPS	6.23E-04	N/A	2.00E-04	0.32	Class A
ELECTRICAL DISTRIBUTION BOX	N/A	1.6E-02	TBD	0.91	Class A
EQUIPMENT HATCH TROLLEY	N/A	4.2E-02	TBD	4.58	Class A
TOOL RACK	N/A	8.4E-02	TBD	0.19	Class A
FUEL HANDLING TOOLS	N/A	8.4E-02	TBD	0.10	Class A
TELEFLEX SHIELD (Steel Section)	N/A	1.5E-03	TBD	4.25	Class A
FUEL TRANSFER CASK SKID	N/A	1.8E-03	TBD	2.98	Class A
HEAD STAND	N/A	1.8E-02	TBD	1.16	Class A
LIGHTS	N/A	8.7E-02	TBD	0.70	Class A
AIR CIRCULATING FAN	N/A	5.0E-01	TBD	0.51	Class A

TBD - To Be Determined At A Later Time.
SCO - Surface Contaminated Object.

TABLE 3.3-2

COMPONENT	AVERAGE ACTIVITY CONCENTRATION (uCi/cc)	AVERAGE uCi's PER 100 cm ^ 2 (SCO)	ESTIMATED CURIES	CUBIC METERS	WASTE CLASSIFICATION
AREA 6					
REACTOR VESSEL	1.13E+02	N/A	1.45E+03	12.85	Class C
REACTOR VESSEL INSULATION CAN	1.21E-01	N/A	1.08E+00	8.95	Class A
REACTOR VESSEL SUPPORT CAN	1.66E-01	N/A	3.03E+00	18.26	Class A
SPENT FUEL RACK	6.22E-04	6.0E-01	7.00E-03	11.25	Class A
BORIC ACID DEMINERALIZER VESSEL	4.15E+01	N/A	1.74E+01	0.42	TBD
STORAGE WELL DEMINERALIZER VESSEL	6.20E+00	N/A	9.70E-01	0.16	TBD
PURIFICATION DEMINERALIZER VESSEL	1.15E+00	N/A	4.80E-01	0.42	TBD
SPENT FUEL POOL ELEVATOR	N/A	6.8E-01	TBD	2.72	Class A
SUPPORT STAND	N/A	6.8E-01	TBD	0.45	Class A
INTERNALS RIGGING FIXTURE	N/A	6.8E-01	TBD	0.51	Class A
REACTOR VESSEL HEAD LIFT RIGGING	N/A	6.8E-01	TBD	0.51	Class A
SUPER HEATED TEST EQUIPMENT TANK	2.05E-02	N/A	7.28E-03	0.36	Class A
GRATING (all areas) (Steel Only)				0.004 *M ^ 3/ft ^ 2*	
		2.9E-01 *Average*	1.46E-02 *Total*	5.74 *Total M ^ 3*	Class A
GRATING (Rx Compartment) (Aluminum Only)				0.004 *M ^ 3/ft ^ 2*	
		8.5E-01 *Average*	1.16E-02 *Total*	1.56 *Total M ^ 3*	Class A
STEP GRATING (all areas) (Steel Only)				0.002 *M ^ 3/ft ^ 2*	
		2.9E-01 *Average*	7.99E-04 *Total*	0.27 *Total M ^ 3*	Class A
SITE CONCRETE	1.21E-03		3.70E-01	307.0	Class A
SITE PIPING	1.92E+00		1.34E+01	7.0	Class A & C
INSULATION	TBD		TBD	17.2	Class A
PROCESS WASTE GENERATED	TBD		Included	TBD	TBD
RV INTERNAL SURFACE CONTAMINATION	N/A		1.18E+01	N/A	Included With RV
TOTALS			1569	579	

TBD – To Be Determined At A Later Time.
SCO – Surface Contaminated Object.
Note: The Volume Estimate Takes No Credit For Decontamination, Volume Reduction Or Packaging Arrangements.

Concrete Volume Estimate

- Includes Surface Areas From
  - Floors
  - Walls
  - Ceilings
  - CV Exterior Walls
  - Septic Systems
  - Tunnel Surfaces

Concrete Core Bore Samples

- **Core Bore Samples Were Taken From:**
  - **Off-site**
    - Used As Representative Backgrounds
  - **On-site**
    - Outside Of CV Used As Site Backgrounds
  - **Internal To CV**

Core Bore Samples

Number Taken:

11 Taken Offsite

10 From Onsite-Near CV

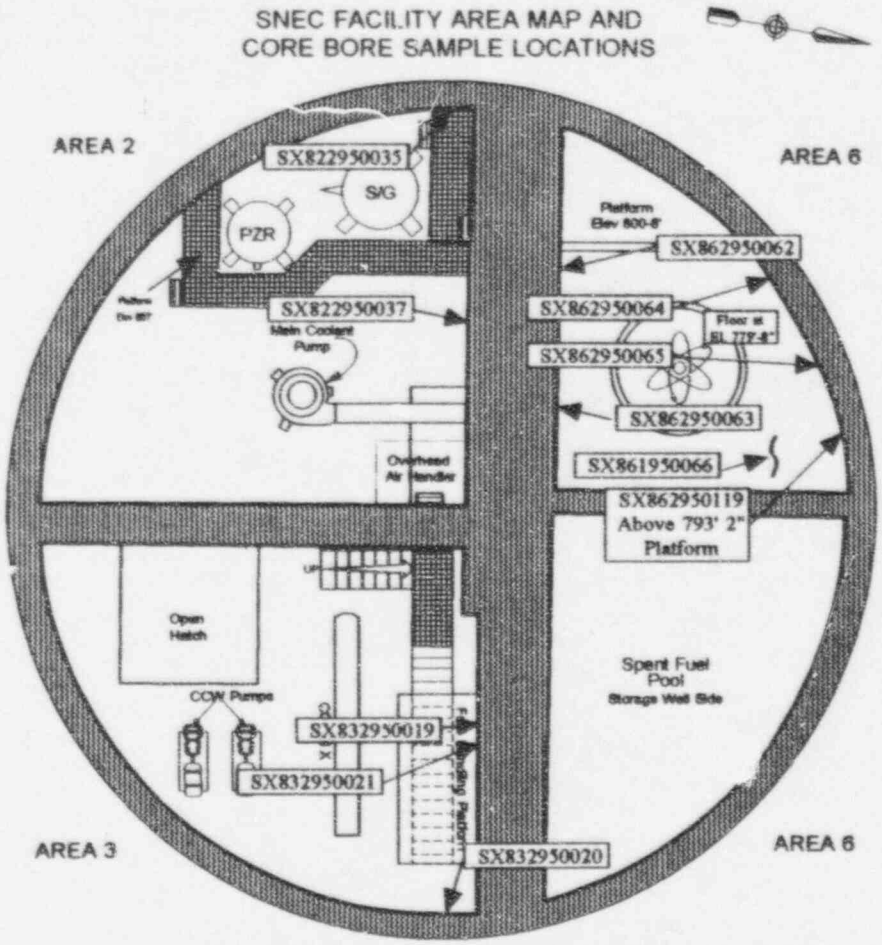
46 Taken From Inside CV

SNEC Concrete Waste Materials-Initial Estimate

Concrete Waste Materials:

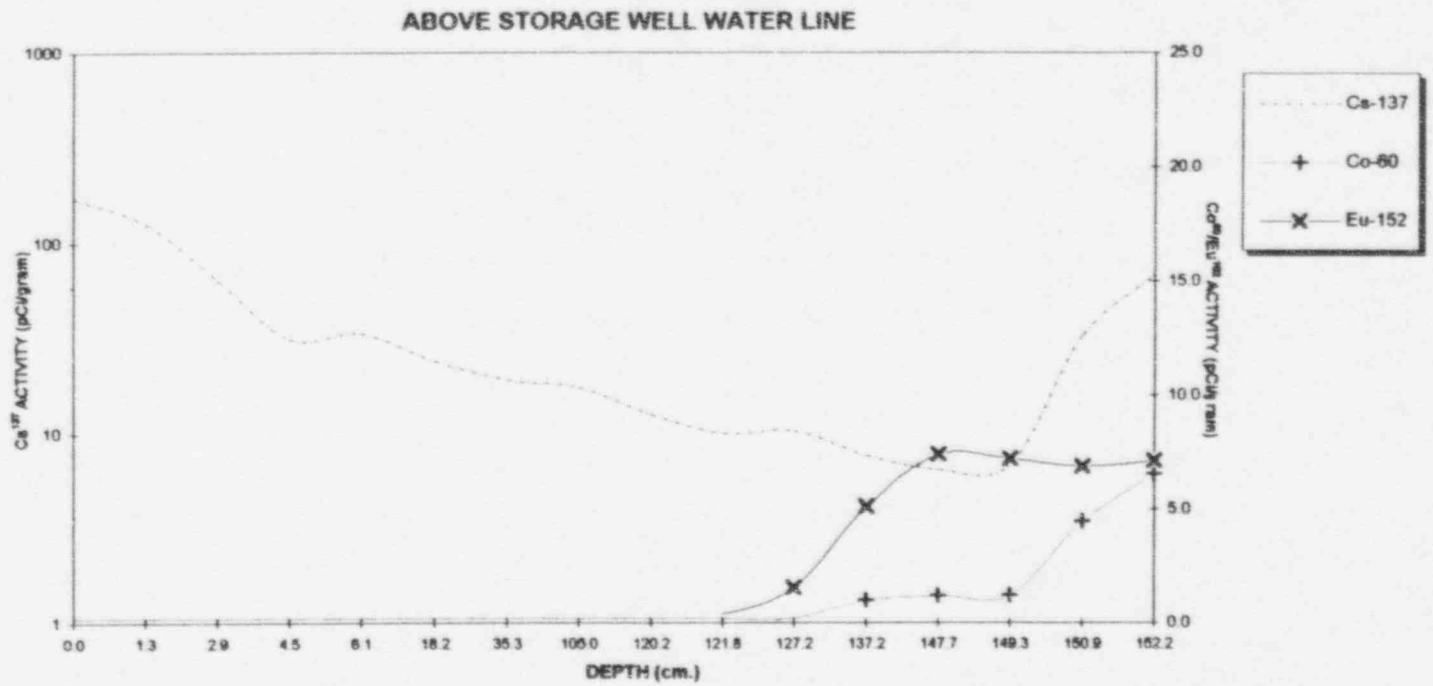
- **~307 Cubic Meters**
- **~770 Tons**
- **45% Is From the 5' Thick Wall Between Reactor & Primary Compartments**
- **Initial Criteria Established By Use Of "USDOE Guidelines For Residual Radioactive Material", RESRAD**

SNEC Concrete Core Bore Location Map



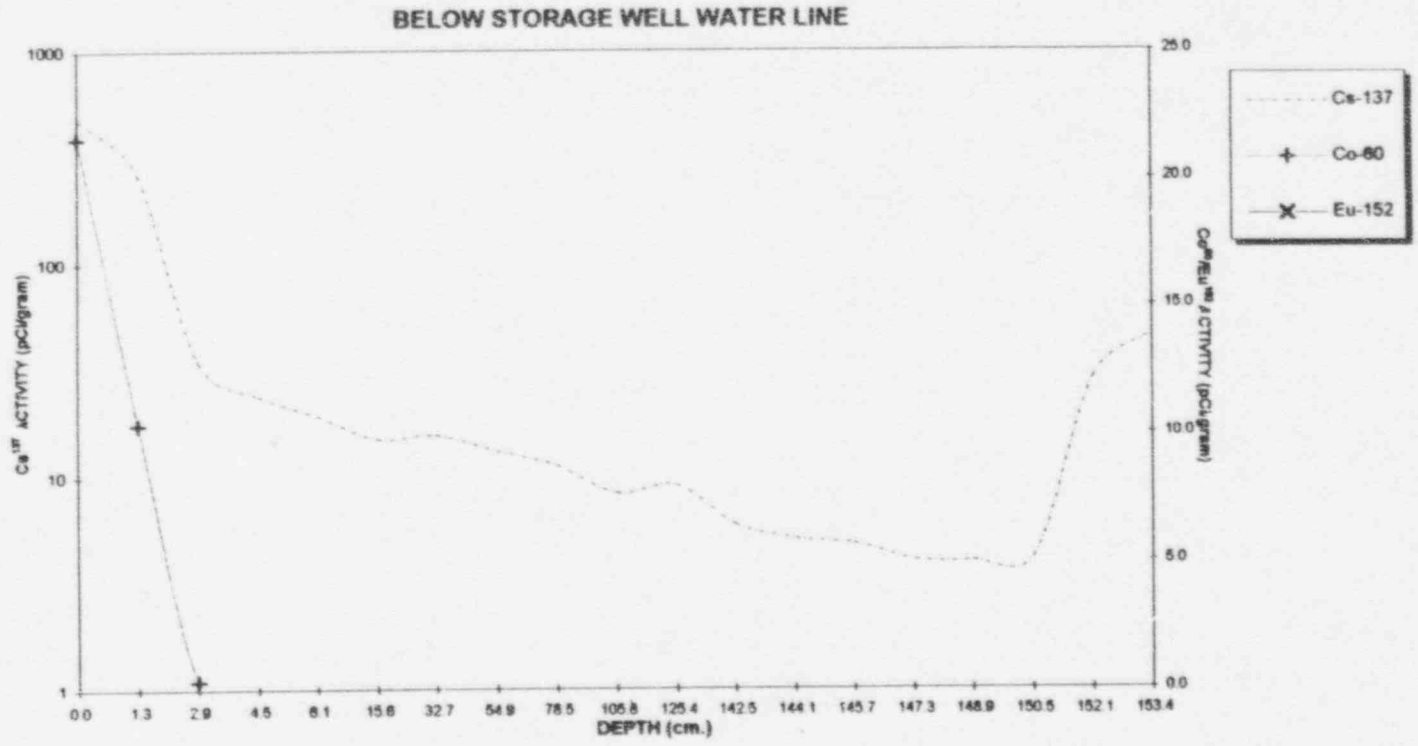
~795' El. SNEC CV

Core Bore Data



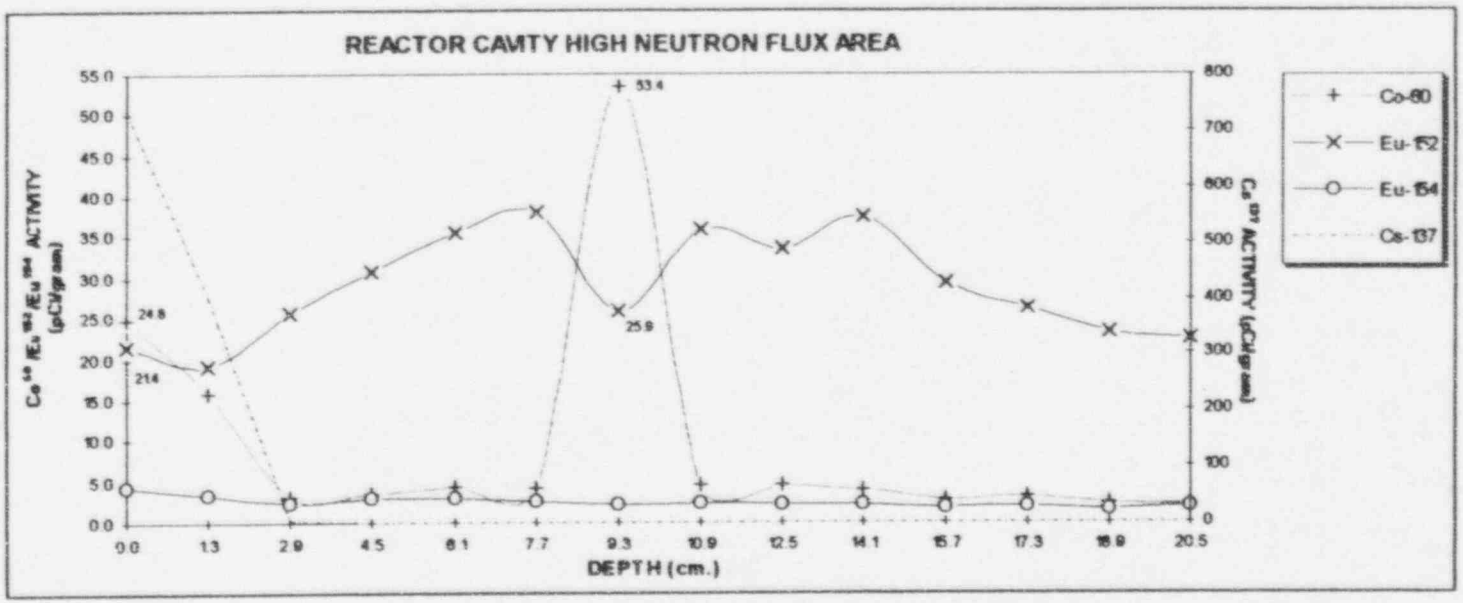
Above Storage Well Water Line

Core Bore Data



Below Storage Well Water Line

Concrete Core In High Flux Area



North East Of Reactor Vessel Above Water Line

TABLE 5. -18

SNEC FACILITY CONCRETE WASTE VOLUMES

AREAS 1–8, SNEC Site CV And Surrounding Facility

11/8/95

NOTE: Volumes are based on the best currently available information.

AREA	ITEM DESCRIPTION	Number of Square Feet	Depth Of Concrete To Be Removed (Inches)	Volume In Cubic Feet	Weight (lbs)	Weight (tons)
1	765' 8" El. Floor	705	6.8	399.5	56862	28.4
1	768' 8" El. Ledge	350	1.3	37.9	5397	2.7
1	765' 8" El. Walls	2543	4.3	911.2	129700	64.9
1	775' 2" El. Ceiling*	733	0.25	15.3	2174	1.1
2	779' 8" El. Floor	475	5.1	201.9	28734	14.4
2	5' Thick Primary Compartment Wall (See Note 1)	968	59.9	4833.9	688029	344.0
2	Primary Compartment Walls, Other Than 5' Section	1875	5.3	827.9	117845	58.9
2	814' 6" El. Concrete Ceiling*	475	0.25	9.9	1409	0.7
3	Auxiliary Compartment Walls (All)	2405	2.7	541.1	77020	38.5
3	810' El. Ceiling*	381	0.25	7.9	1130	0.6
4	818' El Operating Floor	669	0.6	33.4	4761	2.4
4	812' El Operating Floor, Includes Top Of Shld Plugs	1202	1.8	180.3	25663	12.8
4	812' El Operating Flr., Interior Walls	341	0.6	17.1	2427	1.2
5	CV Tunnel Walls, Below Grade	2014	0.4	67.1	9555	4.8
5	CV Tunnel Ceiling, Below Grade	953	0	0.0	0	0.0
5	CV Tunnel Floor, Below Grade (Assume 812' Ops. Floor Depth)	953	1.8	143.0	20347	10.2
5	CV Tunnel Ceiling, Exterior (Grade level)	953	0.6	47.7	6782	3.4
6	765' 8" Storage Well Floor	1035	5.6	483.0	68747	34.4
6	Storage Well Walls – SW Side	2465	2.8	575.1	81855	40.9
6	Rx Cavity Side Walls, < Operating Level Water Line (NO 5' WALL)	387	1.6	51.5	7337	3.7
6	Rx Cavity Side Walls, > Operating Level Water Line (NO 5' WALL)	545	18	817.5	116358	58.2
6	Rx Cavity Side Ledge At 779' 8" El	113	1.9	17.9	2547	1.3
6	807' El. Ceiling Of Storage Well (Shield Blocks etc.)	574	12.8	612.3	87146	43.6
7	Concrete Walls And Pads Outside Of CV	500	0.2	8.3	1186	0.6
8	Sanitary Sewage Treatment Facilities, Weir, Tanks etc.	993	0	0.0	0	0.0
	TOTALS==>	***24606***	***N/A***	***10841***	***1543009***	***772***

**** Volume Based On A Minimium Removal Depth Of 0.25 Inches.***

Note 1: The 5' thick wall between the Rx and Primary Compartments may not be completely contaminated. However, lower sections are contaminated to a depth which may require complete removal of this wall.

TBD's - To Be Determined

Special Case Items Requiring More Detailed Work

- **Shut Down Cooling Heat Exchanger**
- **Regenerative Heat Exchanger**
- **BA , SW & Purification Demins**
- **Process Waste**

Support Facilities and Rad Waste Processing
Decommissioning Support Complex

- Decommissioning Support Building (DSB)
  - 40' x 60' "Butler" type building
  - Main facility for processing and packaging solid components and waste
  - Provides for loading of vehicles and storage of equipment

Support Facilities and Rad Waste Processing
Decommissioning Support Complex

- Material Handling Bay (MHB)
  - Large components and waste containers staged here
  - Rigging to accommodate ten (10) ton load
  - Covers the containment Vessel opening

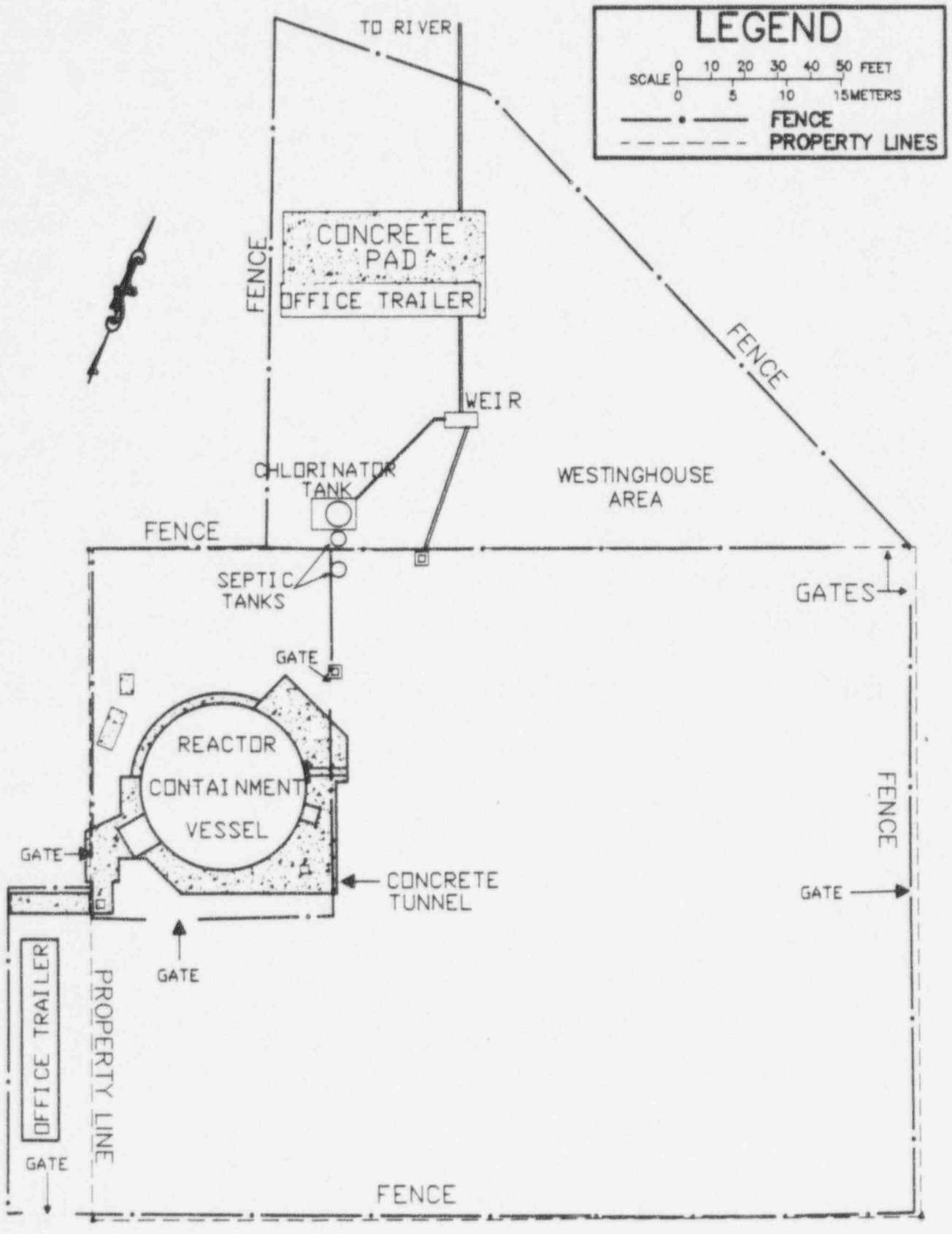
Support Facilities and Rad Waste Processing
Decommissioning Support Complex

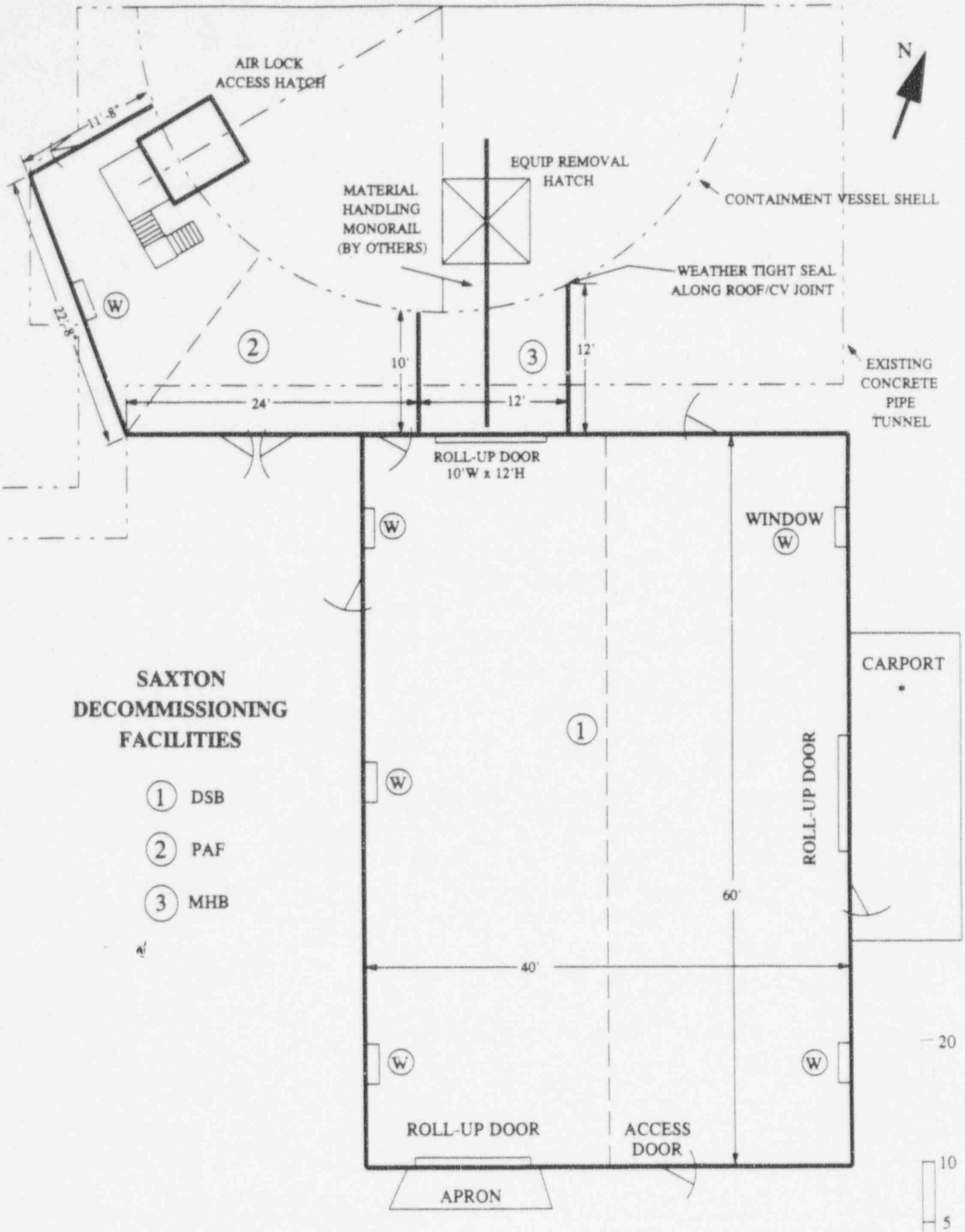
- Personnel Access Facility (PAF)
  - Major personnel ingress and egress point
  - Serves as the personnel dress-out area
  - Laundry storage and personnel frisking

- Design and specification underway
  - construction - second quarter 1996

Figure 1.1-1

SAXTON SITE LAYOUT





SAXTON DECOMMISSIONING FACILITIES

1. DSB
2. PAF
3. MHB

NOTE: ALL DIMENSIONS ARE CONCEPTUAL AND SUBJECT TO CHANGE DURING DETAILED DESIGN

* DESIGNED FOR BOTH REAR LOAD OR SIDE LOAD TRACTOR TRLR

Support Facilities and Rad Waste Processing

Rad Waste Processing

- Disposal at two principle facilities
  - Envirocare (Limited Class A)
  - Barnwell (Class A, B, and C)

Support Facilities and Rad Waste Processing

Rad Waste Processing

- Very Limited On-Site Processing
  - Only that required to efficiently package for shipment
  - Off-Site vendors will perform decontamination of components, sorting and volume reduction
  - Limited On-Site processing of decon water
  - On-site decontamination of fixed structural components and tools / equipment for re-use.
- No gaseous waste present

Support Facilities and Rad Waste Processing

Rad Waste Processing

- Limited liquid wastes present, will minimize generation during decommissioning
  - treated using temporary systems
  - any discharges IAW Radioactive Effluent controls Program
- Mixed wastes disposal
  - Lead - decon/ macro-encapsulation
  - PCB oil - < L.L.D.
- Transportation issues

SNEC ACCIDENT ANALYSIS GUIDANCE UTILIZED

ANALYSIS PERFORMED USING GUIDELINES OF NUREG/CR-0130 (REFERENCE PWR)

- BROADEST RANGE OF ACCIDENTS ANALYZED
- SAME BASIC ASSUMPTIONS AS NUREG/CR-1756 (RESEARCH/TEST REACTOR)
- SAXTON PLANT IS SPECIFICALLY REFERENCED IN NUREG/CR-0130
- OTHER DECOMMISSIONING PLANS ALSO USED FOR GUIDANCE

SNEC ACCIDENT ANALYSIS GENERAL ASSUMPTIONS

ACCIDENT ATMOSPHERIC DISPERSION DEVELOPED USING REG. GUIDE 1.145

- **SITE BOUNDARY ASSUMED TO BE 200 M**
- **WIND SPEED 1 METER/SEC**
- **PASQUILL STABILITY CLASS G**
- **VERY CONSERVATIVE DISPERSION X/Q = 4.14E-3 SEC/CUBIC METER**

SNEC ACCIDENT ANALYSIS
ACCIDENTS SPECIFICALLY ANALYZED

ACCIDENT	MAXIMUM OFFSITE DOSE (mrem)
MATERIALS HANDLING ACCIDENT DROPPED RESIN VESSEL	1.46
SEGMENTATION OF COMPONENTS WITHOUT ENGINEERING CONTROLS	1.43
MATERIALS HANDLING ACCIDENT DROPPED STEAM GENERATOR	1.19
LIQUID PROPANE GAS EXPLOSION	0.36
COMBUSTIBLE WASTE FIRE IN STORAGE YARD	0.25
VACUUM FILTER-BAG RUPTURE	0.09
OXYACETYLENE EXPLOSION	0.04

SNEC ACCIDENT ANALYSIS
OTHER POTENTIAL ACCIDENTS

ACCIDENT	BOUNDED BY
IN SITU DECONTAMINATION	SEGMENTATION
LOSS OF OFFSITE POWER	MATERIALS HANDLING ACCIDENT
EARTHQUAKE	MATERIALS HANDLING ACCIDENT
FLOOD	LOSS OF OFFSITE POWER

SNEC ACCIDENT ANALYSIS
OTHER POTENTIAL ACCIDENTS

ACCIDENT	BOUNDED BY
TORNADO	COMBUSTIBLE WASTE FIRE
LIGHTNING	LOSS OF OFFSITE POWER
INTRUDER	COMBUSTIBLE WASTE FIRE
FOREST FIRE	LOSS OF OFFSITE POWER
LOSS OF COOLING WATER	N/A
LOSS OF COMPRESSED AIR	N/A

SNEC ACCIDENT ANALYSIS MATERIALS HANDLING ACCIDENT

STEEL VESSEL USED TO HOLD RESINS IS DROPPED OUTSIDE CONTAINMENT

- NO CREDIT TAKEN FOR HEPA FILTRATION
- NO CREDIT TAKEN FOR PLATEOUT OF ACTIVITY

ISOTOPIC DISTRIBUTION AND ACTIVITY OBTAINED FROM RADIOLOGICAL CHARACTERIZATION

- TOTAL OF 17 CURIES OF ACTIVITY
- PU-241 (44%), NI-63 (30%), CS-137 (10%), CO-60 (5%), PU-238/239 (4%), AM-241 (4%), AND SR-90 (2%)

SNEC ACCIDENT ANALYSIS
MATERIALS HANDLING ACCIDENT

ASSUMES VESSEL IS DROPPED AND SPLITS OPEN WITH A RELEASE FRACTION OF 1.7E-6

- RELEASE FRACTION BASED ON RESIN FIRE/EXPLOSION SPECIFIED IN NUREG/CR-0130
- DROPPED VESSEL PROVIDES LESS MOTIVE FORCE THAN EXPLOSION
- VESSEL TO BE FILLED WITH GROUT PRIOR TO MOVEMENT
- RELEASE FRACTION CONSIDERED CONSERVATIVE

29 uCi RELEASED TO THE ENVIRONMENT DURING TWO HOUR PERIOD

CALCULATED DOSE TO INDIVIDUAL AT THE SITE BOUNDARY FOR THE DURATION OF THE ACCIDENT IS 1.46 MREM

SNEC ACCIDENT ANALYSIS
MATERIALS HANDLING ACCIDENT

ANALYSIS ALSO PERFORMED FOR STEAM GENERATOR DROPPED OUTSIDE CONTAINMENT

ISOTOPIC DISTRIBUTION AND ACTIVITY OBTAINED FROM RADIOLOGICAL CHARACTERIZATION

- TOTAL OF 31 CURIES OF ACTIVITY
- PU-241 (14%), NI-63 (34%), CS-137 (16%), CO-60 (16%), PU-238/239 (2%), AM-241 (2%), AND SR-90 (3%)

SAME RELEASE FRACTION AND OTHER ASSUMPTIONS AS USED IN DROPPED RESIN VESSEL

52 uCi RELEASED TO THE ENVIRONMENT DURING TWO HOUR PERIOD

MAXIMUM OFFSITE DOSE IS 1.19 MREM

SNEC ACCIDENT ANALYSIS
LOSS OF ENGINEERING CONTROLS

ASSUMES LOCAL ENGINEERING CONTROLS ARE LOST OR NOT USED DURING SEGMENTATION OF RCS PIPING WITH AN ARC SAW

ASSUMPTIONS USED SPECIFIED BY NUREG/CR-0130

- PIPE DIAMETER 78.7 CM
- KERF WIDTH OF CUT 0.95 CM

ASSUMES THAT ENTIRE PIPE IS SEGMENTED PRIOR TO RECOGNIZING THE PROBLEM - NO CREDIT TAKEN FOR LOCAL AIR MONITOR ALARMS

ASSUMES THAT CONTAINMENT BUILDING VENTILATION IS OPERATING AND EXHAUSTED AIR IS CLEANED BY HEPA FILTRATION PRIOR TO RELEASE TO THE ATMOSPHERE

- HEPA IS 99.95% EFFICIENT PER NUREG/CR-0130

SNEC ACCIDENT ANALYSIS
LOSS OF ENGINEERING CONTROLS

ISOTOPIC DISTRIBUTION AND ACTIVITY OBTAINED FROM RADIOLOGICAL CHARACTERIZATION

- INCLUDES BOTH SURFACE AND ACTIVATION ACTIVITY IN THE PIPE
- ASSUMES THAT ALL METAL ALONG THE CUT IS VAPORIZED AND RELEASED TO THE BUILDING
- A TOTAL OF 62,000 uCi RELEASED INTO BUILDING
- PU-241 (28%), NI-63 (44%), CO-60 (17%), PU-238/239 (4%), AND AM-241 (4%)

31 uCi RELEASED TO THE ENVIRONMENT

CALCULATED DOSE TO INDIVIDUAL AT THE SITE BOUNDARY FOR THE DURATION OF THE ACCIDENT IS 1.43 MREM

SNEC Facility Decommissioning

Licensing Activities

- Decommissioning Technical Specification Submittal
  - Significant changes from existing Tech Spec
    - Allows performance of decommissioning activities
      - Includes specific decommission activities controls
    - 50.59 Authorization
    - Extended Exclusion Area controls
    - Establishes new Tech Spec requirements for:
      - Radiological Environmental Monitoring Program
      - Radioactive Effluent Control Program
      - Process Control Program
  - Submittal date: March 22,1996