

Mr. Ralph Stein, Acting Associate Director
Office of Systems Integration and Regulation
Office of Civilian Radioactive Waste Management
U. S. Department of Energy RW-24
Washington, D. C. 20545

OCT 14 1988

Dear Mr. Stein:

This letter transmits minutes from the September 29-30, 1988 meeting between the Nuclear Regulatory Commission (NRC), the Department of Energy (DOE), and the State of Nevada. The purpose of the meeting was to have DOE provide informational briefings to NRC and the State of Nevada on plans for demonstrating that the waste form produced at the Defense Waste Processing Facility (DWPF) at Savannah River will meet disposal requirements at the repository. As a result of the meeting, there are several actions that DOE needs to undertake. These are discussed in the enclosed minutes.

After reading these minutes and discussing them with my staff, I would like to bring to your attention the need for better systems engineering and integration of the various elements of the waste acceptance process (WAP) into the overall repository development program. I was surprised to discover that DWPF management has been expecting NRC to review DWPF quality assurance (QA) program documents on a schedule contrary to what we had been told by the Office of Civilian Radioactive Waste Management (OCRWM) in your attached August 9, 1988 letter to Mr. B.J. Youngblood, then Chief of our Operations Branch. I was also surprised to learn that my staff was expected to review WAP documents on the schedule laid out in the September 29 meeting. We had been given no indication that this would be the case when we conferred with OCRWM several months ago for the purpose of projecting our FY89 activities. Furthermore, there should be sufficient time in the schedule to allow OCRWM to do a thorough review of the documents (i.e., Waste Acceptance, Prelicensing Specifications, Waste Compliance Plan, Waste Qualification Report and QA plan) before submitting them to NRC for review.

As the Commission noted in its recent comments on the DOE Draft Mission Plan Amendment, there is a need for a more clearly integrated and effective systems approach to the Nuclear Waste Policy Act program, and the Mission Plan Amendment itself contains a commitment to this goal. Consistent with our prior agreement, we look to OCRWM to provide that overall integration of the component efforts of the repository program. Although all of the actions documented in the enclosed meeting minutes are important, we believe that first and foremost, OCRWM needs to provide an integrated schedule and milestones for all of the WAP-related activities at the DWPF and the West Valley Demonstration Project. Included in this should be production, compliance demonstration, technical review, and qualification activities for both technical and QA efforts. The discussion of technical review activities should include proposed points for consultation with NRC. Only after we receive this integrated schedule and milestones from OCRWM relating WAP to repository development activities can we have an authoritative basis on which to plan the allocation of our resources for the reviews needed by DOE in a timely manner.

Mr. Ralph Stein

Should you have any questions on this matter, please contact Wayne Walker at FTS 492-0447.

Sincerely,

Robert E. Browning, Director
Division of High-Level Waste Management

Enclosures:

- 1. List of Attendees
- 2. Briefing Charts and Meeting Agenda
- 3. Ltr, RStein, DOE, to BYoungblood, NRC
dtd 8/9/88

cc: R. Loux, State of Nevada

DISTRIBUTION

Central File	B. J. Youngblood	R. E. Browning	J. Bunting
PDR	On-Site Reps	R. Ballard	J. Linehan
LPDR	HLPM R/F	NMSS R/F	CNWS
LSS	R. MacDougall	W. Walker	ACNW
J. Holonich			

OFC :HLPM :HLPM :HLPM :HLPM :DHLWM :DHLWM

NAME: Walker :RMacDougall:JHolonich:JLinehan:BYoungblood :RBrowning:

DATE:10/12/88 :10/17/88 :10/17/88 :10/13/88:10/19/88 :10/19/88:

Summary of the September 29, 1988
Technical Exchange Meeting on the Waste Acceptance
Process for the Defense Waste Processing Facility

Background:

The Department of Energy (DOE) has maintained an ongoing interaction with the Nuclear Regulatory Commission (NRC) concerning the Waste Acceptance Process for the West Valley Demonstration Project (WVDP) and the Defense Waste Processing Facility (DWPF) at Savannah River. The DOE Office of Civilian Radioactive Waste Management (OCRWM) has recognized the tie-in that the waste form produced at the DWPF and the WVDP will have in relation to overall repository licensing. DOE schedules indicate that radioactive vitrification activities will begin at DWPF and WVDP prior to submittal of the license application for the geologic repository. For this reason OCRWM has solicited consultation with NRC at appropriate points of the process prior to licensing to inform NRC how OCRWM will ensure that the waste forms produced will be acceptable at the repository. On September 29, 1988 members of the NRC staff and representatives from the State of Nevada and DOE met to have DOE present information on the waste processing activities at Savannah River. Enclosure 1 is a list of attendees.

Objective:

As stated above, the objective of the meeting was to provide an informational briefings to NRC and the State of Nevada, on plans for demonstrating the production of waste forms at the DWPF which meet disposal requirements at the repository. The emphasis of the meeting was not on substantive technical discussion but on presenting current information about future activities at the DWPF to facilitate NRC review of the DWPF Waste Acceptance Process Documents and related quality assurance documents. These documents include the Waste Acceptance Preliminary Specifications (WAPS), Waste Compliance Plan (WCP), Waste Qualification Report (WQR), and Quality Assurance Requirements Document (OGR/B-14).

The approach of the NRC was to make no formal presentation but rather to ask questions about the DOE presentations for the purpose of clarification, to raise concerns as needed, and to answer questions asked by the DOE to clarify those concerns.

DOE Presentation:

DOE made presentations addressing the following topics:

1) Defense Waste Processing Facility Status Update

The status of construction of the facility was reviewed. A facility overview was provided.

2) Status of the Waste Acceptance Preliminary Specifications

The development of the waste acceptance process and the Waste Acceptance Preliminary Specifications were reviewed. Reserved parts of specifications 1.2 and 1.3 were discussed.

3) Waste Acceptance Process Programs and Compliance Plans

The program for establishing acceptability of DWPF glass production was described. Acceptance criteria and compliance plans were discussed. Organizational responsibilities and acceptance reviews of compliance program documentation were presented.

4) QA Requirements and QA Programs

The specification for QA requirements for the high-level waste form was reviewed. The DP/DWPF QA Programs and their interrelationships were reviewed.

Copies of the DOE presentations are contained in Enclosure 2.

Agenda:

(See enclosed)

Meeting Observations:

NRC concerns presented at the opening of the meeting were:

- the need to obtain OCRWM milestones and schedules for the review of Waste Acceptance Process activities at the DWPF and WVDP;
- the need to exchange open items lists concerning previous Waste Acceptance Process interactions on October 12, 1988; and
- the need to determine a date for future meetings to discuss open item lists and agree on an approach and schedule for resolution of open items.

In addition, the following topics were discussed as a result of the information presented at the meeting:

- DOE representatives said that specifications require a high-quality glass. Specification tests are intended to be an index of durability of the glass product and are not intended to be representative of expected repository performance. NRC raised a concern about integration of the waste acceptance preliminary specifications and performance allocation of the waste form in the repository. DOE responded that consideration of the glass waste form had been made. NRC requested that DOE provide a description of the integration between waste producer specifications for the waste form and the performance allocation assigned to the waste form in the Site Characterization Plan (SCP). DOE will provide information on how the waste form performance allocation in the SCP factored in the characteristics of a glass waste form.
- Toward the end of the Waste Acceptance Process, the NRC staff would like to see a preliminary performance assessment for the waste package, including the waste form. This would be an integrated look at the performance of the entire waste package, using the most up-to-date tests and information including available site characterization data and taking into account the site specific anticipated processes and events.

- o OCRWM proposed a process and milestones for the NRC review of the Waste Acceptance Documents. The staff will provide feedback on the proposal within one month of receiving an integrated, OCRWM-approved process and schedule.
- o The schedule for quality assurance reviews presented by OCRWM was inconsistent with previous plans for NRC review coordinated between the staff and OCRWM. The staff will continue to follow the present schedule unless changes in priorities are formally requested by OCRWM.
- o The staff needs to evaluate OCRWM's plan for qualifying the DWPF and WVDP QA programs. QA qualification should include document review, and audits by OCRWM. In order for the NRC staff to have confidence that OCRWM is qualifying these programs, NRC involvement would at least consist of observation audits. OCRWM agreed to allow the staff to participate as observers.

Besides the observations discussed above there were several other items requiring actions by DOE:

- o OCRWM will provide by November 30, 1988 the schedule and method of documentation to describe the DWPF Process Control Program (PCP).
- o OCRWM will provide NRC with a statement and supporting documentation as to how, in developing the performance allocation, OCRWM considered anticipated performance characteristics of the DWPF glass in the repository environment.
- o OCRWM will request by letter NRC review of the revised WAPS and WCP within two weeks. At the meeting OCRWM requested that NRC initiate these reviews promptly.
- o Technical exchange meetings will be held every 2-3 months. The next meeting is tentatively scheduled for January 1989.

A representative from the State of Nevada was present at the meeting and invited to participate in all meeting sessions.

Acknowledgments:

The undersigned agree that this summary is a fair representation of the meeting. The signatures below do not necessarily indicate agreement with the comments or views expressed by other participants.

Joseph J. Holonich 09/30/88 Joseph J. Holonich, Sr. Project Manager, NRC

Edward P. Regnier 09/30/88 Edward Regnier, OCRWM

Donald C. Fulmer 09/30/88 Donald Fulmer, Deputy Project Manager, DWPF

Ken Chacey 09/30/88 Ken Chacey, DOE-Defense Programs

10:30 - 11:30 Presentation on Waste Compliance Plan (WCP) DP/SR

- a. Summary of Plan
- b. Organizational Responsibilities
- c. Proposed Approach for Review for WCP
- d. Proposed Approach for Review for WQR

11:30 - 12:30 Lunch

12:30 - 1:30 Discussion Period

1:30 - 2:00 Specification of QA Requirements for HLW Form Production (OGR/B-14) DOE

2:00 - 2:15 Break

2:15 - 3:00 Status of DP/DWPF's QA Program DOE

3:00 - 4:00 Discussion

4:00 - 4:30 Summary of Meeting

- NRC
- DOE
- State of Nevada
- Plans for future meeting

DAY 2

8:00 - 12:00 Preparation of Meeting Minutes DOE/NRC

12:00 - 1:00 Lunch

1:00 - 2:00 Final Sign-off of Meeting Minutes

DOE-NRC TECHNICAL EXCHANGE
DWPf

<u>NAME</u>	<u>ORGANIZATION</u>	<u>TELEPHONE</u>
John Bradbury	NRC/HLWM	301-492-0536
David Brooks	NRC/HLWM	301-492-3457
Dan Fehringer	NRC/HLWM	301-492-0426
Joe Holonich	NRC/HLWM	301-492-3403
John Linahan	NRC/HLWM	301-492-3387
Rob MacDougall	NRC/HLWM	301-492-3401
Tin Mo	NRC/HLWM	301-492-0541
Robert Neel	NRC/HLWM	301-492-0448
Charles H. Peterson	NRC/HLWM	301-492-0531
Wayne Walker	NRC/HLWM	301-492-0447
Ruth Weiner	CNWRA	703-979-9129
Rick Weller	NRC/HLWM	301-492-3458
J. R. Wolf	NRC/OGC	301-492-1641
Willis Bixby	DOE/WVPO	716-942-4312
Ken Chacey	DOE-HQ/DP-123	FTS-233-4970
Michael O. Cloninger	DOE/NV/YMP	FTS-544-7847
Martha Crosland	DOE/OGC	FTS-586-6947
Leah Dever	DOE/EP-323	FTS-896-6377
Don Fulmer	DOE/SR(DWPF)	FTS-239-2292
L. Ben Gannon	DOE-HQS/DP-122	FTS-233-5343
W. T. (Sonny) Goldston	DOE-SR/DWPF	FTS-239-5532
Tom Gutmann	DOE-HQS/RW-3	202-586-1703
H. Jackson Hale	DOE/OCRWM	202-586-9322
Joel Haugen	DOE/CH	FTS-972-2093
Bud Kehew	DOE/CH&RW	FTS-972-7818
W. Stephen Ketola	DOE/RL/HWVP	FTS-444-7134
P. E. LaMont	DOE-RL/HWVP	FTS-444-6117
Bill Pearson	DOE-SR/DWPF	FTS-239-1372
Ed Regnier	DOE/RW	FTS-586-6590
Doug Smith	DOE/RL	FTS-444-6314
Wallace A. Stringfield	DOE/RW	FTS-896-6028
Henry Walter	NE-24	301-353-5510
P. Spiegler	St.ofNV/NWPO	702-885-3744
Roger Aines	LLNL/YMP	FTS-543-7184
Joe W. Anderson	PDC	615-482-9004
Amy L. Applewhite	DuPont/SRL	803-725-5804
Steven M. Barnes	West Valley Nuclear Sv.	716-942-4480
Richard G. Baxter	DuPont/SRP/DWPF	FTS-237-1027
J. J. Buggy	West Valley Nuclear Sv.	716-942-4200
Enrico F. Conti	Scientech, Inc.	301-468-6425
Greg Duggan	BDM	301-353-0046
Angus Kimming	Weston/RE&C	FTS-646-6644
Jim Knight	DuPont/SRL	FTS-239-2596
Paul M. Krishna	Battelle	202-586-1330

Desi Lege
Jim L. Nelson
Jerry O'Leary
V. M. Overby
Lou Papouchado
E. A. Patzer
John Plodinec
Jim Pope
Ann Ratcliff
John K. Ralej
Steve Schaw
David L. Shugars

Weston/Jacobs
Westinghouse Hanford-HWVP
BDM/DP-123
LLNL
DuPont/SRP
Battelle/OWTD CH
DuPont/SRL
West Valley Nuclear Sv.
SAIC
ANL/NNWSI
Westinghouse Hanford
West Valley Nuclear Sv.

202-646-6748
FTS-444-1456
301-353-0044
FTS-543-2228
FTS-239-3320
312-655-8605
FTS-239-2170
716-942-4275
703-827-4950
FTS-972-4385
FTS-444-8365
716-942-4827

AGENDA
DOE/NRC Technical Exchange
Room 6E-069, Forrestal Building
Washington, DC
September 29-30, 1988

PURPOSE OF MEETING: This meeting will serve as an informational exchange. DOE wishes to brief the NRC staff on plans for demonstrating the production of waste forms which meet disposal requirements, from the Defense Waste Processing Facility at Savannah River and to receive preliminary NRC staff feedback on the adequacy of the compliance plans.

DAY 1

8:30 - 8:45

Welcome and Objectives

DOE

- a. Welcome
- b. Defense Waste Processing Facility (DWPF) Status
- c. NRC Feedback
 - Waste Acceptance Preliminary Specifications
 - Waste Compliance Plan

8:45 - 9:15

Defense Waste Processing Facility Status Update

DP/SR

- Presentation
- Background Update
 - Status of Defense Waste Processing Facility (Schedule of key activities)

9:15 - 9:45

Update on Waste Acceptance Preliminary Specifications

RW

- Presentation
- Background
 - WAPS for the DWPF HLW Form (OGR/B-8)
 - Resolution of Reserved Items

9:45 - 10:15

Discussion

10:15 - 10:30

Break

CONSTRUCTION STATUS

AUGUST 1988

SAFETY:	9,500,000	EXPOSURE HOURS
	1,360	DAYS

STAFFING:	1,280
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CONSTRUCTION:	85 %	OVERALL
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- CONCRETE > 99 %
- PIPING ERECTED 96 %
- JUMPERS MADE 86 % (OF 821)

FACILITY SEGMENTS TURNED OVER-466 OF 737	63 %
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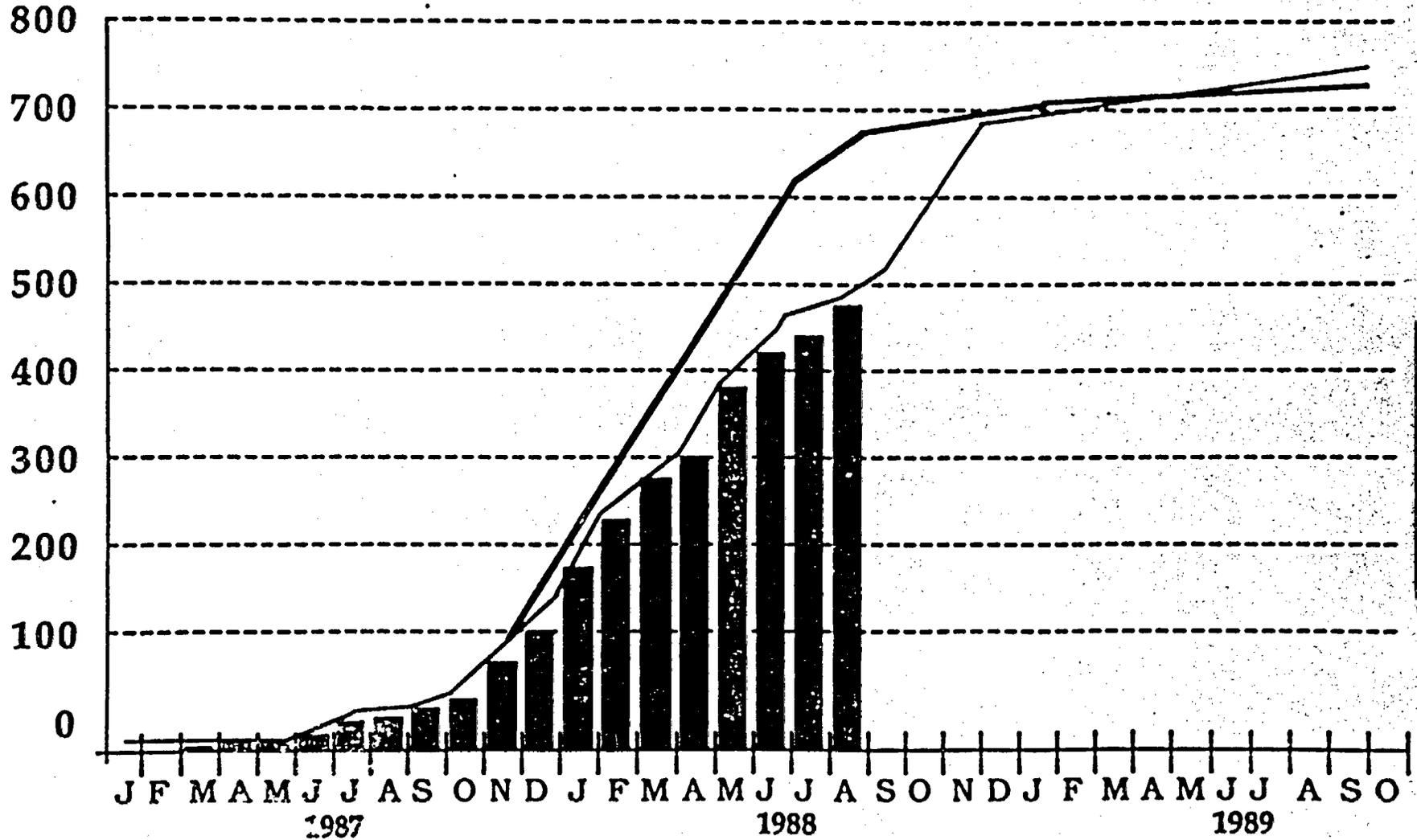
FACILITIES TURNED OVER

AUGUST 1988

	<u>PERCENT COMMISSIONED</u>
• SALTSTONE FACILITY (Z-AREA)	ESSENTIALLY COMPLETE
• ELECTRICAL, FIRE ALARMS, COMMUNICATIONS	88
• SAND FILTER and FAN HOUSE	55
• WATER and CHEMICAL WASTE TREATMENT	53
• COLD FEED PREPARATION	36
• PUMP PITS and INTERAREA TRANSFER LINES	30

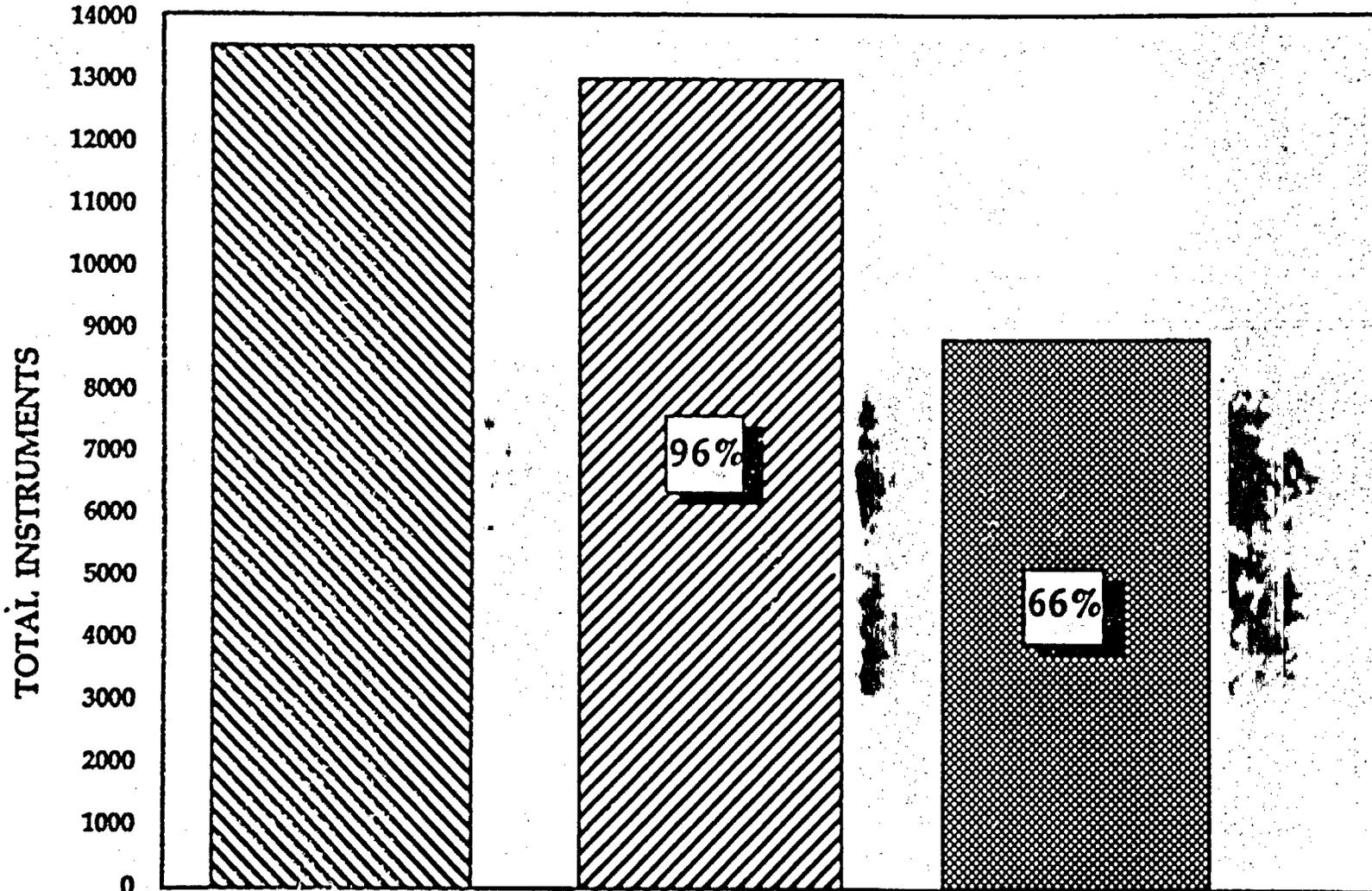
DWPF FACILITY SEGMENT TURNOVER SCHEDULE

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12/37 SCHEDULE
 CURRENT FORECAST
 ACTUAL TURNOVERS

**SAVANNAH RIVER CONSTRUCTION PROJECT DWPF
S-AREA INSTRUMENTS
AUGUST 1988**

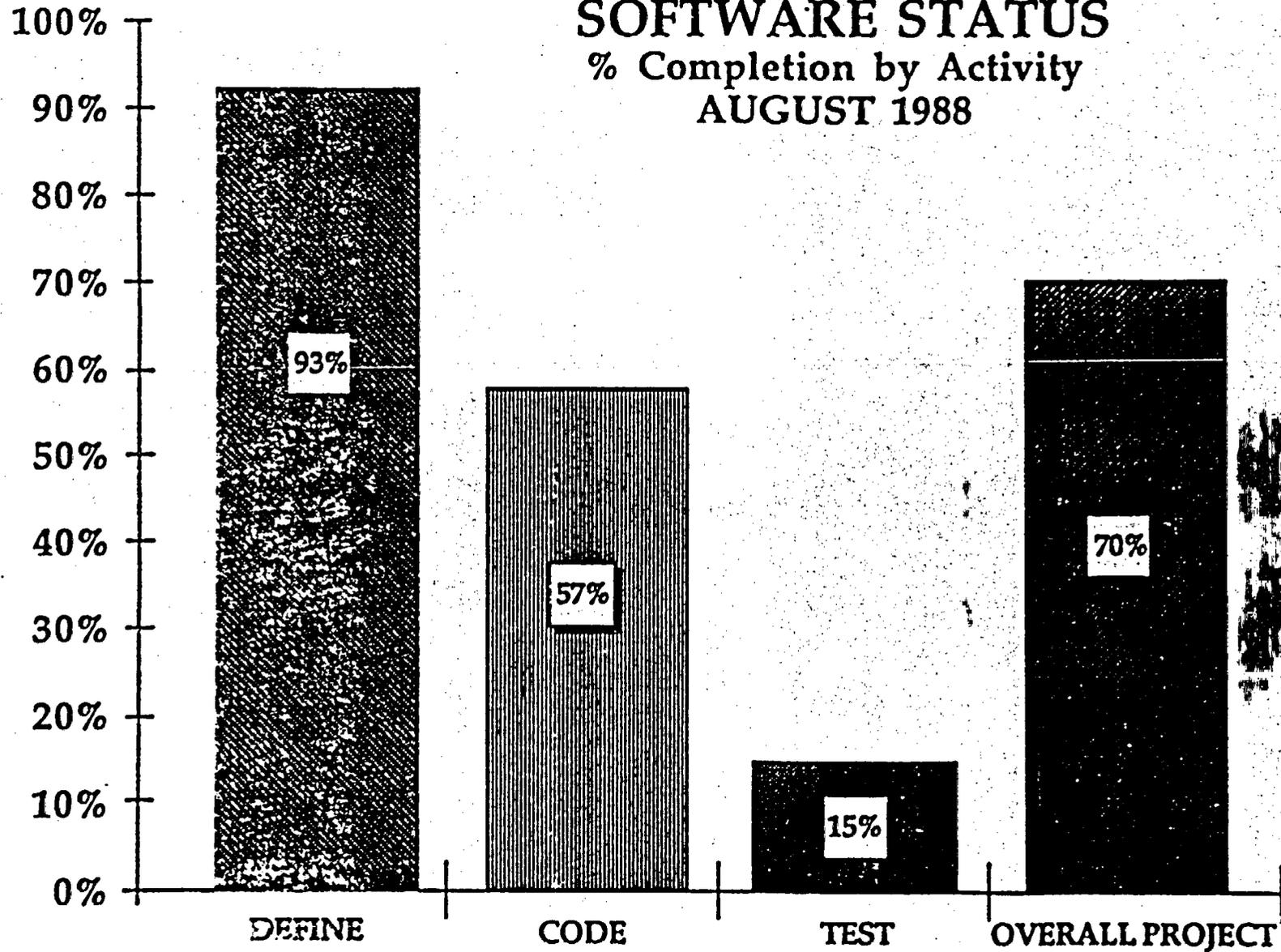


TOTAL NO. INSTRUMENTS	13461
TOTAL RECEIVED	12916
TOTAL INSTALLED	8851

	TOTAL NO. INSTRUMENTS
	TOTAL RECEIVED
	TOTAL INSTALLED

DISTRIBUTED CONTROL SYSTEM SOFTWARE STATUS

% Completion by Activity
AUGUST 1988



CONSTRUCTION PLANNED ACTIVITIES NEXT THREE MONTHS

- COMPLETE SAND FILTER and FAN HOUSE SEPT 1988
- COMPLETE BULK FRIT STORAGE FACILITY SEPT 1988
- COMPLETE VITRIFICATION BUILDING DEC 1988
- COMPLETE GLASS WASTE STORAGE BUILDING DEC 1988
- COMPLETE NORTH SERVICE BUILDING DEC 1988

SUMMARY VITRIFICATION FACILITY SCHEDULE

STATUS SEPT 1988

ACTIVITY DESCRIPTION	FY 1987				FY 1988				FY 1989				FY 1990			
	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
	CY1987				CY1988				CY1989				CY1990			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
CONSTRUCT ROOF SLAB	▲															
SAND FILTER	▲															
PREPARE CELLS FOR EQUIPMENT	▲															
MELTER INSTALLATION			▲													
MOCKUP EQUIPMENT	▲															
INSTALL EQUIPMENT AND JUMPERS					▲											
MECHANICAL COMPLETE-SLUDGE																
SALT PROCESS CELL					▲											
FINAL SITE WORK & FAILED EQUIPMENT STORAGE									▲							
DISTRIBUTIVE CONTROL SYSTEM-MANUAL CONTROL					▲											
DISTRIBUTIVE CONTROL SYSTEM-ENHANCEMENTS											▲					
COLD RUNS - OPERATIONS													▲			
HOT STARTUP																▲

LEGEND

FORCAST Hatched box

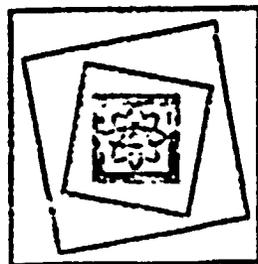
ACTUAL Solid black box

COMPLETE Triangle

DWPF

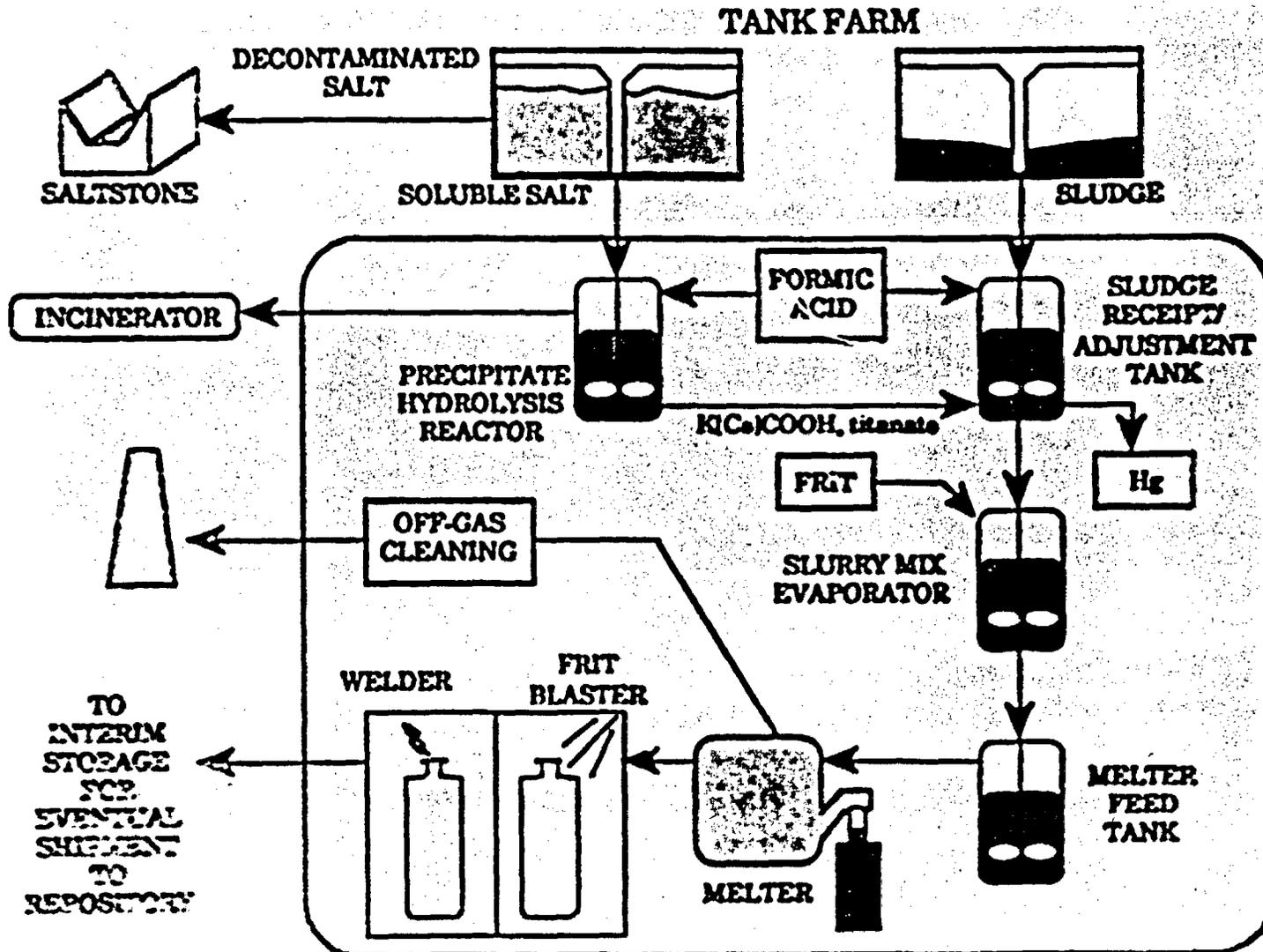
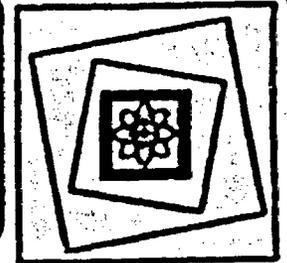
Waste Acceptance Process

Programs



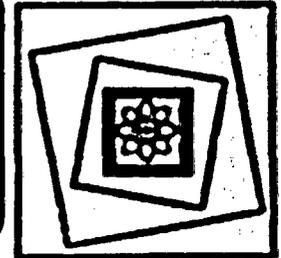
M. J. Plodinec
September, 1988

Immobilization of SRP High-Level Waste



DWPF Waste Acceptance Programs

Objective



PUBLIC / INSTITUTIONAL ACCEPTANCE OF DWPF GLASS

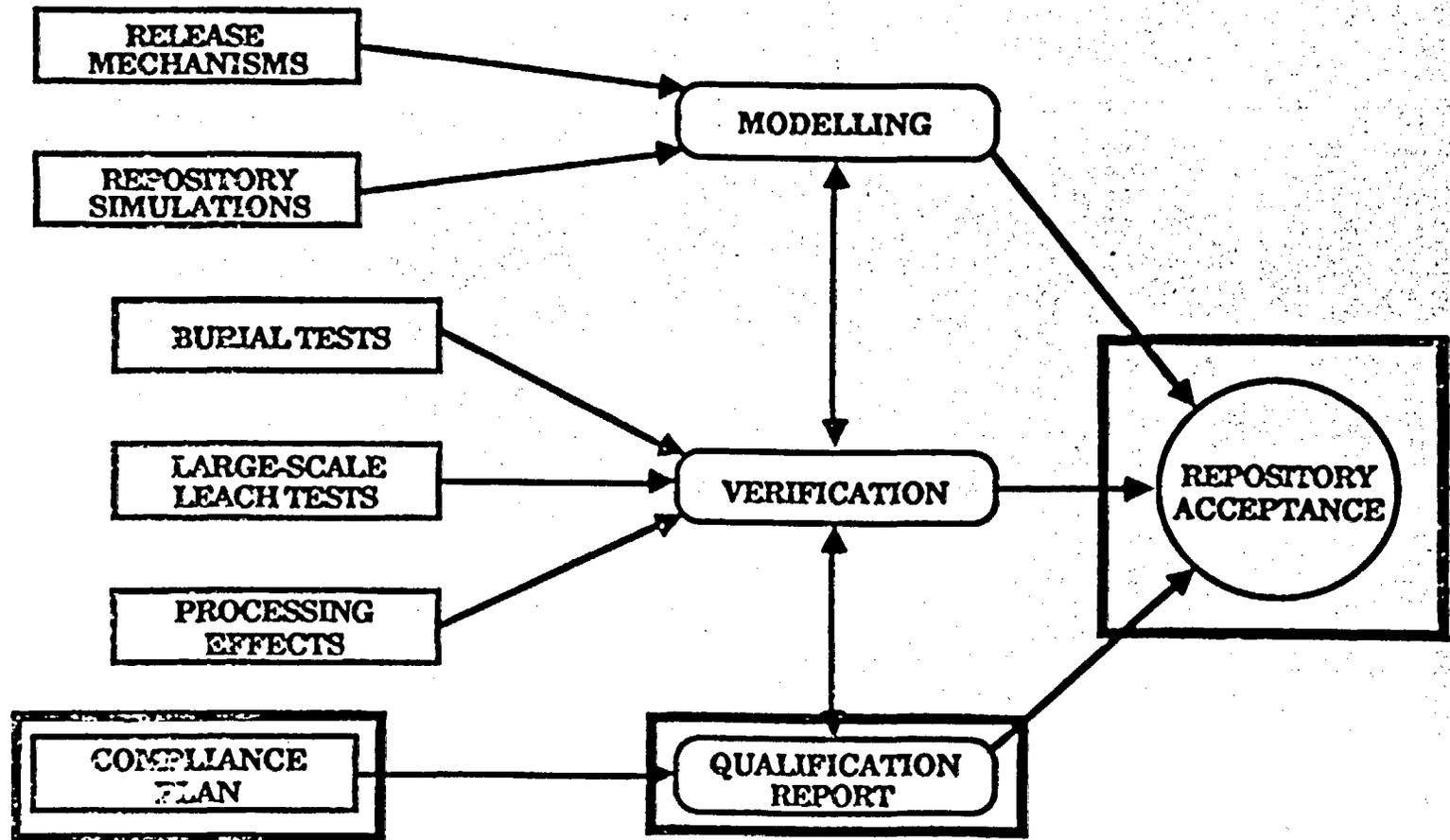
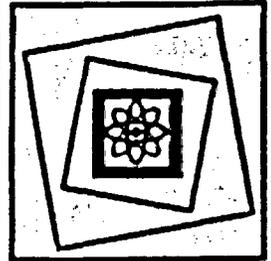
PUBLIC ACCEPTANCE:

- DWPF glass is safe
- DWPF glass is environmentally acceptable

INSTITUTIONAL ACCEPTANCE:

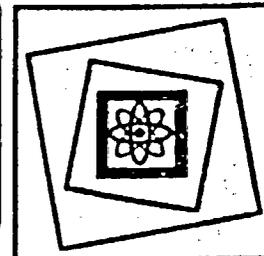
- Glass can meet specifications
- DWPF has met specifications during production

DWPF Waste Acceptance Programs



Waste Acceptance Process:

DWPF View



DOE - OCRWM

SPECIFICATIONS

ASSURE COMPATIBILITY
WITH REPOSITORY



DWPF

**WASTE FORM
COMPLIANCE PLAN**

- HOW WILL WE DEMONSTRATE COMPLIANCE?

**WASTE FORM
QUALIFICATION
REPORT**

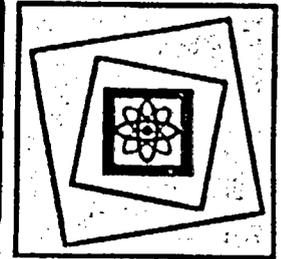
- CAN WE COMPLY, IN DWPF?

**PRODUCTION
RECORDS**

- HAVE WE COMPLIED, IN DWPF?

Waste Form Compliance Plan for DWPF:

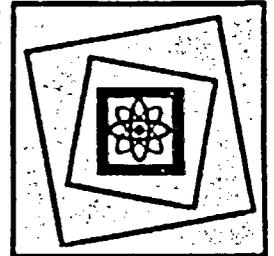
Background



- Glass selected as waste form for DWPF - 1982
 - Glass processing is well-known and safe
 - Glass is stable to radiation
 - Glass is durable, and rugged
- DOE set up Waste Acceptance Process to ensure glass acceptability -1985
- First QA discussions with RW - 9/86
- WCP completed - 6/87; latest revision - 7/88
- QA Program Description for qualification activities - 9/88
- Implementation underway

Waste Form Compliance Plan for DWPF:

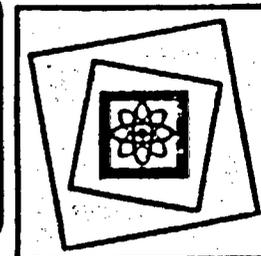
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Waste Form Compliance Plan for DWPF:

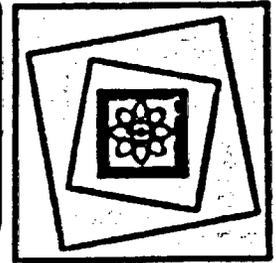
Approach



- Overall strategy for compliance is to assure product quality by:
 - Component specifications
 - Process controls
 - Outlined in Waste Form Compliance Plan
- Emphasizing tests at SRL and Integrated Cold Runs
- Limiting activities in DWPF to only those essential for waste acceptance (after start of radioactive operations)
- Role of Integrated Cold Runs:
 - Qualify technology developed before WAP set up
 - Demonstrate strategies for control of product quality

Waste Form Compliance Plan:

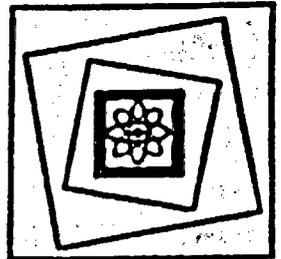
— Glass Specifications



- Chemical composition:
 - Projections
 - During production
- Radionuclide inventory:
 - Projections
 - During production
- Radionuclide release properties:
 - Control
 - Verification of control
- Chemical and phase stability
 - Glass transition temperatures
 - T-T-T diagrams

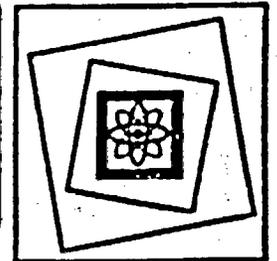
Glass Specifications:

— Control and Verification of Radionuclide Release Properties



- Control product so that the glass will release $< 1 \text{ g/m}^2\text{-d}$ on MCC-1 leach test
 - Verify, during production, that at least 95 % of the product is acceptable, to the 95 % confidence level

Control and Verification of Radionuclide Release Properties — Strategy



DOE - OCRWM

SPECIFICATIONS

CONTROL PRODUCT TO
MEET LIMIT

VERIFY CONTROL DURING
PRODUCTION



DWPF

**SRL
LABORATORY TESTS**

- QUALIFY RANGE OF GLASS
COMPOSITIONS

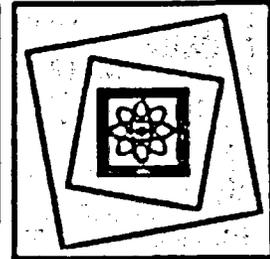
**INTEGRATED
COLD RUNS**

- DEMONSTRATE CONTROL OF
PRODUCT QUALITY

PRODUCTION

- VERIFY PRODUCT
ACCEPTABILITY

Anticipated Range of DWPF Glass Compositions

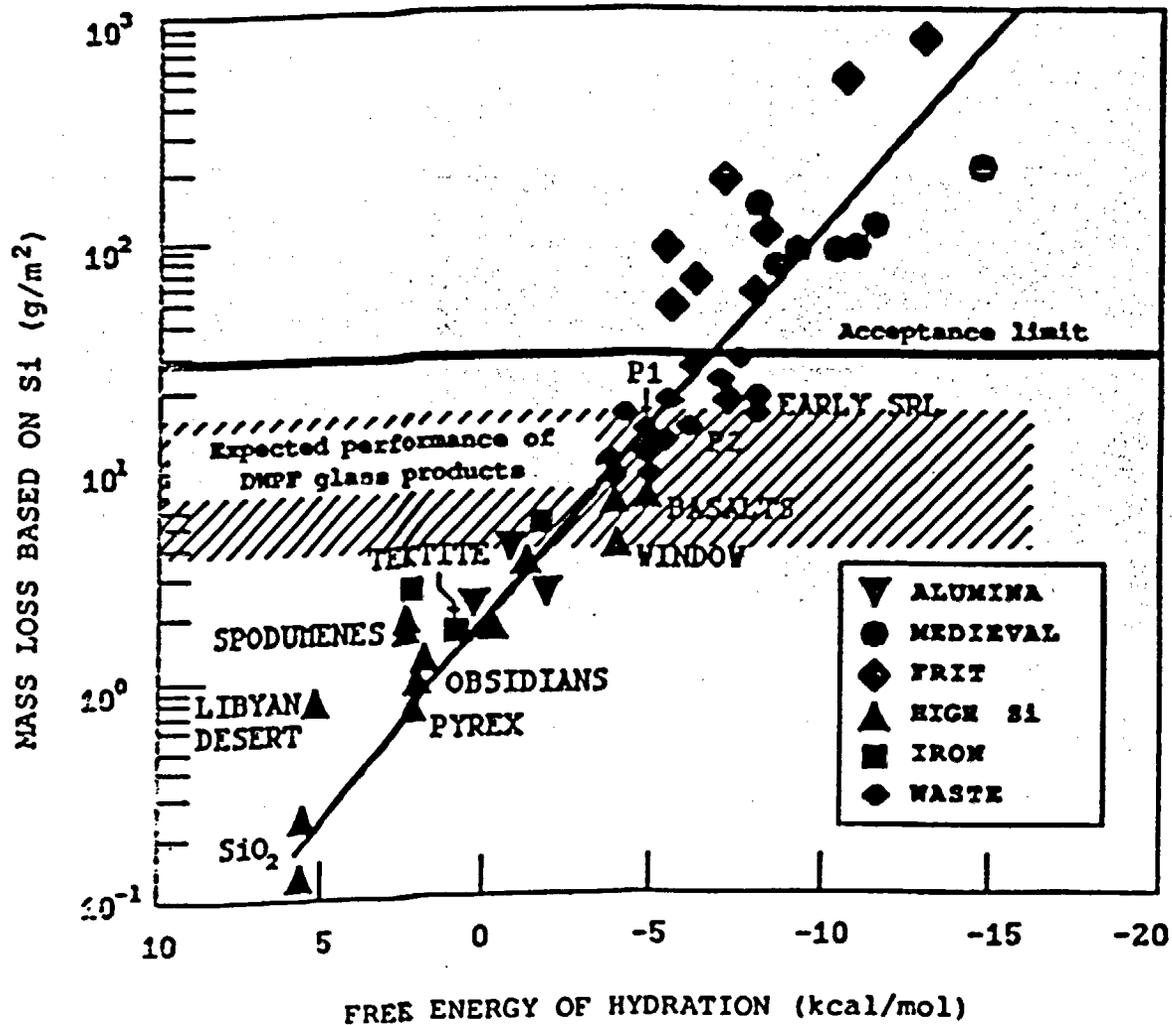
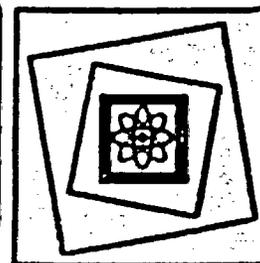


- Currently, seven glasses projected
- Included are blends for first 10 years of operation, an overall blend, extremes based on possible nuclear materials production flowsheets, and a worst case
- Major components' variations:

SiO ₂	44.5 - 54.4 %
Na ₂ O	8.2 - 12.1
Fe ₂ O ₃	7.1 - 12.3
B ₂ O ₃	6.9 - 10.2

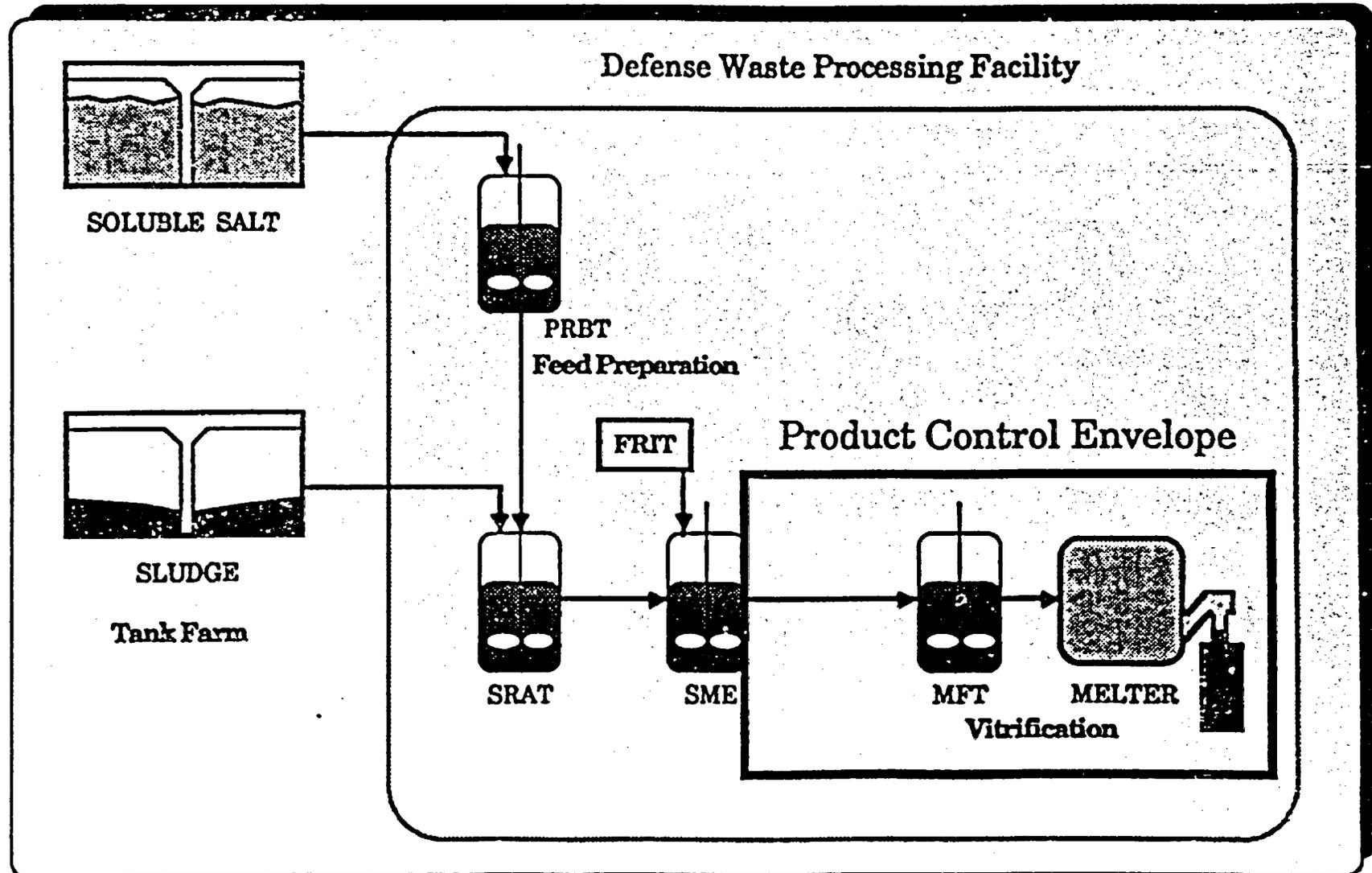
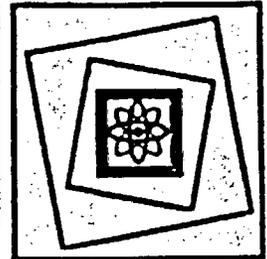
Expected Performance of DWPF Glasses

— MCC-1 Tests



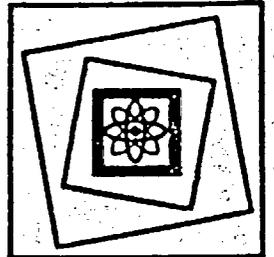
Control of Radionuclide Release Properties

— Product Control



Control of Radionuclide Release Properties

— Glass Composition Control



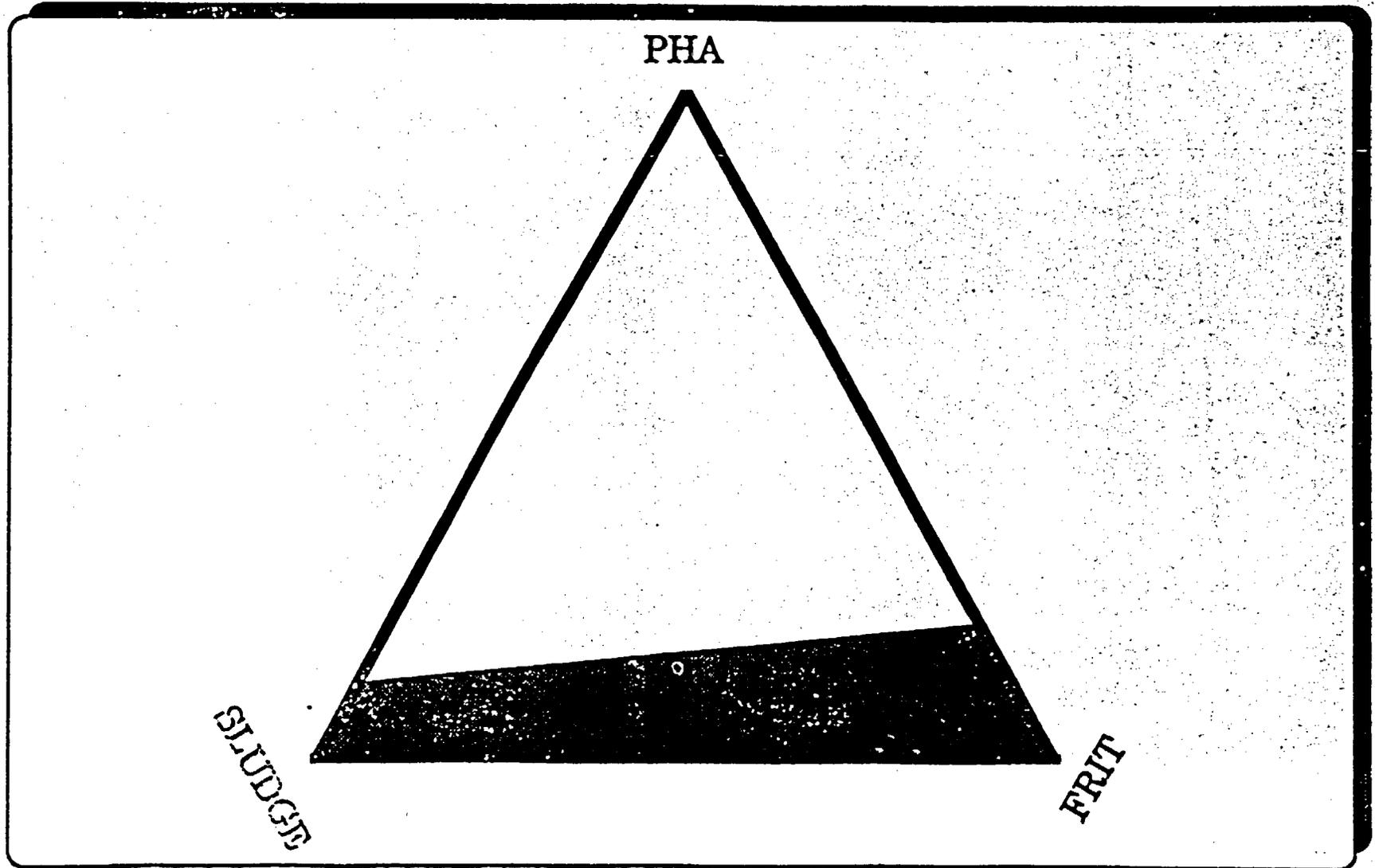
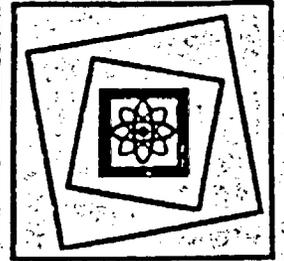
- Before processing of a "macrobatch":
 - Based on waste composition, specify frit and waste blending targets to produce acceptable product
 - Demonstrate acceptable product (pre-qualify)

- In DWPF:
 - Determine feed composition in SME
 - If necessary, adjust with frit, waste, or cold chemicals
 - Verify adjusted composition
 - Feed will not be transferred to melter feed tank until it will make acceptable glass, and is processible

- Will demonstrate during Integrated Cold Runs

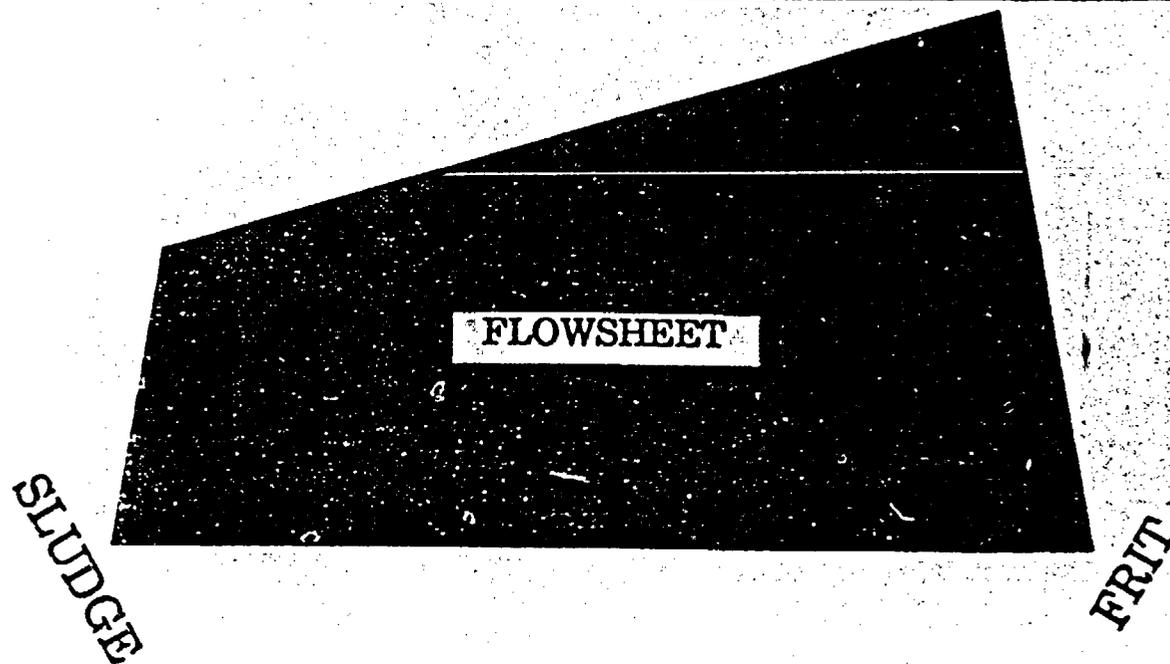
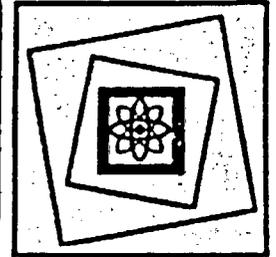
Control of Radionuclide Release Properties

— Acceptable Product



Control of Radionuclide Release Properties

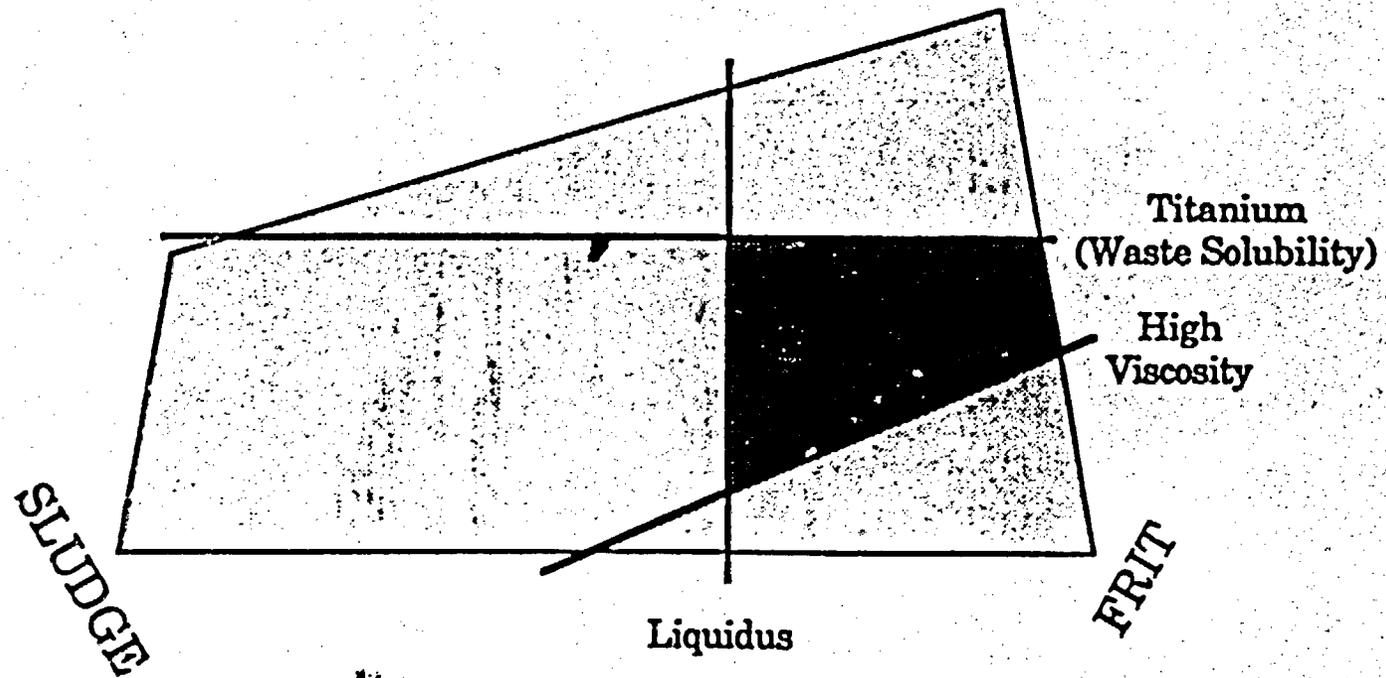
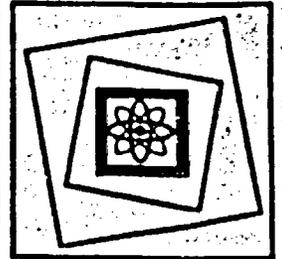
— Range of Acceptable Products



- PHA: From none to 2.3X flowsheet levels (0 - 18%)
- FRIT: From none to 100%
- SLUDGE: From none to 3.6X flowsheet levels (0 - 100%)

Control of Radionuclide Release Properties

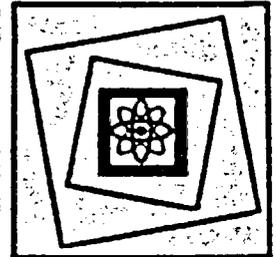
— Addition of Processing Constraints



- Processing constraints are more limiting than product specifications

Control of Radionuclide Release Properties

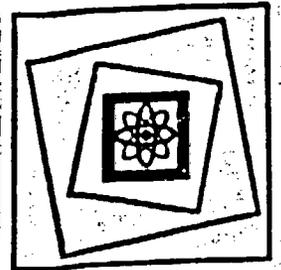
— Integrated Cold Runs



- The DWPF is preparing detailed Cold Run plans to demonstrate that the strategy works
- If feed is acceptable, then must show that it comes out of the system as an acceptable product - a flow problem
- Therefore, key variable during Cold Runs is viscosity
- Will use results from Cold Runs 2 — 5 to verify ability to control product quality over a range of viscosities:
 - Run 2 - verify for small changes (e.g. Batch 1 → 2)
 - Run 3 - low viscosity
 - Run 4 - high viscosity
 - Run 5 - return to baseline

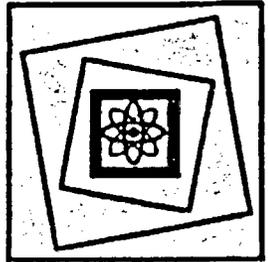
Control of Radionuclide Release Properties

— Activities During Each Cold Run



- Control product as described
- Sample Melter Feed Tank, and analyze
- Predict glass composition
- Sample glass entering canister, using sampler
- Analyze glass, and compare to prediction (update predictive algorithm, if necessary)
- Compare glass samples to canister contents

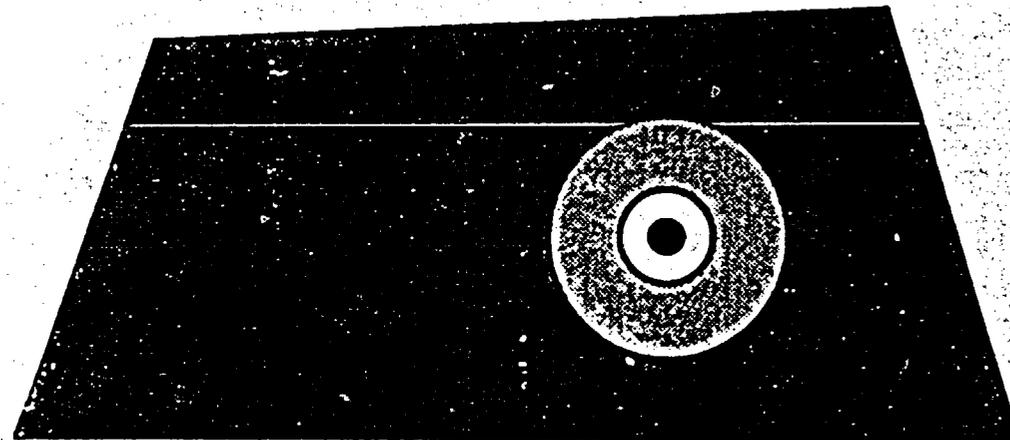
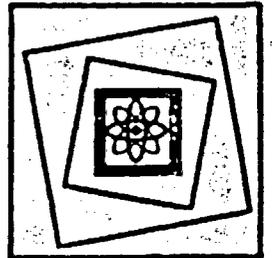
Verification of Radionuclide Release Properties — Strategy



- Samples from Melter Feed Tank are primary basis for verification of control and reporting
- Based on standard deviation of determination of product from Cold Runs, will determine amount of glass sampling necessary to achieve 95% confidence that 95% of product acceptable
- For each "macrobatch," will take at least one glass sample
 - Confirm composition
 - Product Consistency Test

Verification of Radionuclide Release Properties

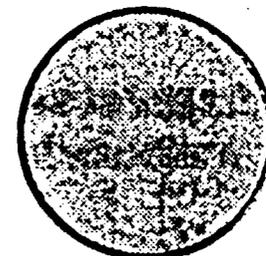
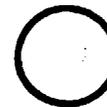
— Glass Sampling Frequency



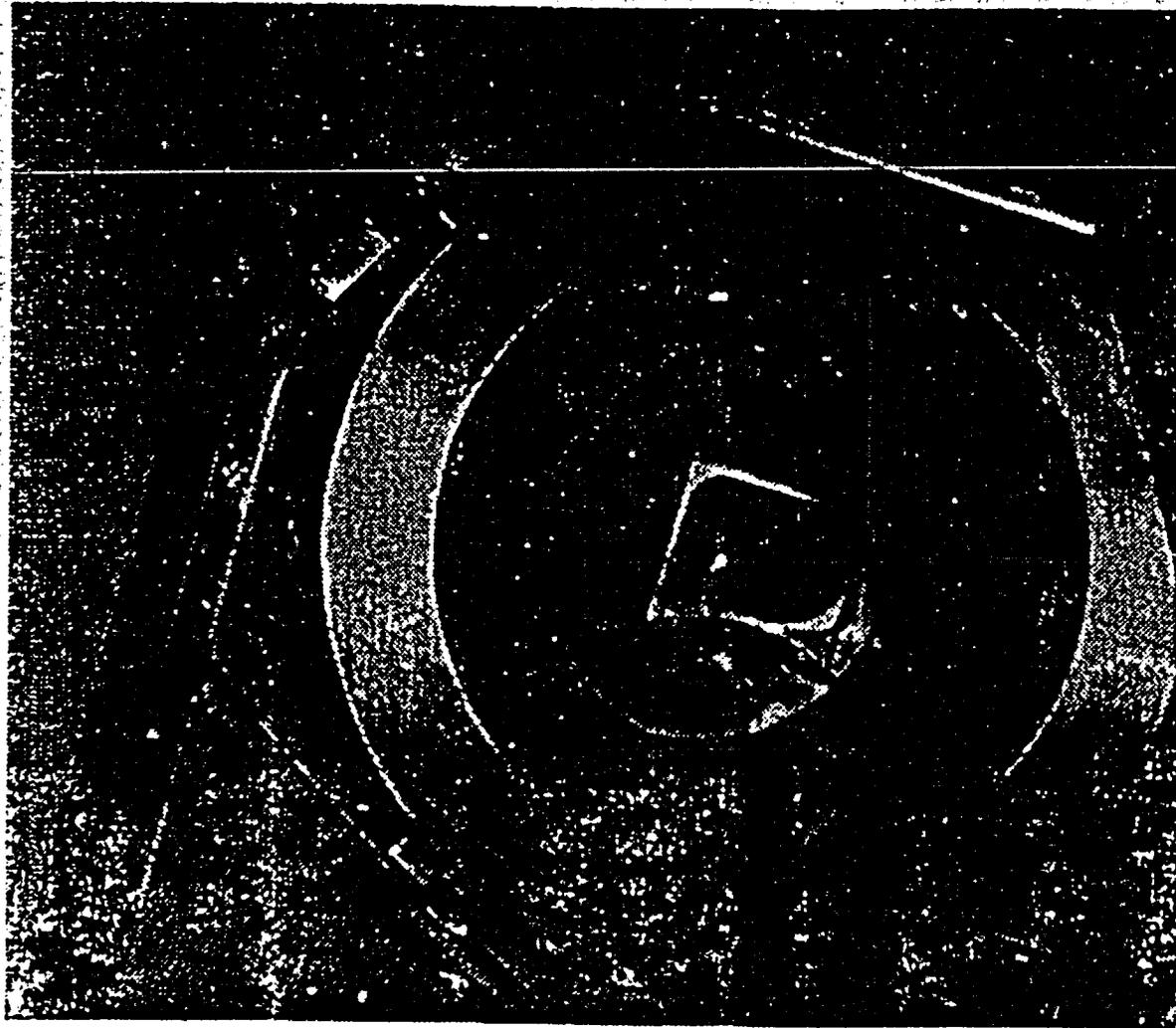
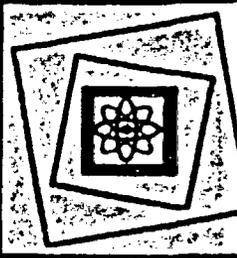
Predicted composition ●

Error due to sampling and analysis ○

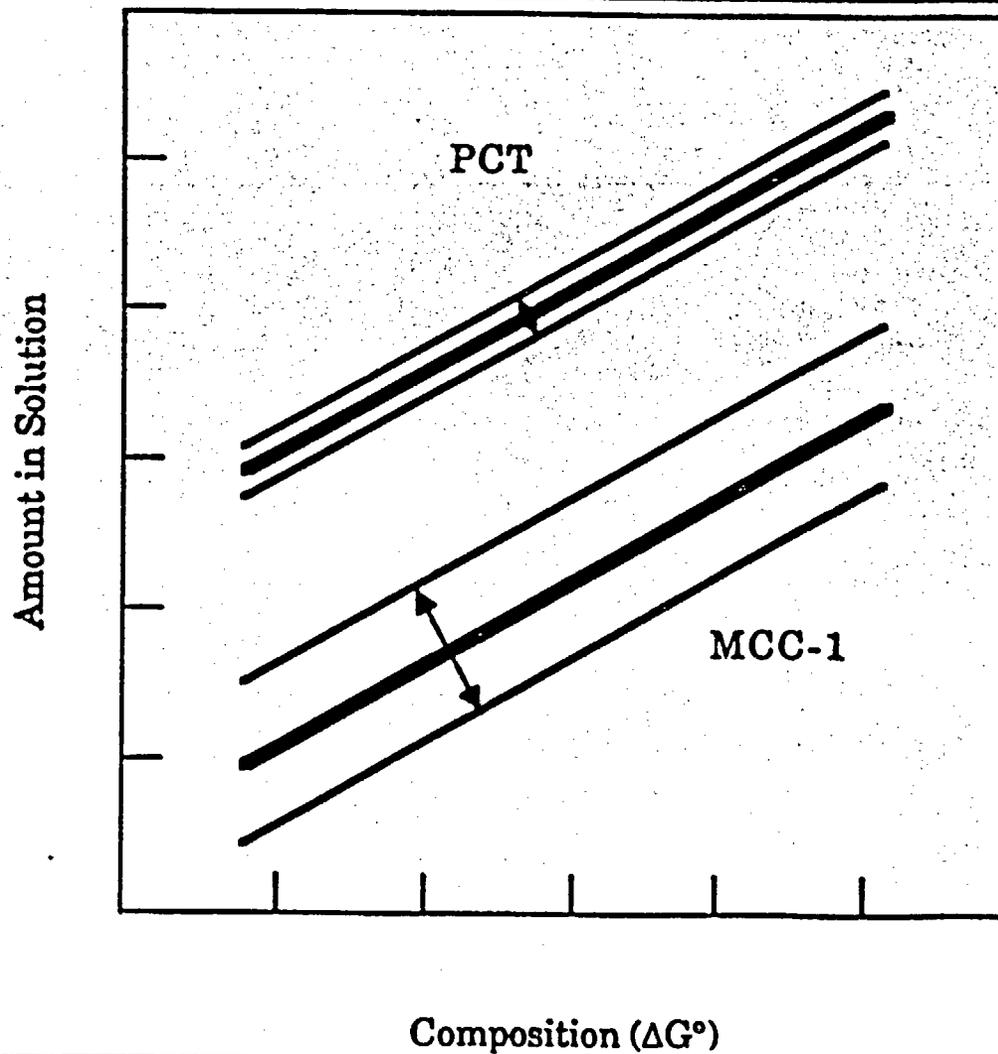
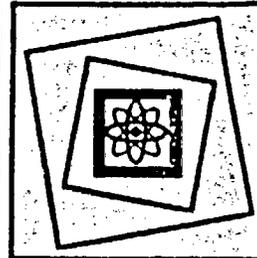
Above + uncertainty in predictive algorithm
(To be determined during Cold Runs)



Verification of Radionuclide Release
Properties
— Glass Sampler

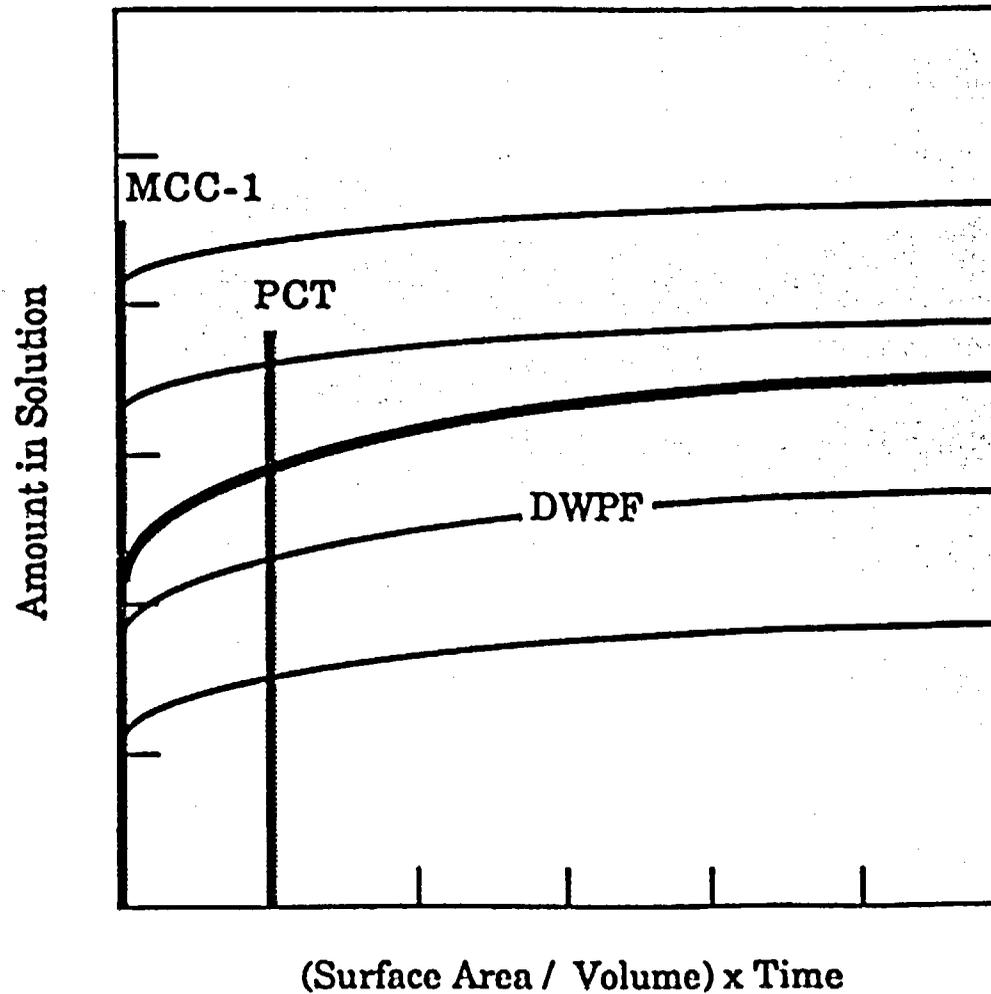
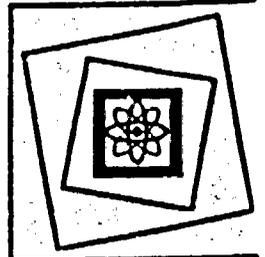


Control and Verification of Radionuclide Release Properties — PCT vs. MCC-1 Tests

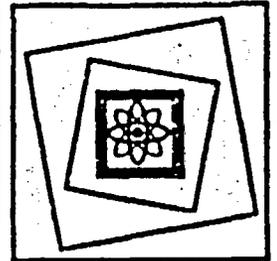


Control and Verification of Radionuclide Release Properties

— PCT vs. MCC-1 Tests



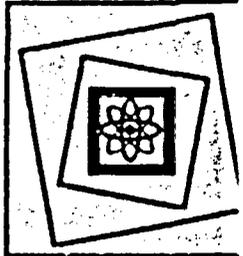
Control and Verification of Radionuclide
 Release Properties
 — PCT, MCC-1, and Tuff Repository



	<u>PCT</u>	<u>MCC-1</u>	<u>Tuff Repository*</u>
Specimen	Crushed glass	Monolith	Fractured glass
Surface	Fracture	Cut	Fracture
Leachant	DIW	DIW	J-13
Time (d)	7	28	365
Normalized time (SA/V)·t	14,000	280	> 16,000

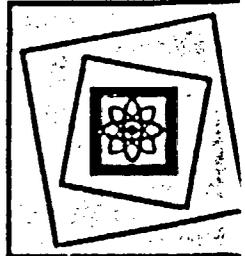
*Assumed conditions: breached DWPF canister with filled head space; leaching on an annual basis; flow rate < 110 L/canister-yr, all going through breached head.

Waste Form Compliance Plan: — Canistered Waste Form Specifications



- Prevention of extraneous materials
 - Free liquids and gases
 - Explosives, pyrophorics, combustibles, organics
- Free volume not more than 20 % of canister volume
- Decontamination of external surfaces
- Heat generation rate; dose rate:
 - Projections
 - During production
- Chemical compatibility
- Subcriticality
- Weight, length, diameter, overall dimensions, handling features
- Drop test

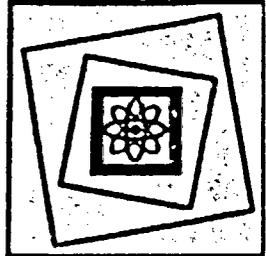
Waste Form Compliance Plan: — Canistered Waste Form Specifications



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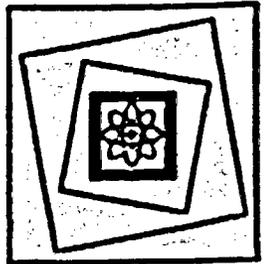
Quality Assurance Specification

— Requirements



- Developed by working group made up of repositories and waste form producers, based on NQA-1
- Activities covered
 - For SRL, Waste Form Compliance Plan is "sieve"
 - Examples:
 - DWPF sampling
 - Canister closure
 - Smearing / decon
 - Glass sampling
- Supplemental requirements, e.g.
 - Control of essential software
 - Control and documentation of experiments
 - Use of historic data
 - Process control
 - Modification control

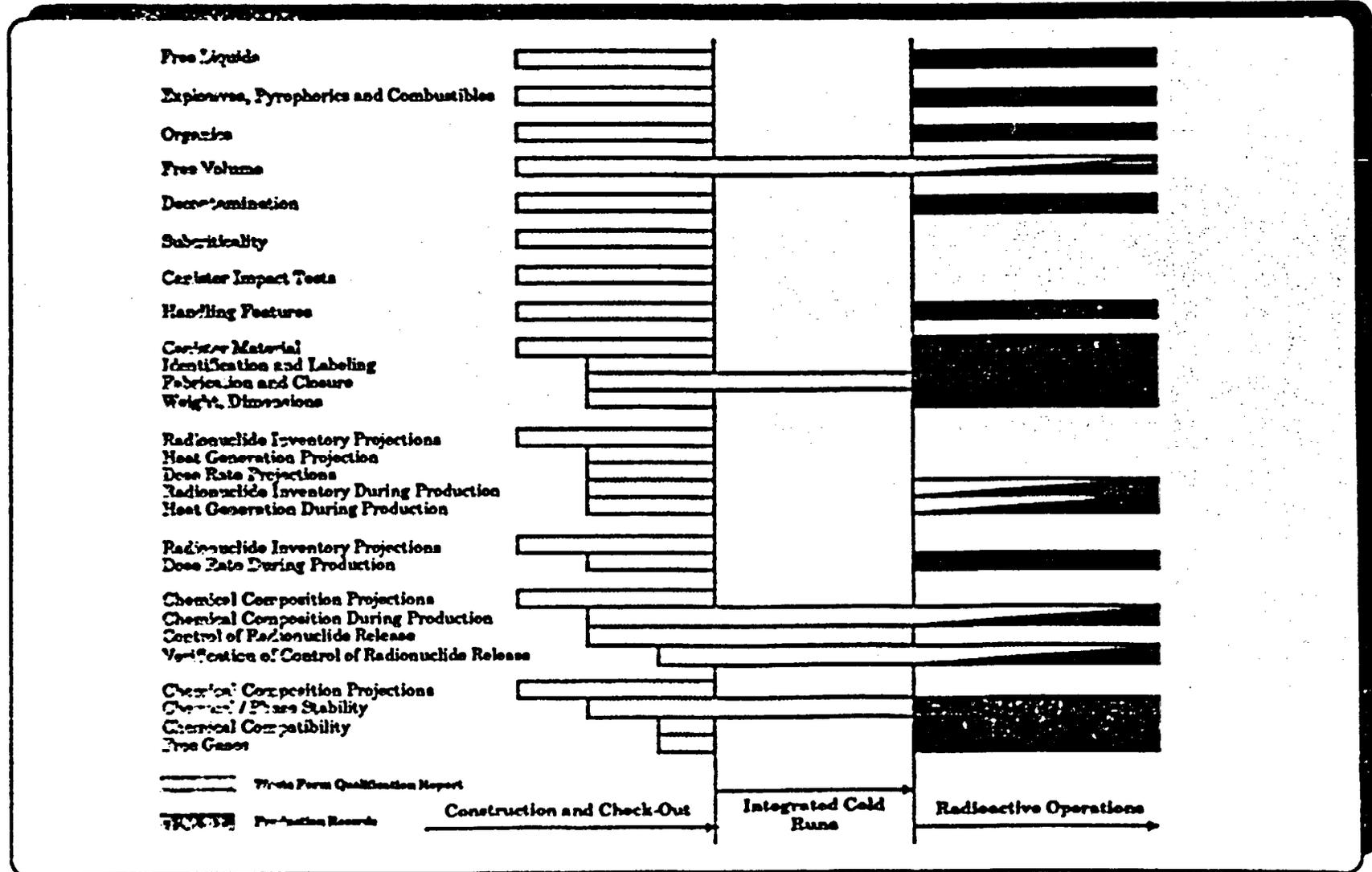
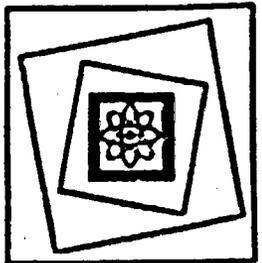
Quality Assurance Specification



- DWPF must have valid QA program, which meets repository licensing needs
- Compliance Strategy
 - Have worked with repository projects to develop requirements
 - Now beginning program implementation

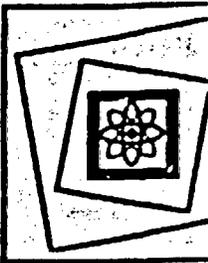
Waste Acceptance Preliminary Specifications

Compliance



Integrated Cold Runs:

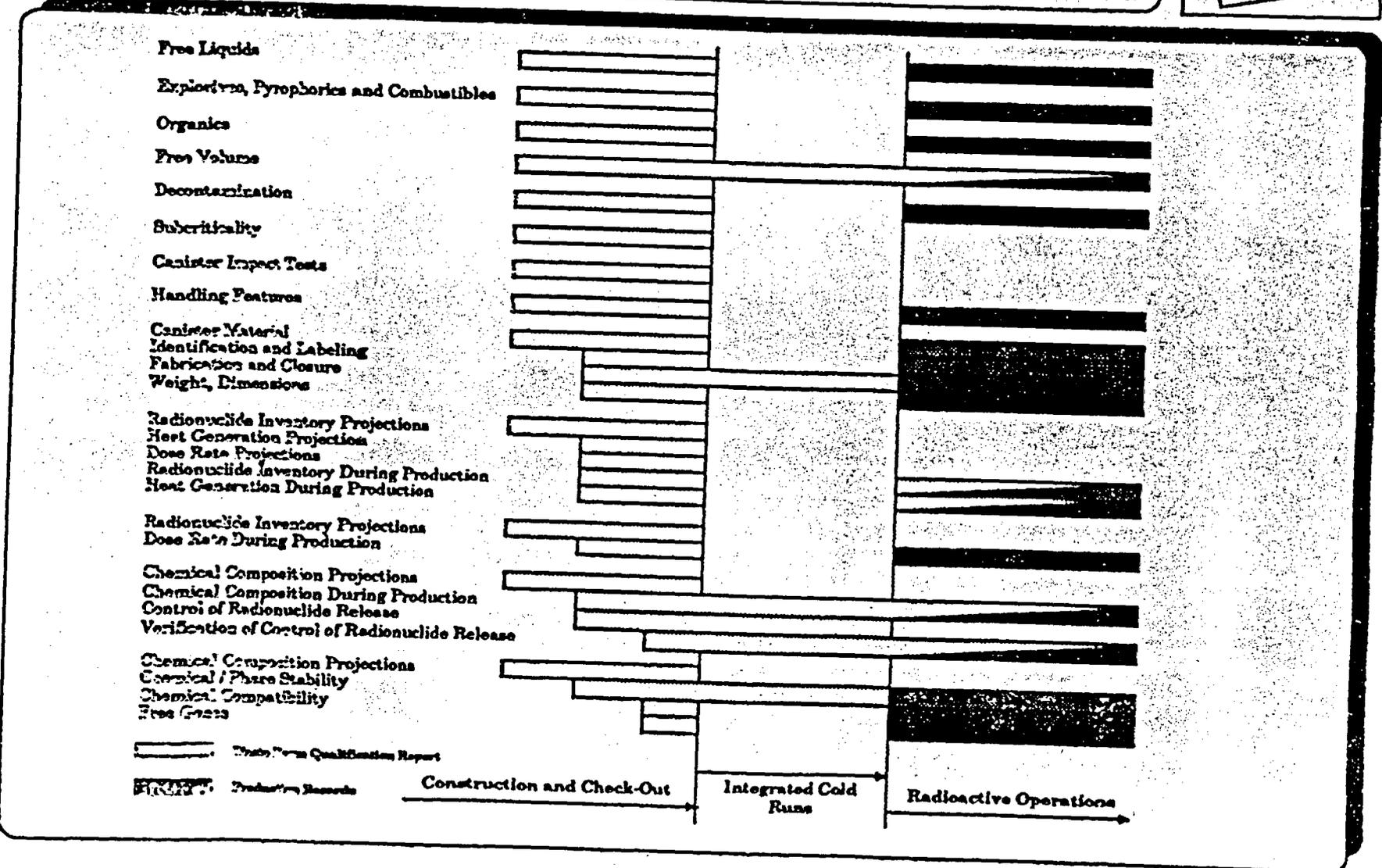
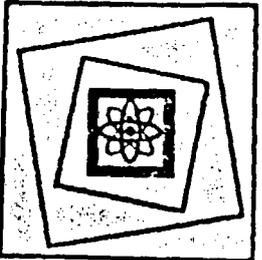
Acceptance Activities



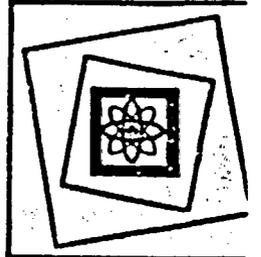
- Demonstrate ability to sample and analyze melter feed
- Determine precision and accuracy of glass composition analyses
- Verify strategy to control product quality
- Demonstrate use of glass sampler
- Demonstrate ability to verify control of product quality
- Determine relationship between glass sample and canister contents
- Demonstrate weld and ICC leaktightness
- Demonstrate ability to determine glass level in canister
- Determine glass temperatures during filling and cooldown

Waste Acceptance Preliminary Specifications

Compliance



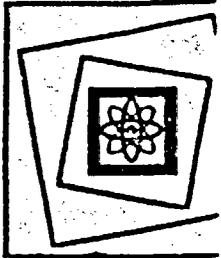
DWPF — NRC Technical Exchanges



- Have met three times in recent past
 - 7/86: Comments on Waste Acceptance Process & WAPS
 - 12/86: Primary focus - process control
 - Agreement on glass sampling
 - Agreement that DWPF process control program contained all essential elements
 - Agreement on later discussions of WCP, QA
 - Agreement to transmit DWPF bibliography
 - 4/87: Leaching mechanisms

- DWPF is planning for a very active review and technical exchange program with RW and the NRC

Conclusion



- Construction of the DWPF is almost complete; ensuring product quality is an important part of production planning
- We are confident DWPF will meet repository's product specifications
 - We have demonstrated that the entire range of glass compositions we might make are acceptable (including actual waste glasses)
 - We have a simple strategy for meeting specifications
- Plans have been developed to qualify technology and demonstrate that we can control product quality
- Implementation of those plans underway
- Planning a system to ensure timely reviews, and technical exchanges

WASTE ACCEPTANCE PROCESS

PRESENTED BY

ED BENZ

DOE AND NRC INTERACTIONS ON THE WASTE ACCEPTANCE PROCESS

JULY 31, 1986:

**DOE WASTE ACCEPTANCE PROCESS AND
WASTE ACCEPTANCE PRELIMINARY
SPECIFICATIONS**

DECEMBER 9, 1986:

**DWPF TECHNICAL EXCHANGE WITH
THE NRC**

FEBRUARY 18, 1987:

**WVDP TECHNICAL EXCHANGE WITH
THE NRC**

APRIL 22, 1987:

**DWPF TECHNICAL EXCHANGE WITH
THE NRC**

FEBRUARY 2, 1988:

**WVDP TECHNICAL EXCHANGE WITH
THE NRC**

SEPTEMBER 29, 1988:

**DWPF TECHNICAL EXCHANGE WITH
THE NRC**

**WASTE ACCEPTANCE
PRELIMINARY SPECIFICATIONS**
for the
**Defense Waste Processing Facility
High-Level Waste Form**

1. WASTE FORM SPECIFICATIONS

1.1 CHEMICAL SPECIFICATION

1.2 RADIONUCLIDE INVENTORY SPECIFICATION

1.3 SPECIFICATION FOR RADIONUCLIDE RELEASE PROPERTIES

1.4 SPECIFICATION FOR CHEMICAL AND PHASE STABILITY

2. CANISTER SPECIFICATIONS

2.1 MATERIAL SPECIFICATION

2.2 FABRICATION AND CLOSURE SPECIFICATION

2.3 IDENTIFICATION AND LABELING SPECIFICATIONS

3. CANISTERED WASTE FORM SPECIFICATIONS

3.1 FREE-LIQUID SPECIFICATION

3.2 GAS SPECIFICATION

3.3 SPECIFICATION FOR EXPLOSIVENESS, PYROPHORICITY, AND COMBUSTIBILITY

3.4 ORGANIC MATERIALS SPECIFICATION

3.5 FREE-VOLUME SPECIFICATION

3.6 SPECIFICATION FOR REMOVABLE RADIOACTIVE CONTAMINATION ON EXTERNAL SURFACES

3. CANISTERED WASTE FORM SPECIFICATIONS (CONT'D)

3.7 HEAT GENERATION SPECIFICATION

3.8 SPECIFICATION FOR MAXIMUM DOSE RATES

3.9 CHEMICAL COMPATIBILITY SPECIFICATION

**3.10 SPECIFICATION FOR WEIGHT, LENGTH, DIAMETER, AND
OVERALL DIMENSIONS**

3.12 DROP TEST SPECIFICATION

3.13 HANDLING FEATURES SPECIFICATION

4. QUALITY ASSURANCE SPECIFICATION

1.2 RADIONUCLIDE INVENTORY SPECIFICATION

FOR ALL RADIONUCLIDE INVENTORY ESTIMATES REQUIRED BY THIS SPECIFICATION, THE PRODUCER SHALL REPORT ALL RADIOISOTOPES THAT HAVE HALF-LIVES LONGER THAN 10 YEARS AND ARE PRESENT IN CONCENTRATIONS GREATER THAN 0.05 PERCENT OF THE TOTAL RADIOACTIVE INVENTORY IN CURIES (IN THE AGGREGATE OR IN THE CANISTERED WASTE FORM, AS APPLICABLE) AT ANY TIME UP TO 1100 YEARS AFTER PRODUCTION

1.3 SPECIFICATION FOR RADIONUCLIDE RELEASE PROPERTIES

THE PRODUCER SHALL CONTROL THE RADIONUCLIDE RELEASE PROPERTIES OF THE WASTE FORM PRODUCTION TO SATISFY THE REQUIREMENTS OF SPECIFICATION 1.3.1 AND 1.3.2, OR SPECIFICATION 1.3.3. THE PRODUCER SHALL DESCRIBE THE INTENDED METHOD FOR DEMONSTRATING COMPLIANCE IN THE WCP. SUPPORTING TECHNICAL DOCUMENTATION FOR THE SELECTED METHOD OF CONTROL SHALL BE INCLUDED IN THE WQR. DOCUMENTATION SUPPORTING THE SELECTED METHOD OF VERIFICATION OF COMPLIANCE AND THE VERIFICATION RESULTS SHALL BE INCLUDED IN THE PRODUCTION RECORDS.

1.3.1 CONTROL OF RADIONUCLIDE RELEASE PROPERTIES

FOR THE NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS PROJECT, THE CAPABILITY OF THE WASTE FORM TO LIMIT RELEASES OF RADIONUCLIDES SHALL BE DEMONSTRATED USING TEST MCC-1 (MATERIALS CHARACTERIZATION CENTER-1, NUCLEAR WASTE MATERIALS HANDBOOK, DOE/TIC-11400, 1983) CONDUCTED IN DEIONIZED WATER AT 90°C. THE TEST DURATION IS TO BE 28 DAYS. THE ACCEPTANCE CRITERION IS THAT THE NORMALIZED ELEMENTAL LEACH RATE FOR THE MATRIX ELEMENTS SODIUM, SILICON, AND BORON, AND FOR THE RADIONUCLIDES CESIUM-137 AND URANIUM-238 SHALL BE LESS THAN ONE GRAM PER SQUARE METER PER DAY AVERAGED OVER THE 28 DAY TEST DURATION.

1.3.2 VERIFICATION OF RADIONUCLIDE RELEASE PROPERTIES

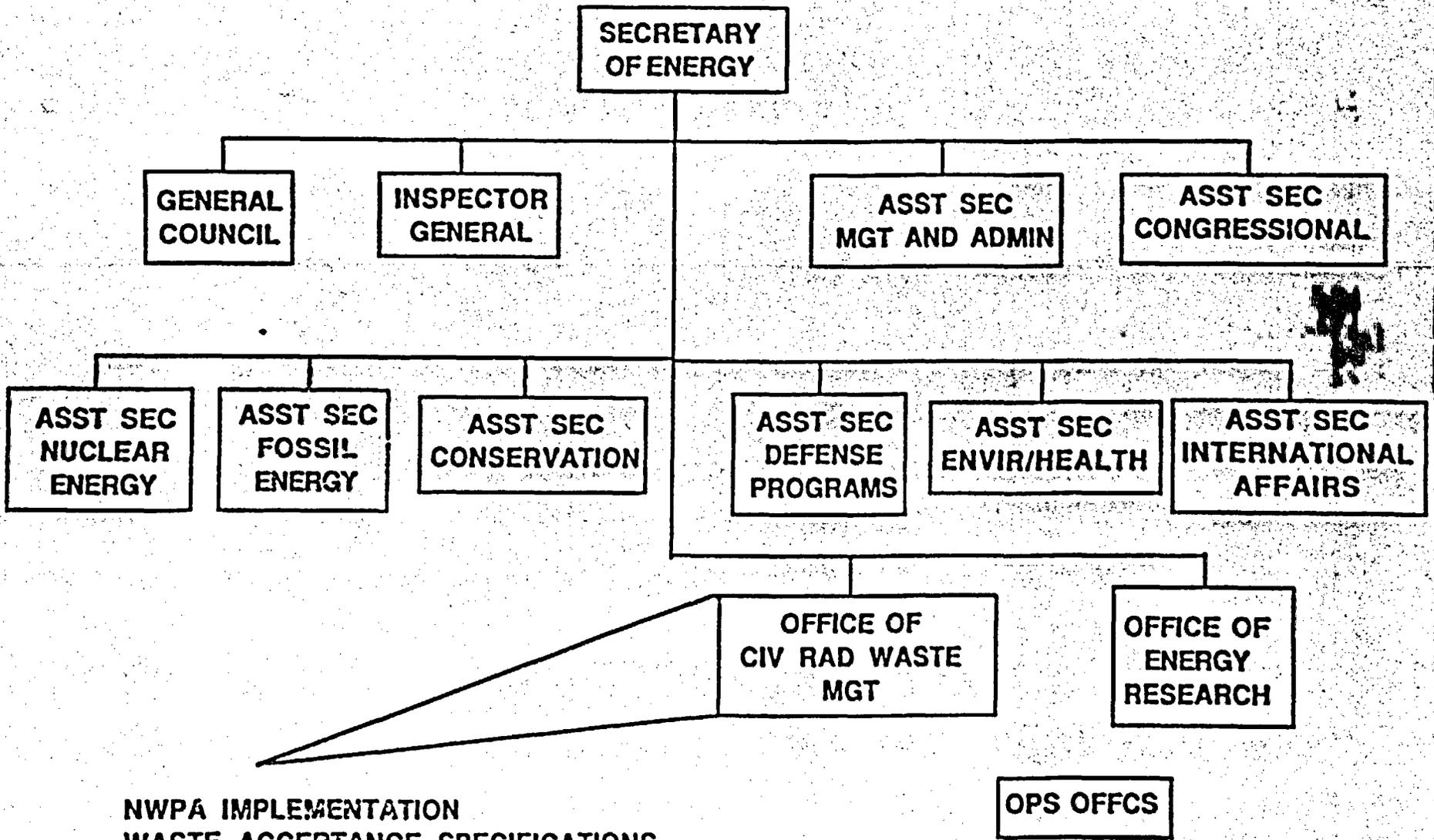
THE CAPABILITY OF THE WASTE FORM TO MEET THIS SPECIFICATION SHALL BE DEMONSTRATED BY TESTING ACTUAL PRODUCTION SAMPLES OF WASTE FORMS. THE SAMPLING SCHEDULE SHALL BE SUFFICIENT TO DEMONSTRATE AT THE 95 PERCENT CONFIDENCE LEVEL THAT 95 PERCENT OF THE PRODUCTION WASTE FORMS WOULD YIELD LEACH TEST RESULTS THAT CONFORM TO THE CRITERION. TEST SAMPLES SHALL BE TAKEN FROM A CONVENIENT LOCATION NEAR THE MOUTH OF THE WASTE FORM CANISTER BEFORE THE CANISTER IS SEALED CLOSED. THE TEMPERATURE OF THE WASTE FORM AT THE TIME OF SAMPLING SHALL BE NO HIGHER THAN 90°C

1.3.3 ALTERNATIVE MEANS OF COMPLIANCE

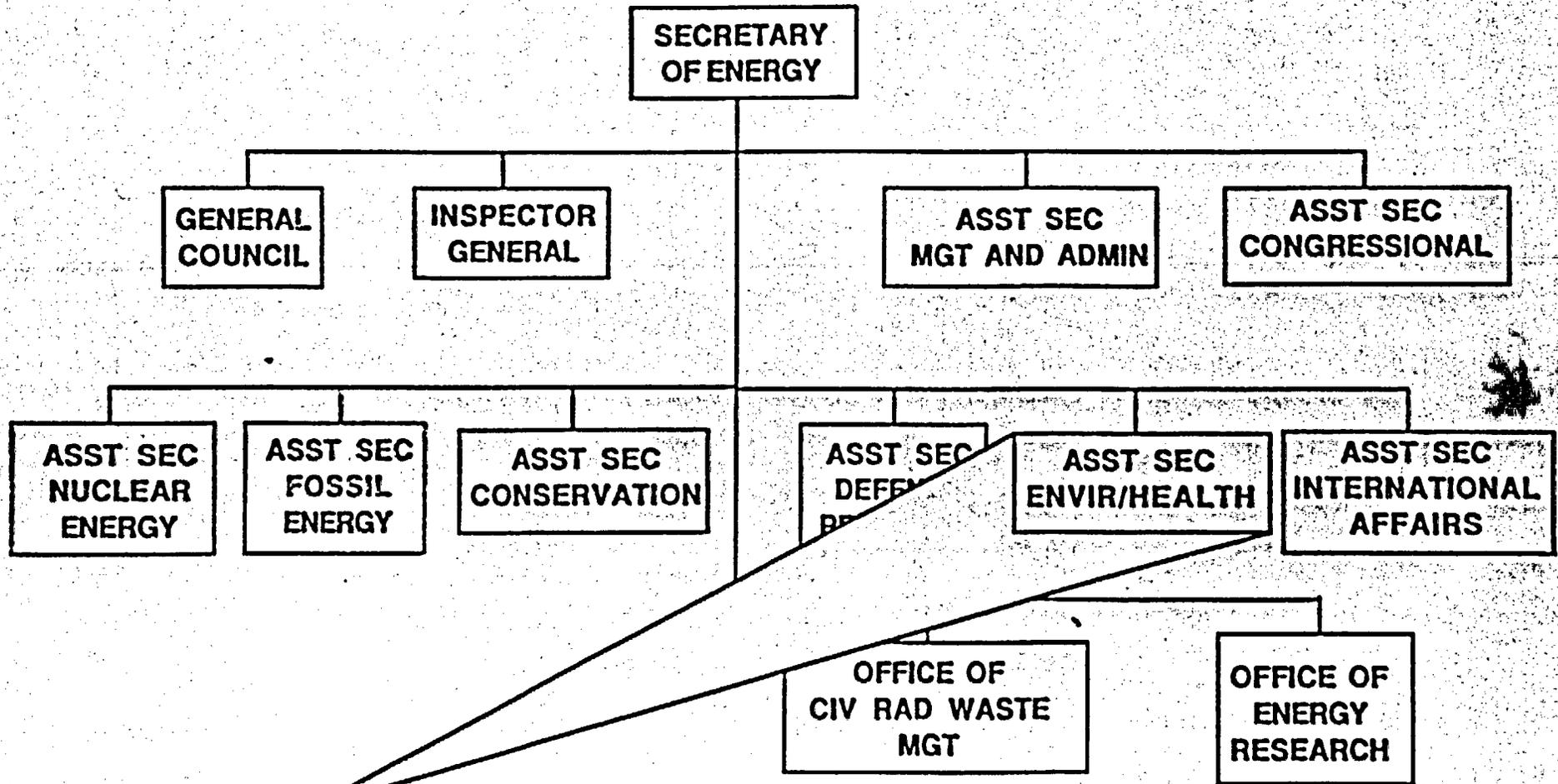
THE PRODUCER MAY USE AN ALTERNATIVE APPROACH TO DEMONSTRATE CONTROL OF THE RADIONUCLIDE RELEASE PROPERTIES OF THE WASTE FORM FROM THAT OF SPECIFICATIONS 1.3.1 AND 1.3.2 PROVIDED THAT THE PRODUCER RELATES, TO THE SATISFACTION OF THE REPOSITORY PROJECT, THE RADIONUCLIDE RELEASE PROPERTIES OF THE WASTE FORM OBTAINED USING THE ALTERNATIVE APPROACH TO THOSE THAT WOULD BE OBTAINED BY ADHERING TO THE REQUIREMENTS OF SPECIFICATIONS 1.3.1 AND 1.3.2.

- **THE MCC-1 TEST AND ASSOCIATED LIMIT ARE INTENDED TO BE AN INDEX OF DURABILITY OF THE GLASS PRODUCT**
- **THE 1 gm/m² -DAY CRITERION WAS DERIVED FROM EXTENSIVE MCC-1 TEST DATA ON DURABILITY OF BOTH NATURAL AND MANMADE GLASS FORMS AND IS CONSISTENT WITH WHAT HAS BEEN FOUND TO BE TECHNOLOGICALLY ACHIEVABLE IN PRACTICE**
- **THE MCC-1 TEST AND THE 1 gm/m² -DAY CRITERIA ARE NOT INTENDED TO BE REPRESENTATIVE OF EXPECTED REPOSITORY PERFORMANCE AND TOGETHER DO NOT GUARANTEE COMPLIANCE WITH REGULATORY REQUIREMENTS**

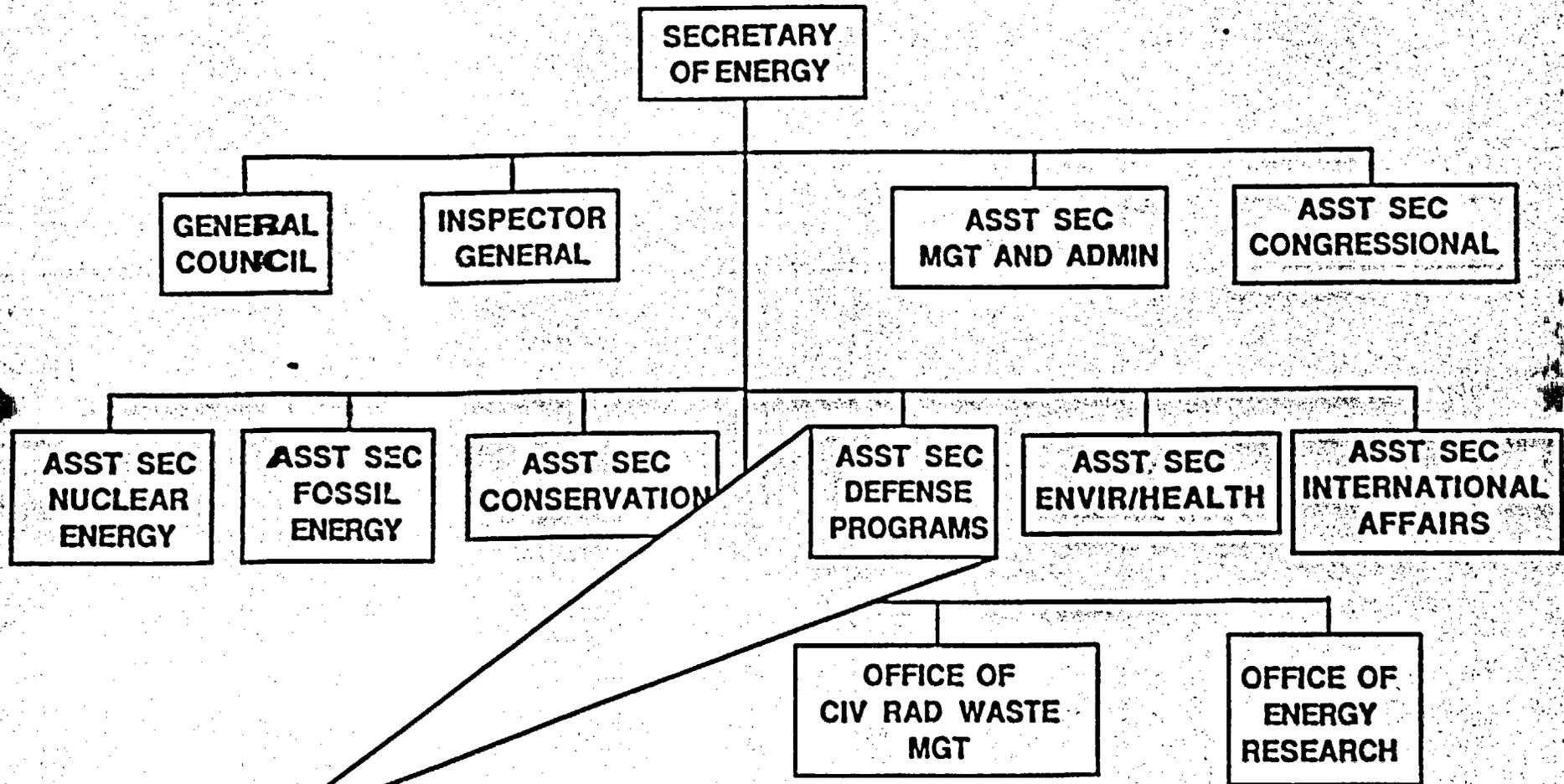
- **DOE WILL DEVELOP PERFORMANCE MODELS OF GLASS WASTE FORM RELEASES UNDER REPOSITORY CONDITIONS**
- **THESE MODELS WILL BE USED TO PREDICT GLASS WASTE FORM RELEASE RATES AND TO DETERMINE WHAT ADDITIONAL ENGINEERED BARRIER PERFORMANCE IS REQUIRED TO MEET REGULATORY REQUIREMENTS**
- **THE PROGRAM DESCRIBING THESE ACTIVITIES MAY BE FOUND IN SECTION 8.3.5.10 OF THE SCP**



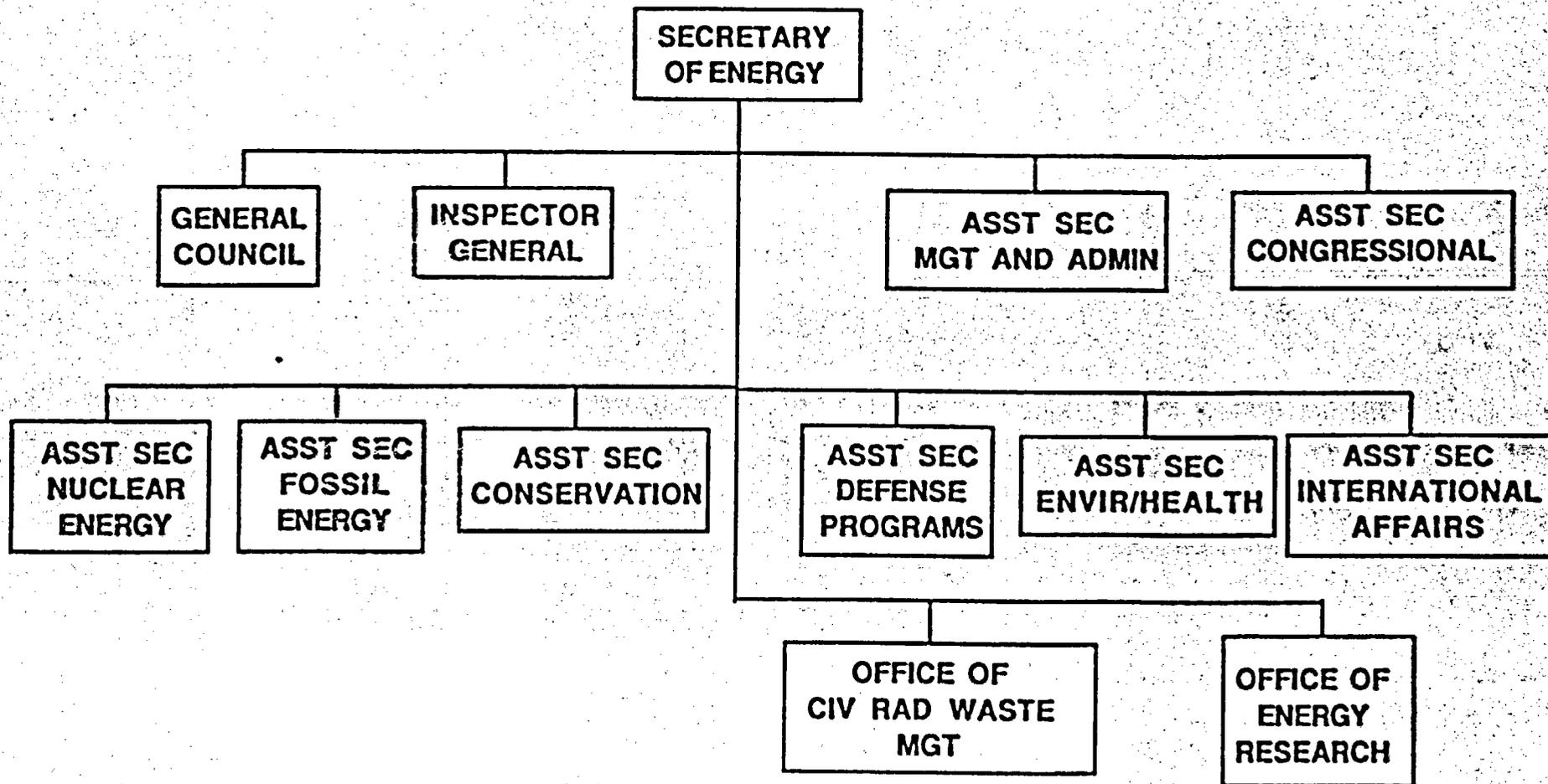
NWPA IMPLEMENTATION
WASTE ACCEPTANCE SPECIFICATIONS
SCP



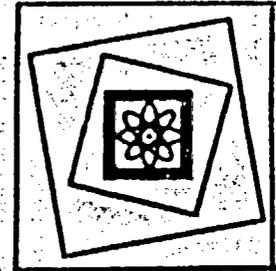
**GUIDANCE AND OVERSIGHT
ISSUE ENVIRONMENTAL DIRECTIVES
COORDINATE WITH EPA**



PROGRAM DIRECTION
ISSUE WASTE MGT DIRECTIVES
WASTE PRODUCER DOCUMENTATION



Defense Waste Processing Facility



Document Reviews

Proposed Approach for Review of WCP

and

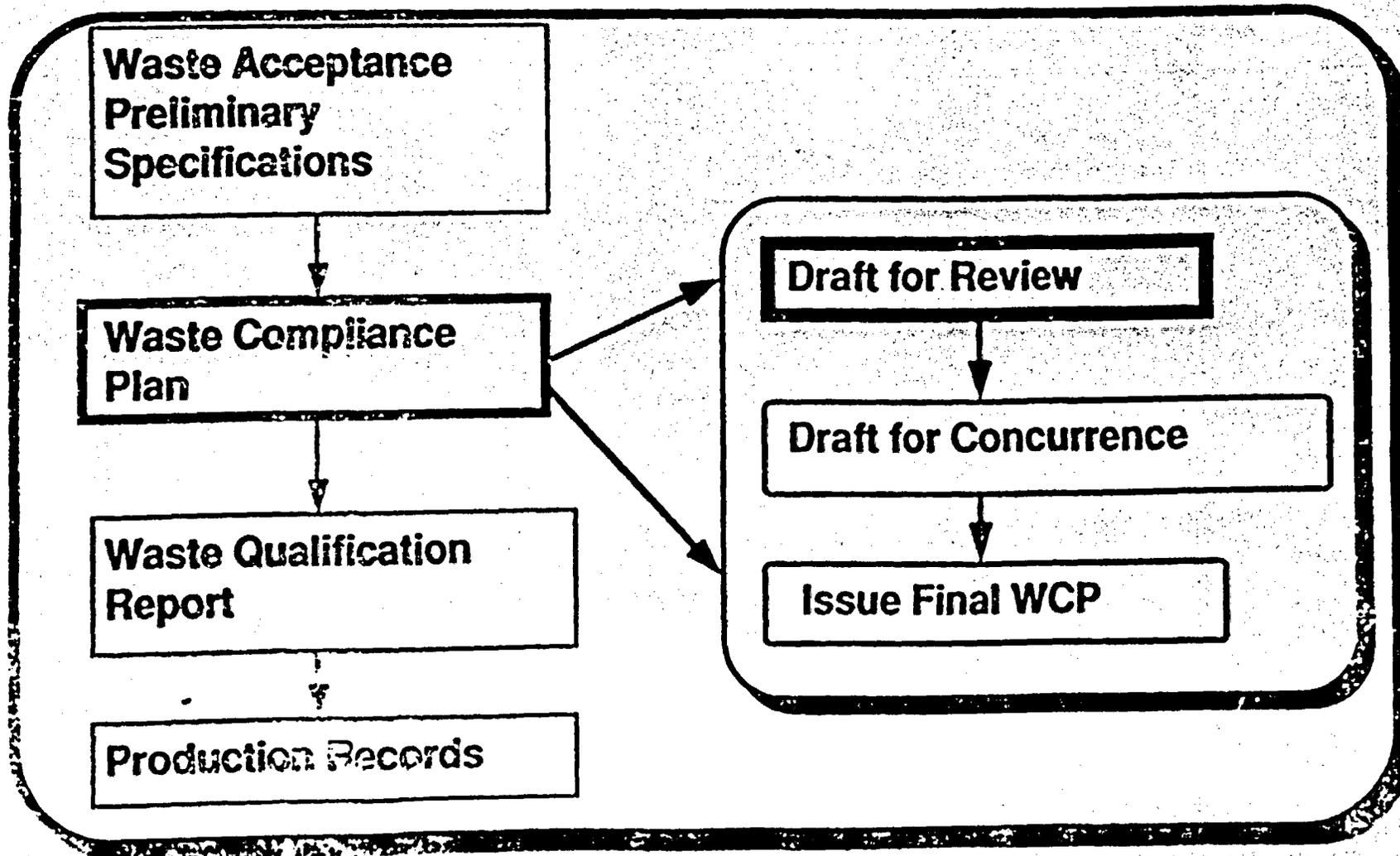
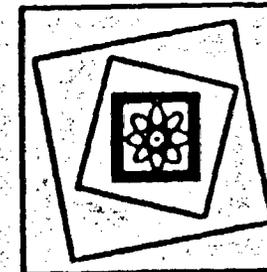
Proposed Approach for Review of WQR

By Bill Pearson - DWPF

Document Reviews

Proposed Review of WCP

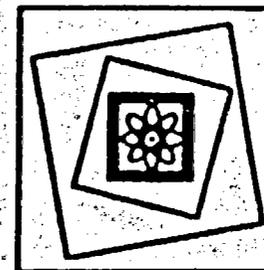
Relation of Documents



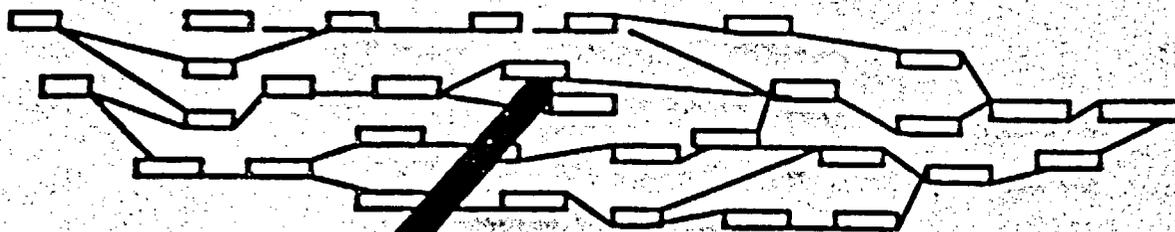
Document Reviews

Proposed Review of WCP

WCP / Integrated Schedule



DWPF MASTER SCHEDULE



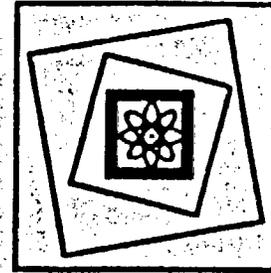
Waste Acceptance
Activities
Schedule

WCP
Documents
Review
Schedule

Document Reviews

Proposed Review of WCP

WCP Review Procedure

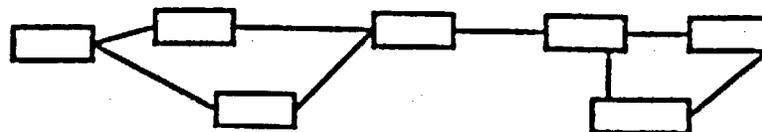


**Waste Acceptance
Activities
Schedule**



**WCP
Documents
Review
Schedule**

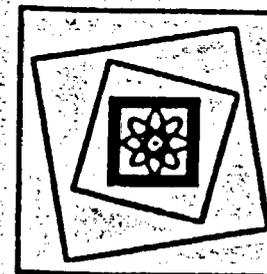
**NRC Review of Waste Acceptance Documents
(Document Review Cycle)**



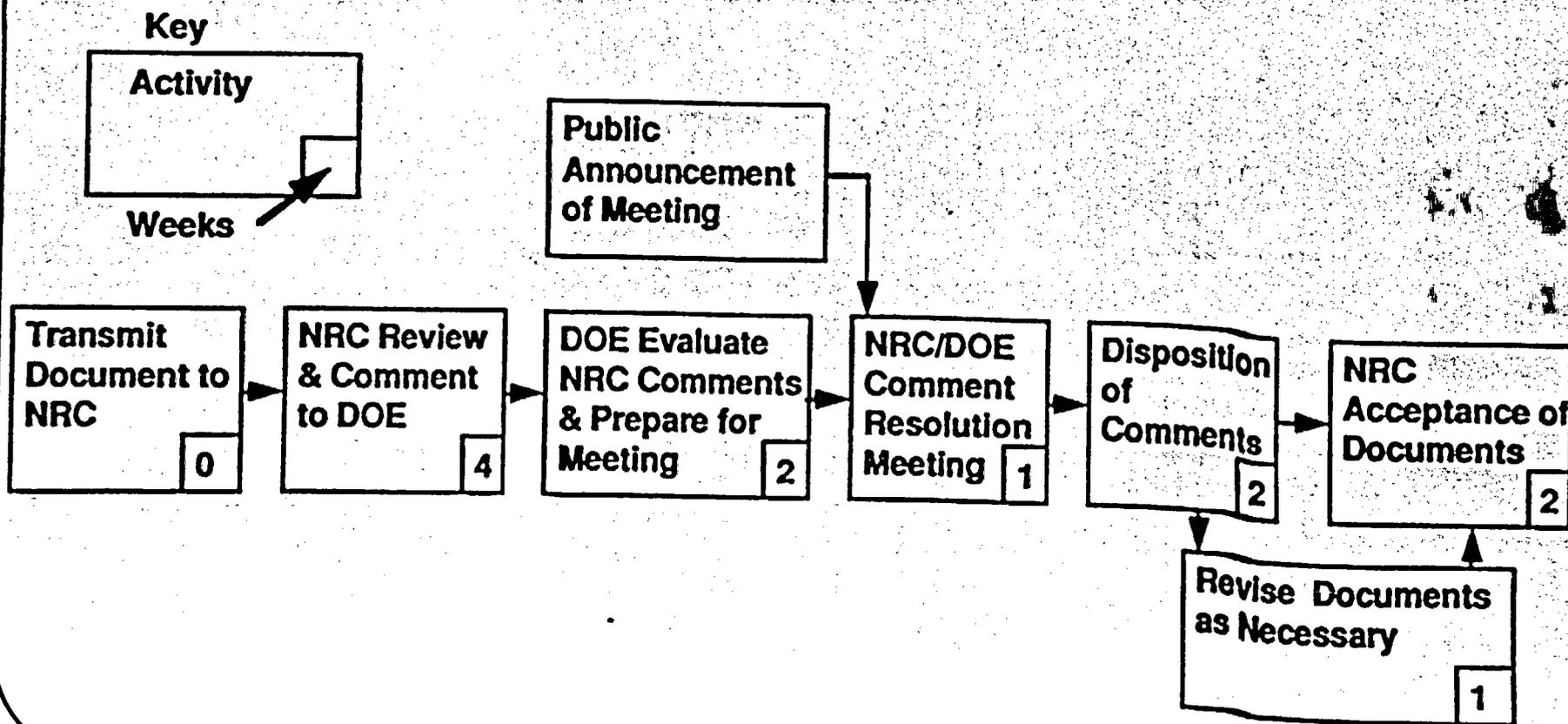
Document Reviews

Proposed Review of WCP & WQR

WCP/WQR Review Procedure



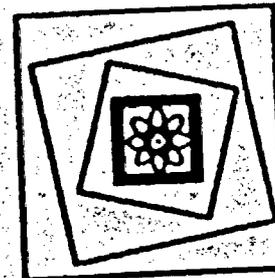
NRC Review of Waste Acceptance Documents



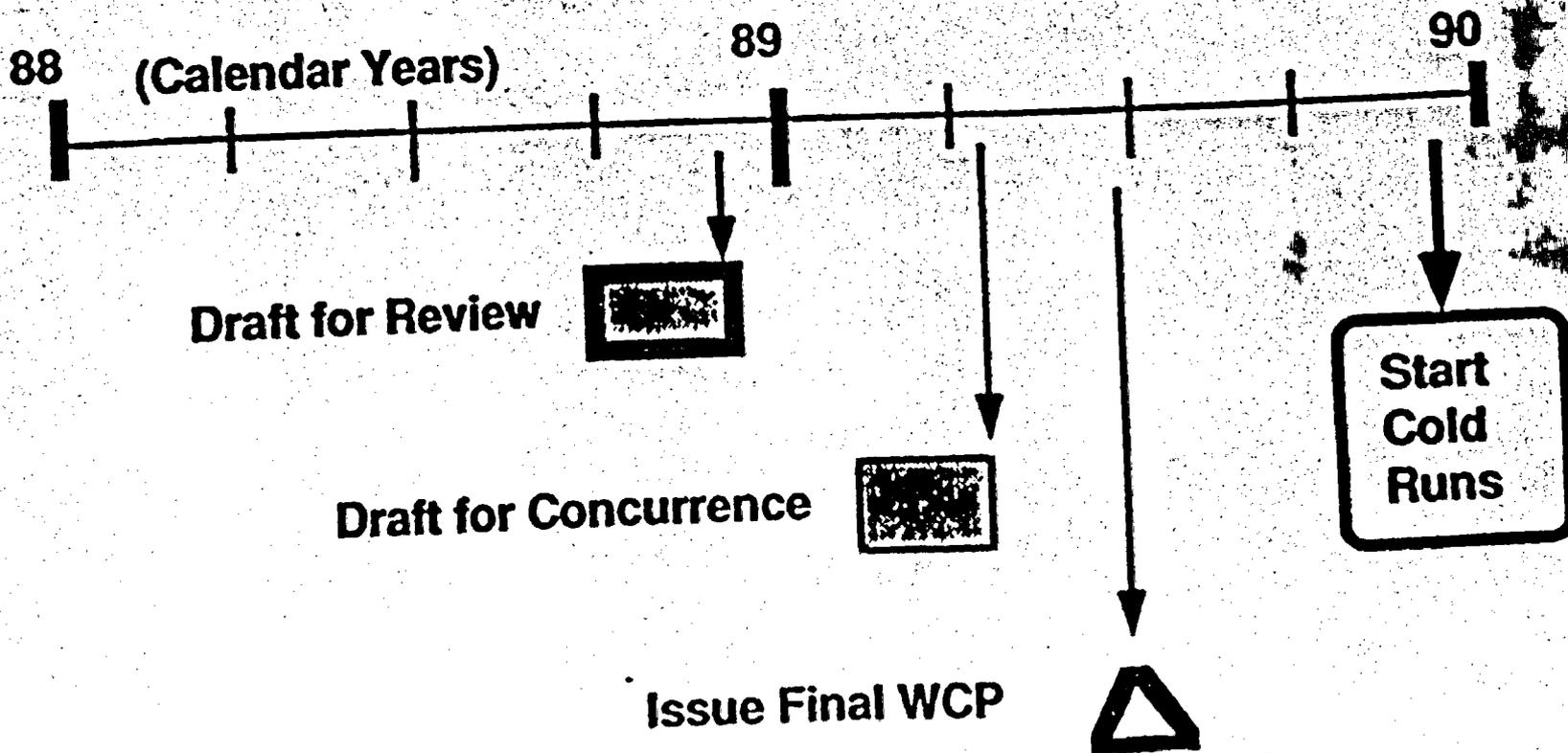
Document Reviews

Proposed Review of WCP

Status of WCP Review

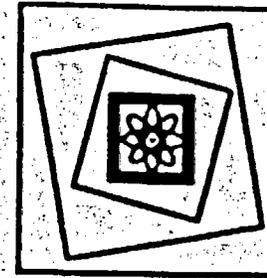


Waste Compliance Plan - Review With NRC



Document Reviews

Proposed Review of WCP/WQR DWPF Cold Run Data



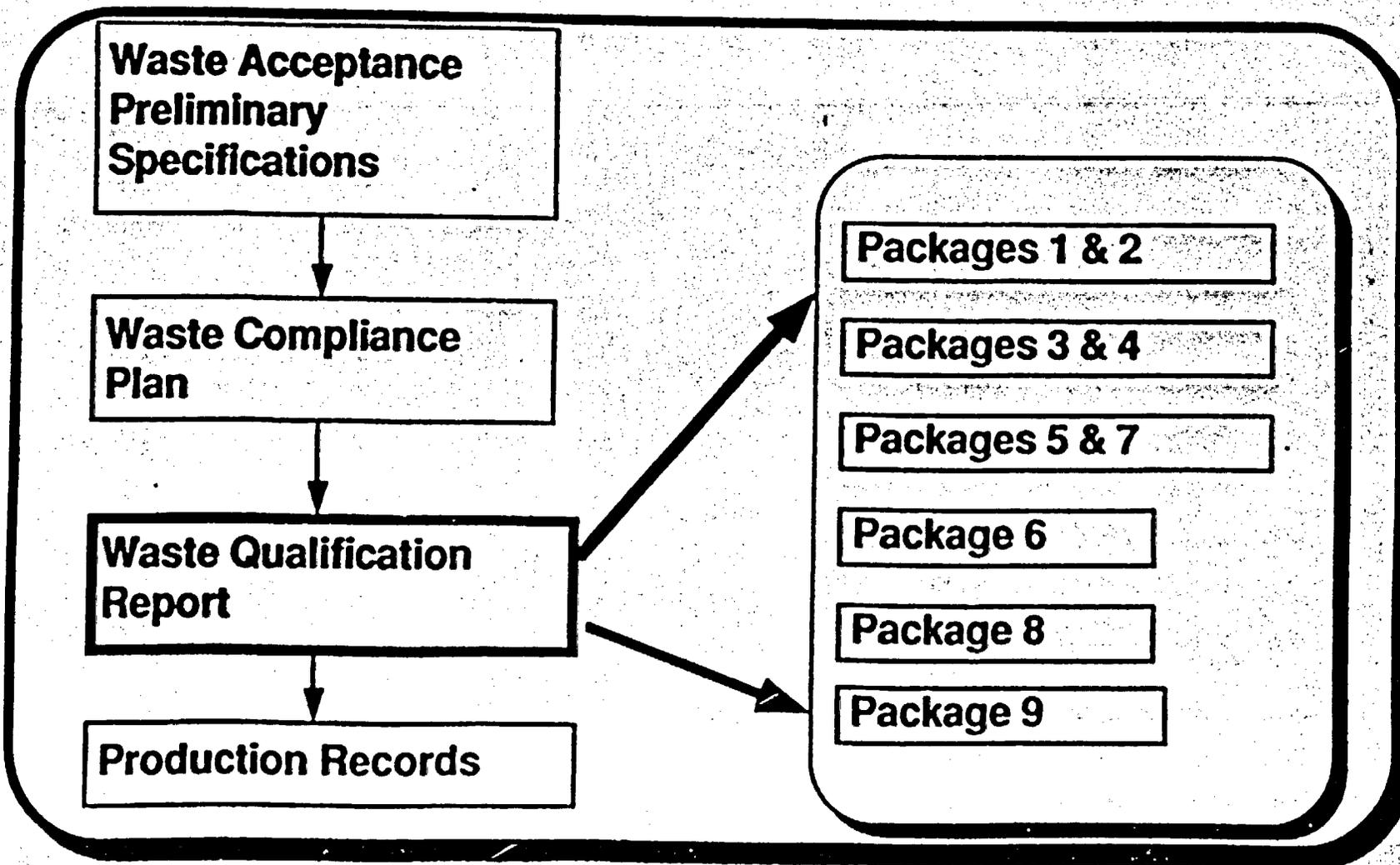
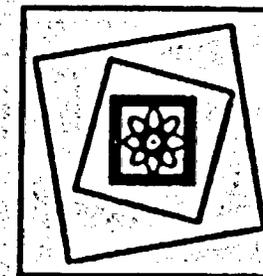
WCP determines what data is needed from Cold Runs

<u>Run</u>	<u>Purpose</u>	<u>Volume Produced</u> (Canisters)	<u>Duration</u> (Days)
1	Melter Characterization	24	66
2	Normal Melter Mixing	24	47
3	Low Viscosity, High Density	24	41
4	High Viscosity, Low Density	24	55
5	Return to Normal Viscosity	24	41
6	Mercury Recovery	24	33
7	Off-Gas DF	24	33

Document Reviews

Proposed Review of WQR

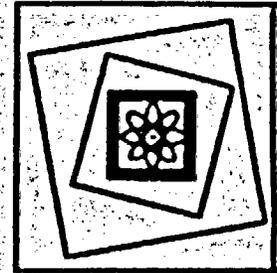
Relation of Documents



Document Reviews

Proposed Review of WQR

Description of WQR Packages



Package 1:

- **Canister Material**
 - Identification and Labeling
 - Fabrication and Closure
 - Weight and Dimensions
- **Canister Impact Tests**

Package 3:

- **Free Liquids**
- **Explosives, Pyrophorics, and Combustibles**
- **Organics**

Package 2:

- **Decontamination**
- **Free Volume**
- **Handling Features**

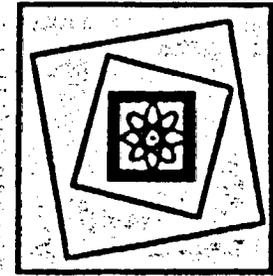
Package 4:

- **Radionuclide Inventory Projection**
 - Dose Rate During Production
- **Subcriticality**

Document Reviews

Proposed Review of WQR

Description of WQR Packages



Package 5:

- Radionuclide Inventory Projections
 - Heat Generation Projections
 - Dose Rate Projections
 - Radionuclide Inventory During Production
 - Heat Generation During Production

Package 6:

- Chemical Composition Projections
 - Chemical / Phase Stability
 - * Chemical Compatibility
 - * Free Gases

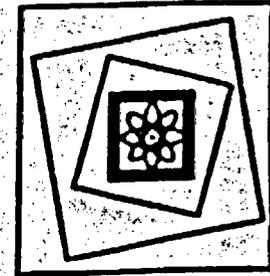
Package 7:

- Chemical Composition Projections
 - Chemical Composition During Production
 - Control of Radionuclide Release

Document Reviews

Proposed Review of WQR

Description of WQR Packages



Package 8:

- Free Volume (ICR)

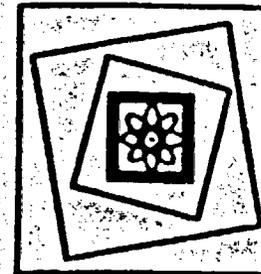
Package 9:

- Chemical / Phase Stability (ICR)

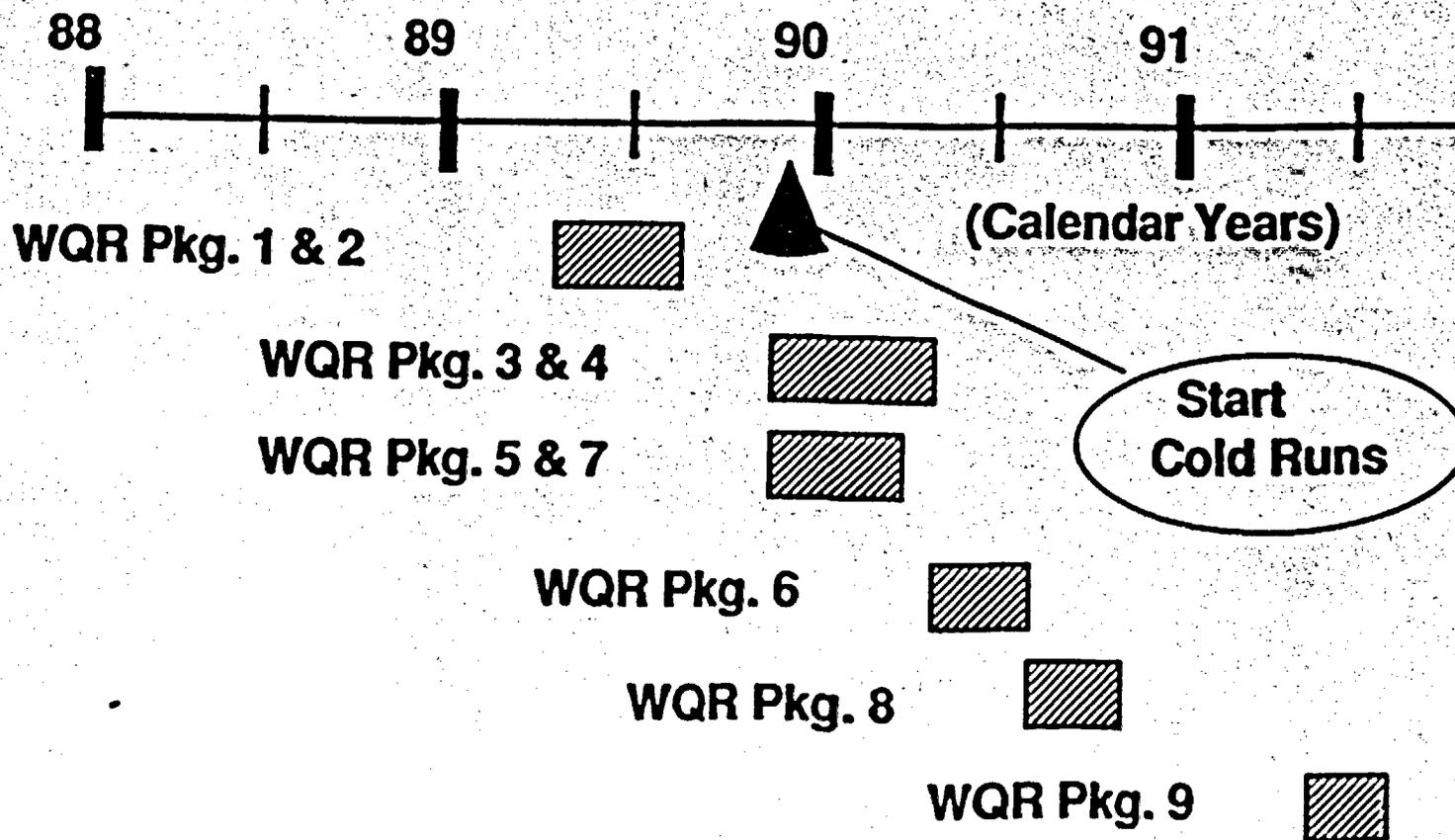
Document Reviews

Proposed Review of WQR

WQR Review Schedule



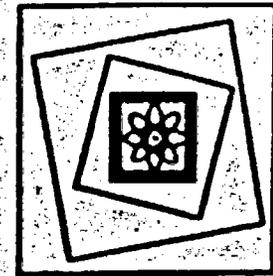
Waste Qualification Report - NRC Review



Document Reviews

Proposed Review of WQR

Document Schedule Summary



Proposed WQR Package Review Schedule

NRC can start review of WQR - Packages 1 & 2 by 4/89

- Packages 3 & 4 by 11/89

- Packages 5 & 7 by 11/89

- Package 6 by 4/90

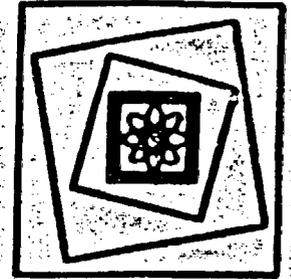
- Package 8 by 6/90

- Package 9 by 4/91

Document Reviews

Proposed Review of WCP/WQR

Summary



- **Document Review Schedule is derived from the Integrated DWPF Schedule**
- **Waste Acceptance Document Review is on the Critical Path**
- **Delays in reviews can push "Hot Start" past January 1992**
- **A delay of "Hot Start" past January 1992 will have used all of the available tank storage capacity impacting other SR operations**

*Specification of Quality
Assurance Requirements for
High-Level Waste Form
Production (OGR/B-14)*

SEP 29 1981

RW12831.01

**QUALITY ASSURANCE REQUIREMENTS FOR HIGH-LEVEL
WASTE FORM PRODUCTION (OGR/B-14)**

- **Prepared by DOE QA Work Group on Waste Acceptance**
- **Issued by OCRWM - February 1988**
- **Identifies BASIC and SUPPLEMENTAL Requirements for QA Programs Applied to DOE HLW Form Production**

QUALITY ASSURANCE REQUIREMENTS FOR HIGH-LEVEL WASTE FORM PRODUCTION (OGR/B-14)

Foreword

- Waste Form Producer Organization
- Waste Acceptance Strategy
- Quality Assurance Program Strategy
- Support to Repository Licensing

QUALITY ASSURANCE REQUIREMENTS FOR HIGH-LEVEL WASTE FORM PRODUCTION (OGR/B-14)

Scope

- **Waste Acceptance Process Activities of High-Level Waste Form Production:**
 - R&D essential to qualify waste form
 - Control of materials, equipment, facilities and processes essential to certification of canistered waste forms
 - Processing operations essential to certification of canistered waste form

QUALITY ASSURANCE REQUIREMENTS FOR HIGH-LEVEL WASTE FORM PRODUCTION (OGR/B-14)

Basic Requirements

- **National Concensus Standard**
 - **ANSI/ASME NQA-1, Sections I, II, and III**
- **DOE Orders and Guidance**
 - **DOE 5000.3 "Unusual Occurance Reporting System"**
 - **DOE 5700.6B "Quality Assurance"**
 - **"Guidelines for Application of Readiness Reviews to DOE Activities"**

QUALITY ASSURANCE REQUIREMENTS FOR HIGH-LEVEL WASTE FORM PRODUCTION (OGR/B-14)

Basic Requirements (cont.)

- **Relationship to Other Requirements and Guidance**
 - **10 CFR Part 60 "Disposal of High Level Radioactive Waste in Geologic Repositories", Subpart G "Quality Assurance"**
 - **DOE/RW-0005, "Mission Plan for Civilian Radioactive Waste Management", Section 5.6, "Quality Assurance" (Superceded by June 1987, "OCRWM Mission Plan Amendment")**
 - **DOE/RW-0032, "OCRWM Quality Assurance Management Policies and Requirements" (Superceded by August 1988, "Quality Assurance Requirements for the Civilian Radioactive Waste Management Program")**

QUALITY ASSURANCE REQUIREMENTS FOR HIGH-LEVEL WASTE FORM PRODUCTION (OGR/B-14)

- **Relationship to Other Requirements and Guidance (cont.)**
 - **DOE/RW-0043, "Program Management Systems Manual", Chapter 5, Quality Assurance**
 - **DOE/RW-0095, "Quality Assurance Plan for High Level Radioactive Waste Repositories" (OGR/B-3)**

(Superceded by September 1988, "Quality Assurance Program Description for the Civilian Radioactive Waste Management Program")

QUALITY ASSURANCE REQUIREMENTS FOR HIGH-LEVEL WASTE FORM PRODUCTION (OGR/B-14)

- **Relationship to Other Requirements and Guidance (cont.)**
 - DOE/RW-0043, "Program Management Systems Manual", Chapter 5, Quality Assurance
 - DOE/RW-0095, "Quality Assurance Plan for High Level Radioactive Waste Repositories" (OGR/B-3)

(Superceded by September 1988, "Quality Assurance Program Description for the Civilian Radioactive Waste Management Program")

**QUALITY ASSURANCE REQUIREMENTS FOR HIGH-LEVEL
WASTE FORM PRODUCTION (OGR/B-14)**

Supplemental Requirements

- 1. Control of Essential Software**
- 2. Peer Review**
- 3. Control of Experiments and Developmental Activities**
- 4. Qualification of Data**
- 5. Archival of Samples**
- 6. Control of Special Processes**
- 7. Product Certification**
- 8. Readiness Review**
- 9. Selective Application of Program Activities (Quality Levels)**
- 10. Selection, Indoctrination, and Training of Personnel**
- 11. Overview of Quality Assurance Activities**
- 12. Quality Records**
- 13. Modification Control**
- 14. Effectiveness Evaluation**

**QUALITY ASSURANCE REQUIREMENTS FOR HIGH-LEVEL
WASTE FORM PRODUCTION (OGR/B-14)**

Quality Assurance Program Description

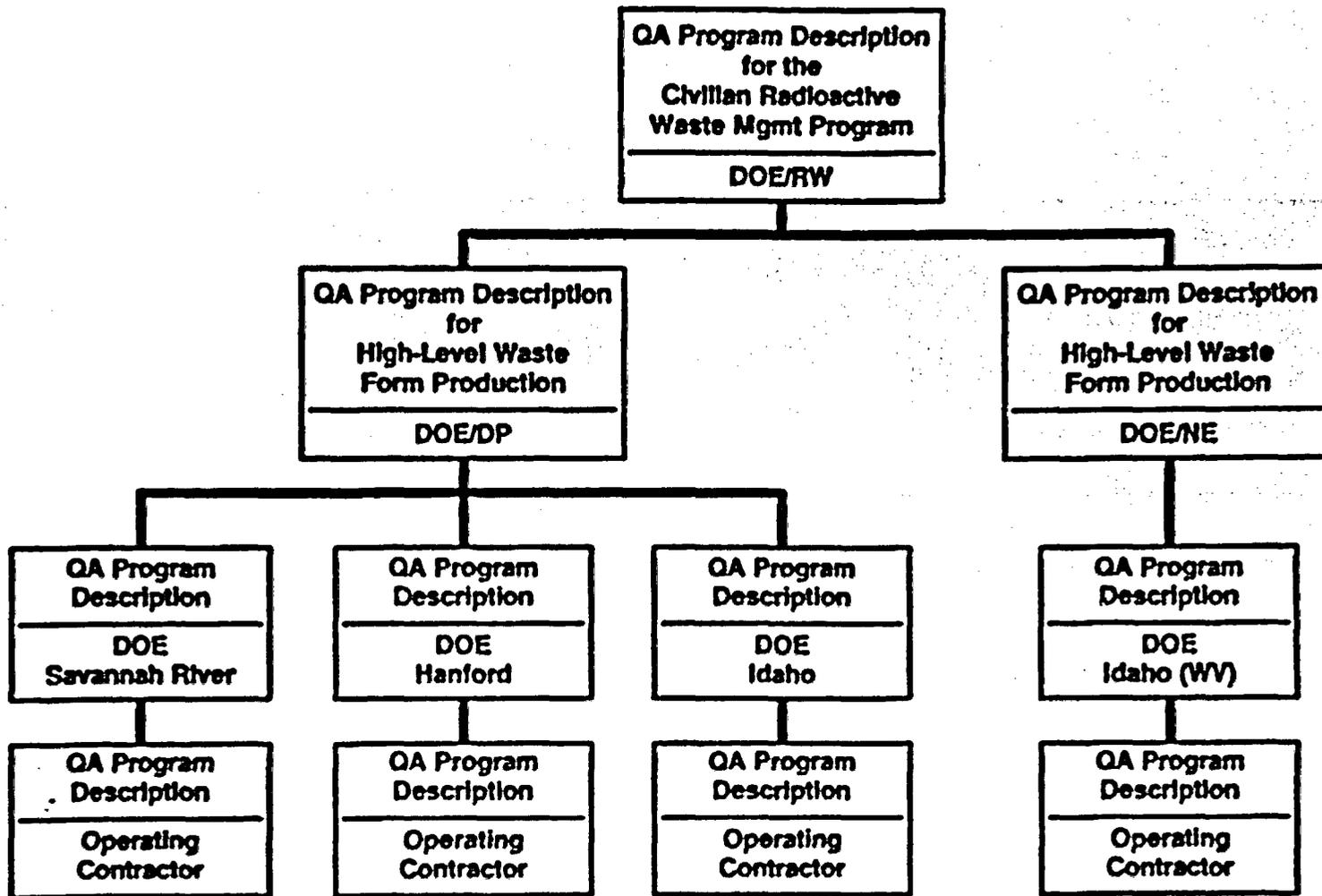
- **Shall Cover BASIC and SUPPLEMENTAL Requirements**
- **Shall be a Composite of Program Descriptions of All Major Participants**
- **Shall be Prepared per NRC-Type Instructions (Appendix A, "Guidelines for Preparation of a QA Program Description for HLW Form Production")**
- **Shall be Made a Part of WCP**
- **Shall be Approved and Maintained per DOE Requirements**

**QUALITY ASSURANCE REQUIREMENTS FOR HIGH-LEVEL
WASTE FORM PRODUCTION (OGR/B-14)**

Program Description Evaluation

- **Shall be Evaluated Against NRC-Type Review Plan (Appendix B, "Review Plan for QA Programs for HLW Form Production")**
- **Shall be Evaluated Internally**
- **Any Modifications to Appendix B to be Addressed in WCP**

Hierarchy of Quality Assurance Program Descriptions For High-Level Waste Form Production Activity



STATUS OF

**DP/DWPF
QUALITY ASSURANCE
PROGRAM**

**Presented in Joint Session to DOE/RW, DOE/DP/SR, and NRC
DOE/NRC Technical Exchange Meeting
September 29-30, 1988**

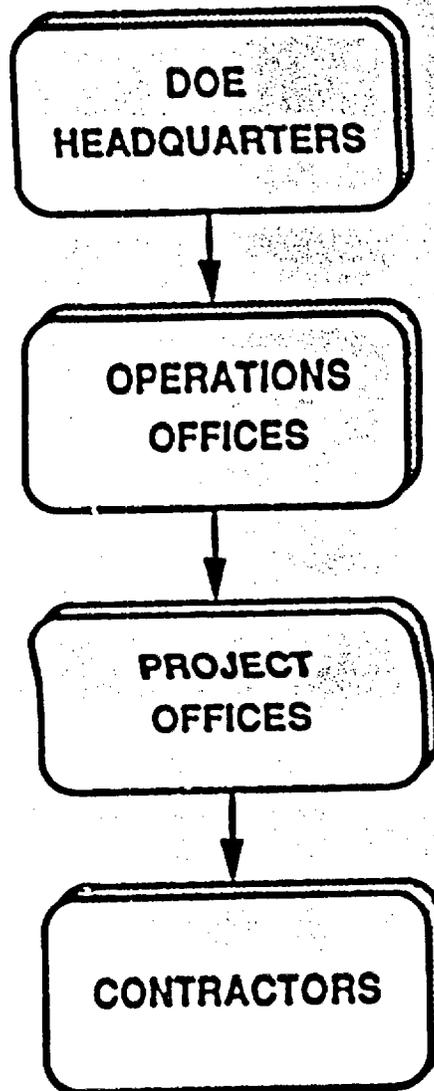
Joe Anderson

STATUS OF DP/DWPF QUALITY ASSURANCE PROGRAM

INTRODUCTION

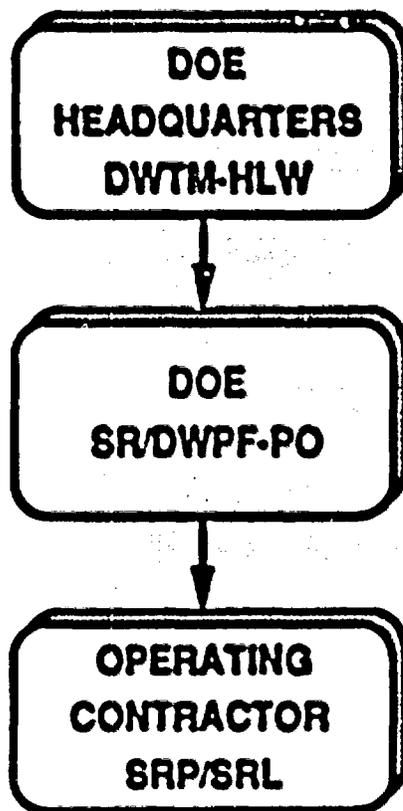
- ***Savannah River Waste Form Producer***
 - ***Roles of Program Participants***
 - ***SR-WFP Quality Assurance Program***
 - ***Quality Assurance Program Descriptions***
 - ***Status And Schedule***
-
-

DWTM/DWPF QAP FOR DHLW PROCESSING



MAJOR PARTICIPANT ORGANIZATIONS

COMPOSITE SAVANNAH RIVER WASTE FORM PRODUCER ORGANIZATION



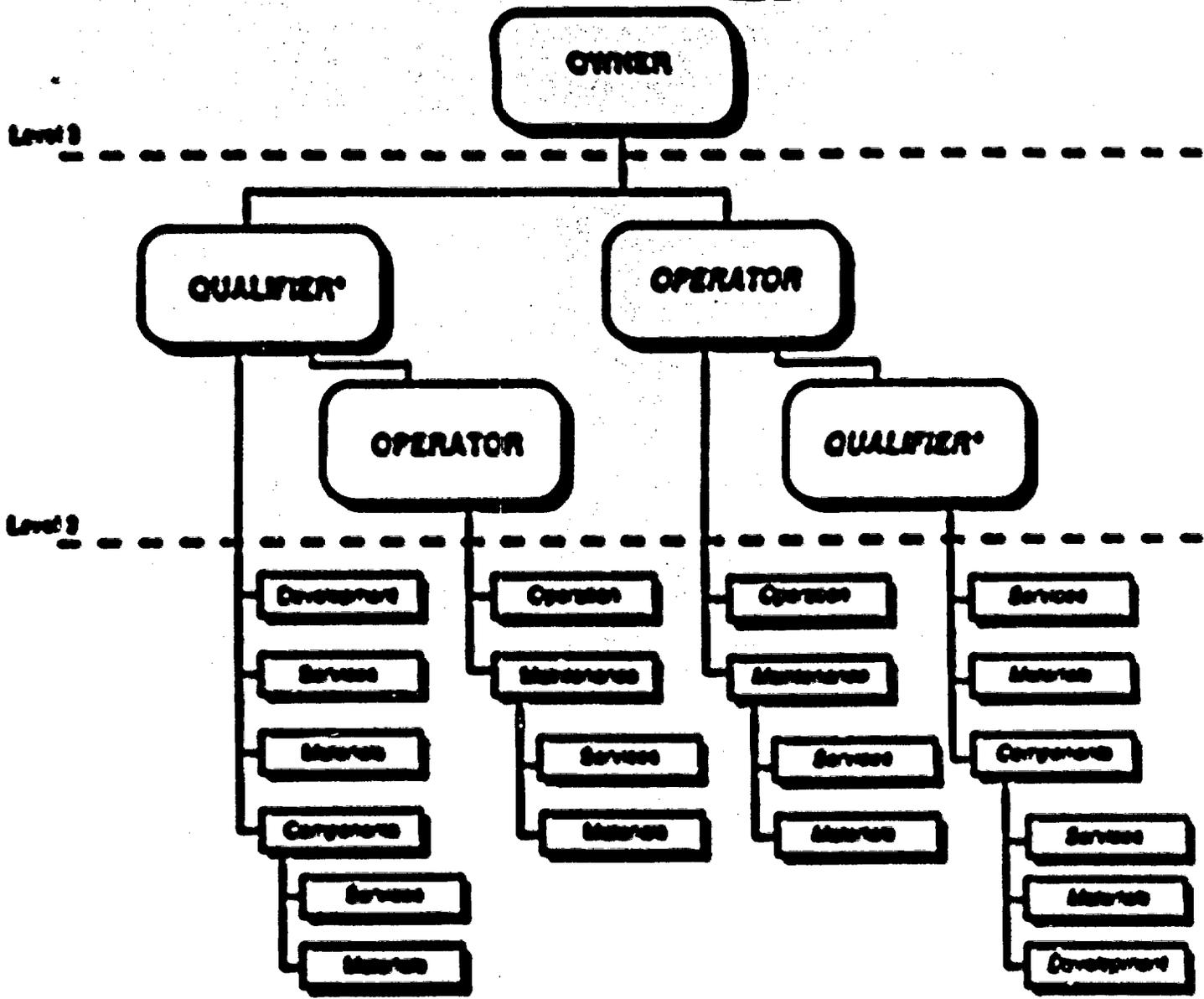
MAJOR PARTICIPANT ORGANIZATIONS OF SR WASTE FORM PRODUCER

OGR/B-14 REQUIRES:

Quality Assurance Programs for:

- ***Research and Development that is Essential to Qualification of the Waste Form;***
- ***Control of Materials, Equipment, Facilities, and Processes that are Essential to the Certification of the Canistered Waste Form and;***
- ***Processing Operations that are Essential to the Certification of the Canistered Waste Forms.***

SAVANNAH RIVER WASTE FORM PRODUCER



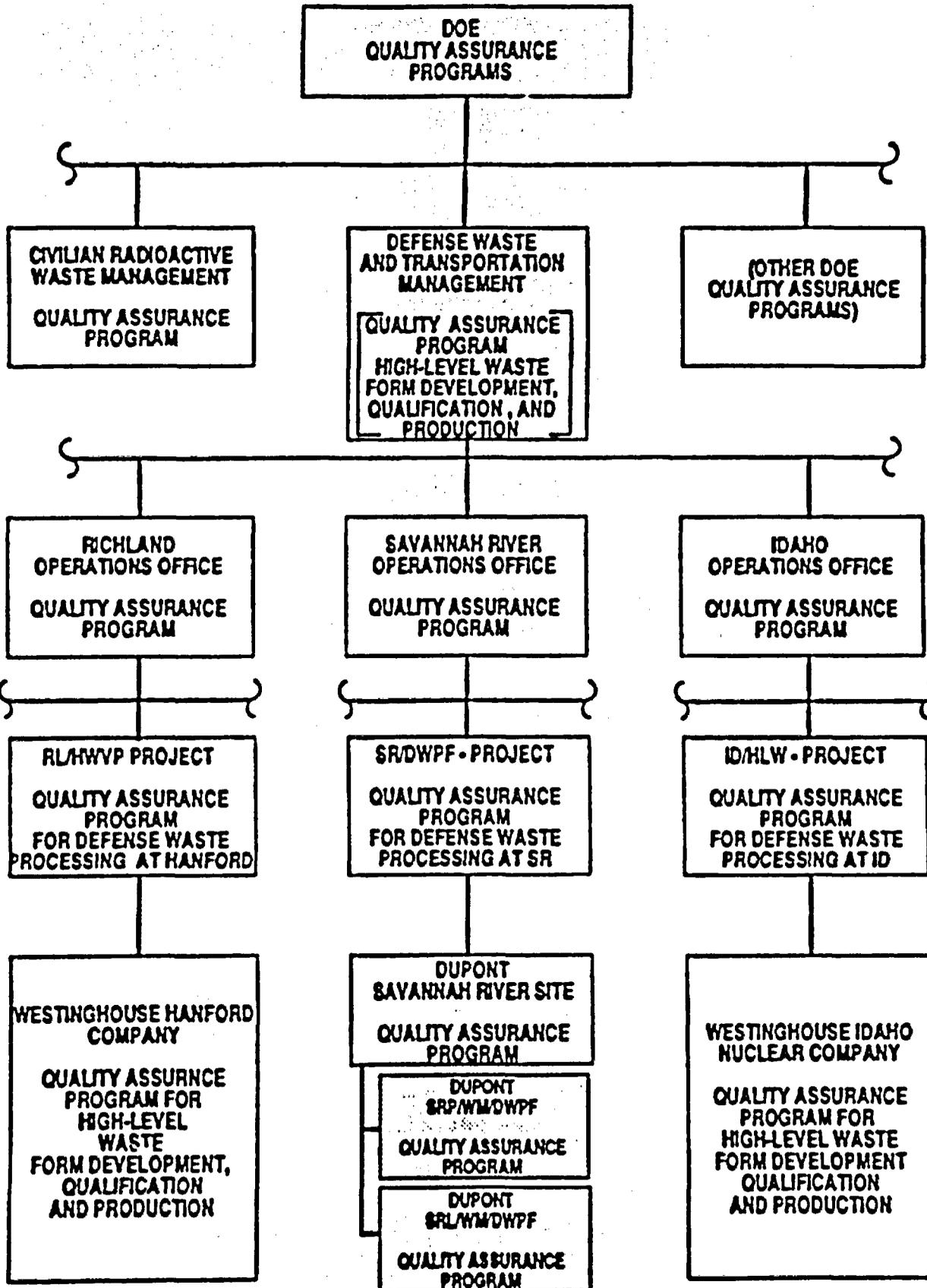
Level 1

* Includes program responsibility for any developmental activities associated with qualification.

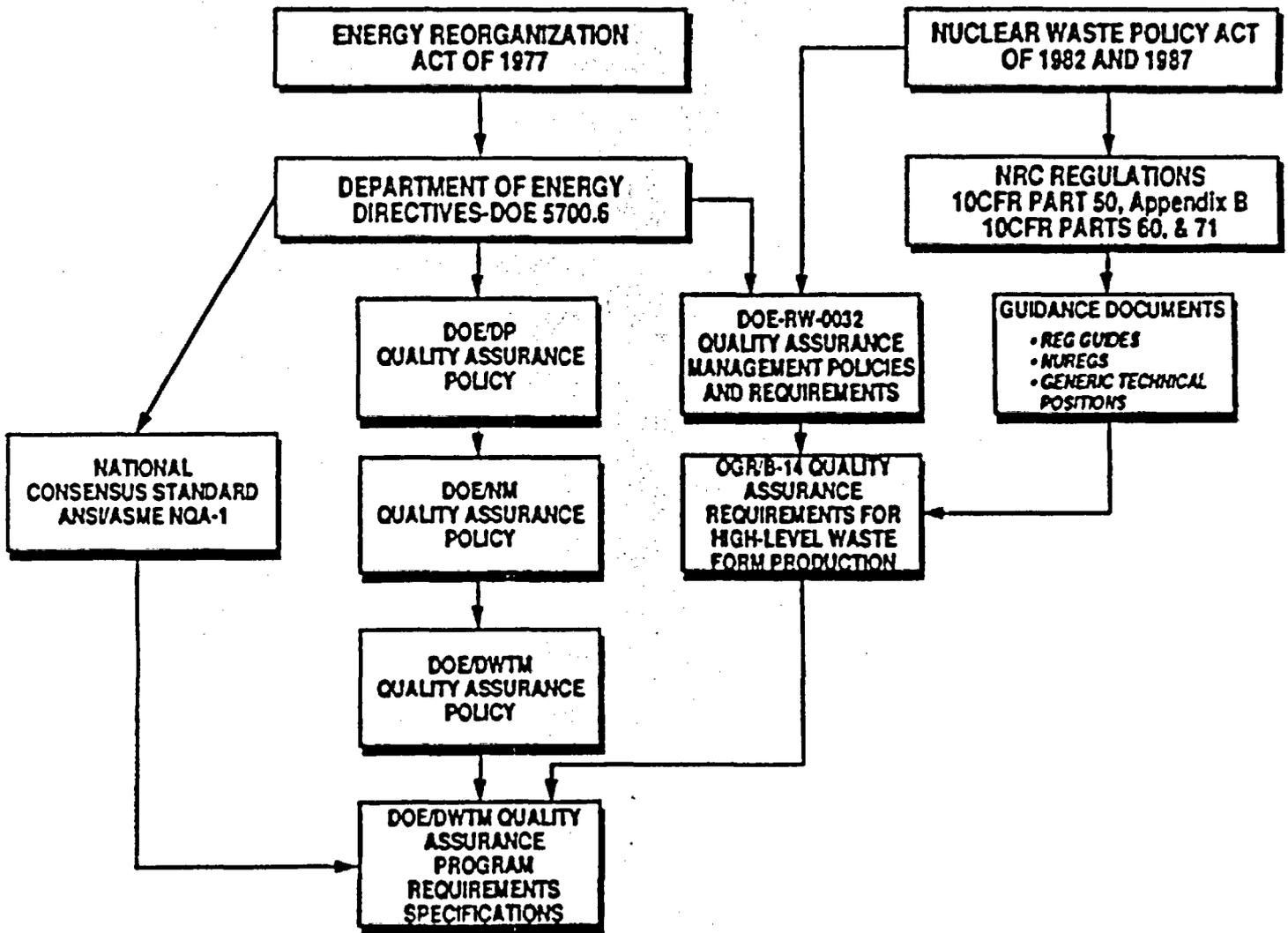
NOTE: Participants in italicized are active during development and qualification. Participants in underline are active during production.

FUNCTIONAL ORGANIZATION OF QUALITY ASSURANCE PROGRAM RESPONSIBILITIES

**QUALITY ASSURANCE PROGRAM FOR
DEFENSE HIGH-LEVEL WASTE FORM
DEVELOPMENT, QUALIFICATION AND PRODUCTION**



DEFENSE HIGH-LEVEL WASTE QUALITY ASSURANCE REQUIREMENTS



QUALITY ASSURANCE REQUIREMENTS FOR HIGH-LEVEL WASTE FORM PRODUCTION

BASIC REQUIREMENTS

- **NQA-1 Quality Assurance Program Requirements for Nuclear Facilities Sections I, II and III**
- **DOE 5000.3 Unusual Occurrence Reporting System**
- **DOE 5700.6 Quality Assurance**
- **Guidelines for Application of Readiness Reviews to Department of Energy Activities**

PRINCIPAL QUALITY ASSURING ACTIVITIES

(ANSI/ASME NQA-1)

1. ORGANIZATION

2. QUALITY ASSURANCE PROGRAM

3. DESIGN CONTROL

4. PROCUREMENT DOCUMENT CONTROL

**5. INSTRUCTIONS, PROCEDURES, AND
DRAWINGS**

6. DOCUMENT CONTROL

**7. CONTROL OF PURCHASED ITEMS
AND SERVICES**

**8. IDENTIFICATION AND CONTROL
OF ITEMS**

9. CONTROL OF PROCESSES

10. INSPECTION

11. TEST CONTROL

**12. CONTROL OF MEASURING AND TEST
EQUIPMENT**

13. HANDLING, STORAGE, AND SHIPPING

**14. INSPECTION, TEST, AND OPERATING
STATUS**

15. CONTROL OF NONCONFORMING ITEMS

16. CORRECTIVE ACTION

17. QUALITY ASSURANCE RECORDS

18. AUDITS

PRINCIPAL QUALITY ASSURING ACTIVITIES

(ANSI/ASME NQA-1)

1. ORGANIZATION

2. QUALITY ASSURANCE PROGRAM

3. DESIGN CONTROL

4. PROCUREMENT DOCUMENT CONTROL

5. INSTRUCTIONS, PROCEDURES, AND
DRAWINGS

6. DOCUMENT CONTROL

7. CONTROL OF PURCHASED ITEMS
AND SERVICES

8. IDENTIFICATION AND CONTROL
OF ITEMS

9. CONTROL OF PROCESSES

10. INSPECTION

11. TEST CONTROL

12. CONTROL OF MEASURING AND TEST
EQUIPMENT

13. HANDLING, STORAGE, AND SHIPPING

14. INSPECTION, TEST, AND OPERATING
STATUS

15. CONTROL OF NONCONFORMING ITEMS

16. CORRECTIVE ACTION

17. QUALITY ASSURANCE RECORDS

18. AUDITS

QUALITY ASSURANCE REQUIREMENTS FOR HIGH-LEVEL WASTE FORM PRODUCTION

Supplemental Requirements

- Control of Essential Software
- Peer Review
- Control of Experiments and Developmental Activities
- Qualification of Data
- Archival of Samples
- Control of Special Processes
- Product Certification
- Readiness Review
- Selective Application of Program Activities (Quality Levels)
- Selection, Indoctrination, and Training of Personnel
- Overview of Quality Assurance Activities
- Quality Records
- Modification Control
- Effectiveness Evaluation

Quality Assurance Program Description

Program Description Evaluation

QUALITY ASSURANCE REQUIREMENTS FOR HIGH-LEVEL WASTE FORM PRODUCTION

Supplemental Requirements -- DWTM

- Control of Essential Software
- Peer Review
- Control of Experiments and Developmental Activities
- Qualification of Data
- Archival of Samples
- Control of Special Processes
- Product Certification
- Readiness Review
- Selective Application of Program Activities (Quality Levels)
- Selection, Indoctrination, and Training of Personnel
- Overview of Quality Assurance Activities
- Quality Records
- Modification Control
- Effectiveness Evaluation

Quality Assurance Program Description

Program Description Evaluation

QUALITY ASSURANCE REQUIREMENTS FOR HIGH-LEVEL WASTE FORM PRODUCTION

Supplemental Requirements -- DWPF-PO

- Control of Essential Software
- **Peer Review**
- Control of Experiments and Developmental Activities
- Qualification of Data
- Archival of Samples
- Control of Special Processes
- Product Certification
- **Readiness Review**
- **Selective Application of Program Activities (Quality Levels)**
- **Selection, Indoctrination, and Training of Personnel**
- **Overview of Quality Assurance Activities**
- **Quality Records**
- Modification Control
- **Effectiveness Evaluation**

Quality Assurance Program Description

Program Description Evaluation

QUALITY ASSURANCE REQUIREMENTS FOR HIGH-LEVEL WASTE FORM PRODUCTION

Supplemental Requirements -- OC

- Control of Essential Software
- Peer Review
- Control of Experiments and Developmental Activities
- Qualification of Data
- Archival of Samples
- Control of Special Processes
- Product Certification
- Readiness Review
- Selective Application of Program Activities (Quality Levels)
- Selection, Indoctrination, and Training of Personnel
- Overview of Quality Assurance Activities
- Quality Records
- Modification Control
- Effectiveness Evaluation

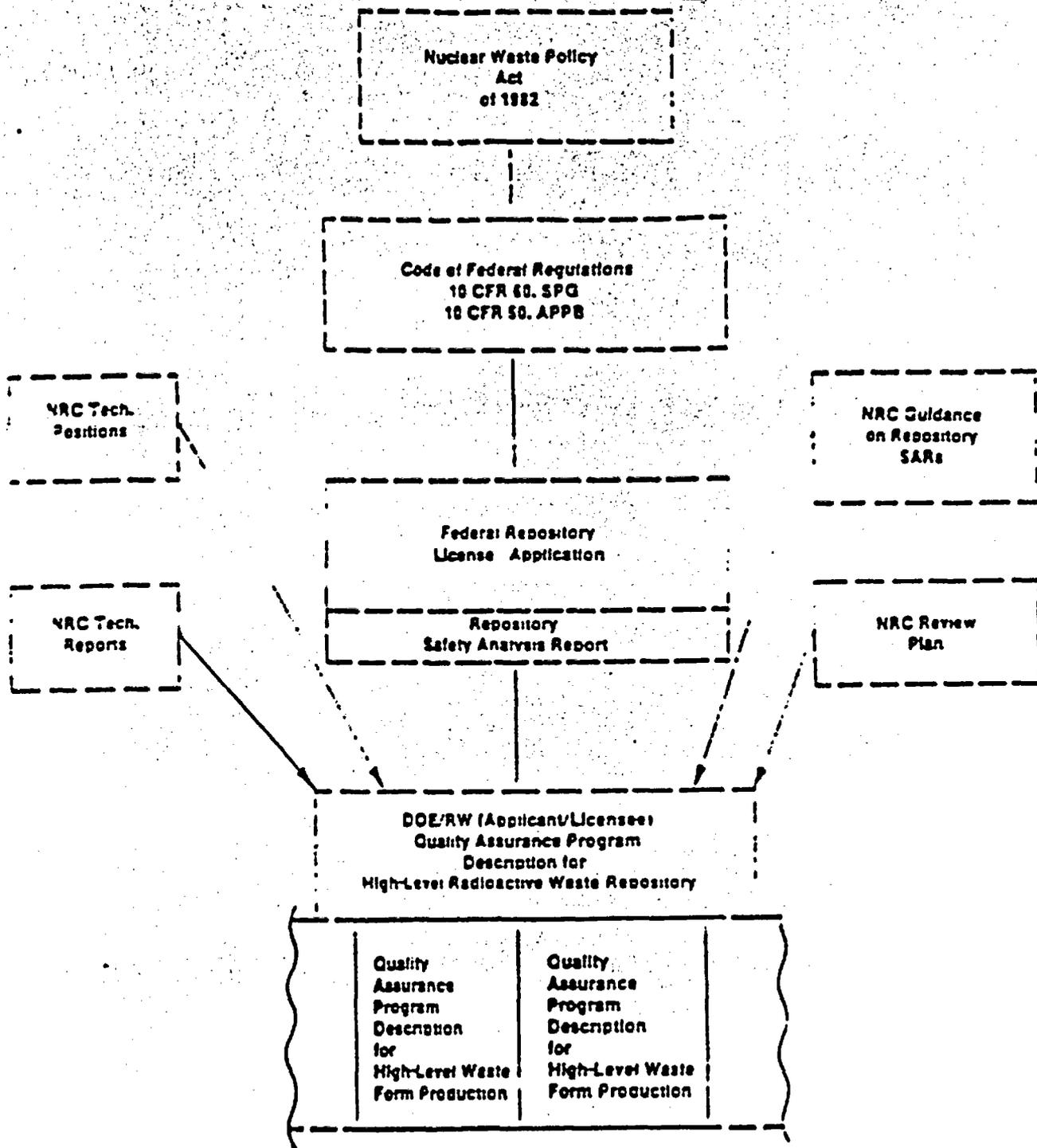
Quality Assurance Program Description

Program Description Evaluation

DWTM/DWPF QAP FOR DHLW PROCESSING

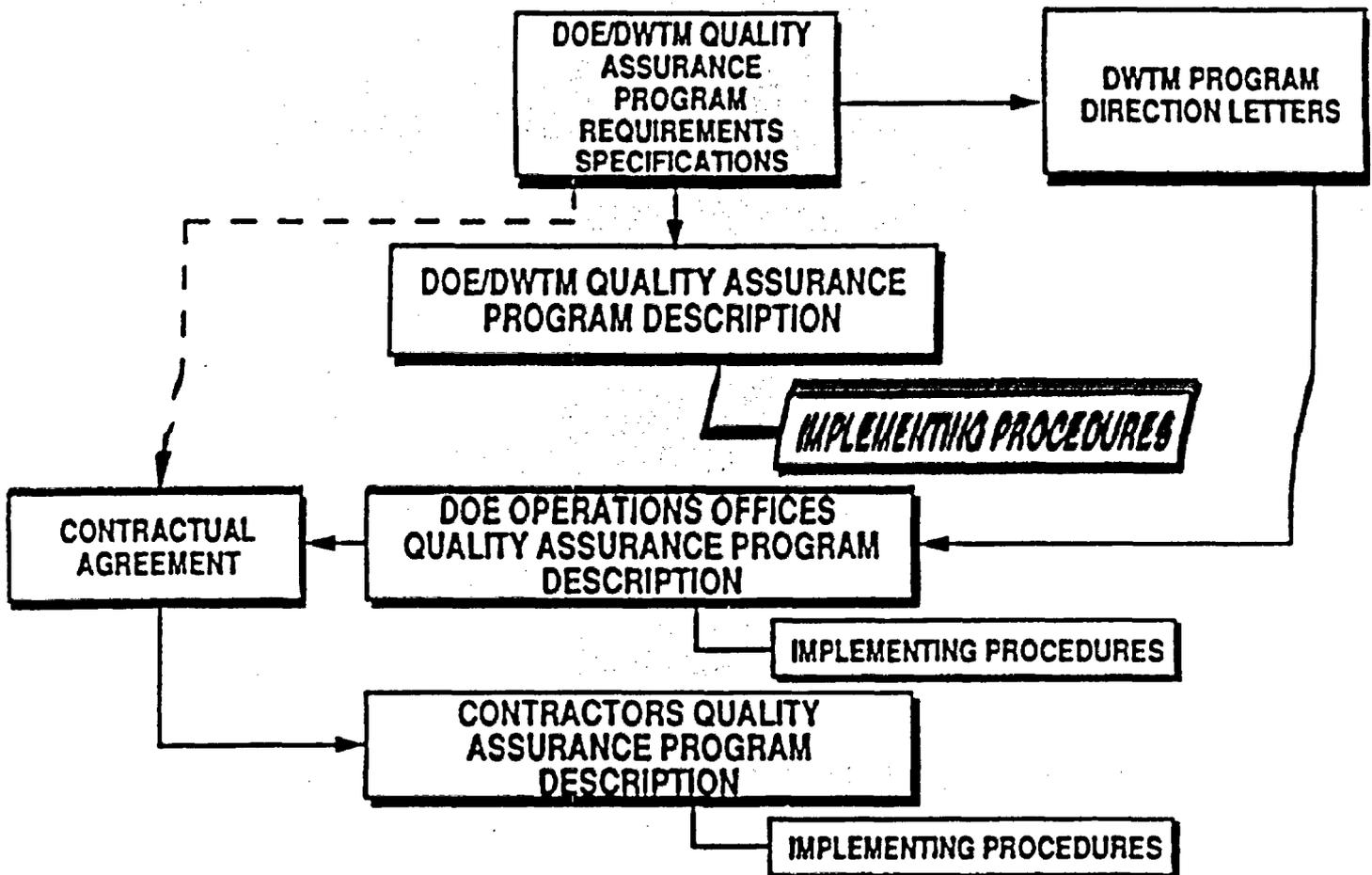
PROGRAM DOCUMENTATION

- *PROGRAM DEFINING DOCUMENTATION*
- *PROGRAM IMPLEMENTING DOCUMENTATION*
- *PROGRAM RECORDING DOCUMENTATION*



TYPICAL RELATIONSHIP OF QUALITY ASSURANCE PROGRAM DESCRIPTIONS TO SUPPORT REPOSITORY LICENSING

DEFENSE HIGH-LEVEL WASTE QUALITY ASSURANCE REQUIREMENTS

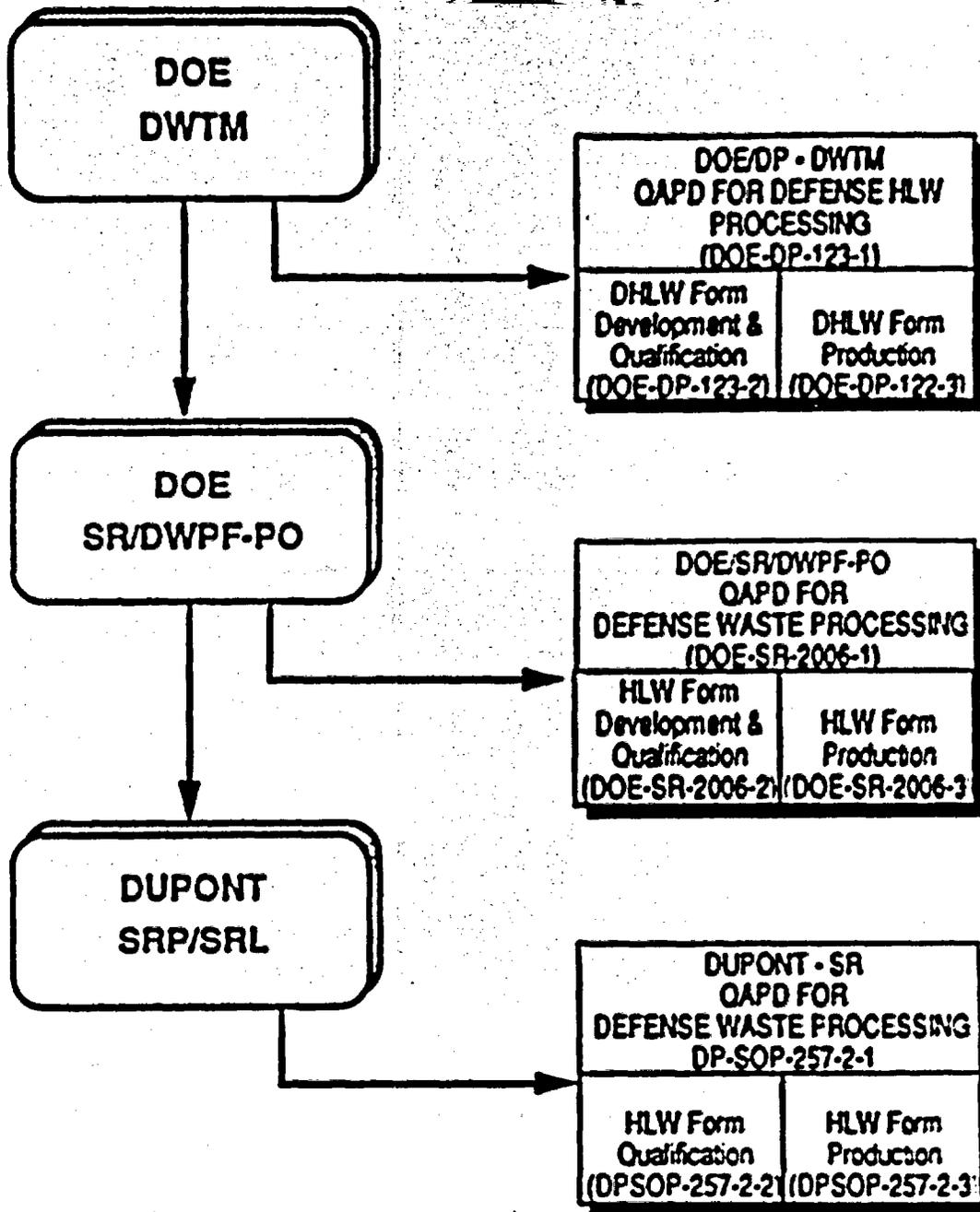


----- Only Used if Contract is Issued
from DOE/HQ

**QUALITY ASSURANCE PROGRAM DESCRIPTION
FOR DEFENSE WASTE PROCESSING-SAVANNAH RIVER**

PLAN FOR DEVELOPMENT-MAJOR PARTICIPANTS

- ⇒ ***Overall Program Description for
Defense Waste Processing***
- ⇒ ***Program Description for
High-Level Waste Form Qualification***
- ⇒ ***Program Description for
High-Level Waste Form Production***



**MAJOR PARTICIPANT ORGANIZATIONS
OF SR WASTE FORM PRODUCER**

**U. S. DEPARTMENT OF ENERGY
OFFICE OF DEFENSE WASTE AND TRANSPORTATION MANAGEMENT**

**QUALITY ASSURANCE
PROGRAM DESCRIPTION**

DOE-DP-123-1

DOE-DWTM

**DEFENSE HIGH-LEVEL
WASTE PROCESSING**

**DOE/DWTM
QUALITY ASSURANCE PROGRAM DESCRIPTION
For
DEFENSE WASTE PROCESSING**

CONCEPTS REFLECTED

- ***Addresses the Requirements***
- ***Identifies DOE Implementation vs Delegation***
- ***Per NRC Type Instructions***
- ***Identifies its Specific Application***

U. S. DEPARTMENT OF ENERGY SAVANNAH RIVER OPERATIONS

QUALITY ASSURANCE PROGRAM DESCRIPTION

FOR
THE DEFENSE WASTE PROCESSING FACILITY-
PROJECT OFFICE

DOE-SR-2006-1

DEFENSE WASTE PROCESSING

DOE/SR
QUALITY ASSURANCE PROGRAM DESCRIPTION
For
DEFENSE WASTE PROCESSING

CONCEPTS REFLECTED

- *Addresses the Requirements*
- *Identifies DOE Implementation vs Delegation*
- *Per NRC Type Instructions*
- *Identifies its Specific Application*

E. I. DU PONT DE NEMOURS & COMPANY
Savannah River Site

AIKEN, SOUTH CAROLINA

**QUALITY ASSURANCE
PROGRAM DESCRIPTION**

DPSOP-257-2-1

**HIGH-LEVEL DEFENSE
WASTE PROCESSING**

**DuPONT
QUALITY ASSURANCE PROGRAM DESCRIPTION
For
DEFENSE WASTE PROCESSING**

CONCEPTS REFLECTED

- ***Addresses the Requirements***
- ***Identifies SRL/SRP Implementation***
- ***Per NRC Type Instructions***
- ***Identifies its Specific Application***
 - ***Qualification***
 - ***Production***

QUALITY ASSURANCE PROGRAM DESCRIPTION
For
DEFENSE WASTE PROCESSING

TYPICAL CONTENTS

Part 1

- **INTRODUCTION**
- **PROGRAM OBJECTIVES**
- **PROGRAM APPLICATION**
- **PROGRAM CONTENT**
- **REFERENCES**
- **ACRONYMS**
- **FIGURES**
- **APPENDICES**

QUALITY ASSURANCE PROGRAM DESCRIPTION
For
DEFENSE WASTE PROCESSING

TYPICAL CONTENTS
Part 2 & 3

- INTRODUCTION
- ORGANIZATION
- QUALITY ASSURANCE PROGRAM
- DESIGN CONTROL
- PROCUREMENT DOCUMENT CONTROL
- INSTRUCTIONS, PROCEDURES AND DRAWINGS
- DOCUMENT CONTROL
- CONTROL OF PURCHASED ITEMS AND SERVICES
- IDENTIFICATION AND CONTROL OF ITEMS
- CONTROL OF PROCESSES
- INSPECTION
- TEST CONTROL
- CONTROL OF MEASURING AND TEST EQUIPMENT
- HANDLING, STORAGE AND SHIPPING
- INSPECTION, TEST AND OPERATING STATUS
- CONTROL OF NONCONFORMING ITEMS
- CORRECTIVE ACTION
- QUALITY ASSURANCE RECORDS
- AUDITS
- ACRONYMS
- REFERENCES
- FIGURES
- TABLES
- ATTACHMENTS

***Example of A Section
From Part 3 of Each
Description***

**QUALITY ASSURANCE
PROGRAM DESCRIPTION**

DOE-DP-122-3

DOE-DWTM

**DEFENSE HIGH-LEVEL
WASTE PROCESSING**

DOE-DP-122-3
Page 55
Rev. 0
6/10/88

8.0 IDENTIFICATION AND CONTROL OF ITEMS

8.1 O&P IMPLEMENTATION

8.1.1 O&P delegates execution responsibility for identification and control of items (including materials or samples) in support of production activities to the operations offices.

8.2 REQUIREMENTS OF OPERATIONS OFFICES

8.2.1 Operations offices are required to establish and implement identification and control practices to support production activities. The description of the practices should include organizational responsibilities. The identification requirements are determined during the initial planning stages and their practice will assure

- (1) That identification of the item is maintained, both on or attached to the item and on records traceable to the item as required throughout storage, handling, and production processing.
- (2) The item(s) can be traced to the appropriate documentation such as drawings, specifications, purchase orders, manufacturing and inspection documents, deviation reports, and physical and chemical test reports.
- (3) The method and location of identification does not affect the function or quality of the item being identified.

U.S. DEPARTMENT OF ENERGY
OFFICE OF ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT

QUALITY ASSURANCE PROGRAM DESCRIPTION

FOR
THE DEFENSE WASTE PROCESSING FACILITY
PROJECT OFFICE

DOE-SR-2006-1

DEFENSE WASTE PROCESSING

DOE-SR 2006-3
Page 59
Rev 0
4/3/08

8.0 IDENTIFICATION AND CONTROL OF ITEMS

8.1 DWPF-PO IMPLEMENTATION

8.1.1 The DWPF-PO delegates execution responsibility for identification and control of items (including materials or samples) in support of production activities to the Operator

8.2 REQUIREMENTS OF THE OPERATOR

8.2.1 The OPERATOR is required, by contract to establish and implement identification and control practices to support production activities. The description of the practices should include organizational responsibilities. The OPERATOR's identification requirements are determined during the initial planning stages and their practice will assure:

- (1) That identification of the item is maintained, both on or attached to the item and on records traceable to the item as required throughout storage, handling, and production processing
- (2) The item(s) can be traced to the appropriate documentation such as drawings, specifications, purchase orders, manufacturing and inspection documents, deviation reports, and physical and chemical test reports.

**QUALITY ASSURANCE
PROGRAM DESCRIPTION**

DPFOP-27-54

**HIGH-LEVEL DEFENSE
WASTE PROCESSING**

DPFOP 257-2-3
Page 48
Draft 2
7-25-88

8.0 IDENTIFICATION AND CONTROL OF ITEMS

DWPF-PWT has implemented a control practice for identification and control of items which support production activities. These practices include the following:

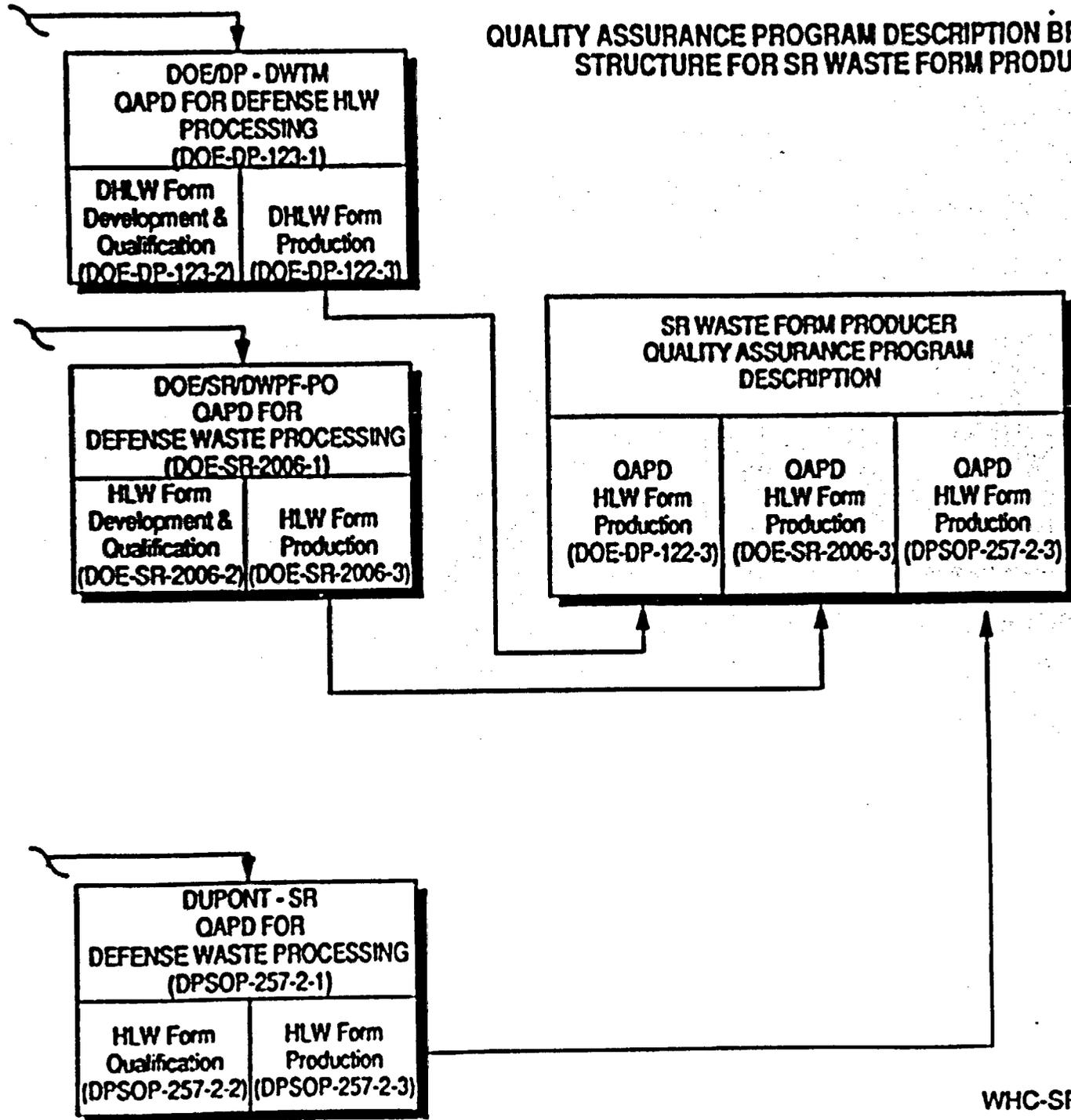
- (1) Identification of items are maintained, both on the item (when possible) and on records traceable to the item as required throughout storage, handling, and product processing of the item. Procedures specify the methods for identification either by physical means, through documentation, or both.
- (2) Traceability of items to drawings, specifications by which they were purchased or manufactured. The DWPF-WE or the Project Department, whichever has design responsibility is responsible for assigning unique identifiers to each item which is designed and purchased or fabricated within SRP for DWPF. Purchase request engineers are responsible for defining unique identifiers for items such as process raw materials or containers that are purchased directly from suppliers.
- (3) Assurance that the correct identification of items and the ensuing traceability (when required) is controlled through the use of an "issue distribution record" which follows the item through its life cycle.

**QUALITY ASSURANCE PROGRAM DESCRIPTION
FOR DEFENSE WASTE PROCESSING-SAVANNAH RIVER**

WHAT THE PROGRAM DESCRIPTIONS DO:

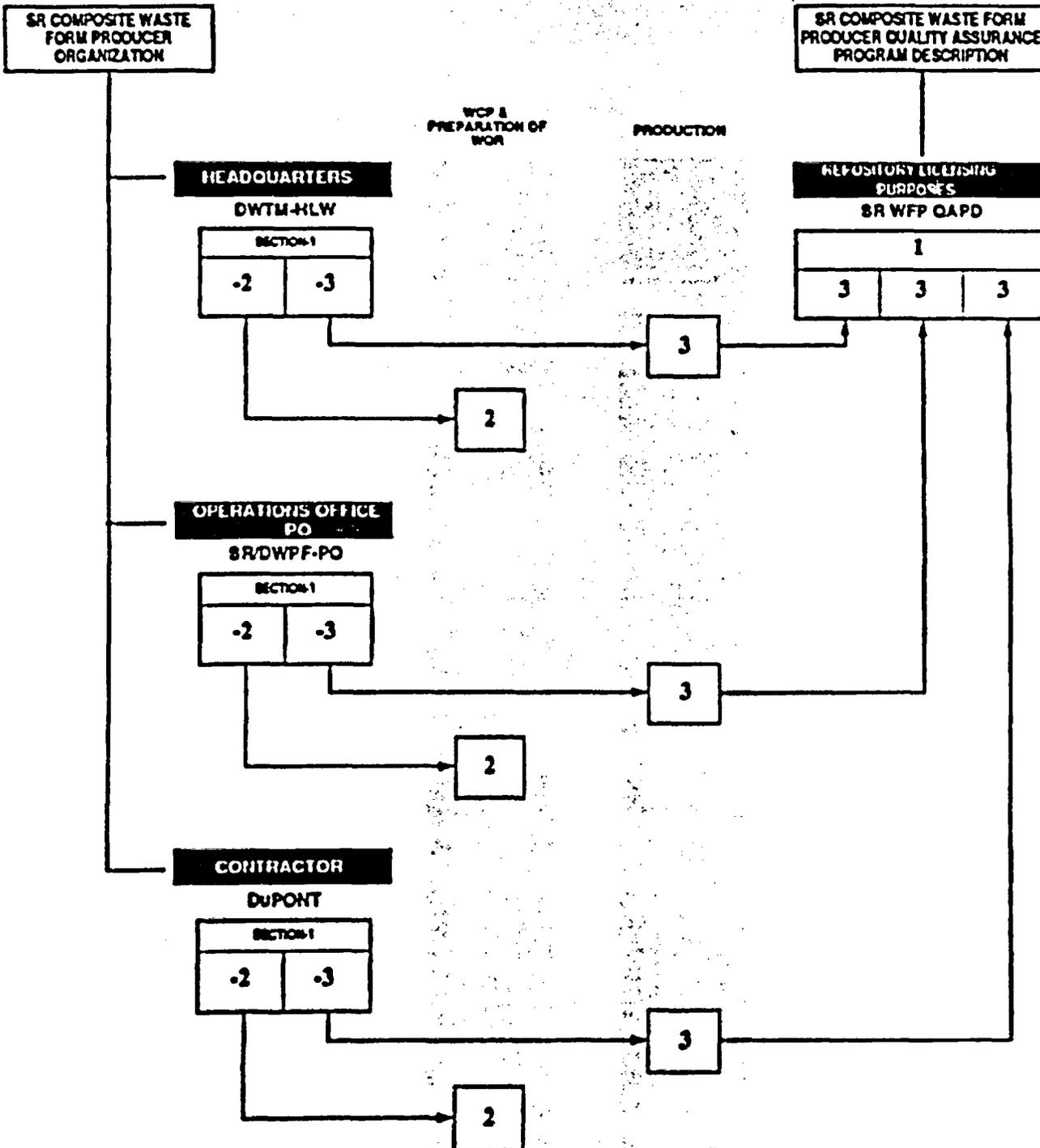
- ⇒ **Organize and Manage the Overall Project Quality Assurance Program**
- ⇒ **Solidify the Waste Form Producer Organizations in their Quality Assurance Programs**
- ⇒ **Secure the Acceptance of DOE Organizations**
- ⇒ **Provide Needed Input to Repository Licensing Activity for Waste Package**

**QUALITY ASSURANCE PROGRAM DESCRIPTION BREAKDOWN
STRUCTURE FOR SR WASTE FORM PRODUCER**



SAVANNAH RIVER

WASTE FORM PRODUCER ORGANIZATIONS QUALITY ASSURANCE PROGRAM DESCRIPTIONS AND THEIR USES



OGR/B-14 IMPLEMENTATION SCHEDULE FOR THE SR WASTE FORM PRODUCER

Schedule Date: 9/15/88

Progress Through: 9/23/88

	FY 88			FY 89									
	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
DWTM QA PROGRAM	1 9/30				2 1/31			3 4/9		4 6/1 Full Implementation			
SR/DWPF-PQ	1 9/30							3 5/1		4 7/1 Full Implementation			
SR/OPERATING CONTRACTOR- QUALIFICATION	1 9/30				2 1/31	3 2/15		4 4/1 Full Implementation					
SR/OPERATING CONTRACTOR- PRODUCTION	1 9/30				2 1/31		3 4/1						4 9/30 Full Implementation

LEGEND

1. OAPD Preparation and Issue
2. Obtain Concurrence (OAPD)
3. Procedure Preparation & Issue
4. Training & Certification
5. Preparation for Implementation
6. SR WFP OAPD Preparation & Issue

STATUS OF DP/DWPF QUALITY ASSURANCE PROGRAM

SUMMARY

- ***Savannah River Waste Form Producer***
 - ***Roles of Program Participants***
 - ***SR-WFP Quality Assurance Program***
 - ***Quality Assurance Program Descriptions***
 - ***Status And Schedule***
-
-



Department of Energy
Washington, DC 20585

AUG 1988

Mr. D.J. Youngblood, Chief
Operations Branch
Division of High-Level
Waste Management
Office of Nuclear Material Safety
and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Reference: 1) Meeting Minutes, Summary of NRC/DOE Meeting
dated July 12, 1988.

Dear Mr. Youngblood:

Find attached a copy of the OCHM baseline document "OGR/B-14
Office of Geologic Repositories Quality Assurance Requirements
for High-Level Waste Form Production", February 1988, for your
information and review. This transmittal is related to QA Open-
Item #4 identified in the meeting summary from our July 7, 1988
meeting (Reference 1).

As we discussed in the meeting, the review of this document is in
our view a lower priority than the NRC review and acceptance of
the ten Program Participant QA Plans identified in our schedule
for NRC acceptance of the DOE QA Program to initiate new site
characterization activities.

Questions related to this transmittal should be addressed to
Edward Rejzner of my staff (202) 506-4500.

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Waste Management

Enclosures

Distribution

Specialist, 202-506-4500
10/1/88
10/1/88

10/1/88

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10/1/88