

Draft
Steering Committee Meeting
Transmutation of Waste

June 21-23, 1999
Battelle Albuquerque Office

6/21/99--1:00 p.m.

Attendees—

Steering Committee

Jim Bresee	DOE-RW
Mike Todosow	BNL
Darlene Hoffman	LBL
Les Burris	ANL
Carl Walter	LLNL
Dave Wade	ANL
Ed Arthur	LANL
Dave Goodwin	DOE-SC
John Herczeg	DOE-NE
Eric Schweitzer (Alt)	DOE-DP

TWG Chairs

Jim Laidler	ST&WF ANL
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Support

Dill Shipler	PNNL
Mike Shay	PNNL
Rosalind Schrempf	PNNL

These minutes attempt to capture concepts, issues, and opinions, but are not intended to be a verbatim transcript. Please provide any additions or corrections to Dill Shipler:

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Agenda

Monday Afternoon: Review and discussion of June 15 version of ATW Overview Report.

Tuesday Morning: Status and discussion of TWG Reports including costs, schedules, and remaining issues.

Tuesday Afternoon: Continue discussions of Overview and TWG Reports including roadmaps, schedules, and issues.

Wednesday Morning: Review of revised Overview Report Sections. Address remaining TWG issues.

Discussion during Lunch

- TWG reports—Laboratory reports are to be prepared, reviewed, and approved by each responsible laboratory.
- Overview report—will be based on the TWG reports and also express DOE policy.
- The audience for the Overview report was discussed and determined to primarily be congressional staffers.
- ATW program—There is no ATW program now—However, a program would be of interest to NE (reactors) and SC (accelerators)

Overview Report Review—

- Arthur—If for staffers:
 - Now contains too much jargon.
 - Needs more background information on nuclear aspects and basic definitions of processes.
 - Need to develop information basis for the proposed scenario, i.e., set the stage, describe how ATW works.
 - The summary does not provide a picture of the R&D technology road map and indicates no decision points.
- Todosow
 - Needs more background up front—doesn't provide a flow, doesn't string the process all together.
- Walter
 - SSIG fills in some of detail—hangs together better.
 - Should expand scope to cover all fuel, HLW, research reactor fuel, and other nuclear waste issues.
 - Add analysis without HLW in repository.
 - Separate HLW and FP repositories.
- Wade—Same comments as above.
 - Too much mixing of scenario features between R&D and LCC
 - LCC seems to drive R&D and it should not be a driver. They should be clearly separated
 - Explain conversion of 2% of SNF being turned into heat and that heat could be used for other conversion purposes.
- Burris—
 - Inconsistency in numbers and dates.
 - Factor of 10 seems to be the limit on dose improvement.

Discussion on repository improvements and treatment of various wastes (Section 9)

- Laidler
 - Going for a 30 year program is too much.
 - Several agreed that limiting the discussion to R&D period would be beneficial.
 - Need to clearly separate R&D, Demo, and deployment.
 - Concentrate on R&D with decision point to move on

Discussion on what should be in the overview report—

- Summary of TWG reports? No, not the same kind of report.
- The overview report is not a summary report. It would be difficult to just summarize.
- The reports have different focuses. People involved have different views and concerns.
- Current version has too much on LCC. Should have more focus on R&D and benefits there from.
- Should show a difference between scientific and engineering research, and ATW technology development.
- Congressional staff will be more interested in research rather than technology deployment.
- Focus on R&D. The first 5 pages are critical to getting and keeping attention.
- Bresee—The overview report is **not** going to world experts—The overview report will be the DOE report to congress.
 - We have 2 months to work on this report outside of the TWG reports.
- (Herczeg—French interested in doing research in US. What are we doing with ATW that could be of interest to French and US, e.g., FFTF, other facilities?)
- Goodwin—need to limit activities to less than 15 years. Need to demonstrate something in 10 years.
 - Really need something in 5-10 year period.
 - Need early integrated demonstration.
 - For political visibility.
 - To demonstrate materials capabilities.
 - Should separate tracks for materials vs demo.
 - Will we be just shuffling existing DOE money from other programs?
 - We should reinsert some visible intermediate test/demo facilities like the STF.
- Wade—Thinks it is all here in the overview report but it needs to be reorganized.

Revisit meeting agenda:

- Bresee
 - Monday p.m.—identify and address key concerns.
 - Tuesday a.m.—identify what needs to be reworked.
 - Seemingly seamless schedule to deployment.
 - Identify and address major problems.

- Redefine and reschedule STF and/or other tests/facilities.
- Revised overview format, as needed, for emphasis and background.
- Tuesday p.m.
 - TWG reports status, problems, consistency, etc.
- Wednesday a.m.
 - Review revised overview report sections.
 - Review T/B costs, R&D, and demonstration

Discussion on early test facility

- Spallation and cooling testing at LANSCE.
- Fuel studies at FFTF.
- Add accelerator to FFTF—linac or cyclotron.
- Processing at ANL.
- SR—APT accelerator.
- French facility.
- Multinational test facility.
- Europeans ahead on target materials.
- National policies.
- Integrated demo.
 - Target and fuels.
 - Add accelerator to FFTF.
- Demonstrate something at least every 5 years.
- Breese concerns about current scenario.
 - Seamless move to deployment.
 - Steep ramp up of R&D costs.
 - OK if back fill for APT staff/activities.
 - OK if use \$ for test/demo facility.
 - Bad visuals for congress.
 - LCC driving RD&D.
 - Shift from LBE to Na cooling.

***What can the SC do to help guide the next version of the Overview report?

- Relook at requirements (see overview report requirements document handed out by PNNL)
- Revise section 1.3, summary-check bullets, content, and format.
- Reorder sections and prioritize.

***Tudosow--Look at the SSIG report for input to the overview report.

- Chapter 2 for what ATW is and why.
 - Chapter 6 for pieces of the ATW program—R&D to Demo to deployment.
 - Need more of this in the overview report.
- What are the ATW system options?
 - Coolant—Na, LBE, gas?

- Accelerator—linac, cyclotron (testing/demo/deployment?)
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New content and format for the overview report—(see file from computer/projector session)

- What is the vision? Will this 100-year timeline turn people off? Probably. Only provide the concept, **not** the LCC scenario (that comes later in the report for a different purpose).
- Logic for Section 1.
 - Why do we need to do anything about SNF (or HLW)?
 - What are the options for accomplishing this?
 - How does ATW fit into this accomplishment?
 - What is the top-level roadmap for ATW R&D?
 - How does it fit into the repository design/program?

New Demonstration Scenario

(Lengthy, productive discussion at the boards—TWG and SSIG roadmaps).

- Transmuter (Back End)—5 to 8 years (decision on coolant)

<ul style="list-style-type: none"> • Oxide to metal • Fuel definition • Fuel performance (Burnup, material) • Coolant performance, components • Chloride Volatility Processing at end of irradiation • Waste forms • Fuel fab 		FFTF		ANL-W		Initial Integrated Demo
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- Spent Fuel Preparation (Front End)—5 years

<ul style="list-style-type: none"> • SF to UREX • Oxide Reduction • FP targets 		SR
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- Accelerator (Driver) --5 years

<ul style="list-style-type: none"> • Accelerator • Window • Target (spallation) 		LANSCE
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- Design and build 2007

***See viewgraph of new RD&D roadmap

6/22/99
Dill Shipler

ATW Steering Committee Meeting
BAO

Additional Attendees

TWG Chairs

Greg Van Tuyle	LANL
David Hill	SSIG-ANL
Phillip Finck	SSIG-ANL
Doug Crawford	ST&WF-ANL-W

Summary of concerns from first day.

- Bresee
 - Funding ramp up too steep.
 - Need early, small scale testing.
 - Show visibility of early progress.
 - Early integration/testing of related components.
 - Separation of R&D, Demo, and deployment.
 - Multinational testing/demonstration.

TWG Presentations

- Hill—SSIG (see handout)
 - Collaboration recommendations (3).
 - US is behind, haven't been participating in ATW technology.
 - We need to find out what's going on—update.
 - Do what's necessary to acquire distilled information—meetings, publications, collaborations.
 - US must start this involvement **now**, not a year from now.
 - Make collaboration explicit in overview report.
 - Russian collaboration.
 - Accelerator technology control.
 - Look at related R&D from a scientific view, not necessarily as alternative technology.
 - Need specific proposals in the overview report?
 - Probably not specifics, other than LBE? Craft words to couple with specific technical activities.
 - Identify potential hooks—organizations, programs, subjects,
 - Suggest coordinating committee—US lead? Policy? Funding? Consistent?
 - ISTC money supporting target work? Includes US \$? Other examples?
 - SSIG Report Content—what's there-why-comments
 - Move implementation at end (appendix?)-make clear that it's not necessarily a follow on of R&D
 - Show R&D as “Science-based” not deployment driven.

- Reference scenario provides support for R&D planning and scheduling.
- ***Provided redraft of SSIG sections 6, 9, & App to 6 for review today

***Showed revision 2 of new roadmap viewgraph—many comments—Didn't like (see Shay sketch).

- Need system integration piece/line.
- Don't use "CD" notation.
- Show lines pointing toward demo.
- Grouping of technologies is good.
- Show R&D separate from development (on separate lines-below).
- Liked "rev" rather than "rev 2", e.g., selling R&D with options toward development.
- List major decision points (not CD or KD) no change of dates.
 - May have two schedules: preferred case vs quickest case.
 - Programmatic decision to go to demo-not everything, but enough info to make decision (Schweitzer-enough to see the light at the end of the tunnel-not done with R&D)—(see rest of Hill viewgraphs)
 - 6 years?
- Discussion on "reference" vs "preferred" & perhaps "baseline" technologies
- How about "backup" for technologies that would be used if deployment were accelerated ahead of R&D results.
 - Ended-preferred, reference, alternate.
- Start funding and activities in 2000—separate section.
 - Show first year activities—start up activities.
 - Program office.
 - Trade studies.
 - On-going activities.
 - International collaboration.
 - Demo decision—2004 (five years into program).

***Don't change cost profiles—let it be what it is

***Use dates not years—not 0, 1, 2, but 2000, 2001

- Laidler ST&WF
(See viewgraphs on separations technology)
 - Process selection—much discussion (note difference in processing SNF and ATW—pyro vs chloride volatility).
 - Description of processes-much discussion
 - Relative costs—aqueous vs pyro—batch vs continuous
 - Proliferation resistance isn't as good as we think it is—any process can be jimmied to bring out Pu.—but we do transmute it—real question is the ease of **diversion**—monitoring, accountability, control.
- **Crawford T/B**
(See viewgraphs)
 - Question and suggestions on standardizing terminology.

- Blanket, not core (use transmuter)
- Blanket fuel assemblies (OK), not transmutation assemblies
- LLFP transmutation assemblies, not target assemblies (fission product assemblies)
- Spallation target (just target), not fuel assemblies
- Feasibility Decisions-what years?
 - Blanket neutronics and design concepts—
 - Blanket safety—
 - LBE coolant tech—
 - Fuel form—
 - LBE target (window)—
 - W target issues—
- Larger issues for T/B report.
 - Demo size and components/Component Test Facility (CTF) strategy-30 MWt too small (for LBE)-would take ¼ scale, e.g., 100 + MWt.
 - Better integration effort earlier (SSIG plans trade studies/system integration).
 - He system in RM? Not now a full-fledged alternative. Will carry as vicarious option.
- Minor issues for T/B.
 - Tc & I transmutation strategy—not well developed or known—state as a goal—watch how it's used-e.g., repository performance—is included in fuel section, will need to be addressed in separations.
 - Secondary pump development.
 - Recalibrate revised scenario/schedule (today).
 - Ideas seem to gain credibility through discussions. Need caution and hard data.

***TWG provide a summary/abstract of each report for overview report? Use as executive summary for TWG reports. By 6/25/99

World Expert Meeting

- Bresee
 - Purpose/process/products of their review.
 - Need for reservations 6/23/99.
 - Will have 30 min to present review results.
 - Wednesday evening reception—6:00 p.m.—cash bar—experts and SC—Crystal City Marriott.
 - Thursday start 8:30 a.m.—
 - Thursday dinner 7:00 p.m., **tickets** for dinner.
 - Experts will **not** have overview report.
 - **Associated SC meeting? Friday afternoon?**

TWG Reports/Overview Report

- Bresee
 - TWG reports

- To Experts by Friday 7/2/99
- Final TWG reports 8/8/99
- Overview Report
 - SC meet a few hours on Friday 7/16/99 after Expert meeting
 - SC meet week or two after Expert meeting—7/23-24/99—ANL

6/23/99

Dill Shipler

Attendees-

SC

Dave Goodwin	DOE-SC
Jim Bresee	DOE-RW
Mike Todosow	BNL
Carl Walter	LLNL

TWG Chairs

Dave Hill	SSIG-ANL	SC Alt for Dave Wade
Phillip Finck	SSIG-ANL	
Doug Crawford	T/B-ANL-W	
Francesco Venneri	T/B-LANL	

Other

Greg Van Tyule	LANL
Dill Shipler	PNNL
Mike Shay	PNNL
Rosalind Schrempf	PNNL

Received comments—

- Carl Walter—overview report markup.
- Bill Bishop-- overview report markup.
- **Review Section 1 rewrite—**
 - Shay--
 - See markups of attendees.
 - SNF equals waste? Make a statement? SSIG does. Now a waste but could become an energy resource later.
 - Define ADS/ADTT (accelerator-driven systems and accelerator-driven transmutation technology) European terminology.
 - Labs and countries in alphabetical order.
 - Use “spent fuel” not civilian or commercial.
 - For tonnes—use small “t” (SI).
 - Question and discussion on proliferation vs diversion—indicate risk vs time—see Laidler vugraph—add to glossary.

- Throughput is one word, not hyphenated.
- Lines 279-281, 294-, and 309-314---too much on proliferation-more balance
- Question—all benefits-needs more balance with institutional and other issues—lighten up, tone down benefits and spin-off technologies. More emphasis on main reason for ATW.
- 272-287, strike or move to core competency and make into text.—helps balance –see 309-314.
- 295-300 not international benefits-collapse into text—eliminate bullet last.
- Add P with list of institutional challenges—after line 108-
- Retitle section—stand alone—Executive summary?

*****Bresee-would really like a 7 page “executive summary”**

- Todosow
 - Still need sum kind of summary—road map, costs, schedule—like what we put in section 1.3
- Hill—
 - must be even and balanced—
 - Make statement that no comparisons were made relative to ATS vs reactor systems (this is only a scientific activity, i.e., R&D)
- Veneri/Crawford—T/B planning review
 - Revised schedule and cost estimate (see Shay notes and cost summaries).
 - Can not carry all LANSCE charges.
 - Smooth the annual cost profile over the first 5-8 years
 - Question on inclusion of contingency (how about other program planning and management costs?)
 - Generally included in R&D costs.
- Summary
 - Bresee
 - Show discrete elements/phases of the program with clear decision points.
 - Want summaries of TWG reports—pages? Short-3 pages?
 - Want 6 viewgraphs to express summary
 - Overview will not go to experts.
 - Comments and other input due by early August—6th.
 - Revision of SSIG section 6 table.
 - Primary system components.
 - Backup system components.
 - Reference system for TCLCC.
 - TSLCC will be moved to end and down played.
 - **SC meeting July 21-22, 1999, ANL (Wednesday-Thursday)**
 - **Will look at potential SC meeting at Expert meeting July 15-16, 1999, WDC**

- **Actions**

- Comments from Venneri to Shipler, 6/23/99.
- List of TWG members to attend World Expert meeting to Julian Hill 6/23/99.
- Electronic versions of vugraphs used in this SC meeting to Shipler, 6/25/99.
- Three page summary from TWG Chairs to Mike Shay, 6/28/99.
- Six summary vugraphs from each TWG chair to Mike Shay, 6/28/99.

Questions

- Technical question on demo schedule and what it technically concludes.—
Particularly, LBE application?
 - A loop system—OK—LBE loop in FFTF?
 - Pumps—OK
 - To 840 MWt—OK
 - Na vs LBE, broadly of similar cost--OK
 - Both liquid.
 - Engineering similar.
 - Except LBE has stagnation problems. Must design to look like loop.
 - Can develop like Na—big vessel, limited internals.