R2-B33

LOW-LEVEL RADIOACTIVE WASTE STRATEGIC PLAN

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August 1994

PURPOSE

The purpose of this plan is to identify the strategy for minimizing Low-Level Radioactive Waste (LLRW) generation and disposal costs, and to identify the actions needed to implement the strategy.

GOAL

The Columbia Plant's goal is to reduce LLRW generation to 1000 ft^3 in 1996.

BACKGROUND

Figure 1 shows the results of the very successful LLRW reduction program that's been in place for almost 10 years under the primary leadership of Jim McCormac.

Although the Columbia Plant has a very successful history, LLRW disposal costs projected after the closure of the Barnwell LLRW disposal site on December 31, 1995 force us to make another step change reduction in LLRW generation.

Figure 2 shows the increase in LLRW disposal costs for drums sent directly to Barnwell.

Figure 3 shows the increase in LLRW disposal costs for drums ultra-compacted at SEG first and then sent to Barnwell.

In 1993, 2300 ft^3 of LLRW was disposed for $500,000. The projection for 1994 is 2700 ft^3 at almost $1,000,000. The dramatic cost increase came after the Barnwell site was closed to generators outside the Southeast Compact on July 1, 1994. Chem Nuclear (Barnwell's operator) raised its prices on the remaining customers in the Southeast Compact to ensure their costs were covered.

The official announcement recently was that the replacement site in North Carolina is not expected to open until 1998 at the earliest. If it does open, costs are expected to be 5-10 times today's cost. Also, the future of the Southeast Compact is uncertain; some predict the North Carolina site will never open to generators outside the state. In this case, the South Carolina Legislature could vote to keep Barnwell open to South Carolina generators (a very emotional issue). The bottom line is that **LLRW disposal costs beyond 1995 are extremely uncertain, but will be extremely high.**

C-22

Jim/Bill — I organized our thoughts into this "Strategic Plan" for McDonald. Review & let's talk Friday 8/12 @ 10:00 in my office to finalize before presenting to McD/ECK.

STRATEGY

During the short-term (ie., while Barnwell is still open), our strategy is to process and dispose of the entire currently known LLRW backlog.

Attachment 1 shows this backlog.

Simultaneously, the strategy to minimize LLRW generation and disposal costs is broken down into the following steps:

- Prevent
- Minimize
- Recycle
- Free-release
- Volume-reduce

PREVENT
The first step is to prevent generation of materials that could become LLRW. This includes prohibiting unnecessary materials from entering the Chemical Area, and judiciously replacing equipment and systems already in the Chemical Area.

MINIMIZE
If a material must be in the Chemical Area, the next step is to minimize the amount generated to the lowest practical level.

RECYCLE
The next step in the strategy is to recycle the material within the Chemical Area. This includes rebuilding parts and equipment as much as possible.

FREE-RELEASE
Materials not able to be recycled are to be free-released from the Columbia Plant for recycle by an outside vendor or disposal as non-LLRW. Note that recycling by an outside vendor includes SEG's Metal Melt Facility, even though the material is not actually "free-released" from the Columbia Plant.

VOLUME-REDUCE
Once all of the above options are exhausted, the volume of the material is minimized and disposed of as LLRW.

Attachment 2 shows the actions needed to implement the strategy for each category of LLRW.

ATTACHMENT 2

COMBUSTIBLES - MISCELLANEOUS	
PREVENT	1. Educate Plant employees on LLRW disposal situation & cost 2. Prohibit all unnecessary materials from entering Chemical Area (eg., packaging)
MINIMIZE	1. Develop accounting system to charge generators for combustible waste generated 2. Plant Management hold generators accountable for combustible waste cost objectives 3. Publicize data showing waste generated by Area versus objective
RECYCLE	1. Develop culture of reusing materials as much as practical (eg., gloves, rags)
FREE-RELEASE	No actions identified
VOLUME-REDUCE	1. Burn all combustibles without segregation by uranium content (ie., all Incinerator ash will be dissolved for total uranium recovery) 2. Intall next generation of Incinerator controls to maximize combustion efficiency & minimize ash volume

COMBUSTIBLES - HEPA FILTERS	
PREVENT	The only way to prevent generation of HEPA filters is to develop/design/install a new particulate removal technology such as electrostatic precipitation. This will not be pursued at this time.
MINIMIZE	1. For HEPA filters being changed due to moisture, implement upstream corrective actions to prevent moisture from reaching filters 2. For HEPA filters being changed due to powder, implement upstream corrective actions to prevent excess powder from reaching filters
RECYCLE	1. Develop HEPA filter with reusable frame & internals made only of combustible materials (Possible Technology Development Agreement with GE, working with filter manufacturer)
FREE-RELEASE	1. Develop HEPA filter with free-releasable metal frame, and internals made only of combustible materials (Second choice if reuseable filter cannot be developed - possible Technology Development Agreement with GE, working with filter manufacturer)
VOLUME-REDUCE	Developing HEPA filters described above will reduce ash volume by eliminating combustible frame 1. Burn all combustibles without segregation by uranium content (ie., all Incinerator ash will be dissolved for total uranium recovery) 2. Intall next generation of Incinerator controls to maximize combustion efficiency & minimize ash volume

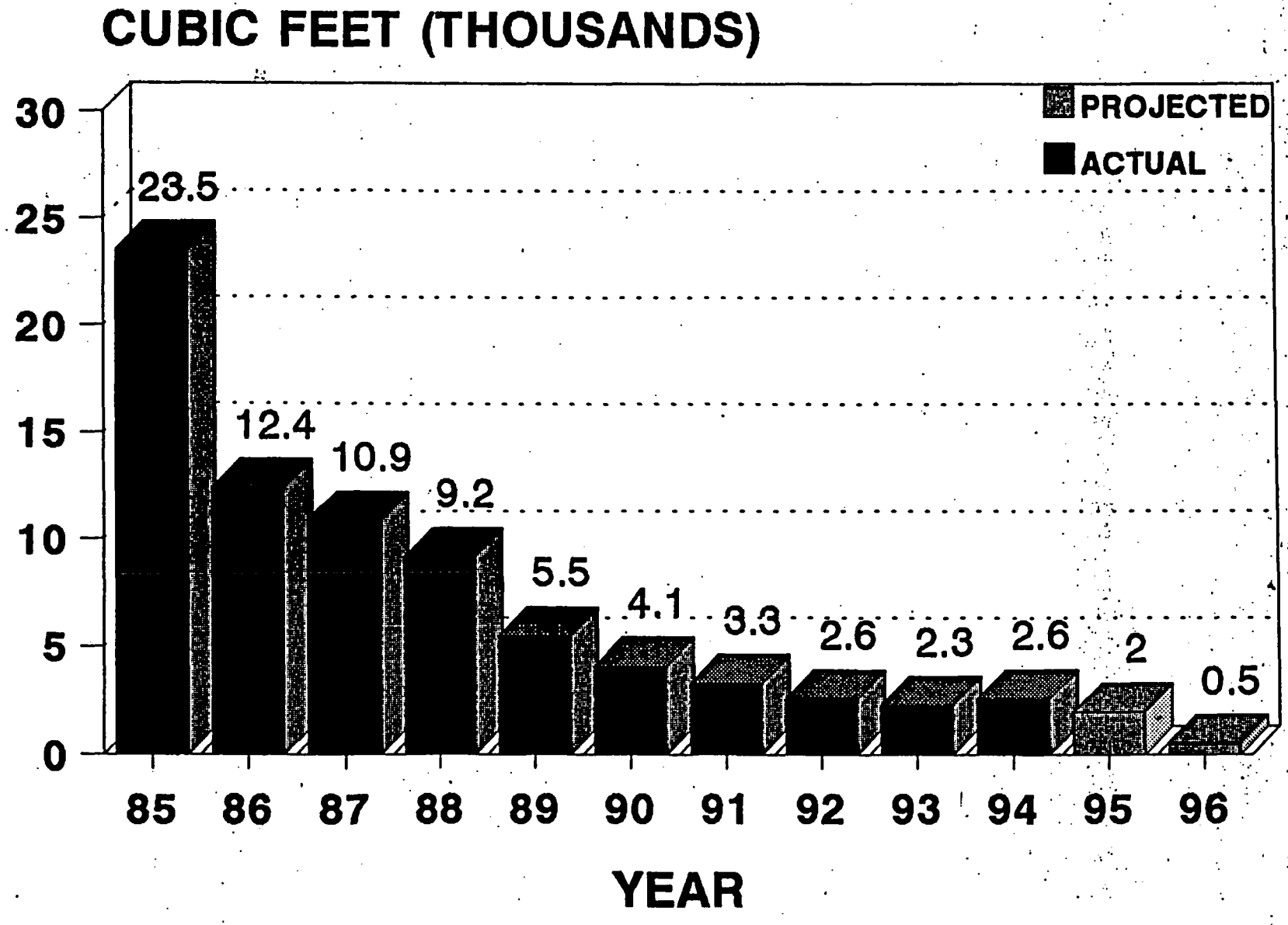
NON-COMBUSTIBLES	
PREVENT	1. For proposed process improvement projects requiring dismantling of existing equipment, calculate ROI using: a. $6,000/drum LLRW disposal cost, and b. "experienced" estimate of LLRW volume generated 2. For proposed projects requiring dismantling of existing equipment not classified as process improvements (eg., regulatory), Plant Staff approval required
MINIMIZE	1. Design equipment to maximize free-releasable materials (eg., large flat removable metal sections) 2. Substitute combustible materials for non-free-releasable non-combustible materials (eg., wood polypak racks instead of angle-iron)
RECYCLE	1. Rebuild parts & equipment (eg., valves, pressure gages) 2. Use rebuilt parts & equipment instead of new for all capital & expense projects and maintenance activities 3. Develop Plant Standard for reusable pipe insulation & specify for all new & replacement insulation
FREE-RELEASE	1. Startup Ultrasonic Cleaning system 2. Maximize use of Honing Booth, Parts Washer & Ultrasonic Cleaning system 3. Dismantle large equipment items into smaller, free-releasable items 4. Prohibit painting of Chemical Area equipment (which makes free-release impossible or extremely difficult) 5. For non-free-releasable metals, use SEG's Metal Melt Facility To free-release smaller, irregular-shaped parts, a method for measuring U_{235} content must be developed. This will not be pursued at this time.
VOLUME-REDUCE	1. Manually separate all combustible materials from non-combustibles 2. Maximize use of Shredder, Low-Pressure Compactor & SEG's Ultra-Compactor 3. Identify & use container more volume-efficient than 55-gallon drums

RESIDUES - WATERGLASS CAKE	
PREVENT	The only ways to prevent the generation of Waterglass Cake are to 1) shut down the ADU Conversion operation, or 2) develop a uranium recovery method that generates no waste. These will not be pursued at this time.
MINIMIZE	1. Minimize ratio of sodium silicate-to-plant waste for Waterglass precipitation 2. Identify extraneous sources contributing to plant waste stream to Waterglass & remove (eg., ADU Slurry Dryer Condenser condensate) 3. Optimize ADU Conversion hydrolysis, precipitation & decanter unit operations to minimize waste liquid generated while maintaining product quality
RECYCLE	1. Develop method to regenerate sodium silicate from Waterglass Cake & recycle to Waterglass process
FREE-RELEASE	1. Develop method to recover all uranium from Waterglass Cake & dispose of residue as non-LLRW
VOLUME-REDUCE	1. Identify & implement method for filling drum with Waterglass Cake without using small bags 2. Proceduralize multiple compactions of Waterglass Cake in drums 3. Maximize use of SEG's Ultra-Compactor or Mobile High-Pressure Compactor for Waterglass Cake drums

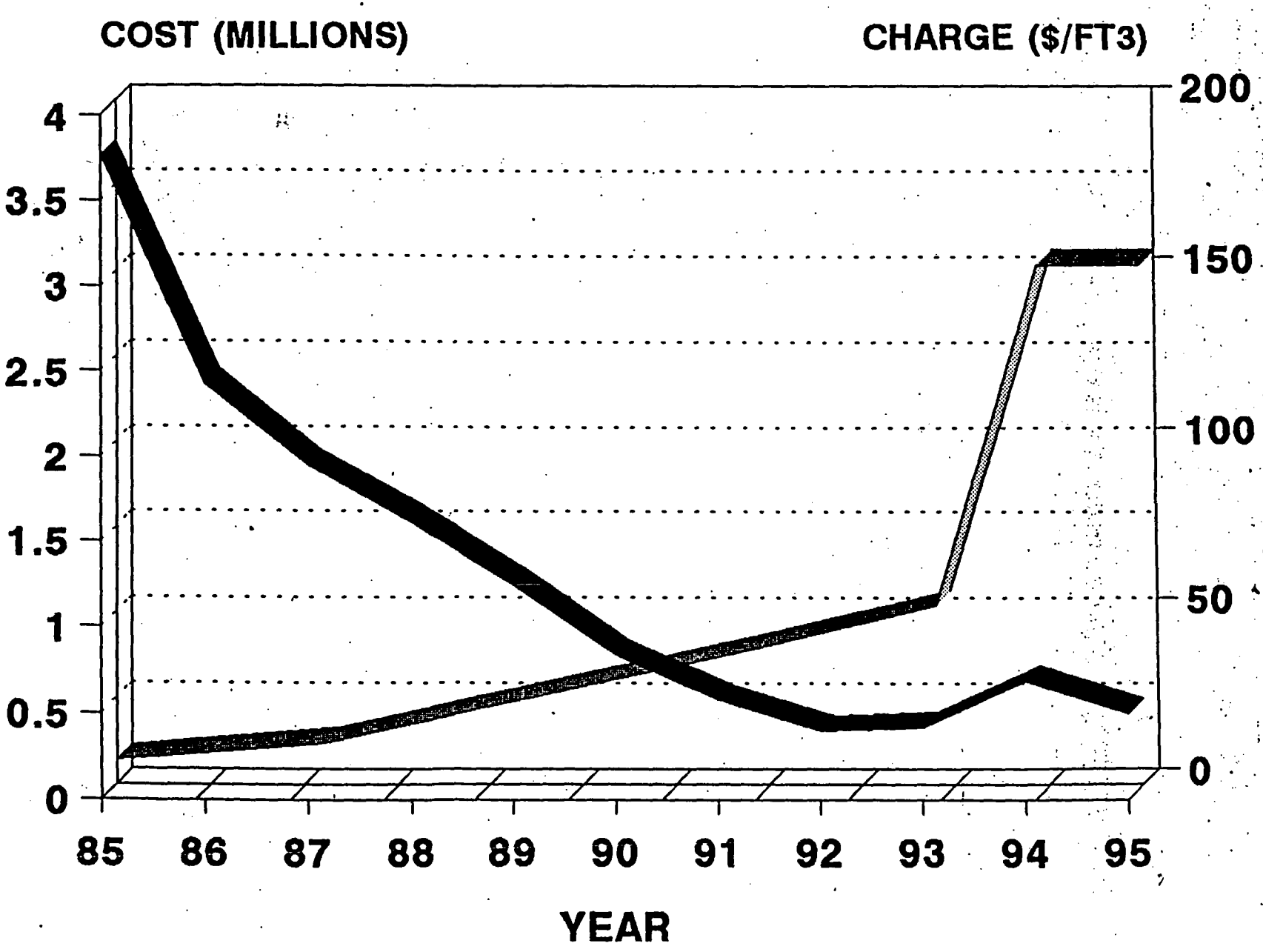
RESIDUES - AQ WASTE CAKE	
PREVENT	The only ways to prevent the generation of AQ Waste Cake are to 1) shut down the Solvent Extraction operation, or 2) develop a uranium recovery method that generates no waste. These will not be pursued at this time.
MINIMIZE	1. Manage recycle materials in ADU Conversion & Pelleting to minimize nitrate solutions requiring Solvent Extraction processing
RECYCLE	No actions identified
FREE-RELEASE	1. Develop method to recover all uranium from AQ Waste Liquid or Cake & dispose of residue as non-LLRW
VOLUME-REDUCE	1. Identify & implement method for filling drum with AQ Waste Cake without using small bags 2. Proceduralize multiple compactions of AQ Waste Cake in drums 3. Maximize use of SEG's Ultra-Compactor or Mobile High-Pressure Compactor for AQ Waste Cake drums

RESIDUES - DISSOLVER PRESS CAKE	
PREVENT	No actions identified
MINIMIZE	Actions identified to minimize ash generated from Combustibles will minimize volume of Dissolver Press Cake generated from ash No other actions identified
RECYCLE	No actions identified
FREE-RELEASE	1. Develop method to recover all uranium from Dissolver Press Cake & dispose of residue as non-LLRW
VOLUME-REDUCE	1. Identify & implement method for filling drum with Dissolver Press Cake without using small bags 2. Proceduralize multiple compactions of Dissolver Press Cake in drums 3. Maximize use of SEG's Ultra-Compactor or Mobile High-Pressure Compactor for Dissolver Press Cake drums

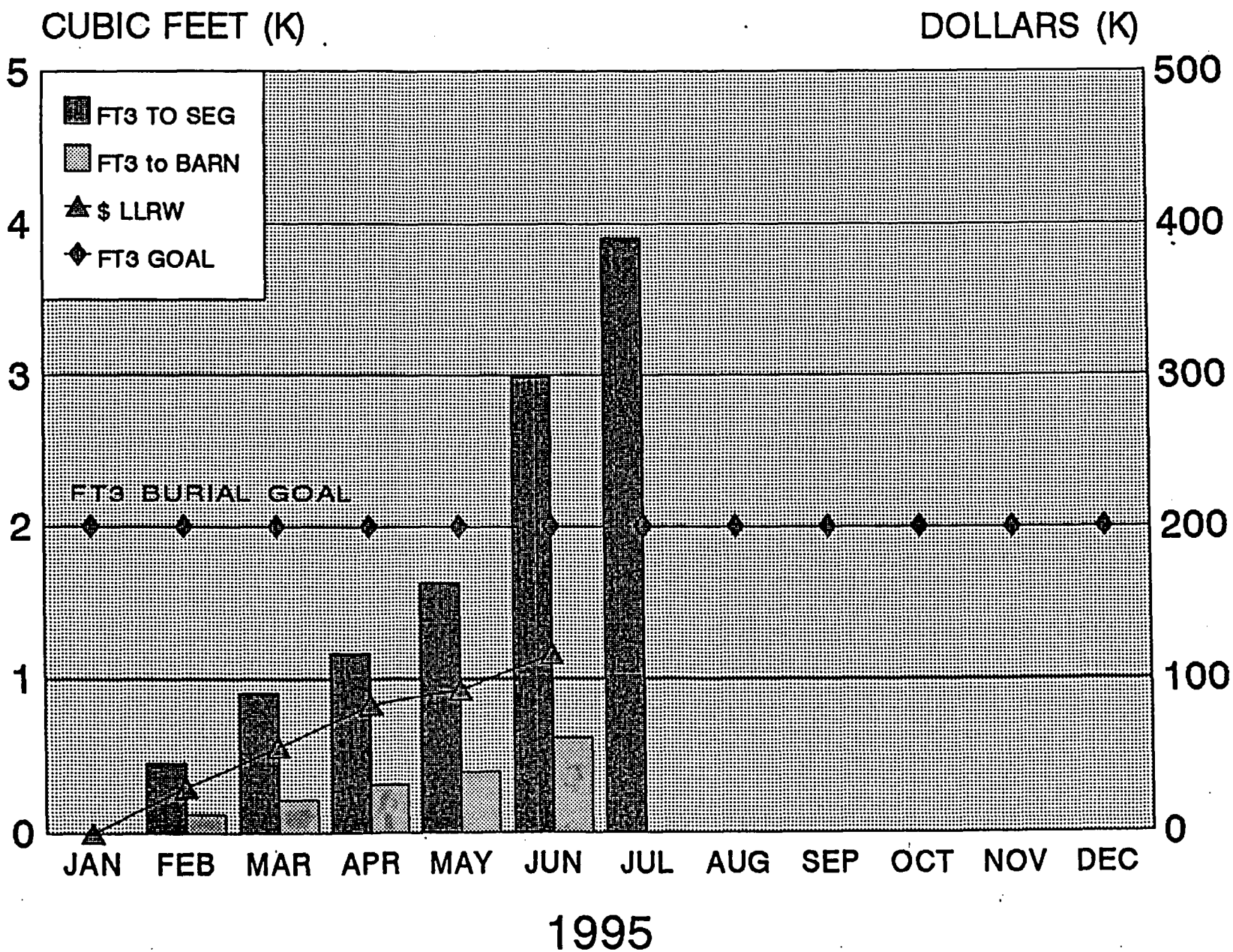
LOW LEVEL RADIOACTIVE WASTE DISPOSAL VOLUME



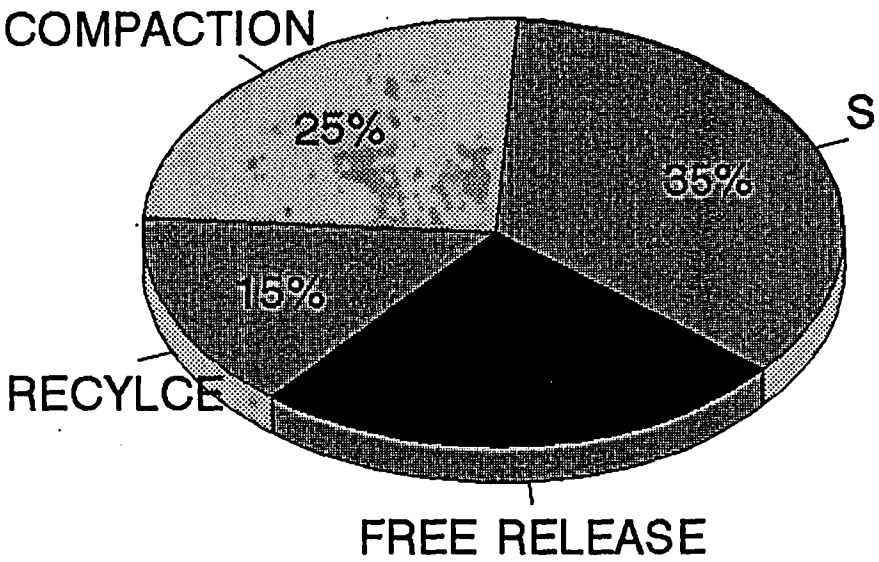
LOW LEVEL RADIOACTIVE WASTE



1995 LLRW STATUS

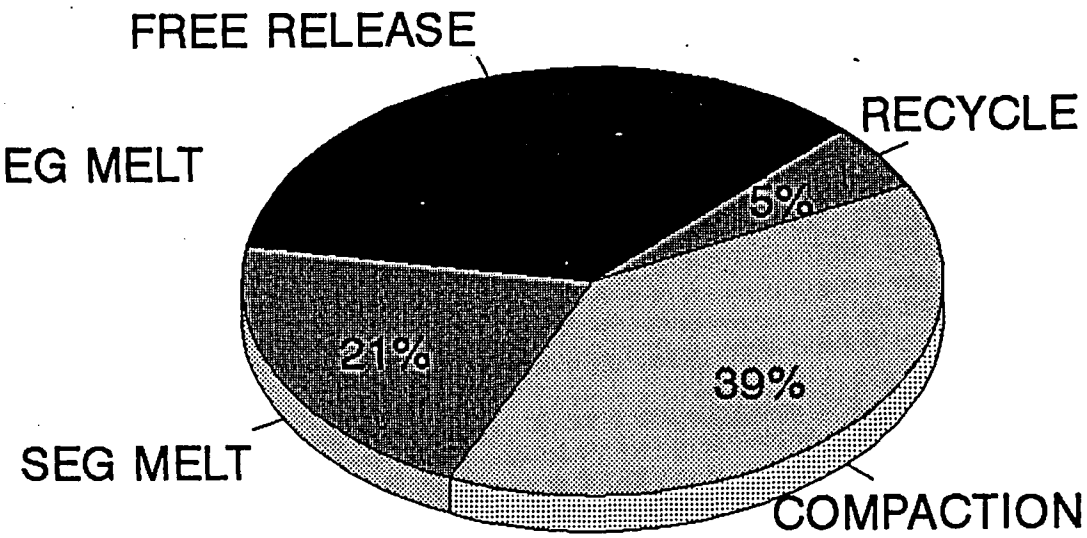


LOW LEVEL RADIOACTIVE WASTE



1995 PROJECTED

$1000K 2000FT3



1995 YTD (THRU MAY)

$57K 410FT3

APPROACH

KEY ISSUES:

METALLICS:

- **DEDICATED LLRW TEAM (1 MANAGER - 13 OPERATORS - 1 HP TECH - 1 TECHNICIAN - 1/2 ENGINEER) {CONTRARY TO JOB DESIGN FLEXIBILITY} (WARD/HEATH/GOLDBACH)**
- **INSTITUTE AND ENFORCE REBUILD PROGRAM (TURNER/LOWDER/BATSON)**
- **INSTALL MORE EFFICIENT PACKAGING OF LLRW (TURNER/MCCORMAC)**
- **STARTUP ULTRASONIC CLEANING (MCCORMAC/MONTGOMERY/TURNER)**

SLUDGES

- **ELIMINATE URANIUM IN SLUDGE VIA SOLX 2 RECYCLE OR CONSTRUCT SOLX 3 (NOE/MCCORMAC/BATSON)**
- **REDUCE SLUDGE GENERATION (MCCORMAC/MLCOCH)**
- **REDUCE MATERIAL TO SOLVENT EXTRACTION (HALLMAN/PARKS)**
- **ELIMINATE WET AND PLUGGED HEPA FILTERS (LONDON/RUHL)**