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# Reengineering of Waste Management at the Oak Ridge National Laboratory

## Volume I

T. E. Myrick







MANAGED AND OPERATED BY
LOCKHEED MARTIN ENERGY RESEARCH CORPORATION
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## Volume I

T. E. Myrick

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Prepared by the
OAK RIDGE NATIONAL LABORATORY
Oak Ridge, Tennessee 37831-6296
managed by
LOCKHEED MARTIN ENERGY RESEARCH CORP.
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## CONTENTS

# 1. EXECUTIVE SUMMARY

A reengineering evaluation of the waste management program at the Oak Ridge National Laboratory (ORNL) was conducted during the months of February through July 1997. More than 83 people representing the Department of Energy (DOE), ORNL management, the ORNL Waste Management and Remedial Action Division (WMRAD), ORNL waste generators in the Research and Development (R&D) and support service organizations, the Lockheed Martin Energy Systems (LMES) waste management organization, and industry consultants participated in this exercise. The goal of the reengineering was to identify ways in which the waste management process could be streamlined and improved to reduce costs while maintaining full compliance and customer satisfaction.

ORNL's Reengineering Steering Committee, led by J. O. Stiegler, directed T. E. Myrick, head of the Office of Environmental Management Programs (OEMP), to lead the ORNL Waste Management Program Reengineering activity. A Core Team was selected with representation from Lockheed Martin Energy Research (LMER) management, DOE, LMES-Environmental Management & Enrichment Facilities (EM&EF), generators, Waste Management (WM), and subject matter experts. This Core Team conducted preliminary evaluations and determined that eight particular aspects of the ORNL waste management program warranted focussed investigations during the reengineering. The eight areas included Pollution Prevention, Waste Characterization, Waste Certification/Verification, Hazardous/Mixed Waste Stream, Generator/WM Teaming, Reporting/Records, Disposal End Points, and On-Site Treatment/Storage.

The Core Team commissioned and assembled Process Teams to conduct in-depth evaluations of each of these eight areas. Each Process Team operated for about a month, thoroughly evaluating the subject matter and generating a report of their findings and recommendations. (Each complete Process Team report is contained in Appendices D-K.) The Core Team then evaluated the Process Team results and consolidated the 80 process-specific recommendations into 15 overall recommendations. Benchmarking of a commercial nuclear facility, a commercial research facility, and a DOE research facility was conducted to both validate the efficacy of these findings and seek additional ideas for improvement. The outcome of this evaluation is represented by the 15 final recommendations that are described in this report.

In summary, these 15 recommendations add up to a vision for the reengineered approach to the "cradle-to-grave" process of waste management at ORNL consisting of an integrated WM/Generator function that treats ORNL as a single generator for expert-based waste characterization and certification purposes; a waste management organization that recognizes the generators, DOE, and the Management and Integrating (M&I) organization as equally important customers; focused pollution prevention followed by waste generation, collection, treatment, storage, and disposal operations that reflect more cost effective commercial approaches and incorporate new technologies and outsourcing of services where appropriate to provide the lowest cost solutions; and incorporation of new information management technologies into a more interactive WM/Generator structure to create a "seamless" WM Information System.

Successful implementation of these recommendations is estimated to be able to save ORNL $10-$15M annually in the cost of managing waste.

This report provides a description of the reengineering process and its outcome. Plans to initiate the implementation of the recommendations made are also described.

## 2. INTRODUCTION

SUMMARY OF CURRENT ORNL WASTE MANAGEMENT PROGRAM

The current waste management program at ORNL is composed primarily of two separate components, WMRAD and the waste generators within the R&D and support service organizations.

WMRAD provides waste management services (i.e. waste collection, treatment, storage, and disposal) to ORNL waste generators. Waste types include radioactive (low-level and transuranic), hazardous, mixed radioactive and hazardous, medical/infectious, and solid sanitary/industrial. Waste forms include gaseous, liquid, sludge, and solid. There are approximately 140 facilities operated by WMRAD at ORNL. These include administrative facilities and facilities that provide continuous routine treatment and compliant, permitted discharge of radioactive and nonradioactive liquid and gaseous wastes, long-term storage and surveillance of solid radioactive and mixed wastes, and disposal of radioactive and hazardous wastes. The approximate annual quantities of waste destined for TSD facilities are detailed below:

| TREATMENT | STORAGE | DISPOSAL |
|---|---|---|
| LLW 490,000 gal | Mixed 114,000 lbs | SLLW 35,000 cu ft |
| PW 75,000.000 gal | CH TRU 425 cu ft | HAZ 61,000 lbs |
| NRWTP 180.000,000 gal | RH TRU 350 cu ft | SAN/IND 300,000 cu ft |
| Gaseous 8.36E10 cu feet | SLLW 20,000 cu ft | |

In addition to the above, WMRAD manages inactive waste facilities, the spent nuclear fuel program, Subtitle I underground storage tanks, Federal Facility Agreement (FFA) compliance of the Melton Valley Storage Tanks, and the Pollution Prevention/Waste Minimization program at ORNL. WMRAD operating cost funding for Fiscal Year (FY) 1997 to accomplish all of these activities is $58M.

There are currently about 1,500 registered individual waste generators within the R&D mission and support service organizations (including WMRAD) at ORNL. It is estimated that 1,000 of these spend minimal time on waste management, but that the other 500 spend approximately 20% of their time on waste management (these are rough estimates). Therefore, ORNL waste generators currently devote approximately 100 full time equivalents (FTEs) of effort per year to waste management. At an approximate cost of $150K per FTE, this translates into $15M in generator labor costs. The additional costs to generators for waste characterization (i.e. sampling and analysis, radiological surveys, etc.) presently are indeterminable, but are conservatively estimated to be $2M, bringing the total generator cost for waste management to $17M and the total cost for all waste management activities at ORNL to approximately $75M.

## SCOPE OF WASTE MANAGEMENT REENGINEERING

DOE has proposed that the responsibility (and cost) for management of newly generated wastes be returned to the generating DOE programs as a way of incentivizing waste minimization and pollution prevention. As a result, management of newly generated wastes at ORNL will become the responsibility of LMER under the DOE Energy Research (ER) program, rather than remaining a part of the Environmental Management (EM) program, which is being bid under an M&I contract. Management of waste is an expensive burden to the R&D mission of ORNL and is, therefore, a prime target for reengineering to enhance the competitive position of the Lab. In order to address this need for more efficient and cost-effective waste management services, ORNL commissioned a formal reengineering effort in February 1997. The Reengineering Team's charter (Appendix A) included: the entire waste management process at ORNL, not just the WMRAD organization; the ORNL R&D mission and support organizations as the customers of the WM process; cost savings/investments in Generator Divisions and WMRAD; maintaining safe/compliant operations; all waste streams (sanitary, radioactive, hazardous, mixed, recyclable); and newly-generated wastes, not EM legacy, in preparation for cost chargeback to generators. While the scope of the reengineering effort was limited to newly-generated wastes because they will become LMER responsibility, successful implementation of reengineering is also expected to enhance LMER's ability to provide service to the new M&I contractor for legacy waste, thus additionally reducing costs to ORNL mission organizations.

The Team was challenged to seek opportunities in five "focus areas" and make recommendations that would: (1) be considered "revolutionary" in approach to R&D mission support, (2) promote the use of new technologies, (3) lead to organizational and/or process improvements, (4) provide opportunities for outsourcing where cost-effective, and (5) enhance pollution prevention. Ultimately, the bottom-line goal in all of these "focus areas" is the reduction of cost to the mission program. Finally, benchmarking of comparable commercial and DOE facilities was to be conducted as a check on the efficacy of the recommendations.

## REENGINEERING TEAM FORMATION AND APPROACH

ORNL's Reengineering Steering Committee, led by J. O. Stiegler, directed T. E. Myrick, head of the OEMP, to lead the ORNL Waste Management Program Reengineering activity. The following Core Team was selected with representation from LMER management, DOE, LMES-EM&EF, generators, Waste Management, subject matter experts, and a WMRAD waste operator.

| **Core Team Member** | **Title** | **Organization** |
|---|---|---|
| Tim Myrick, Leader | Manager | OEMP |
| Ray Arp | Facility Engineer - Utilities Dept. | P&E |
| Karen Balo | LLLW Program Manager | EM&EF |
| Karl Haff | Department Head - Radiochemical Processing Dept. | CTD |
| Bob Mason | Division Director | WMRAD |

| Core Team Member | Title | Organization |
|---|---|---|
| Jon Forstrom | Facilitator | CMO |
| Sherry Gibson | Program Manager | DOE-EM |
| Lance Mezga | Haz/Mixed Program Manager | EM&EF |
| Marv Poutsma | Division Director | CASD |
| Mac Roddye | Program Manager | DOE Site Office |
| John Trabalka | Sr. Research Staff | CTD |
| Tom Scanlan | Associate Director | WMRAD |
| Tony Sizemore | Chemical Operator | WMRAD |
| Kim Thomas | Environmental Protection Officer & Generator Interface Equivalent | CASD |
| Leroy Stratton | Technical Asst. to Division Director | WMRAD |
| Jerry Bohannon | Compliance Specialist | OECD |
| Kathy Johnson | Manager - ORNL Employee & Organizational Development | HR |

The Team used a two tiered evaluation process. The Core Team listed above served as the primary leadership and decision making body. Process Teams were commissioned by the Core Team to address specific issues. The Core Team provided overall direction to the reengineering effort, identified issues for examination, commissioned and championed the Process Teams, conducted organizational evaluation and benchmarking of other facilities, and developed the final reengineering report. Process Teams conducted in-depth evaluations of specific issues as chartered by the Core Team and developed individual reports containing recommendations to address the issues (see Chapter 3 for more detailed discussion of evaluation results). Benchmarking efforts were conducted in parallel with the overall evaluations and are described in Chapter 5.

## 3. REENGINEERING TEAM EVALUATIONS

### PRELIMINARY CORE TEAM EVALUATIONS

The Core Team held the first organizational meeting on February 4, 1997, where they discussed the reengineering principles and process, established schedules, and committed to a charter. Dramatic and radical improvements were emphasized as expected results from the team. Evaluation of new technologies was also encouraged to meet the objective of assuring a cost effective, generator friendly, safe, and compliant WM process at ORNL.

Activities of the Core Team that were done early to generate baseline information included (1) a meeting held by K. B. Thomas with environmental protection officers (EPOs) to solicit input on waste management concerns; (2) a memo which was sent from WMRAD Division Director R. C. Mason to his staff encouraging them to express any suggestions or concerns directly to T. E. Myrick for use by the reengineering team; and (3) presentations to the Core Team by subject matter experts on waste characterization; waste certification/verification; hazardous/mixed, radiological, liquid and gaseous, and sanitary waste management; and organization of the WMRAD division. Previous benchmarking conducted by WMRAD was reviewed and discussed. The Core Team also reviewed the report on the DOE "Red Team" Review of the waste management programs at Lawrence Livermore National Laboratory (LLNL), Los Alamos National Laboratory (LANL), and Sandia National Laboratories (SNL) for applicability to ORNL. In addition, the Core Team reviewed results of WMRAD customer satisfaction surveys to help identify areas suggested for improvement.

The Core Team then conducted a Situation Analysis to evaluate the current and future issues associated with the waste management program. Twelve issues and eighteen activities were identified as areas of concern covering all ORNL waste streams. They included:

ISSUES (12)

- Communication/Generators & WM
- No End Point for Certain Wastes - i.e. suspect - Special Case
- Time Lag to Move Waste Out of Generator Area
- Dispersement of Generator & TSD Facilities
- Reporting Demands - TN, DOE, Central LM, Internal (WMRAD)
- Inability to Characterize & Certify Major Solid Waste Streams (TRU, Major Trash)
- Reporting & Record Keeping
- Compliance Sampling & Monitoring
- Training - Waste Generator
- Waste vs. Recycle
- Getting & Keeping the Permits
- Strategic Planning

ACTIVITIES (18)

- Waste Forecasting
- Prevention/Minimization
- Segregation & Data Collections Generator Storage
- Certification/Verification
- Characterization
- Packaging
- Pretreatment at Generator Site
- On-Site Transportation
- Coding & Assigning Waste to T/S/D
- On-Site Storage
- On-Site Treatment
- Off-Site Transport
- Off-Site Treatment
- Receipt of Treated Waste from Off-Site
- Interim On-Site Storage (prior to disposal)
- On-Site Transport to Disposal (LLW)
- On-Site Disposal (LLW)
- Off-Site Disposal (Hazardous)

These areas of concern were then scored by each team member based on Seriousness (cost, fines, regulations), Urgency (timing, resolve in 2 years, etc.), Growth (is the problem getting worse? or should we seize the moment now?), and Opportunities for radical improvement. This effort led to the identification of eight critical areas as the highest priority for investigation during reengineering. The eight critical areas identified were Pollution Prevention, Waste Characterization, Waste Certification/Verification, Hazardous/Mixed Waste Stream, Generator/WM Teaming, Reporting/Records, Disposal End Points, and On-Site Treatment/Storage. The Hazardous/Mixed Waste Stream was chosen as the only single waste stream for evaluation, as it represented the best process for direct comparison to industry and greatest potential for outsourcing evaluation.

The Core Team then commissioned and assembled Process Teams to conduct in-depth evaluations of each of these eight critical areas. The Process Teams were made up of a subject matter expert as the Leader, a member of the Core Team to champion the process, a section manager for the applicable waste management activity, operational/technical member(s), generator(s), a LMES and/or private industry representative, and members from Plant and Equipment (P&E) and Environmental Safety and Health (ES&H) as appropriate. Charters and memberships for each Process Team are contained in Appendix B.

## PROCESS TEAM EVALUATIONS AND RESULTS

The Process Teams, aided by facilitators, used a variety of Kepner-Tregoe and SIPOC techniques, as well as other technical evaluations, to understand and map the current processes and to conceptualize alternate, ideal processes for each of these eight critical areas. Individual team reports containing specific recommendations for achieving the ideal processes were created for the eight critical areas and are provided in Appendices D through K. The following is a very brief synopsis of the results of each Process Team.

### *Pollution Prevention and Materials Recycling Process Team (P2 Team)*

The 10-member P2 Team met two or three times per week from March 6 through April 4, 1997, to evaluate opportunities for reengineering of the processes involved in pollution prevention and materials recycling at ORNL in accordance with the Team's charter (Appendix B). Eighteen primary recommendations were identified as a result of this evaluation. Many of these recommendations dealt with improvements in the handling of specific materials (e.g. "reducible" waste from radiological areas, laboratory chemicals, electrical wire, used oil, solvents) that would lead to waste reduction through segregation, reuse, and recycle. The key theme to the P2 Team report is for ORNL to take better advantage of the cost savings opportunities available through pollution prevention and materials recycling by raising the profile of the P2 Program such that it becomes ingrained into the R&D and support service operations.

The full report of the P2 Team is provided in Appendix D.

### *Waste Certification/Verification Process Team (CV Team)*

The 9-member CV Team met more than 20 times in March and April 1997, to evaluate opportunities

for reengineering of the processes involved in waste certification and verification at ORNL in accordance with the Team's charter (Appendix B). Eight primary recommendations dealing with phases of the waste certification/verification process were identified as a result of this evaluation. The key theme to the CV Team report is for ORNL to adopt a waste certification/verification model that reflects ORNL as a single waste-generating entity, rather than each program, organization, or individual researcher as a separate generator. Advantages to this approach are many, the most significant being the economies of scale and consistency in managing consolidated ORNL waste streams.

The full report of the CV Team is provided in Appendix E.

*Waste Characterization Process Team (WC Team)*

The 9-member WC Team met essentially on a daily basis from March 10 through April 3, 1997, to evaluate opportunities for reengineering of the processes involved in waste characterization (focussing primarily on characterization of solid radioactive wastes) at ORNL in accordance with the Team's charter (Appendix B). Five recommendations were identified as a result of this evaluation. Two key themes of the WC Team report are: first, the need to conduct a "systems analysis" of the total ORNL waste picture to determine the optimal management of all waste streams as a single generator; and second, to make waste characterization "expert-based" and consolidated at the ORNL-generator level, rather than the responsibility of each individual R&D and support service operations.

The full report of the WC Team is provided in Appendix F.

*Hazardous/Mixed Waste Stream Process Team (HM Team)*

The 12-member HM Team met essentially on a daily basis from March 7 through April 3, 1997, to evaluate opportunities for reengineering of the processes involved in management of the hazardous/mixed waste stream at ORNL in accordance with the Team's charter (Appendix B). Six primary recommendations were identified as a result of this evaluation. The key theme to the HM Team report is to reorient the hazardous/mixed waste management process to recognize the R&D and support service operations as the customers of the process and waste management as the service provider. This reorientation allows the process to be streamlined by eliminating redundant activities such that these steps are performed only once by the waste management service provider.

The full report of the HM Team is provided in Appendix G.

*Teaming/Forecasting Process Team (TF Team)*

The 11-member TF Team met essentially on a daily basis from April 11 through May 2, 1997, to evaluate opportunities for reengineering of the processes involved in communication, teaming, and forecasting between the R&D mission and support service organizations and waste management at ORNL in accordance with the Team's charter (Appendix B). Five primary recommendations were identified as a result of this evaluation. The key theme to the TF Team report is the need for the

ORNL waste management organization to recognize that it has three equally-important customer entities (DOE EM, DOE ER through R&D mission and support organizations, and the new M&I contractor) and that it must strive for "win-win-win" solutions to achieve optimal efficiency and customer satisfaction.

The full report of the TF Team is provided in Appendix H.

*Records/Reporting Process Team (RR Team)*

The 12-member RR Team met essentially on a daily basis from April 7 through April 25, 1997, to evaluate opportunities for reengineering of the processes involved in records and reporting of waste management information at ORNL in accordance with the Team's charter (Appendix B). Nine primary recommendations were identified as a result of this evaluation. Many of these recommendations dealt with specific improvements in the data collection, handling, and reporting process (e.g. simplify input, utilize barcode readers, modify programs for tracking capabilities, new reporting tool). The key overall theme to the RR Team report is to create a "seamless" information system by connecting all the separate pieces so they interface and fully utilize available technologies such that redundant data entry and tracking are eliminated and customer/user convenience is maximized.

The full report of the RR Team is provided in Appendix I.

*Disposal Endpoints Process Team (DE Team)*

The 8-member DE Team met on a bi-weekly basis from April 4 through May 5, 1997, to evaluate opportunities for reengineering of the processes ensuring the availability of disposal endpoints for ORNL wastes in accordance with the Team's charter (Appendix B). Fifteen primary recommendations were identified as a result of this evaluation. Many of these recommendations were "revolutionary" in nature, dealing with very different approaches to ensuring disposal endpoint availability for ORNL, such as developing new corporate ventures for waste processing and disposal. The key theme to the DE Team report is for ORNL to take a much more active role in ensuring disposal endpoints for ORNL wastes rather than relying on LMES and the future M&I contractor to do so.

The full report of the DE Team is provided in Appendix J.

*On-Site Treatment/Storage Process Team (TS Team)*

The 15-member TS Team met essentially on a daily basis from April 3 through May 9, 1997, to evaluate opportunities for reengineering of the processes involved in the on-site waste treatment and storage operations at ORNL in accordance with the Team's charter (Appendix B). Eight primary recommendations were identified as a result of this evaluation. The key theme to the TS Team report is that the greatest potential for cost savings from on-site treatment/storage lies in the reduction of labor costs, both in rate per hour and number of hours used. The specific recommendations provide a number of suggestions on how to reduce labor costs. The most significant of these suggestions is to replace the function of the existing Process Waste Treatment

Plant (PWTP) with a newer treatment technology to be collocated at the Nonradiological Wastewater Treatment Plant (NRWTP) so that it can be run by the same operators. This replacement would also eliminate one-third of the LLLW stream currently generated at ORNL. One "non-suggestion" dealt with review of the sewage treatment plant operations, from which it was determined that there would be no benefit to moving the operating responsibility from P&E Maintenance to Waste Management.

The full report of the TS Team is provided in Appendix K.

## CORE TEAM EVALUATION OF PROCESS TEAM RESULTS

Upon completion of their evaluations, each Process Team presented its results and recommendations to the Core Team. The Core Team then reviewed each individual, process-specific recommendation and determined that, through combination of common themes, common issues, and/or common solutions, these 80 separate recommendations could be consolidated into 15 final recommendations representing the total waste management reengineering effort. As a "reality check" on the results, the Core Team reviewed the final 15 recommendations against the 5 focus areas they had been challenged to consider and found them to be adequately addressed (Table 1).

The 15 final recommendations are discussed in the following section. Appendix C presents a complete list illustrating how each of the 80 Process Team recommendations were incorporated into the 15 final Core Team recommendations.

## TABLE 1: WASTE MANAGEMENT REENGINEERING RECOMMENDATIONS

| Core Team Recommendation Number | Recommendation | Revolutionary | Pollution Prevention | Technology Innovations | Organization or Process Changes | Outsourcing Potential |
|---|---|---|---|---|---|---|
| 1 | Shift paradigm to reflect ORNL as a single waste generator. | ● | | | ● | |
| 2 | Shift WM Customer Service Orientation to include DOE EM, Research Orgs. and M&I Contractor. | | | | ● | |
| 3 | Perform systems analysis as the basis for WM strategic planning. | | ● | ● | ● | ● |
| 4 | Establish direct ORNL involvement with Disposal Endpoints. | ● | ● | ● | ● | ● |
| 5 | Create a single, expert-based ORNL waste Charact./Verif./Cert. Program and Organization. | ● | ● | ● | ● | ● |
| 6 | Modify the ORNL SLLW management process to mimic the commercial nuclear industry. | ● | ● | ● | ● | ● |
| 7 | Create a "seamless" WM Information Management System. | | ● | ● | ● | ● |
| 8 | ORNL should not convert to LMES WITS system. | ● | | ● | ● | |
| 9 | Strengthen and emphasize the ORNL P2 Program. | | ● | | ● | |
| 10 | Improve WM operating cost effectiveness. | ● | | | ● | |
| 11 | Eliminate Policy Mixed Waste through effective implementation of the No Rad Added Policy. | | ● | | ● | |
| 12 | Replace the function of the PWTP. | | ● | ● | | ● |
| 13 | Eliminate excess conservatism in Operations Requirement Documents. | | | | ● | ● |
| 14 | Improve communications with and accountability of subcontractors. | | | | ● | |
| 15 | Re-examine WMRAD organization in light of Reengineering Recommendations. | | | | ● | ● |

## 4. FINAL CORE TEAM RECOMMENDATIONS

The vision for the reengineered approach to the "cradle-to-grave" process of waste management at ORNL consists of an integrated WM/Generator organization that treats ORNL as a single generator for expert-based waste characterization and certification purposes; a waste organization that recognizes the generators, DOE, and the M&I organization as equally important customers; focused pollution prevention followed by waste generation, collection, treatment, storage, and disposal operations that reflect more cost effective commercial approaches and incorporate new technologies and outsourcing of services where appropriate to provide the lowest cost solutions; and incorporation of new information management technologies into a more interactive WM/Generator structure to create a "seamless" WM Information System.

The following 15 specific recommendations capture the basic components and actions leading to the reengineered waste management program. Table 2 summarizes these recommendations and the expected cost savings and costs to implement. Appendix C provides more detailed information on the scope, cost, and savings associated with each recommendation.

Recommendation #1 - Shift to commercial waste certification model that reflects ORNL as the single waste generator at the site, rather than current approach where 1500 individual generators are required to certify waste for disposal. The single generator concept will simplify the waste certification/verification program and encourage teaming between WM and generating divisions. Minimizing the number of individually managed waste streams will significantly lower the cost of waste characterization and certification.

Advantages to this approach are many, the most significant being the economies of scale and consistency in managing consolidated ORNL waste streams. This approach will also help alleviate the sense of individual vulnerability and liability suffered by generators, which inhibits a number of aspects of the waste management process, especially the "no rad added" determination.

Recommendation #2 - Instill a customer service orientation in WM and direct that orientation to recognize that R&D organizations and the new M&I contractor need to be equivalent customers to DOE EM. Strive for "win-win-win" solutions through teaming with all customer bases. Establish an ORNL Waste Management Customer Advisory Panel, with representation from all waste generating organizations, to promote internal teaming.

This recommendation is very significant in that it is a dramatic shift from the recent atmosphere created by DOE EM being the only source of funding, resulting in actions (or inaction) that were in many cases detrimental to the waste generators. Establishing policy based on what achieves optimal efficiency for the overall process, not on what benefits only a particular portion of the process, will maximize overall cost savings to DOE.

Recommendation #3 - Perform a comprehensive Systems Analysis of ORNL waste as the basis for WM strategic planning. Evaluate present and future waste streams and generation rates. Identify optimal treatment/disposal methods for present and future waste streams. Evaluate options to implement the optimal treatment/disposal methods, e.g. new or upgraded facilities, operational

# TABLE 2: SUMMARY OF FINAL RECOMMENDATIONS

| Recommendation | Total Cost Savings | Total Cost to Implement | New Funds Required (Y/N)[1] | Implem. (H,M,L)[2] | Immediate Priority[3] |
|---|---|---|---|---|---|
| **Recommendation #1:** Shift to commercial waste certification model that reflects ORNL as the single waste generator at the site, rather than current approach where 1500 individual generators are required to certify waste for disposal. | Included in other recomm. | Included in other recomm. | N | H | Y |
| **Recommendation #2:** Instill a customer service orientation in WM and direct that orientation to recognize that R&D organizations and the new M&I contractor need to be equivalent customers to DOE EM. | Included in other recomm. | Negligible | N | M | Y |
| **Recommendation #3:** Perform a comprehensive Systems Analysis of ORNL waste as the basis for WM strategic planning. Evaluate present and future waste streams and generation rates, identify optimal treatment/disposal methods, and evaluate options to implement. | $5M annually | $1M over 3 years | Y | H | Y |
| **Recommendation #4:** Establish direct ORNL involvement with disposal endpoints to ensure availability for present and future ORNL waste. | Included in #3. | Included in #3. | Included in #3 | M | Y |
| **Recommendation #5:** Create an expert-based ORNL waste characterization/verification/certification program and organization within WM to apply a graded approach to characterization, including use of process knowledge. | $6M annually | $2M annually | Y (50%) | M | Y |
| **Recommendation #6:** Modify the ORNL SLLW management process to mimic that of the commercial nuclear industry by segregating "reducible" waste at source and survey for free release. | $1M annually | $500K annually | N | M- | Y |
| **Recommendation #7:** Create a seamless WM information management system utilizing available technology to the maximum benefit of both WM and its customers. | $1.4M annually | $140K one time | Y | H | Y |
| **Recommendation #8:** ORNL should not convert to the LMES WITS system, but should upgrade its current waste tracking system (WTS) to provide DOE the data output they require through a WITS interface capability. | $800K one time, $130K annually | $150K one time | Y | H | Y |
| **Recommendation #9:** Strengthen and emphasize the ORNL Pollution Prevention (P2) Program by moving it from the operational side of the organization (WMRAD) to the programmatic side (OEMP). | $500K annually + $9M elsewher | $300K annually | Y (50%) | H | Y |
| **Recommendation #10:** Improve WM operating cost efficiencies by taking full advantage of broadened craft work categories, assigning dedicated Maintenance personnel to WMRAD, and supporting the ORNL evaluation of reduced overhead rates charged to service organizations. | $3M annually | Negligible | N | M | Y |

## TABLE 2: SUMMARY OF FINAL RECOMMENDATIONS (continued)

| Recommendation | Total Cost Savings | Total Cost to Implement | New Funds Required (Y/N)[1] | Implem. (H,M,L)[2] | Immediate Priority[3] |
|---|---|---|---|---|---|
| **Recommendation #11:** Eliminate "policy mixed waste" through effective implementation of the No Rad Added policy by eliminating fear of individual liability/recrimination. | $1.5M one time, $250K annually | Negligible | N | M | Y |
| **Recommendation #12:** Replace the function of the Process Waste Treatment Plant with more efficient technology and integrate it into the Nonradiological Wastewater Treatment Plant operations by privatizing the financing, design, and construction of the new system. | $2M annually | $6.4M one time | N | M | Y |
| **Recommendation #13:** Eliminate excess conservatism in requirement documents governing WMRAD operations by modifying the On-Site Transportation Plan so that it is clear that DOT equivalency is not a requirement of on-site shipments, implementing a graded approach to WM Conduct of Operations at nonradiological facilities, and negotiating "above and beyond" requirements out of RCRA permits. | $2M annually | $1.1M over 3 years | Y | M | Y |
| **Recommendation #14:** Improve oversight and control of on-site subcontractors that generate waste to ensure appropriate waste management under terms of their contracts, thus eliminating "orphaned" waste. | $50K annually | Negligible | N | M | Y |
| **Recommendation #15:** Re-examine WMRAD organization in light of the Reengineering Recommendations and proceed with changes that support Reengineering Implementation. | Included in other recomm. | Included in other recomm. | Included in other recomm. | M | Y |

[1] **New Funds Required**

Y - Not within current funding scope.

N - Either within current funding scope or could be fully funded from resulting savings to current funding scope.

[2] **Implementability: H - High, M - Medium, L - Low**

Core Team estimation of the overall ease of implementation for the recommendation.

[3] **Immediate Priority**

Y - One or more individual actions under the overall recommendation requires immediate attention.

N - No individual actions under the overall recommendation require immediate attention.

changes, outsourcing, etc., with consideration of life-cycle costs. A comprehensive Systems Analysis is a necessary component of the full implementation of many of these 15 recommendations.

The cost to implement this recommendation would be $1M over 3 years (new funds). The cost savings are estimated to be approximately 10% of the programmatic funding, or about $5M annually.

Recommendation #4 - Establish direct ORNL involvement with disposal endpoints. Take lead in representing ORNL's present and future interests regarding newly generated waste, rather than new M&I filling that role. Become involved with regulatory and political aspects of ensuring disposal endpoint availability for ORNL present and future waste. Accelerate shipment of legacy waste to the East Tennessee Technology Park (ETTP).

The cost to implement this recommendation and the cost savings achieved are represented in the figures provided in Recommendation #3.

Recommendation #5 - Create an expert-based ORNL waste characterization/verification/certification program and organization within WM. Place responsibility for proper characterization on WM experts rather than individual researchers. Apply an expert-based, graded approach to characterization, including use of process knowledge. Ensure appropriate data quality objectives (DQOs) and Waste Acceptance Criteria (WACs) are met.

The cost to implement this recommendation is estimated at $2M annually for 10 new FTEs plus operational costs in WMRAD. (It is expected that 50% would be new funds, the remainder recovered from savings.) The cost savings to generating organizations would be approximately $6M annually in labor hours that could be reinvested in R&D. Additional cost savings will be realized in physical characterization of waste (e.g. sampling and analysis), but the amount of savings is not quantifiable at this time.

Recommendation #6 - Modify the ORNL solid low-level waste (SLLW) management process to mimic that of the commercial nuclear industry. Segregate "reducible" waste at the source and survey for free release. Centrally treat/process contaminated waste for maximum volume reduction and dispose of residual with characterization that takes advantage of homogenization.

The cost to WMRAD to implement this recommendation is estimated to be $500K annually to cover the cost of verifying the releasability of the segregated waste. (The cost to implement will be generated from the cost savings.) The cost savings to ORNL (to WMRAD pre-chargeback and to customers post-chargeback) are estimated to be $1M annually, based on a conservative 20% overall reduction in SLLW.

Recommendation #7 - Create a seamless WM information management system utilizing available technology to the maximum benefit of both WM and its customers. Implement improvements to fully utilize and integrate present components of the system. Tailor system to meet ORNL needs, not needs of all 5 Oak Ridge sites. Ensure future additions or modifications of components "fit" the integrated system.

The cost to WMRAD to implement this recommendation is estimated at a $140K one time investment, primarily to program interfaces between disconnected portions of the present system (new funds required). The cost savings, split about equally between WMRAD and generators, would be about $1.4M annually through the elimination of labor associated with redundant data entry and reviews.

Recommendation #8 - ORNL should not convert to the LMES Waste Information Tracking System (WITS), but should upgrade its current waste tracking system (WTS) to provide DOE the data output they require through a WITS interface capability. WITS lacks present capabilities of ORNL's current system, and both will require equivalent future upgrades, so cost to switch now would be wasted. In addition, WITS will be under M&I control once that contract is issued. WTS, on the other hand, would remain under ORNL control and could be easily tailored to meet ORNL's future waste tracking needs without dependence on other sites or contractors' approvals.

The cost to WMRAD to implement this recommendation is $150K one time (new funds), to program and interface with the LMES/M&I central reporting system. The cost savings to WMRAD would be about $800K one time, by avoiding the cost of changing systems, and $130K annually in labor associated with "participation" in 5-site system.

Recommendation #9 - Strengthen and emphasize the ORNL Pollution Prevention (P2) Program. Raise the profile of the P2 Program by moving it from the operational side of the organization (WMRAD) to the programmatic side (OEMP). Consolidate responsibility for P2 activities which are presently spread among various organizations (e.g. recycle contract management) within the P2 Program. In addition, implement the numerous P2 initiatives, such as reinstituting a limited Chemical Stores function with P2 focus, identified by the P2 Process Team.

The cost to the P2 Program to implement this recommendation is approximately $300K annually to add an FTE and fund Chemical Stores function. (Approximately 50% would be new funds, the remainder generated from cost savings.) Cost savings to generator organizations are estimated to be greater than $500K annually through reduced chemical purchase and waste disposal costs. (In addition, there are some $9M worth of cost savings identified in other recommendations that are, in fact, a reflection of a more active pollution prevention program.)

Recommendation #10 - Improve WM operating cost efficiencies in three particular areas. First, initiate discussions with the Bargaining Unit to take full advantage of the broadened craft work categories provided for in the current contract. Second, assign dedicated Maintenance personnel to WMRAD to reduce need for backups and additional training. Third, endorse and support the ORNL evaluation of reduced overhead rates charged to service organizations to be more representative of the burden associated with this type of waste organization in the commercial world.

The cost to implement this recommendation is negligible. The cost savings to WMRAD would be approximately $800K annually through reduction of six Maintenance FTEs and $2.2M annually in reduced overhead charges.

Recommendation #11 - Eliminate "policy mixed waste" through effective implementation of the No Rad Added policy. Accomplish this by eliminating fear of individual liability/recrimination so that generators are comfortable declaring "no rad added" when appropriate. Also, implement an ORNL off-site approval process so that redundant reviews by LMES are no longer necessary. Update and maintain the ORNL RMMA database to function as a convenient "no rad added" verification tool.

The cost to implement this recommendation would be negligible. The cost savings (avoidance) to WMRAD would be $1.5M one time (new storage facilities) and $250K annually in new storage facility operating costs.

Recommendation #12 - Replace the function of the PWTP with more efficient technology and integrate it into the NRWTP operations. Utilize new technology to eliminate/reduce liquid low-level waste (LLLW) generation from regeneration of current ion exchange columns. Privatize the finance, design, and construction of the new system, with operations integrated into the NRWTP.

The cost to implement this recommendation is $6.4M one time, including total design and construction (to be generated from savings under a privatization contract). The cost savings to WMRAD would be approximately $1.3M annually in reduced operational costs and $1.4 M annually in reduced LLLW disposal cost.

Recommendation #13 - Eliminate excess conservatism in three particular sets of requirement documents governing WMRAD operations. First, modify the On-Site Transportation Plan so that it is clear that Department of Transportation (DOT) equivalency is not a requirement of on-site shipments (which would significantly reduce packaging and transportation costs for moving waste from generator areas to on-site storage). Second, implement a graded approach to WM Conduct of Operations at nonradiological facilities so that restrictions are removed where they were never intended to be applied. And third, negotiate "above and beyond" requirements out of the Resource Conservation and Recovery Act (RCRA) permits such that best management practices can be applied at management discretion rather than becoming a legal requirement due to inclusion in the permit.

The cost to WMRAD to implement this recommendation is estimated at $1.1M over 3 years (new funds), to pay for document reviews and revisions, preparation, submittal, negotiation of permit modifications, and revision of procedures and other command media . The cost savings to WMRAD are estimated to be $2M annually in reduced operational costs (e.g. no longer conducting non-regulatory inspections on weekend/holiday overtime).

Recommendation #14 - Improve oversight and control of on-site subcontractors (both subcontractors to LMER and to other DOE primes) that generate waste to ensure appropriate waste management under terms of their contracts, thus eliminating "orphaned" waste. This can be accomplished through: involvement of Engineering and Environmental Restoration Project Managers on the Customer Advisory Panel (see Recommendation #2), strengthening subcontract language/penalties with regards to WM requirements, and establishing ties to the new M&I contractor and other DOE primes such that communication about WM issues is facilitated. This forum would also improve

communication on other important subcontract issues, such as Price-Anderson Amendment Act requirements.

The cost to implement this recommendation is negligible. The cost savings to ORNL are estimated conservatively to be $50K annually in the avoidance of "orphaned" waste that must be managed after subcontractors leave the site. The potential cost avoidance is expected to escalate with the increase in on-site subcontracted work under the M&I contractor.

Recommendation #15 - Re-examine WMRAD organization in light of the Reengineering Recommendations and proceed with changes that support Reengineering Implementation. First, evaluate WMRAD organization structure relative to the new single generator, customer service, and teaming approach to determine if structural realignment would better support the reengineered process. Second, move programmatic responsibilities such as Pollution Prevention, Reengineering, Strategic Planning, Waste Forecasting, and programmatic Business Management from WMRAD into the OEMP. This will broaden and strengthen the programmatic role of OEMP and focus WMRAD specifically on operations. [In addition, the Core Team recommends that the OEMP report at the Deputy Laboratory Director-level as this is where the service (WMRAD) and customer (R&D organizations) reporting lines converge]. Third, evaluate roles and responsibilities of WMRAD leadership positions relative to the new approach. Identify desirable leadership qualities and characteristics to fulfill the roles and responsibilities of WMRAD leadership positions. Fourth, carry out organizational changes needed to achieve the above.

The cost to implement this recommendation is negligible beyond that included in other recommendations. The cost savings are reflected in the savings estimated for other recommendations, as the purpose of this recommendation is only to facilitate implementation of all the others.

Note Regarding Implementation Costs and Savings

It is important to understand that both the costs to implement and the cost savings described under each recommendation are not only rough, order-of-magnitude estimates, but were also developed for each recommendation without consideration of the synergistic effects of successful implementation of other recommendations. A straight addition of implementation costs for the individual recommendations would imply:

- One-Time Investment Costs of:
  - $1.4 M in new funds
  - $6.4 M in privatized facilities from savings

- Annual Operating Costs of:
  - $1.2 M in new funds
  - $1.7 M from savings

A straight addition of cost savings for the individual recommendations would imply:

- Total One-Time Cost Savings of: $2.3M
- Total Annual Cost Savings of: $22M/yr.

However, the synergism of the recommendations would be expected to not only lower the total overall cost of implementation (by an estimated 10%), but also to reduce the opportunity for cost savings from among interdependent recommendations. Therefore, a more realistic expectation of overall cost savings, compared to FY 1997 base costs, would be:

- Total Cost Savings of: $10-15M/yr in first few years
- $5-$10M/yr in out years

# 5. BENCHMARKING

Benchmarking of waste management operations at enterprises with similar research scope or wastes as ORNL was considered an important element of the reengineering process. The services of PrSM Corporation were retained to aide with identification of appropriate enterprises to benchmark and to facilitate the benchmarking trips themselves. The Core Team and Process Teams were polled for input on benchmarking needs, focus, and suggested enterprises. From this input, PrSM generated a list of potential benchmarking sites. From this list the Core Team selected three sites to visit: the Westinghouse Commercial Fuel Fabrication Facility in Columbia, South Carolina; the LANL in Los Alamos, New Mexico; and the Dow Chemical Research Laboratory in Midland, Michigan. These sites were selected to represent commercial nuclear facilities, a comparable DOE research facility, and commercial research facilities, respectively. Complete reports detailing the results of these benchmarking visits are contained in Appendix L.

While the initial intention of the benchmarking was to search for new ideas that could be incorporated into the ORNL waste management process, the timing of the trips themselves (coming after all the Process Teams had finished their evaluations and concurrently with the Core Team evaluation of Process Team results) made them extremely useful as a "sanity check" on the actual implementability of the reengineering recommendations. Table 3 presents a summary of what the benchmarking revealed about implementability of the 15 final recommendations and identifies any completely new ideas that have been incorporated into the scope of our reengineering recommendations.

The benchmarking did corroborate the efficacy of most of the final recommendations. Recommendation 8, not converting to LMES WITS, and 12, replacing the function of the PWTP, were not applicable to the benchmarking facilities and Recommendation 14, improving subcontractor oversight, was not investigated.

For the remaining recommendations, it is very interesting to note that at the Westinghouse and Dow commercial facilities, they either already have something in place that addresses the issue, or the situation simply did not exist so there is nothing to address. This would certainly appear to confirm that, if the commercial sector is our model, all recommendations are appropriate.

It is also interesting to note how similar the issues at ORNL are to those at LANL. In some cases, our recommendations (e.g. Recommendation 7, a seamless waste management information system) appear to also be very much applicable to LANL. In other cases, they already have programs in place that demonstrate what we have proposed can be successfully implemented within the DOE system (e.g. Recommendation 6, segregation of SLLW, is being implemented at LANL under their "Green-is-Clean" program). Again, this appears to confirm that all of our recommendations are appropriate.

# TABLE 3: SUMMARY OF BENCHMARKING RESULTS FOR EACH RECOMMENDATION

| Core Team Rec. No. | Recommendation | Benchmarking Facility | | |
|---|---|---|---|---|
| | | Westinghouse | Los Alamos | Midland |
| 1 | Shift paradigm to reflect ORNL as a single waste generator. | Entire Facility considered a single waste generator. | Each individual that generates waste is considered a separate waste generator. | Entire facility considered single waste generator, site manager signs for any waste going off-site. |
| 2 | Shift WM Customer Service Orientation to include DOE EM, Research Organizations, and M&I Contractor. | Waste management organization serves all process groups as customers. (Analogous to a "complete deployment" of the ORNL Generator Interface concept.) | Still refer to DOE EM as customer and impose requirements on generators. Are beginning to try to become more helpful to generators. | EH&S compliance specialists serve all researchers as customers. (Analogous to a "complete deployment" of the ORNL Generator Interface concept.) In addition, Kelly Services subcontractor available to researchers for lab packing. |
| 3 | Perform systems analysis as the basis for WM strategic planning. | Waste generating processes are well defined, but are continually reevaluated for application of new minimization opportunities. | No true systems analysis evident. Strategic planning appears based on assumption that current waste streams and quantities continue. | Not an issue here - the small quantities of research-generated waste are managed in one of three on-site facilities - incinerator, wastewater treatment plant, or landfill. |
| 4 | Establish direct ORNL involvement with Disposal Endpoints. | Facility directly interfaces with their endpoints of Barnwell, SEG, Chem Nuclear, and M&M Chemical. | Facility directly interfaces with their endpoints of SEG, WIPP, Rollins, Chem Waste, and Los Alamos County Landfill. | Disposal endpoints are within the facility with rare exception. |
| 5 | Create a single, expert-based ORNL Waste Charact./Verif./ Cert. Program and Organization. | Waste management organization is responsible for charac./verif./ cert. with reliance on process knowledge. | Each individual generator expected to characterize and certify own waste, although waste services increasing its help. Much reliance on process knowledge. | Individual generators characterize waste with help from compliance specialists. Since virtually all disposal is on-site, process knowledge is all that is required for characterization. |
| 6 | Modify the ORNL SLLW management process to mimic the commercial nuclear industry. | Radiological waste is segregated at point of generation if it is non-radiological by process knowledge or HP survey, it is free released. | "Green is Clean" program - segregate radiological waste at point of generation, survey with specialty instruments, free release to county landfill if passes. | Very little radiological, tracers only, use incineration or store for decay then free release. |
| 7 | Create a "seamless" WM Information Management System. | Extensive use of bar coding, paperless tracking until waste leaves the plant. | Still rely on paper information transfers, only parts of system are bar coded, no generator entry system in use. | Environmental Information System data base tracks waste and automatically generates RCRA reports. Notification of pick-up from 90 day area is electronically generated. Just started using bar coding. |

## TABLE 3: SUMMARY OF BENCHMARKING RESULTS FOR EACH RECOMMENDATION (continued)

| Core Team Rec. No. | Recommendation | Benchmarking Facility | | |
|---|---|---|---|---|
| | | Westinghouse | Los Alamos | Midland |
| 8 | ORNL should not convert to LMES WITS. | Not applicable. | Not applicable. | Not applicable. |
| 9 | Strengthen and emphasize the ORNL P2 Program. | Highly visible and successful P2 Program with strong management support, performance rating accountability, and recognition incentives. . . Evaluating chargeback as means to further incentivize waste minimization. Have a central chemical stores for general plant use. | "Environmental Stewardship" Office has been successful in raising profile of P2 and reducing waste generation. Goal is zero generation and discharge by 2010. CHEAPER program reduces chemical inventory by recycling and exchanging. | P2 not a priority of research because of small quantities, but is a priority of production process development and design. Use "best intention" guidance to encourage chemical sharing and hold down inventory. |
| 10 | Improve WM operating cost effectiveness. | Not applicable. | Making organizational changes that assign Chemical Science & Technology Division personnel directly to WM to improve operating cost effectiveness. | Outsourced lab packing to Kelly Services at $15/hr. but not used by all labs. Kelly lab packs have zero defects, researcher lab packs have 20% defects. Do not outsource WM TSD services, and indicated they would not consider it. |
| 11 | Eliminate Policy Mixed Waste through effective implementation of the No Rad Added Policy. | Have no policy mixed waste - if material has never been in a radiological control area, that is sufficient process. knowledge to declare No Rad Added. | Have no policy mixed waste - acceptance of generator process knowledge that it is not radiological, coupled with mixed waste surcharges, eliminates policy mixed. | No mixed waste. Only radioisotope work is studies, incinerate or store for decay then free release. |
| 12 | Replace the function of the PWTP. | Not applicable. | Not applicable. | Not applicable. |
| 13 | Eliminate excess conservatism in Operations Requirement Documents. | Does not appear to be any excess conservatism. Detailed conduct of operations, tight configuration control, accountability checked by NRC, no on-site DOT equivalency. | Attempting to deal with similar issues to ORNL. | Does not appear to be any excess conservatism. No on-site DOT equivalency. |
| 14 | Improve oversight with and accountability of subcontractors. | Not investigated. | Not investigated. | Not investigated. |

# TABLE 3: SUMMARY OF BENCHMARKING RESULTS FOR EACH RECOMMENDATION (continued)

| Core Team Rec. No. | Recommendation | Benchmarking Facility | | |
|---|---|---|---|---|
| | | Westinghouse | Los Alamos | Midland |
| 15 | Re-examine WMRAD organization in light of Reengineering Recommendations. | Very lean organization. | Undergoing organizational evaluations also. | Restructured from 35 FTEs (part-time involvement by over 90 staff) to 18 full-time ES&H and waste management specialists housed in laboratory buildings and leveraged over several facilities/organizations. ES&H compliance specialists devote 20% of time to waste issues - ratio of 4 waste FTEs to 1600 R&D staff. |
| New Ideas | | | CHEAPER program for chemical inventory reduction. "Green is Clean" program for segregation and free release of uncontaminated waste from radiological areas. TRU waste certification program approved by WIPP. | Waste Code labels on bench-top containers rather than chemical inventory. Reduction of number of waste streams to 18 generic categories, with only a few exceptions. |

# 6. IMPLEMENTATION STRATEGY

The vision for the reengineered approach to WM at ORNL consists of an integrated WM/Generator organization that treats ORNL as a single generator for expert-based waste characterization and certification purposes; a waste organization that recognizes the generators, DOE, and the M&I organization as equally important customers; focused pollution prevention followed by waste generation, collection, treatment, storage, and disposal operations that reflect more cost effective commercial approaches and incorporate new technologies and outsourcing of services where appropriate to provide the lowest cost solutions; and incorporation of new information management technologies into a more interactive WM/Generator structure to create a "seamless" WM Information System.

Successful implementation of the 15 final WM reengineering recommendations presented in this report will require an aggressive strategy to proceed as rapidly as possible to take advantage of the momentum for positive change that has been generated during the evaluation phase. The following initial steps of an implementation strategy are proposed:

## Appoint a WM Reengineering Implementation Manager

Senior management should appoint a WM Reengineering Implementation Manager, reporting to the Director of the OEMP, as quickly as possible to get the implementation process moving. This individual would be chartered with ensuring the successful implementation of all 15 recommendations in as short a time-frame as possible to maximize the cost savings and other benefits realized. It is envisioned that this would be a full-time position for up to 24 months, after which the implementation process should have progressed to the point that full-time management is no longer required.

## Transition Core Team to Implementation Steering Committee

The collective knowledge gained by the Core Team during this evaluation and the collective perspective they applied in generating these 15 recommendations should not be lost or scattered during the implementation phase. The Core Team should be transitioned to an Implementation Steering Committee which can be consulted on perspective and intent, should be periodically updated on implementation progress, should approve implementation plans to ensure conformity with intent, and can serve as an advisory committee to the implementation manager.

## Immediately Implement Recommendation 15

With the advice of the Implementation Steering Committee and the consent of Senior Management, the implementation manager, the OEMP Director, and the WMRAD Division Director should proceed immediately to undertake an organizational study of WMRAD and make organizational changes in accordance with Recommendation 15. Successful implementation of many of the recommendations will hinge on having the correctly reengineered organizational structure in place and the correct individuals assigned to management positions responsible for completing

reengineering actions. Delays in implementing Recommendation 15 would likely result in delay of the entire implementation process.

Develop a WM Reengineering Implementation Action Plan

Concurrently with the above, the Implementation Manager should rapidly develop an Implementation Action Plan considering the information on implementability and immediacy provided by the Core Team as in Appendix C. Like all action plans, this one should define the actions to be taken, the party responsible, the target for completion, and the source of funding. This plan should be reviewed and approved for conformity with intent by the Implementation Steering Committee and be ready for initiation within the same time-frame that implementation of Recommendation 15 is being completed.

# APPENDIX A

# Waste Management Program Reengineering Team Charter

The Waste Management Program Reengineering Team is charged with the responsibility for developing the vision, approaches, organizational philosophy, and implementation plan for providing ORNL staff with cost-effective, generator-friendly, safe, and compliant waste treatment, storage, and disposal (TSD) services for newly generated wastes and recyclable materials. The Team approach will include the following:

- Focusing on the waste generator needs and maintaining a viable Laboratory research mission as the basis for determining waste TSD process recommendations.
- Benchmarking the best-in-class waste TSD services in research, government, and/or industrial complex settings and utilize these data in developing recommendations.
- Early evaluation of all waste operations processes, waste streams, and/or administrative and planning functions for prioritizing the reengineering teams efforts. All processes/functions may not be addressed in this initial round of reengineering.
- Identification of primary waste generators for each of the priority waste streams and determination of their future programmatic plans and needs for waste TSD.
- Incorporation of ORNL's Necessary and Sufficient standards into the analysis as the basis for future operations.
- Identification of areas where technology improvements are appropriate and feasible.
- Identification of candidate processes for formal outsourcing determinations.
- Evaluation of existing organizational structures and recommendation of options for improved performance.
- Development of a roadmap to implement the process and organizational changes, focusing on ensuring a smooth transition from EM funding to generator chargeback.
- Identification of barriers to reengineering implementation.
- Identification of performance improvements which will accrue from the recommended approach.

The Team will meet with the Reengineering Steering Committee on a regular basis to report progress and discuss related issues. The Team recommendations on process improvements, organizational structures, and related cost-reduction initiatives will be provided by June 1, 1997, for the priority TSD processes evaluation. This deliverable will also include the roadmap and schedule for implementation of these recommendations.

# WMO Reengineering Team Structure and Approach

Due to the number of unique waste steams and other processes associated with the WMO mission, it is recommended that a multi-layered reengineering team approach be used. In this approach, a core team will be established that includes membership from affected ORNL divisions and DOE staff with primary interest in waste management. This team will be the group responsible for direction of the reengineering effort, for accomplishing the team charter, and for presenting the team recommendations to the Steering Committee. The Core Team will, upon review of the ongoing WMO current and planned activities, develop the prioritized listing of processes to be reviewed and will establish separate subcommittees of technically based members to evaluate the priority waste streams/processes and present reengineering options to the Core Team. A strawman make up of the function membership of the core and process teams is provided as follows, along with a first cut at the waste streams/processes that would likely be prioritized and further addressed by the Reengineering Team.

**Core Team Makeup**

Team Leader (Myrick)
WMRAD Div. Mgr. (Mason/Scanlan)
DOE Site Office (Roddye)
DOE WM (Gibson)
Waste Generator Rep 1 (Haff)
Waste Generator Rep 2 (Thomas)
ES&H Rep (Bohannon)
P&E/Labor Rep
ORNL R&D Div. Mgr. (Poutsma)
WMRAD Operator (Sizemore)
Strategic Planning (Trabalka)
Industry Representative
LMES-EM&EF (Balo/Mezga)

**Process Team Makeup**

Team Leader
WMRAD Sect. Mgr.
Waste Generator 1
Waste Generator 2
P&E Rep
Industry Rep
ES&H Rep
WMRAD Technical

**Processes/Streams**

Hazardous Waste
Mixed Waste
LLW
LLLW/PW
Gaseous Waste
Sanitary Waste
NG-TRU Waste
Waste Cert/Tracking
WMRAD Admin.
Facilities Engr/Constr
Recyclable Materials
Waste Minimization

# APPENDIX B

# POLLUTION PREVENTION AND MATERIALS RECYCLING REENGINEERING TEAM CHARTER

The Pollution Prevention and Materials Recycling Reengineering Team is a subcommittee of the Waste Management Program Reengineering Team. It is tasked with evaluating the current related ORNL programs and providing the Core Team with recommendations that will afford ORNL cost-effective, compliant and generator-friendly programs that are consistent with maintaining a viable Laboratory research mission. The Subteam approach will include the following:

- Identification of primary waste streams that have the greatest potential for improved management. This evaluation should include identification of areas where technology improvements are appropriate and feasible.
- Identification of waste management costs currently incurred by the generator.
- Evaluation of existing organizational structures and recommendations for improved performance. Recommendations should be made that would allow the program to affect a cultural change and make pollution prevention and materials recycling crucial parts of waste management at ORNL.
- Evaluation of the magnitude of the current chemical inventory and recommendations for reducing said volume where appropriate.
- Recommendations for the development of an effective program that reduces the generation of radioactive wastes and minimizes the volumes that need to be treated and/or stored after generation.
- Evaluation of the current pollution prevention generator chargeback tax program.
- Identification of benchmarking information needs. Utilization of benchmarking data obtained by Core Team in developing recommendations.
- Identification of barriers to reengineering implementation.

Weekly updates on the teams progress will be made to the Core Team. The subteam recommendations will be provided to the Core Team by April 7, 1997.

The makeup of the Pollution Prevention and Materials Recycling Subteam will include, but is not limited to (1) a team leader who is from an operating division, (2) a member of the Core Team, (3) the WMRAD Section Manager for Pollution Prevention, (3) WMRAD technical advisors, (4) the ORNL Property Utilization Manager, (5) waste generators and (6) and Plant and Equipment Division representative. Other generators, technical advisors, ES&H representatives and industrial representatives may be consulted as needed.

POLLUTION PREVENTION AND MATERIALS RECYCLING SUBTEAM MEMBERSHIP

| | |
|---|---|
| Team Leader | John Parrott, CTD |
| Core Team Champion | Kim Thomas, CASD |
| Facilitator | Available party |
| WMRAD Section Manager | Susan Michaud |
| WMRAD Technical | Jeff Baldwin |
| WMRAD Technical | Harold Hall |
| Waste Generator | Jamie Bain or Marie Williams, M&C |
| Waste Generator | Randy Burnett, ETD@Y-12 |
| P&E Representative | Jim Hackworth, P&E |
| Property Utilization Manger | Anna Martin |
| Industrial Representative | Melissa Green |

## Waste Management Program Reengineering Team

## Sub-Team on Certification/Verification Charter

The Waste Management Program Reengineering Team Sub-Team on Certification/Verification is charged with he responsibility for developing the approaches, organizational philosophy, and implementation for providing ORNL staff with cost-effective, generator-friendly, safe, and compliant waste certification/verification for newly generated wastes and recyclable materials. The Sub-Team approach will include the following:

- Identification of the primary waste generators for each of the priority waste streams and determination of their future programmatic plans and needs for waste certification/verification. We will also identify, if possible, projected new steams which may be coming on line in ORNL in the future.

- Focusing on the waste generator needs and maintaining a viable ORNL research mission while still meeting those necessary requirements for waste certification\verification as the basis for determining effective certification/verification of wastes and recyclable materials.

- Identification of areas where technology improvements are appropriate and feasible to include capabilities in non-destructive assay, analytical techniques, etc.

- Identification of influences on certification requirements such as off-site shipment of wastes, regulatory and DOE requirements, no-rad-added requirements, etc. The potential for outsourcing of these activities will be examined.

- Identification of the primary methods of certification/verification available to generators.

- Incorporation of ORNL's Necessary and Sufficient standards into the analysis as the basis for future operations.

- Estimation of performance improvements and cost savings which will result from the recommended approach.

- The interface of process knowledge, generator knowledge, and hard data will be examined to determine the level of rigor necessary for certification/verification.

- Release limits and disposal end-points will be examined to determine their effects on certification/verification.

- Examination of certification/verification activities at other sites, to include industrial concerns, will be done to determine best-in-class activities.

The sub-team will plan on a time span not to exceed on month. Regular briefings of the core reengineering team on activities of this sub-team will be held. The sub-team will make recommendations for a new or revised certification plan for ORNL as appropriate based on their findings.

Waste Management Reengineering

Subteam on Certification /Verification

| Position | Name | Phone | Pager | E-Mail Address | Fax | Division |
|---|---|---|---|---|---|---|
| Team Leader | Jeff Chapman | 4-5729 | | j4f | 6-7954 | WMRAD |
| Core Team Champion | Karl Haff | 4-7096 | 873-9258 | hkw | 6-8604 | CTD |
| Facilitator | | | | | | |
| WMRAD Rep | Bob Orrin | 6-7601 | 873-5879 | orn | 1-4645 | WMRAD |
| Technical | Don Gregory | 6-1369 | 873-4193 | icp | 4-4987 | ORP |
| Waste Gen 1 | John Norman | 4-6828 | | n5j | 6-5403 | CTD |
| Waste Gen 2 | Dale Caquelin | 4-4885 | | dc6 | | CASD |
| Waste Gen 3 | Ron Auble | 4-4689 | | aublerl | 4-1268 | PHY |
| Waste Gen 4 | Joe Knauer | 4-5909 | | k8j | | CTD |
| | | | | | | |
| | | | | | | |

| Division | Director | Phone | E-Mail Address |
|---|---|---|---|
| WMRAD | R. C. Mason | 4-1365 | masonrc |
| CTD | L. E. McNeese | 4-7456 | mcneesele |
| ORP | C. S. Sims | 4-6692 | simcs |
| PHY | F. E. Bertrand, Jr. | 4-4737 | bertrandfejr |
| CASD | M. L. Poutsma | 4-5028 | poutsmaml |
| Team Leader | T. Myrick | 1-4597 | myrickt |

# WASTE CHARACTERIZATION REENGINEERING TEAM CHARTER

The Waste Characterization Reengineering Team is charged with providing ORNL with a common-sense, technically sound, compliant (including ALARA), generator-friendly, and cost-effective approach to characterization of radioactive and mixed wastes. Although the primary focus will be on resolving the substantive issues associated with heterogeneous radioactive solid wastes (LLW, TRU, and mixed; with emphasis on characterization of the radionuclide content), some issues involving liquid wastes also may need to be addressed (for example, related to accountability for generation once the transition from EM-funded to generator-funded waste management has been effected?). The Team will be asked to do the following:

- Perform diagnostic evaluation of ORNL's current performance and issues to be addressed using materials presented to the WM Reengineering Core Team and other information as needed, e.g.:

  - How far away are we from striking the appropriate balance between rigor (to avoid costly errors and perpetuation of legacy problems) and practicality (to avoid unnecessary requirements and added costs)?
  - Limitations of current approaches and technologies when applied to heterogeneous solid radioactive wastes (resulting in mismatch, for example, between expectations laid out in waste acceptance criteria and actual capabilities)?
  - Need for expanded generator support by technical experts to conserve resources and reduce potential for errors?
  - Potential for loss of access to treatment and disposal capabilities resulting from inadequate waste characterization?
  - Characterization issues associated with interpretation and application of "No Rad Added"policy?

- Provide early input to WM Reengineering Core Team on benchmarking information needs; use benchmarking data obtained by Core Team in developing recommendations.

- Assess needs, availability, and costs of analytical capabilities (including nondestructive assay) for ORNL waste characterization.

- Identify areas where technology improvements or development are needed.

- Identify barriers to reengineering.

- Estimate performance improvements and cost savings which will result from the recommended approach.

Team recommendations will be provided to the Core Team by March 31, 1997.

## WASTE CHARACTERIZATION REENGINEERING TEAM

| Position | Name | Division | Telephone |
|---|---|---|---|
| Leader | Jon M. Forstrom | OESH | 6-5640 |
| Champion | John R. Trabalka | CTD | 4-7382 |
| WM Technical-Radiol. Charact. | Greg R. Larson | WMRAD | 1-3273 |
| WM Section-NDA Technol. | F. (Fred) J. Schultz | WMRAD | 6-6870 |
| Generator 1 | R. (Dick) E. Schreiber<br>F. (Fred) R. Chattin | CTD<br>(REDC) | 6-7783 |
| Generator 2 | Lloyd J. Turner | M&C<br>(Hot Cells) | 4-2559 |
| Generator 3 | P. M. (Mike) Whaley | RRD<br>(HFIR) | 6-5008 |
| Generator 4/ Analyt. Chem. | C. (Chris) D. Parks | CASD<br>(REDC Analyt. Laboratory) | 4-7064 |

## Hazardous/Mixed Waste Reengineering Team

The Hazardous/Mixed Waste Reengineering Team is charged with providing ORNL with a well-managed, compliant, generator-friendly, and cost-effective approach to hazardous/mixed waste management for newly generated wastes. The team will be asked to consider the following:

- Assessment of day-to-day operations
  - Map the operations process
  - Evaluate areas for technology improvements
  - Identify activities performed by operations personnel, i.e., ORNL site spill response
  - Once established, ORNL's Necessary and Sufficient standards will be evaluated for incorporation

- Identify process for off-site shipments of hazardous waste
  - Evaluate off-site shipment from generator areas

- Determine generator waste management cost from generation to delivery to waste management organization

- Assessment of current hazardous waste permits
  - Identify unnecessary requirements
  - Evaluate innovative approaches to relax permit requirements

- Identification and evaluation of areas where make-buy analyses are appropriate for outsourcing determinations

- Benchmark the best-in-class hazardous waste operation at a comparable R&D, government, and/or industrial setting, and use those data in developing recommendations

- Identification of barriers to reengineering

- Estimation of performance improvements and/or cost savings which will result from the recommended changes

The Subteam recommended changes will be provided to the core team by April 7, 1997, for the priority processes evaluated.



2/27

| | | Phone | E-mail |
|---|---|---|---|
| Team Leader | Jon Forstrom | 6-5640 | KAF |
| Core Team Champion | Jerry Bohannon | 1-3709 | OHA |
| Facilitator | Tim/Kathy | | |
| WMRAD Rep | Dave Drake | 1-3694 | DKX |
| Technical | Jeff Gilpin | 1-2844 | KGI |
| Waste Gen. 1 | Jamie Bain | 6-8665 | JMI |
| Waste Gen. 2 | Gordon Miller | 4-6235 | ZGZ |
| Waste Gen. 3 | Roger Spence | 4-6782 | SUU |
| P&E Rep | Larry Reeves | 4-4214 | [illegible]5 |
| Industry Rep | ~~Lance Monga~~ JIM BAILEY, LMES | ~~4-7256~~ 6-4485 | ~~RUN~~ |
| Transportation Rep. | Greg Livengood/ Jeff Shelton | 4-9458/ 6-6401 | L6D/ EF6 |
| ES&H | Crystal Schrof | 4-9228 | C7Z |

# CHARTER
# GENERATOR/WASTE MANAGEMENT TEAMING/FORECASTING TEAM

The Generator/Waste Management Teaming/Forecasting Process Team is charged with addressing (a) communication channels and staff interactions between the Waste Management (WM) organization and other ORNL organizations and (b) mechanisms for forecasting future waste management needs. The specific goal is to identify improvements in these interfacing areas that will assist the overall goal of providing ORNL staff with cost-effective, generator-friendly, safe, and compliant waste treatment, storage, and disposal (TSD) services for newly generated wastes and recyclable materials.

For the following elements, the current status will be analyzed, barriers to improvement will be identified, and recommendations for change will be made to the Core Team:

- Communication and staff interactions between WM and the dispersed and varied ORNL waste generators, with the goal of achieving improved responsiveness and a true partnership involving all parties.

- Communication and staff interactions between WM and the relevant ORNL compliance and operational support organizations, with the same goal.

- Communication and planning strategies, as well as organizational structures and definitions of staff assignments, that will assist implementation of recommendations made by other Process Teams and approved by the Core Team.

- Mechanisms to translate "upper management commitment" into real culture change among the staff, in particular, the acceptance of a generator-as-customer attitude in WM and of a waste minimization/pollution prevention focus among the generators.

- Appropriate planning/forecasting mechanisms to anticipate future waste management needs and challenges, both within WM and at the ORNL Strategic Planning level. Issues include qualitative and quantitative changes in waste streams and TSD processes driven by, for example, (a) changes in ORNL operations, new ORNL initiatives, and Environmental Restoration operations at the ORNL site, (b) new/improved TSD technology, (c) changes in disposal endpoints and regulatory drivers, and (d) selective future outsourcing.

- Forecasting issues for R&D and support organizations driven by, for example, (a) waste disposal charge-back costs and (b) balancing the often opposing drivers of waste minimization/pollution prevention and upgrading ORNL infrastructure.

The Process Team will begin work on April 2, 1997, will provide the Core Team progress updates as requested, and will submit its analyses and recommendations to the Core Team by April 30, 1997.

To: tfx
From: tfx@ornl.gov (Tom Scanlan)
Subject: R&R Subteam Charter
Cc:
Bcc:

DRAFT DRAFT DRAFT

ORNL Waste Management Reengineering Initiative

Reporting and Records Subteam Charter

The Reporting and Records subteam is charged with making recommendations to the ORNL Waste Management Reengineering Team that will ensure the most efficient process is used to acquire, employ, transfer, and store the waste characterization and status data used to prepare waste management reports and records, both now and in the forseeable future.

Activities to derive the recommendations may include the following:

o review and assessment of the current process

o review and assessment of the administrative concepts that drive the current processes.

o review and assessment of concepts used by other organizations that handle large quantities of data, both within LM and within the private sector.

o review of the drivers for what types of data are needed by whom for what purose.

o review and assessment of the boundary conditions placed on the process by the customer (DOE)

o review of the ability of the current process flexibility (ability to change with new waste streams or administrative situations)

o review of the contraints placed on ORNL missions/research by the current process

o review of the interaction between the waste management field operations and the current process

o review of the buisiness structures which facilitate waste Management's role as a service organization within ORNL

o review of WMRAD integration within ORNL's technical infrastructure

DRAFT DRAFT DRAFT

Waste Management Program Reengineering Team

Charter for Process Team on Disposal Endpoints

The Waste Management Program Reengineering Team Sub-Team on Disposal Endpoints Process is charged with providing an evaluation of the current status and future trends associated with off-site disposal of ORNL's sanitary, industrial, hazardous, mixed, low-level, and transuranic wastes. This evaluation is to support the overall Charter of the Waste Management Reengineering Team in providing well-managed, compliant, generator-friendly, and cost-effective approaches to waste management for all newly-generated waste streams. The Sub-Team is asked to perform the following tasks:

- Identify current disposal endpoints and their current acceptance schedules for all significant ORNL waste streams.
- Assess the confidence level that those endpoints will be available when needed.
- Determine the vulnerable ORNL streams for disposal and at what point in time this lack of defined endpoint will be a serious problem
- Identify waste storage requirements for the vulnerable streams and facility upgrades/construction needs to maintain compliance and not negatively impact generating programs.
- Develop a path forward for each waste stream that identifies needed process changes/improvements and the costs of implementing those changes.
- Identify the barriers to implementing the proposed disposal strategy.
- Provide process team's conclusions and recommendations, in report format, to Core Team by May 2, 1997.
- Provide weekly progress updates to Core Team.

Waste Management Reengineering

Process Team on Disposal End Points

| Position | Name | Phone | Pager | E-Mail Address | Fax |
|---|---|---|---|---|---|
| Team Leader | Allen Croff | 4-1792 | | agc | 6-7468 |
| Core Team Champion | Leroy Stratton | 6-0504 | | les | 6-0105 |
| Facilitator | Kathy Johnson | 1-2975 | 873-4484 | kwh | 4-4427 |
| WMRAD Rep | Martin Tull | 4-8996 or 6-0133 | | mt5 | 1-2843 |
| Technical | Don Lee | 4-5803 | | dzl | 1-5788 |
| Waste Generator 1 | Robert Wham | 6-7783 | | wham | 6008 |
| Waste Generator 2 | Linda Kaiser | 6-8349 | 873-4156 | | ~~5-6339~~ 4-1953 |
| Waste Generator 3 | | | | | |
| Waste Generator 4 | DougTurner | 6-2017 | 873-5378 | dwz | 1-3287 |
| Other | Mac Roddye (DOE) | 6-7705 | | rqu | 4-9275 |
| Complete Date: 5/2/97 | | | | | |

Appendix A

# WM RE-ENGINEERING-ONSITE TREATMENT AND STORAGE PROCESS TEAM CHARTER

The Onsite Treatment and Storage process team for the WM re-engineering effort will evaluate the treatment and storage activities of the division and provide recommendations to the core team for a cost-effective, customer-friendly, safe, and compliant treatment and storage function. The focus of the process team will be on the following:

- Map current treatment and storage activities to provide understanding of the processes and to identify points of customer interface
- Evaluate treatment and storage processes for improved efficiencies and cost reductions
- Identify possible areas for technology improvements
- Evaluate current maintenance philosophies and practices
- Evaluate treatment and storage practices for generator charge back purposes
- Provide WM re-engineering core team a unit cost for treatment and storage of wastes (process team will determine which waste stream unit cost will be provided)
- Provide WM re-engineering core team with an estimate of the savings expected to be realized from the process team recommendations
- Identify barriers to implementation of re-engineering efforts as pertaining to storage and treatment
- Use bench marking information provided by the WM re-engineering core team and other sources in making recommendations
- Evaluate treatment and storage processes for possible outsourcing opportunities

Recommendations from the treatment and storage process team will be provided to the WM core team by May 1, 1997.

## Appendix B

| Name | Organization | Role |
|---|---|---|
| Ray Arp | ORNL P & E | Core Team Champion |
| Jeff Baldwin | WMRAD LGWO Section | Liquid/Gaseous Waste SME |
| Jerry Cunningham | WMRAD SWO Section | Radioactive Waste SME |
| Darrell Daugherty | EET TN Corporation | Team Leader |
| Dave Hall | WMRAD SWO Section | Solid Waste SME |
| Mike Hicks | ORNL P&E | Maintenance SME |
| Larry Jones | LMES Project Execution | Solid Waste SME |
| Jim Kain | Radian Corporation | Industry Liquid Waste SME |
| Jim Mathys | ORNL P&E | Sanitary Waste SME |
| George McRae | Y-12 WMD | Liquid Waste SME |
| Victoria Myers | SAIC | Facilitator |
| Sharon Robinson | ORNL Chem Tech | Liquid Waste SME |
| Chris Scott | WMRAD LGWO Section | Liquid/Gaseous Waste SME |
| Tony Sizemore | WMRAD LGWO Section | Labor Representative |
| Mark Sylvester | Radian Corporation | Industry Solid Waste SME |
| | Ad Hoc Members | |
| Doug Allen | Radian Corporation | Industry Solid Waste SME |
| Dave Drake | ORNL HWOG | Hazardous Waste SME |
| Butch Edgemon | ORNL SWO Section | Solid Waste SME |
| Kathy Johnson | ORNL CMO | Facilitator |
| Tim Kent | ORNL Chem Tech | Liquid Waste SME |
| Greg Larson | ORNL RSWOG | Radioactive Waste SME |
| Greg Livengood | ORNL Transportation | DOT SME |
| Tim Myrick | ORNL EM | Core Team Leader |
| Mark Saunders | EET TN Corporation | Solid Waste SME |
| Sylvia McGhee | ORNL Transportation | Rad Packaging SME |

# APPENDIX C

## Core Team Recommendation #1: Shift Paradigm to Reflect ORNL as a Single Waste Generator

| Process Team Designation | Recommendation | Cat. A | Cat. B | Related Recommendations | Total Cost Savings | Total Cost to Implement | New Funds Required (Y/N) | Implementability (H,M,L) | Immediate Priority | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| **Recommendation #1:** Shift to commercial waste certification model that reflects ORNL as the single waste generator at the site, rather than current approach where 1500 individual generators are required to certify waste for disposal: 1) single generator concept will simplify the waste certification/verification program and encourage teaming between WM and generating divisions, 2) minimizing the number of individually managed waste streams will significantly lower the cost of waste characterization and certification. | | | | | Included in other recomm. | Included in other recomm. | | H | Y | |
| CV-1 | **Develop a WC Model:** Reorient Waste Management at ORNL to embody a system in which ORNL becomes the one single generator with the research organizations being the customer of the Waste Management service organization. This should enable the laboratory to consolidate what are today considered as individual waste streams into broader "ORNL waste streams" that are then certified by the laboratory prior to disposition. Section 2 describes the process and the subtasks we believe should be performed by WM. Figures 2 and 3 illustrate the concept of model building (current and proposed). | REV | PROC | | NI | NI | | H | Y | |

## Core Team Recommendation #2: Shift WM Customer Service Orientation to Include DOE EM, Research Organizations, and M/I Contractor

| Process Team Designation | Recommendation | Cat. A | Cat. B | Related Recommendations | Total Cost Savings | Total Cost to Implement | New Funds Required (Y/N) | Implementability (H,M,L) | Immediate Priority | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| **Recommendation #2:** Instill a customer service orientation in WMRAD: 1) direct that orientation to recognize that R&D organizations and the new M&I contractor need to be equivalent customers to DOE EM, 2) strive for "win-win-win" solutions through teaming with all customers bases, and 3) establish ORNL WM Customer Advisory Panel with representatives from all waste generating orgs. to promote internal teaming. | | | | | Included in other recomm. | Negligible | | M | Y | |
| HM-1 | **Cradle-to-Grave System:** Completely reengineer the "cradle-to-grave" waste management process to incorporate the principles of trust, teamwork, customer service, experience and expertise, "necessary and sufficient," and life-cycle cost efficiency. Support and facilitate this process using best available ("off-the-shelf") information management technologies linked together in such a way that waste can be tracked and managed from the point of generation to final disposal using the minimum information necessary, eliminating redundant reviews and approvals, and without the need to generate paper copies. | REV | PROC | RR-1, DE-2 | NI | NI | | M | Y | |
| TF-2 | **ORNL Culture Change:** Institute a culture change within ORNL--beginning with ORNL senior management--that recognizes waste management as an important service critical to mission success with potentially "show-stopping" ramifications. Further this culture change by instilling a "generator-service" attitude and approach to doing business within the WMO. Complete this culture change by encouraging ORNL waste generators to be responsible, accountable, and cooperative customers of the WMO. Table 2 lists specific suggested actions to successfully implement this overall recommendation. | REV | ORG | PP-15 | NI | NI | | L | Y | |
| TF-3 | **WM-Gen. Teaming:** Improve teaming between the ORNL waste generators and WMO to achieve optimum efficiencies in the NG waste management process. Table 3 lists specific suggested actions to successfully implement this overall recommendation. | ORG | | PP-15 | NI | NI | | M | Y | |

## Core Team Recommendation #2: Shift WM Customer Service Orientation to Include DOE EM, Research Organizations, and M/I Contractor

| Process Team Designation | Recommendation | Cat. A | Cat. B | Related Recommendations | Total Cost Savings | Total Cost to Implement | New Funds Required (Y/N) | Implementability (H,M,L) | Immediate Priority | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| TF-1 | **Customer Approach:** Lockheed Martin should change our corporate approach to communications with our DOE customers to be proactive not reactive, to reflect our perspective that DOE is a single customer even though there are multiple factions within that customer, and to reflect our ability to please multiple and diverse customers (DOE and non-DOE) by developing "win-win" solutions that help achieve overall program cost efficiencies that benefit all customers. Table 1 lists specific suggested actions to successfully implement this overall recommendation. | REV | ORG | | NI | NI | | L | Y | |

## Core Team Recommendation #3: Perform Systems Analysis as the Basis for WM Strategic Planning

| Process Team Designation | Recommendation | Cat. A | Cat. B | Related Recommendations | Total Cost Savings | Total Cost to Implement | New Funds Required (Y/N) | Implementability (H,M,L) | Immediate Priority | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| **Recommendation #3:** Perform a comprehensive Systems Analysis of ORNL waste as the basis for WM strategic planning: 1) evaluate present and future waste streams and generation rates, 2) identify optimal treatment/disposal methods for present and future waste streams, and 3) evaluate options to implement the optimal treatment/disposal methods, e.g. new or upgraded facilities, operational changes, outsourcing, etc., with consideration of life-cycle costs. | | | | | $5M annually | $1M over 3 years (new) | | H | Y | |
| DE-1 | **Invest. Endpts.:** ORNL should invest more to ensure endpoint availability | ORG | | TF-2 | NI | NI | | M | N | |
| DE-2 | **Pursue Waivers:** ORNL's contingency option to a newly inaccessible endpoint should be to pursue waivers | ORG | PROC | PP-13 | NI | NI | | L | N | |
| DE-3 | **Endpts. Cradle-to-Grave.:** ORNL should adopt endpoint-focussed cradle-to-grave waste management, a) Systems analysis is required to fully understand and optimize the system, b)Order 435.1 will require this (if promulgated) | PROC | ORG | HM-1, WC-1 | NI | NI | | H | Y | |
| DE-4 | **Disp. Known Bef. Gen.:** Wastes should be produced with dispositions as the foremost thought, a)Will require a true team effort - Generators cannot regard their wastes as someone else's problem, b) Permit to generate a new waste type?, c) Pedigree and package wastes at time of generation, d) Make process knowledge acceptable basis for waste pedigree, e) Study needed 1.)How to do so with newly generated wastes, 2.) Propose solution for intractable waste or cease generation. | PROC | | TF-3, WC-2 | NI | NI | | M | Y | |
| DE-6 | **NTS/Hanford:** a) Focus on NTS for LLW and Hanford for mixed LLW and b) send both LLW and mixed to one site. | REV | | | NI | NI | | A: M<br>B: L | A: Y<br>B: N | |
| DE-7 | **WIPP for TRU:** Must use WIPP for TRU but be prepared for long-term storage | PROC | | | NI | NI | | H | N | |

## Core Team Recommendation #3: Perform Systems Analysis as the Basis for WM Strategic Planning

| Process Team Designation | Recommendation | Cat. A | Cat. B | Related Recommendations | Total Cost Savings | Total Cost to Implement | New Funds Required (Y/N) | Implementability (H,M,L) | Immediate Priority | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| DE-13 | **Radically Altered Endpts.:** Feasibility studies of radically altering some waste endpoint requirements: a) Outfalls: Eliminate all liquid discharges, b) Mixed Waste: Minimize RCRA materials, make all wastes non-RCRA, c) RH-TRU: Separate into RH-LLW (to NTS) and CH-TRU (more reliably to WIPP). | REV | | | NI | NI | | L | N | |
| WC-1 | **Systems Analysis:** Perform systems analysis to guide management of ORNL wastes. | PROC | | | NI | 1,000K | | H | Y | |

## Core Team Recommendation #4: Establish Direct ORNL Involvement With Disposal Endpoints

| Process Team Designation | Recommendation | Cat. A | Cat. B | Related Recommendations | Total Cost Savings | Total Cost to Implement | New Funds Required (Y/N) | Implementability (H,M,L) | Immediate Priority | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| **Recommendation #4:** Establish direct ORNL involvement with disposal endpoints: 1) take lead in representing ORNL's present and future interests regarding newly generated waste, rather than the new M&I filling that role, 2) become involved with regulatory and political aspects of ensuring disposal endpoint available for ORNL present and future waste, and 3) accelerate shipment of legacy waste to ETTP. | | | | | Included in #3. | Included in #3. | | M | Y | |
| DE-10 | **Activist Role:** Adopt an activist role regarding endpoints: a) Identify endpoint managers, b) Collaborate with other labs to work the system - Strategic Lab Council?, c) Involvement in advisory/technical/steering committees related to WIPP, NTS, Hanford | REV | ORG | PP-13, DE-7 | NI | NI | N | H | Y | |
| DE-11 | **Y-12 Landfill PA:** Development of Y-12 Industrial Landfill PA | REV | | | NI | NI | Y | L | N | |
| DE-12 | **State Equity:** Actively recognize and manage state equity balance to provide leverage for endpoint access and reduce unit disposal costs - CONCEPT: Become a treatment, storage, packaging, and shipping depot for the eastern U.S.: a) On the way for many eastern sites, b) Capitalize on expertise in some waste types, c) Attuned to Western needs: minimum voids, maximum stability. | REV | | | NI | NI | Y | L | N | |
| DE-14 | **New Site for Trouble. Waste:** Feasibility study of ORNL taking the lead in establishing a new waste disposal site for intermediate-level or otherwise troublesome wastes: a) Focus on NTS, b) LM complex-wide initiative on government land?, c) LM commercial initiative on leased land? | REV | | | NI | NI | Y | L | N | |
| DE-15 | **MVST/TRU Sub:** Encourage the MVST/TRU solid waste contractor to use 3517 and 3525 to process legacy wastes leading to a continuing capability to handle newly generated wastes | REV | | | NI | NI | N | M-H? | Y | |
| TS-5 | **Ship MW to ETTP:** Accelerate and maximize mixed waste shipments to ETTP. | ORG | | HM-3 | NI | NI | | M | Y | |

7/23/97

## Core Team Recommendation #5: Create a Single, Expert-based ORNL Waste Charact./Verif./Cert. Program and Organization

| Process Team Designation | Recommendation | Cat. A | Cat. B | Related Recommendations | Total Cost Savings | Total Cost to Implement | New Funds Required (Y/N) | Implementability (H,M,L) | Immediate Priority | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| **Recommendation #5:** Create an expert-based ORNL waste characterization/verification/certification program and organization within WM: 1) place responsibility for proper characterization on WM experts rather than individual researchers, 2) apply an expert-based, graded approach to characterization, including use of process knowledge, and 3) ensure appropriate DQOs and WACs are met. | | | | | $6M annually | $2M annually (50% new) | | M | Y | |
| CV-2 | **Adopt Prop. WC Mod:** We fully support & endorse the waste cert. improvements devel. and implem. by the ORNL Waste Cert Team (Daily et. al.). The concept of a GIG is an excellent idea & will streamline WM ops. for the researcher divs. The exist. model still places the most important & diff. cert. step in the hands of the researcher: charac. Without a consistent, verified, & validated approach to charac. the lab incurs an unknown business risk of vulnerability to undetected miscert. A recomm. of the charac. team, to perform a systems analysis of the existing WM prog., will ferret out inadequacies or inconsistencies in approach & thus streamline tasks and responsibilities. We concur with the waste charac. subteam that a sys. approach to WM should be adopted. This approach should identify specific waste streams at the source that will be destined for specific disp. sites. Waste charac., pack., and/or treat. issues should specifically address the offsite WAC. Critical issues should be sep. from noncritical issues, e.g. what isotopes are important or what items are forbidden. | REV | PROC | WC-1 | NI | NI | | H | Y | |

## Core Team Recommendation #5: Create a Single, Expert-based ORNL Waste Charact./Verif./Cert. Program and Organization

| Process Team Designation | Recommendation | Cat. A | Cat. B | Related Recommendations | Total Cost Savings | Total Cost to Implement | New Funds Required (Y/N) | Implementability (H,M,L) | Immediate Priority | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| CV-3 | **Validate The WC Process:** The waste certification process should be validated through assessments and audits in order to insure that the process is being followed and implemented as delineated by laboratory policy, action plans, and procedures. Validation assures that the certification program is in order and that it is being implemented. However, the fact that the certification plan/process has been validated does not necessarily provide any degree of confidence about the certification of any individual container. As pressure continues to push more waste to off-site repositories, certification of individual containers will become much more important than it has in the past. | PROC | | | NI | NI | | ? | ? | |
| CV-4 | **Verify Indiv. Containers:** To achieve confidence regarding the certification of an individual container requires verification. Verification is potentially more rigorous than validation and for this reason should be subjected to the Necessary and Sufficient process. This will require a "systems analysis" to determine answers to the following questions: what is an acceptable undetected miscertification rate? what is the business risk in miscertification? what resources are available? what constitutes a heroic effort, i.e. putting in place more personnel/equipment resources than we have funding for? what verification frequency should be utilized (10%, 20%...)? is the waste processed or treated (e.g. incineration, acid dissolution)? how good and appropriate are existing waste certification steps? and what tools do we use for verification (real-time radiography, independent laboratory sampling and analysis, nondestructive assay)? The means for determining and performing verification should be developed through a Data Quality Objectives (DQO) process. | PROC | | | NI | NI | | ? | ? | |

7/23/97

## Core Team Recommendation #5: Create a Single, Expert-based ORNL Waste Charact./Verif./Cert. Program and Organization

| Process Team Designation | Recommendation | Cat. A | Cat. B | Related Recommendations | Total Cost Savings | Total Cost to Implement | New Funds Required (Y/N) | Implementability (H,M,L) | Immediate Priority | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| CV-5 | **Deploy Technology:** Another example is the deployment of technology for measuring radionuclide quantity or consideration of treatment technologies for specific waste streams. Significant improvements could be realized for making the TRU concentration determination (100 nCi/g) or for assuring that "no-rad was added" to outgoing hazardous waste. We would hope that other subteams have identified these re-engineering activities and have reported them elsewhere. | TECH | | RR-1, WC-2 | NI | NI | | M | N | |
| CV-6 | **Eval. Use of PK:** Process knowledge plays a very large role in waste certification, especially characterization. Good process knowledge is paramount, particularly in the case of making the no rad added decision. Since process knowledge plays such a key role in certification, it needs to be evaluated under a set of boundary conditions for when it is really sufficient and when it is not. Upper management should be acutely aware of potential business risks associated with PK and should evaluate liability on a laboratory basis, not at a waste certifier level. | ORG | | WC-2 | NI | NI | | H | Y | |
| HM-FA-2 | **Sampling & Analysis:** Evaluate potential cost savings in analytical work - off-site analysis/sampling services. | OUT | ORG | | NI | NI | | H | Y | |
| WC-2 | **Charac. System:** Move characterization of ORNL radioactive waste to an expert-based system. | TECH | PROC | | 1,000K | 260K | | M | Y | |

## Core Team Recommendation #6: Modify the ORNL SLLW Mgmt. Process to Mimic the Commercial Nuclear Industry

| Process Team Designation | Recommendation | Cat. A | Cat. B | Related Recommendations | Total Cost Savings | Total Cost to Implement | New Funds Required (Y/N) | Implementability (H,M,L) | Immediate Priority | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| **Recommendation #6:** Modify the ORNL SLLW management process to mimic that of the commercial nuclear industry: 1) segregate "reducible" waste at source and survey for free release, and 2) centrally treat/process contaminated waste for maximum volume reduction and dispose of residual with characterization that takes advantage of homogenization. | | | | | $1M annually | $500K annually (from savings) | | M- | Y | |
| PP-1 | **SLLW Mgmt.:** Revamp the Solid Low-Level Waste Program to include the following key points: a) SLLW pickup by WMRAD on a per item basis, b) Internally institute a category of SLLW called "reducible waste," c) Institute a "store for decay" policy for SLLW containing short-lived isotopes, d) Develop (or purchase) a facility for automated checking of small items for radioactive contamination. | REV | PROC | TS-4, WC-3 | 966K | NI | | A: H<br>B: M<br>C: M<br>D: M | A: Y<br>B: Y<br>C: N<br>D: N | |
| PP-16 | **HP Green Tag:** HP green tag procedures need to be clear and totally understood by every HP at the Lab. Lab-wide procedures for green-tagging should be followed and used so that it is possible for clean materials to be tagged as such. It should be recognized that HP technicians provide a service, much as analytical chemists do, in the waste disposal process. The widely recognized feeling among waste generators, waste certifiers, and radiation protection personnel is that their signature on a waste form means that they are opening themselves up to later liability. The perception is that the Company will use this signature as a means of "going after" the signatories in the event that problems surface at a later date. Company policy should be to support those who sign documents in good faith using approved procedures and best available knowledge and technology. | REV | PROC | | NI | NI | | M | Y | |

## Core Team Recommendation #6: Modify the ORNL SLLW Mgmt. Process to Mimic the Commercial Nuclear Industry

| Process Team Designation | Recommendation | Cat. A | Cat. B | Related Recommendations | Total Cost Savings | Total Cost to Implement | New Funds Required (Y/N) | Implementability (H,M,L) | Immediate Priority | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| TS-4 | **SLLW Mgmt.:** Modify existing SLLW management process to (1) maximize up-front on-site segregation, (2) use offsite "free release" service, (3) characterize waste streams initially to satisfy only DOT classification requirements, (4) maximize offsite volume reduction when supported by favorable benefit-cost analysis results, (5) use characterization data from ash analysis for profiling and scaling isotopic information for specific waste streams, and (6) optimize utilization of combined IWMF and offsite disposal. | REV | P2 | PP-1, WC-3 | 1,221K | NI | | 1: M<br>2: M<br>3: M<br>4: H<br>5: M<br>6: H | 1: Y<br>2: Y<br>3: Y<br>4: Y<br>5: N<br>6: N | |
| WC-3 | **Comm. No Rad-Added:** Deploy ORNL equivalent of accepted nuclear industry practices to segregate uncontaminated waste from LLW at the source and to dispose of uncontaminated materials in the Y-12 landfill. | P2 | | PP-1, TS-1 | 400K | NI | | M | Y | |

## Core Team Recommendation #7: Create a "Seamless" WM Information Management System

| Process Team Designation | Recommendation | Cat. A | Cat. B | Related Recommendations | Total Cost Savings | Total Cost to Implement | New Funds Required (Y/N) | Implementability (H,M,L) | Immediate Priority | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| **Recommendation #7:** Create a seamless WM information management system utilizing available technology to the maximum benefit of both WM and its customers: 1) implement improvements to fully utilize and integrate present components of the system, 2) tailor system to meet ORNL needs, not needs of all 5 OR sites, and 3) ensure future additions or modifications of components "fit" the integrated system. | | | | | $1.4M annually | $140K one time (new) | | H | Y | |
| CV-5 | **Deploy Technology:** Several improvements to the waste certification process can be realized by the deployment of technology. For example, an advanced database system should track and trend information facility by facility, include smart processing for consistent decision analysis (including feedback/branching based on input data), and validate user input entries. Currently, WM relies on personnel to "eyeball" facility data for legitimacy and consistency. Decision analysis is on a case by case basis. | TECH | | RR-1, WC-2 | NI | NI | | H | Y | |
| HM-1 | **Cradle-to-Grave System:** Completely reengineer the "cradle-to-grave" waste management process to incorporate the principles of trust, teamwork, customer service, experience and expertise, "necessary and sufficient," and life-cycle cost efficiency. Support and facilitate this process using best available ("off-the-shelf") information management technologies linked together in such a way that waste can be tracked and managed from the point of generation to final disposal using the minimum information necessary, eliminating redundant reviews and approvals, and without the need to generate paper copies. | REV | PROC | RR-1, DE-2 | 1,350 K | >200K | Y | M | N | |

## Core Team Recommendation #7: Create a "Seamless" WM Information Management System

| Process Team Designation | Recommendation | Cat. A | Cat. B | Related Recommendations | Total Cost Savings | Total Cost to Implement | New Funds Required (Y/N) | Implementability (H,M,L) | Immediate Priority | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| RR-1 | **Seamless System:** Restructure the existing waste information support systems to provide a more seamless process to capture and distribute waste information. The ideal process will support the electronic capture of waste information as early as possible in the life cycle of the data. Once captured the data will be routed electronically from organization to organization and system to system with little to no paper involved in the flow. The process will utilize existing commercially available off the shelf software (COTS) wherever possible and will build on many of the technological infrastructure components put in place over the last 5 years including networks, servers, World Wide Web support and software technologies. The process will support and consolidate all waste information requirements eliminating the proliferation of redundant subsystems with associated duplication of effort in data entry and analysis. Automation of the process will minimize manual intervention. | TECH | PROC | HM-1, PP-15, TF-4 | NI | NI | Y | M | N | |
| RR-2 | **Optimal GES:** Identify the optimal information that waste generators must provide on the Generator Entry System (GES) form set for Waste Management to accept and complete the form set for the generator. | PROC | | HM-5 | 726K | 2K | ? | H | Y | |
| RR-3 | **Track 90D w/GES:** Utilize the existing Generator Entry System (GES) to provide inventory data and track accumulation time limits remaining for 90-day accumulation areas (90-DAA) and PCB storage areas. | TECH | PROC | HM-5 | 52K | 4K | | H | Y | |
| RR-5 | **Complete Barcoding:** Complete ORNL's barcoding system for electronic completion of Treatment, Storage and Disposal (TSD) forms and Waste Container Record (WCR) forms. | TECH | PROC | | 153K | 14K | | H | Y | |
| RR-6 | **New Reporting Tool:** Provide the existing user base with a new end-user reporting tool with more powerful features and functionality. | TECH | | | 356K | 50K | | H | Y | |
| RR-7 | **GES Templates:** Create a set of templates for commonly generated wastes for use with the Generator Entry System (GES). | PROC | TECH | | 29K | 4K | | H | Y | |

## Core Team Recommendation #7: Create a "Seamless" WM Information Management System

| Process Team Designation | Recommendation | Cat. A | Cat. B | Related Recommendations | Total Cost Savings | Total Cost to Implement | New Funds Required (Y/N) | Implementability (H,M,L) | Immediate Priority | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| RR-8 | **Elec. Inspection:** Implement electronic inspection record keeping/validation system for WM storage or treatment units (RCRA and TSCA). | TECH | PROC | | 42K | 48K | | M | N | |
| RR-9 | **Elec. PK:** Include the process knowledge (PK) form as an electronic form within GES. | PROC | TECH | | 26K | 5K | | H | Y | |
| TF-4 | **Forecast System:** Establish a "user-friendly" electronic waste and cost forecasting system that will help WMO manage the program based on waste projections and will assist generators in their budgeting process by providing cost projections. Table 4 lists specific suggested actions to successfully implement this overall recommendation. | TECH | PROC | PP-15, RR-1 | NI | NI | Y | M | N | |

## Core Team Recommendation #8: ORNL Should Not Convert to LMES WITS System

| Process Team Designation | Recommendation | Cat. A | Cat. B | Related Recommendations | Total Cost Savings | Total Cost to Implement | New Funds Required (Y/N) | Implementability (H,M,L) | Immediate Priority | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| **Recommendation #8:** ORNL should not convert to the LMES WITS system, but should upgrade its current waste tracking system (WTS) to provide DOE the data output they require through a WITS interface capability: 1) WITS lacks present capabilities of ORNL's current system, 2) both will require equivalent future upgrades, so cost to switch now would be wasted, and 3) WITS will be under M&I control once that contract is issued; WTS, on the other hand, would remain under ORNL control. | | | | | $800K one time, $130K annually | $150K one time (new) | | H | Y | |
| RR-4 | **No WITS:** Do not shift to new LMES waste tracking system (WITS); instead, continue to use existing ORNL system (WTS). | REV | | | 166K | Zero K | N | H | Y | |

## Core Team Recommendation #9: Strengthen and Emphasize the ORNL P2 Program

| Process Team Designation | Recommendation | Cat. A | Cat. B | Related Recommendations | Total Cost Savings | Total Cost to Implement | New Funds Required (Y/N) | Implementability (H,M,L) | Immediate Priority | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| **Recommendation #9:** Strengthen and emphasize the ORNL P2 program: 1) raise the profile of the P2 program, 2) consolidate various P2 responsibilities within the P2 program, 3) implement identified P2 initiatives, and 4) resurrect Chemical Stores. | | | | | $500K annually + $9M elsewhere | $300K annually (50% new) | 50% New | H | Y | |
| PP-2 | **Café. Waste:** Reduce the amount of sanitary waste generated by the ORNL Cafeteria. | P2 | PROC | | 86K | NI | | H | N | |
| PP-3 | **Wire Disp.:** Develop a simple and logical protocol for the disposition of waste electrical wiring. | P2 | PROC | | NI | NI | | H | N | |
| PP-4 | **Central Recyc.:** Establish a central facility for collection recyclable materials. | P2 | PROC | | <10K | <<<10K | | H | N | |
| PP-5 | **Chem. Invent.:** Create an active, aggressive program to reduce the current excess chemical inventory and keep the future inventory as small as possible. The ideal program should include one or all of the following: a) A" purge team" that will reduce the current inventory of excess chemicals and equipment at the Lab, b) A virtual Between Use Storage (Bus Stop) for utilizing excess chemicals, c) A Centralized Chemical Stockroom to better utilize all chemicals, to permanently reduce the Lab's chemical inventory, and to make chemical acquisition and disposal easier and cheaper for researchers, d) A link between the AVID and HMIS systems that would alert generators ordering chemicals to the availability of identical chemicals. | P2 | PROC | | 360K | NI | | A: H<br>B: H<br>C: M<br>D: M | A: Y<br>B: N<br>C: Y<br>D: N | |
| PP-6 | **P2Dept.:** Evaluate the performance measures and best organizational structure and placement for the Pollution Prevention Department. | ORG | | | NI | NI | | H | Y | |
| PP-8 | **Reuse Drums:** Implement a policy to reuse drums on-site or sell them to others for reuse. Since the beginning of 1996 over 687 steel drums and 36 plastic drums have been discarded as waste. (This issue is currently being worked by the Property Management Section of the Administrative Services Division.) | P2 | PROC | | NI | NI | | H | Y | |

7/23/97

## Core Team Recommendation #9: Strengthen and Emphasize the ORNL P2 Program

| Process Team Designation | Recommendation | Cat. A | Cat. B | Related Recommendations | Total Cost Savings | Total Cost to Implement | New Funds Required (Y/N) | Implementability (H,M,L) | Immediate Priority | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| PP-9 | **Gas Cyl:** Emphasize need for change in policies concerning gas cylinders. Used gas cylinders are currently being delivered and used in non-radioactive areas and then are found to be radioactively contaminated when checked by local radiation protection personnel before return of the cylinders to the vendor. These cylinders are obviously contaminated upon receipt by the user, who then becomes responsible for their decontamination or disposal. This is a significant expense to the cylinder user that is unfairly imposed upon them. | P2 | PROC | | NI | NI | | M | N | |
| PP-10 | **Used Oil Recyc.:** ORNL needs an onsite filtration system to purify used oil for onsite reuse, or at least a recycle contract to eliminate the need for disposal of used oil. The stream should be collected and managed centrally to reduce analysis and other management costs. (This issue is currently being worked by the Property Management Section of the Administrative Services Division.) | P2 | PROC | | NI | NI | | H | Y | |
| PP-11 | **Distill Solvents:** Encourage the distillation of used solvents on a laboratory scale for reuse. This must first be negotiated with state regulators. | P2 | PROC | | NI | NI | | M | N | |
| PP-12 | **Matrl. Proc. Control:** Materials procurement at the Lab needs to be controlled with an eye toward the future disposal of those materials, rather than allowing anyone at the Lab to obtain any material in any quantity they want with no regard to future disposal problems or costs. | P2 | PROC | | NI | NI | | M | Y | |
| PP-13 | **Reg. Advocate:** The Lab needs a strong advocate to negotiate for it, representing its needs, when dealing with regulators and regulatory issues which involve waste disposal, salvage, or recycling. | ORG | | | NI | NI | | M | Y | |

## Core Team Recommendation #9: Strengthen and Emphasize the ORNL P2 Program

| Process Team Designation | Recommendation | Cat. A | Cat. B | Related Recommendations | Total Cost Savings | Total Cost to Implement | New Funds Required (Y/N) | Implementability (H,M,L) | Immediate Priority | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| PP-14 | **Cons. Recyc. Resp.:** There needs to be conformity and continuity in recycling programs. These programs are currently confusing with a variety of differing contracts, regulations, and contact points. All recycling contracts should be implemented via the P2 Department to ensure that P2 personnel are aware of the program and how it is run. The P2 Department could therefore act as a central point of contact to disseminate information on all recycling programs. Recycling programs must be both easier and cheaper than waste disposal for the programs to be effective. Collection bins for recyclables need to be plentiful and convenient and emptied often. | ORG | | | NI | NI | | H | Y | |
| PP-15 | **Gen. Cost Saving:** Generators need to be made aware that they are going to be charged for WM services in the future so that they can begin implementing cost-saving procedures now - especially recycling. Clear and concise recycling and salvage materials guidelines need to be established and published. | ORG | | TF-2, TF-3, TF-4 | NI | NI | | H | Y | |
| PP-17 | **Retiree Labs:** Laboratory policy should prevent personnel from retiring or leaving the Lab without first arranging for the disposition of their chemical inventory (and legacy waste). | ORG | | | NI | NI | | H | Y | |
| PP-18 | **Elim. Exist. Chargeback:** The current pollution prevention charge back tax program should be eliminated because: a) it costs a great deal of money (approximately 33% of the revenue generated) to collect the tax to cover accounting costs, etc., and b) Charge numbers for collecting the tax are frequently invalid due to the lag time between project conclusion and waste disposal. | PROC | | | NI | NI | | M | N | |

## Core Team Recommendation #10: Improve WM Operating Cost Effectivness

| Process Team Designation | Recommendation | Cat. A | Cat. B | Related Recommendations | Total Cost Savings | Total Cost to Implement | New Funds Required (Y/N) | Implementability (H,M,L) | Immediate Priority | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| **Recommendation #10:** Improve WM operating cost efficiencies: 1) initiate discussions with the Bargaining Unit to take full advantage of the broadened craft work categories provided for in the current contract, 2) assign dedicated Maintenance personnel to WMRAD to reduce need for backups and additional training, and 3) endorse and support the ORNL evaluation of reduced overhead rates charged to service organizations to be more representative of the burden associated with this type of waste organization in the commercial world. | | | | | $3M annually | Negligible | | M | Y | |
| CT-1 | **Reduce Overhead for Service Orgs.:** ORNL should charge a lower overhead rate to those service organizations that are program funded. | REV | PROC | | | | | H | Y | |
| TS-2 | **Bargaining Unit MCWA:** Negotiate with the Bargaining Unit to include all hourly pay codes in the existing maintenance craft work agreement. | REV | | | 94K | NI | | L | N | |
| TS-9 | **LGWO Maint. Staff:** Assign "dedicated" staff to LGWO Section to perform routine and special maintenance tasks. | REV | ORG | | | NI | | H | Y | Do it. |

## Core Team Recommendation #11: Eliminate Policy Mixed Waste Through Effective Implementation of the No Rad Added Policy

| Process Team Designation | Recommendation | Cat. A | Cat. B | Related Recommendations | Total Cost Savings | Total Cost to Implement | New Funds Required (Y/N) | Implementability (H,M,L) | Immediate Priority | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| **Recommendation #11:** Eliminate "policy mixed waste" through effective implementation of the No Rad Added policy: 1) eliminate fear of individual liability/recrimination, 2) implement ORNL off-site approval process (no LMES review), and 3) update and maintain RMMA database to function as a convenient "no rad added" verification tool. | | | | | $1.5M one time, $250K annually | Negligible | | M | Y | |
| CV-7 | **Respond to Needs of No-Rad Added:** The quantity of hazardous material currently under the control of waste generators is large. Waste generated from the use of this material, particularly when it originates from within an RMMA (Radioactive Material Management Area), has the potential to be contaminated with radioactive material. The existing ORNL infrastructure, support, and guidance for delineating No Rad Added under these conditions is NOT responsive to the generator's needs. A program needs to be established to respond to this significant need. | PROC | ORG | PP-1, HM-4, TS-6, WC-3 | NI | NI | | M | Y | Just Do It |
| HM-2 | **Off-Site Approv.:** The approval for shipping waste to off-site facilities is to be streamlined to minimize duplicative reviews and delays in executing shipments. The Director of waste management shall be authorized to approve waste or waste stream shipments to off-site facilities verifying appropriate certifications are completed and requirements at the receiving facility are met. | PROC | ORG | TS-6 | >60K | Zero K | | H | Y | |
| HM-4 | **RMMA Database:** Update and maintain the health physics database on current posting of RMMAs to serve as a historical record and status of the RMMAs at ORNL. Allocate adequate resources to maintain the database. | ORG | | | 30K | NI | | H | Y | |
| TS-6 | **No Rad Added:** Accelerate and expand Generator implementation of No Rad Added Program. | ORG | | HM-2 | NI | NI | | M | Y | |

7/23/97

## Core Team Recommendation #12: Replace the Function of the PWTP

| Process Team Designation | Recommendation | Cat. A | Cat. B | Related Recommendations | Total Cost Savings | Total Cost to Implement | New Funds Required (Y/N) | Implementability (H,M,L) | Immediate Priority | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| **Recommendation #12:** Replace the function of the Process Waste Treatment Plant (PWTP) with more efficient technology and integrate it into the Nonradiological Wastewater Treatment Plant (NRWTP) operations: 1) utilize new technology to eliminate/reduce LLLW generation from regeneration of current ion exchange columns, and 2 privatize the financing, design, and construction of the new system, with operations integrated into the NRWTP. | | | | | $2M annually | $6.4M one time (from savings) | N | M | Y | |
| PP-7 | **Ion-Ex. PWTP:** Emphasize and expedite research on improved methods of ion exchange column regeneration at the Process Waste Treatment Plant to decouple the process waste system from the LLLW system and therefore eliminate the largest LLLW flow into the system. | P2 | PROC | TS-1 | NI | NI | | M | Y | |
| TS-1 | **Ion Ex. PWTP:** Pending success of FY97 pilot scale studies being conducted by Chemical Technology Division, replace the Process Waste Treatment Process - Building 3544 with an electrochemical ion exchange (EIX) unit operation to be added at the Nonradiological Wastewater Treatment Plant - Building 3608. Pursue co-funding from EM-50 Technology Implementation Initiative and EM-30 Waste Management. | TECH | P2 | PP-7 | 2,982K | 6,345K | | M | Y | |

## Core Team Recommendation #13: Eliminate Excess Conservatism in Operations Requirement Documents

| Process Team Designation | Recommendation | Cat. A | Cat. B | Related Recommendations | Total Cost Savings | Total Cost to Implement | New Funds Required (Y/N) | Implementability (H,M,L) | Immediate Priority | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| **Recommendation #13:** Eliminate excess conservatism in three particular sets of requirement documents governing WMRAD operations: 1) eliminate on-site DOE equivalency, 2) implement graded approach to WM Conduct of Operations, and 3) negotiate "above and beyond" requirements out of RCRA permits. | | | | | $2M annually | $1.1M over 3 years | | M | Y | |
| HM-6 | **On-Site DOT:** The On-site Transportation Plan should be rewritten to clearly specify "necessary and sufficient"-type requirements applicable to movement of wastes on-site. The current version has lead WM to conclude that "off-site DOT equivalency" is required on-site, so they have created protocols, approvals, and recordkeeping systems to assure their compliance. | PROC | | WC-5 | 120K | NI | | H | Y | |
| HM-FA-1 | **N&S Permits:** Eliminate excess requirements in RCRA permits. | PROC | REV(? | TS-8 | NI | NI | | M | Y | |
| TS-7 | **Graded COO:** Implement graded Conduct of Operations. Train to DOE Order 5480.20A requirements at WMRAD Nuclear Facilities only. | PROC | | | NI | NI | | H | N | |
| TS-8 | **N&S Permits:** Reduce environmental permit requirement units (RU's) through application of necessary and sufficient process. | PROC | | HM-FA1 | 50K | NI | | M | Y | |
| WC-4 | **Reeval. On-Site WAC:** Reevaluate on-site waste acceptance criteria to eliminate unnecessary conservatism. | PROC | | | 1,000K | NI | | M | Y | |
| WC-5 | **On-Site DOT:** Use standard radiological protection procedures - not DOT requirements - to move materials on-site. Revise the On-Site Transportation Plan for ORNL. | PROC | | HM-6 | 250K | NI | | H | Y | |

7/23/97

## Core Team Recommendation #14: Improve Communications with and Accountability of Subcontractors

| Process Team Designation | Recommendation | Cat. A | Cat. B | Related Recommendations | Total Cost Savings | Total Cost to Implement | New Funds Required (Y/N) | Implementability (H,M,L) | Immediate Priority | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| **Recommendation #14:** Improve oversight and control of on-site subcontractors that generate waste to ensure appropriate waste management under terms of their contracts, thus eliminating "orphaned" waste. This can be accomplished through: 1) involvement of Engineering and ER Project Managers on WM Customer Advisory Panel, 2) strengthening subcontract language/penalties with regards to WM requirements, and 3) establishing ties to new M&I contractor and other DOE primes such that communication about WM issues is facilitated. | | | | | $50K annually | Negligible | | M | Y | |
| DE-9 | **M&I Stakeholder:** ORNL staff need to be involved in ORO/EM activities that could compromise our mission: CERCLA stakeholder - About half the team endorsed "owning" the most critical problems | REV | | | NI | NI | N | H | Y | |
| TF-5 | **Subcon. Commun.:** Improve communication of waste management requirements to and the accountability of subcontractors. Table 5 lists specific suggested actions to successfully implement this overall recommendation. | OUT | ORG | | >50K | NI | | M | Y | |

## Process Team Recommendations Not Represented in Core Team Roll-Up

| Process Team Designation | Recommendation | Cat. A | Cat. B | Related Recommendations | Total Cost Savings | Total Cost to Implement | New Funds Required (Y/N) | Implementability (H,M,L) | Immediate Priority | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| HM-5 | **2109 10 Days:** Operators of 90 Day Areas should turn in completed 2109s within 10 calender days of placing the waste in that area. This time frame will allow for the flexibility to ship off-site directly from large quantity 90 day areas. It will also eliminate duplication of work for waste items not fully classified due to the waste forms not being completed and received in a time frame to allow required steps for pickup. If there are extenuating circumstances which prevent submittal of the forms within 10 days, a plan of action should be worked out before hand with agreement of the generator and WM. The generator will be accountable for any additional costs and regulatory noncompliances caused by submittal of 2109s later than 10 days. | ORG | PROC | RR-2, RR-3 | 30K | Zero K | | | | |
| HM-FA-3 | **Make-Buy:** Conduct make-or-buy analyses to determine the viability of outsourcing discrete elements or the totality of the hazardous/mixed waste management process. | OUT | ORG | | NI | NI | | | | |
| TS-3 | **No Batch Treat.:** Maintain continuous "around-the-clock" operations at the Process Waste Treatment Complex rather than implement "batch treatment". | PROC | | | Zero K | Zero K | | | | |

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