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**ANALYSIS OF OFFSITE EMERGENCY PLANNING ZONES
(EPZ) FOR THE ROCKY FLATS PLANT**

**PHASE II - INTERIM EPZ ANALYSIS
MAXIMUM CREDIBLE ACCIDENT**

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 **EG&G ROCKY FLATS**

MASTER

PREFACE

This Project Plan was developed jointly by an interdisciplinary team involving representatives from the U. S. Department of Energy - Rocky Flats Office (DOE-RFO), EG&G Rocky Flats, Inc., and its subcontractors. This report details our design for Phase II of the overall program, "Interim Emergency Planning Zone Analysis, Maximum Credible Accident."

The objective of this report is to fully document the plan for Phase II as it existed at the time of project initiation in early May 1990. The process and schedule for the project have evolved significantly during the period between development of the project plan and its final publication. In accordance with the objective for this report, those changes have not been incorporated in this document.

The following personnel contributed to the development of this project plan:

- C. Armstrong, Clean Air & Environmental Reporting, EG&G Rocky Flats, Inc., served as a resource for assessment of impacts from nonradiological hazardous substances;
- B. L. Crist, Safeguards and Security Division, the U. S. Department of Energy, Rocky Flats Office, served as resource in the areas of maximum credible accident review, source characterization, and protective action guide development;
- N. M. Daugherty, Clean Air & Environmental Reporting, EG&G Rocky Flats, Inc., represented the areas of dose assessment and protective action guide analysis;

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- T. L. Foppe, Safety Analysis Engineering, EG&G Rocky Flats, Inc., represented analysis of the maximum credible accident for the Rocky Flats Plant and radiological source characterization;
- A. Hazle, Radiation Protection Division, Colorado Department of Health, served as resource in the areas of maximum credible accident analysis, source characterization, protection action guide development, dose assessment, and dispersion modeling;
- C. R. Hodgin, Manager of Emergency Assessment Systems, EG&G Rocky Flats, Inc., served as project manager and as resource for atmospheric dispersion modeling;
- A. J. Petrocchi, Emergency Preparedness, EG&G Rocky Flats, Inc., served as resource for assessment of impacts from nonradiological hazardous substances; and
- B. Southward, Safety Analysis Engineering, EG&G Rocky Flats, Inc., served as resource for review of the Rocky Flats Plant maximum credible accident and radiological source characterization.

This report was prepared within the Emergency Assessment Systems of the Safeguards and Security Directorate, EG&G Rocky Flats. The following personnel contributed to this report:

- C. R. Hodgin, Manager of Emergency Assessment Systems, EG&G Rocky Flats, Inc., wrote this report;
- C. Bennett, Terry Personnel Services, Inc., transcribed the text of this report;

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- M. A. Brown-Strattan, EG&G Rocky Flats, Inc., acted as technical editor of this report; and
- J. K. Hooker, Express Personnel Services, acted as desktop administrative support and desktop publisher for this report.

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EXECUTIVE SUMMARY

This project plan for Phase II summarizes the design of a project to complete analysis of offsite Emergency Planning Zones (EPZ) for the Rocky Flats Plant. An interdepartmental team of EG&G Rocky Flats, Inc. and contractor personnel are conducting the project at the request of the State of Colorado.

Federal, state, and local governments develop emergency plans for facilities that may affect the public in the event of an accidental release of nuclear or hazardous materials. One of the purposes of these plans is to identify EPZs where actions might be necessary to protect public health. Public protective actions include sheltering, evacuation, and relocation. Agencies use EPZs to develop response plans and to determine needed resources.

The State of Colorado, with support from the U.S. Department of Energy (DOE) and Rocky Flats contractors, has developed emergency plans and EPZs for the Rocky Flats Plant periodically beginning in 1980. In the Fall of 1988, Governor Romer requested a review and revision of the EPZs for Rocky Flats. Subsequently, the Colorado Department of Health (CDH), DOE, and Rockwell International (the Rocky Flats contractor at the time), began a joint review in December 1988.

In Phase II, "Interim Emergency Planning Zones Analysis, Maximum Credible Accident" we will utilize the current Rocky Flats maximum credible accident (MCA), existing dispersion methodologies, and upgraded dosimetry methodologies to update the radiological EPZs. Additionally, we will develop recommendations for EPZs for nonradiological hazardous materials releases and evaluate potential surface water releases from the facility.

Analysis of Offsite EPZs

This project plan will allow EG&G Rocky Flats to meet current commitments to the State of Colorado and make steady, tangible improvements in our understanding of risk to offsite populations during potential emergencies at the Rocky Flats Plant.

OBJECTIVE

The U.S. Department of Energy (DOE) and EG&G Rocky Flats, Inc., will jointly develop recommended offsite Emergency Planning Zones (EPZ) for the Rocky Flats Plant (RFP). We will develop recommended sheltering and evacuation EPZs for accidental release of radionuclides to the atmosphere from the facility. We will also develop recommendations EPZs for accidental releases of major nonradiological hazardous substances to the atmosphere, and will analyze the impacts of an unplanned surface water release from the facility. The DOE and EG&G Rocky Flats, Inc. will submit these recommendations to the Colorado Department of Health (CDH) for potential use in the State's offsite emergency planning for the RFP.

Federal, state, and local governments require emergency planning for facilities that may affect the public in the event of an accidental release of nuclear or hazardous materials. Governments develop emergency plans for nuclear plants, chemical plants, and nuclear weapons facilities, among others. One of the purposes of these plans is to identify EPZs where actions may be necessary to protect public health. These zones often focus on atmospheric releases where impacts are less controllable than with pathways such as water or soil.

Public protective actions may include sheltering (in homes or other structures), evacuation (short-term removal of population to avoid immediate impacts), and relocation (long-term removal of population to allow cleanup). States, local governments, and other cognizant agencies use EPZs to develop response plans and to determine needed resources.

The State of Colorado approaches the development of EPZs in a three-step process. Potential accidents are first identified and scenarios devised. This produces expected source characteristics (such as duration) and amount of materia' released. The second step

Analysis of Offsite EPZs

calculates impacts from the hypothetical accident on the public and environment. Finally, the resulting health effects are determined and compared against criteria to establish zones where protective action (evacuation or sheltering) may be needed.

The State of Colorado is responsible for offsite emergency planning for radiological incidents at the RFP. Jefferson and Boulder counties have joint responsibility for offsite emergency planning for nonradioactive hazardous materials incidents at the facility.

DOE and the State of Colorado have historically established the MCA as the basis for developing EPZs around the Rocky Flats Plant. The maximum credible accident (MCA) for Rocky Flats is defined as the greatest release of plutonium with a probability of 1×10^{-7} per year (once in every 10 million years) or greater.

Rocky Flats Plant first published its MCA in the *Final Environmental Impact Statement (FEIS) (Final Statement to ERDA 1545-D), Rocky Flats Plant Site, Golden, Jefferson County, Colorado (1980)*². The MCA is defined as an aircraft crashing into a plutonium processing building, releasing 100 grams of plutonium to the atmosphere. The State of Colorado adopted this accident scenario, and through consequence assessments (dispersion modeling), established EPZs at about 4 miles (evacuation) and 10 miles (sheltering) from Rocky Flats. CDH, DOE, and Rockwell International (the Rocky Flats contractor to DOE at the time) reviewed and updated the MCA and consequence analysis in 1983 and in 1985.

In the fall of 1988, Governor Romer requested a review of the MCA for the RFP. Subsequently, CDH, DOE, and Rockwell International began a joint MCA review in December 1988 to identify and affirm the material-at-risk and to estimate the releases of plutonium (Pu) that might occur because of an MCA. With the increased

onsite storage of waste due to unavailability of offsite storage, the State of Colorado had concern that the MCA might have become outside the bounds of the FEIS².

The following sections focus on Phase II of the overall project. This report provides detailed information on tasks, schedules, resources, and required level of effort.

BACKGROUND

In the report entitled, "Analysis of Offsite Emergency Planning Zones for the Rocky Flats Plant - Overview," EG&G Rocky Flats defined the continuation, refinement, and enlargement of the technical emergency planning zone (EPZ) analysis, which was begun in December 1988. The overall project includes four phases, which allows EG&G Rocky Flats to make recommendations to the State within a committed schedule, respond effectively to new expectations, and incorporate new technology and approaches as they become available.

Table 1 lists the phases and associated completion dates for the overall program. Figure 1 establishes the relationship among these major phases in a network diagram. Figure 2 presents a time/task analysis for the overall program.

Phase I of the program is complete. We are now beginning efforts for Phase II of the overall program, "Interim Emergency Planning Zones Analysis, Maximum Credible Accident." In this phase, we are utilizing the Rocky Flats MCA, existing dispersion methodologies, and upgraded dosimetry methodologies to update the radiological EPZs. Additionally, we are developing EPZ recommendations for nonradiological hazardous materials releases and evaluating potential surface water releases from the facility. We are planning to complete these objectives by July 31, 1990.

Analysis of Offsite EPZs

Table 1. Four Phases and Completion Dates for EPZ Analysis Project

<u>Phase</u>	<u>Title</u>	<u>Completion Date</u>
I	MCA Review	May 8, 1990
II	Interim EPZ Analysis - MCA	July 31, 1990
III	Final EPZ Analysis - MCA	January 31, 1991
IV	Comprehensive Hazards Analysis	September 30, 1990

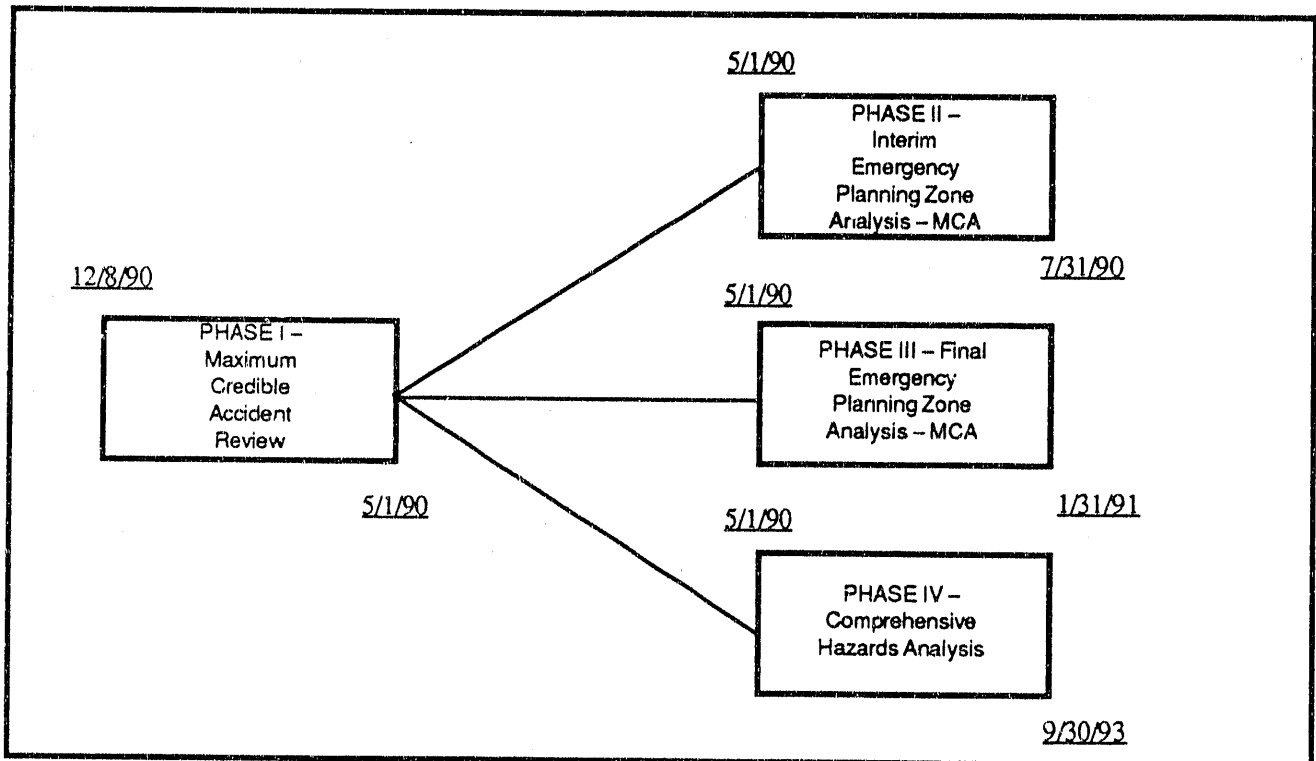


Figure 1. Network Diagram in Four Phases of EPZ Analysis Project

Analysis of Offsite EPZs

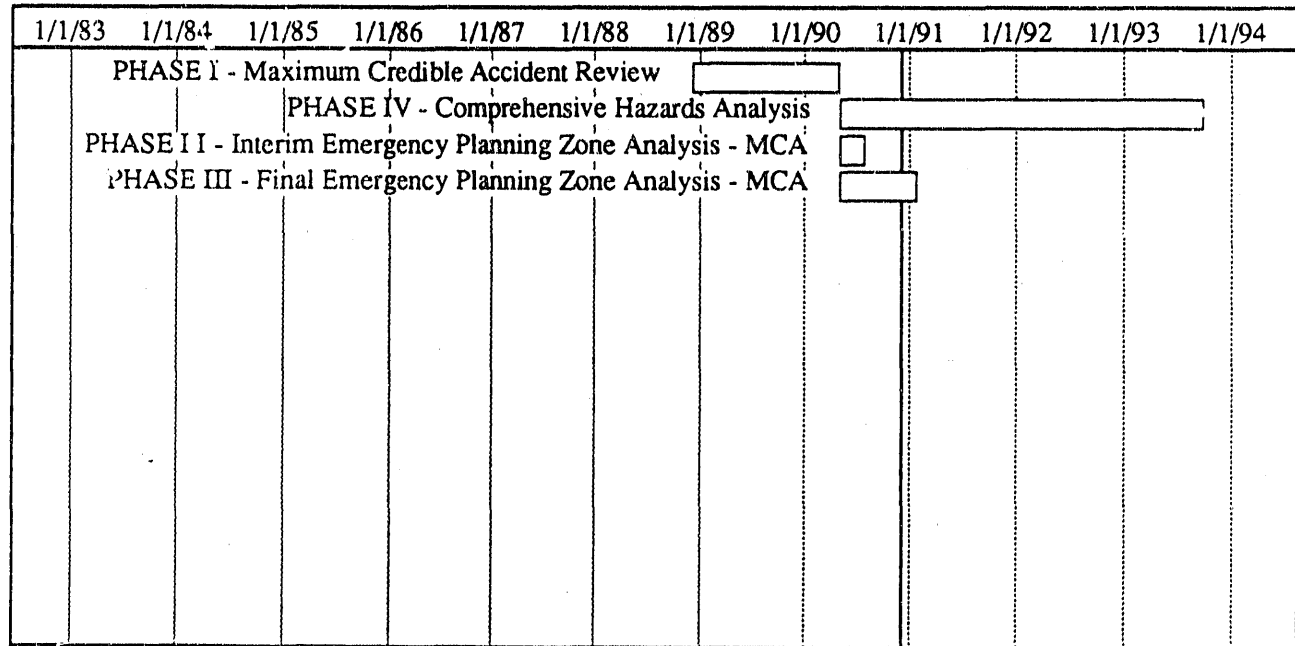


Figure 2. Time/Task Diagram for EPZ Analysis Project

Phase III, "Final Emergency Planning Zone Analysis, Maximum Credible Accident," will upgrade our interim EPZ analyses, adding an advanced determination of plutonium release fractions in a more comprehensive review of nonradiological hazardous materials scenarios. We will gain approval for and utilize the Terrain-Responsive Atmospheric Code (TRAC) for the consequence analysis. We will complete our initial plan for this phase that identifies completion by January 31, 1991.

Phase IV of the overall project, "Comprehensive Hazards Analysis," will evaluate in detail the full spectrum of emergencies that could occur at Rocky Flats. Using a zero-based approach, we will identify all potential accidents, radiological and hazardous, at the facility. The database will include low-, mid-, and high-probability events and will evaluate severe accidents (those beyond credible levels).

Analysis of Offsite EPZs

We will screen these accidents that could produce offsite releases of hazardous or toxic materials, focusing our offsite emergency planning efforts on this subset. We plan to complete this multiperson year effort by the end of Fiscal Year 1993.

This project plan will allow EG&G Rocky Flats to meet current commitments to the State of Colorado and make steady, tangible improvements in our understanding of risk to offsite populations during potential emergencies at the Rocky Flats Plant.

PHASE II - TASKS

In Phase I of the program, Rockwell/EG&G Rocky Flats reviewed and verified the MCA as the bounding radiological release scenario for RFP. In Phase II, we will utilize the Rocky Flats MCA, existing dispersion methodologies, and upgraded dosimetry methodologies to identify interim radiological EPZs for Rocky Flats as recommendations to the State of Colorado. Additionally, we will also identify recommended screening-level EPZs for nonradiological hazardous materials releases, and documentation of surface water releases from the RFP, which will also be submitted to the State. These interim analyses will be conducted in support of a revised State Radiological Emergency Response Plan for the RFP, now being developed by the State Division of Disaster Emergency Services (DODES).

EG&G Rocky Flats will apply currently approved dispersion approaches to the MCA in order to establish interim EPZs for the RFP. We will base our consequence assessment on dosimetry methodologies recommended in *Recommendations of the International Commission on Radiological Protection*³ and *Limits for Intakes of Radionuclides by Workers*⁴. Phase II of the project will meet the original goals set in December 1988 within a schedule that will

support revision of the Colorado Radiological Emergency Response Plan for RFP. EG&G Rocky Flats will complete Phase II by July 31, 1990.

The project team has completed a detailed analysis of the Phase II project plan. This analysis includes detailed subtasking, scheduling, resource allocation, and milestone development. Table 2 presents an outline of the 15 major tasks involved in Phase II of the project. Figure 1 establishes the relationship among the major tasks or network diagram. Figure 2 presents the time/task analysis for Phase II tasks. Figure 2 also lists the major milestones and completion dates established to ensure completion of Phase II by July 31, 1990, as requested by the State of Colorado. Appendix A presents subtask level network diagrams and time/task diagrams for each major task in Phase II of the overall project.

Phase III, "Final Emergency Planning Zone Analysis, Maximum Credible Accident," will upgrade our interim EPZ analyses, adding an advanced determination of plutonium release fractions in a more comprehensive review of nonradiological hazardous materials scenarios. We will gain approval for and utilize the Terrain-Responsive Atmospheric Code (TRAC) for the consequence analysis. We will complete our initial plan for this phase that identifies completion by January 31, 1991.

Phase IV of the overall project, "Comprehensive Hazards Analysis," will evaluate in detail the full spectrum of emergencies that could occur at Rocky Flats. Using a zero-based approach, we will identify all potential accidents, radiological and hazardous, at the facility. The database will include low-, mid-, and high-probability events and will evaluate severe accidents (those beyond credible levels). We will screen these accidents that could produce offsite releases of hazardous or toxic materials, focusing our offsite emergency

Table 2. Task-by-task Breakdown for Phase II

II.1 Administer Project	C. R. Hodgkin
II.1.1 Obtain Necessary Contract Staffing	
II.1.2 Develop Project Plan and Schedule	
II.1.3 Monitor/Coordinate Project Progress	
II.1.4 Liaison with Oversight Groups	
II.1.5 Provide Clerical/Administrative Support	
II.2 Confirm and Quantify Interim Release Fractions - Radiological	T. L. Foppe
II.3 Confirm and Quantify MCA Using Interim Release Fractions - Radiological	T. L. Foppe
II.3.1 Finalize All MCA Calculation Work Sheets	
II.3.2 Complete Tours of Building 774 and 707	
II.3.3 Issue Past Meeting Minutes	
II.3.4 Discuss Criticality and Nonplutonium Materials	
II.3.5 Produce Draft Documentation for Final Report	
II.4 Establish Dosimetry Approach	N. M. Daugherty
II.4.1 Resolve Americium Treatment	
II.4.2 Choose Particle Size	
II.4.3 Resolve Dose Commitment Period	
II.4.4 Choose Inhalation Class	
II.4.5 Choose Pathways	
II.4.6 Obtain Necessary Contract Staffing	
II.4.7 Calculate Dose Conversion Factors	
II.4.8 Prepare Dose Conversion Factors for Consequence Modeling	
II.4.9 Produce Draft Documentation for Final Report	
II.5 Develop Consequence Modeling Approach - Radiological	C. R. Hodgkin
II.5.1 Obtain Necessary Contract Staffing	
II.5.2 Identify Consequence Modeling Methods	
II.5.3 Evaluate Consequence Modeling Methods	

Table 2. (cont.) Task-by-task Breakdown for Phase II

II.5.5	Develop Software	
II.5.6	Implement Software	
II.5.7	Produce Draft Documentation for Final Report	
II.6	Establish Protective Action Guides - Radiological	N.M. Daughtery
II.6.1	Document Choice of Effective Dose Equivalent	
II.6.2	Obtain Necessary Contract Staffing	
II.6.3	Identify Available Protective Action Guides (PAG)	
II.6.4	Evaluate Available PAGs	
II.6.5	Choose PAGs Approach	
II.6.6	Prepare Draft Documentation for Final Report	
II.7	Develop Screening Level EPZs for Hazardous Materials	A. J. Petrocchi
II.7.1	Obtain Necessary Contract Staffing	
II.7.2	Select Potential Source Terms Using Superfund Amendments and Reauthorization Act (SARA) Title III Reports	
II.7.3	Select Potential Source Terms Using Occupational Health Information System (OHIS) Chemical Inventory	
II.7.4	Select Potential Hazardous Materials (HAZMAT) Source Terms	
II.7.5	Prioritize Final Candidate Chemicals in Source Term List	
II.7.6	Conduct Tours of HAZMAT Storage/Use	
II.7.7	Select Model for Consequence Assessment	
II.7.8	Establish PAGs for EPZs Determination	
II.7.9	Modeling Consequences and Document Assumptions	
II.7.10	Delineate EPZs for Each Source Scenario	
II.7.11	Prepare Draft Documentation for Final Report	
II.8	Develop Final Contingency Plan for Water Releases	A. J. Petrocchi
II.8.1	Obtain Necessary Contract Staffing	
II.8.2	Update Plan for Current Conditions	

Table 2. (cont.) Task-by-task Breakdown for Phase II

II.8.3	Incorporate DOE-requested Revisions	
II.8.4	Incorporate 1989 State Exercise Revisions	
II.8.5	Produce and Publish Revised Contingency Plan	
II.8.6	Issue Plan as Controlled Document	
II.9	Ensure Quality of Project	C. R. Hodgin
II.9.1	Obtain Necessary Staffing Resources	
II.9.2	Develop Quality Assurance Plan	
II.9.3	Produce Quality Assurance Document	
II.9.4	Conduct Quality Assurance Activities	
II.9.5	Produce Draft Quality Assurance Documentation for Final Report	
II.10	Ongoing Documentation	C. R. Hodgin
II.10.1	Obtain Necessary Contract Staffing	
II.10.2	Develop Documentation Formats and Style Guide	
II.10.3	Fully Document Phase I of the Project	
II.10.4	Produce Minutes for Each Project Meeting	
II.11	Conduct Consequence Modeling - Radiological	C. R. Hodgin
II.11.1	Develop Input Data - Source	
II.11.2	Develop Input Data - Meteorological	
II.11.3	Conduct Atmospheric Dispersion Analyses	
II.11.4	Incorporate Dosimetry	
II.11.5	Produce Draft Documentation for Final Report	
II.12	Establish Emergency Planning Zones	C. R. Hodgin
II.13	Prepare Final Report	C. R. Hodgin
II.14	Review and Accept the Report	C. R. Hodgin
II.15	Issue Final Report to State	C. R. Hodgin

planning efforts on this subset. We plan to complete this multiperson year effort by the end of Fiscal Year 1993.

This project plan will allow EG&G Rocky Flats to meet current commitments to the State of Colorado and make steady, tangible improvements in our understanding of risk to offsite populations during potential emergencies at the Rocky Flats Plant.

The following section summarizes the tasks and subtasks associated with Phase II.

Task II.1 Administer Project

Task Leader: C. R. Hodgins, Emergency Assessment Systems

The project coordinator and project manager will coordinate and administer the program to ensure that the project objectives are fully met within the committed schedule.

II.1.1 Obtain Necessary Contract Staffing

The Phase II project coordinator will identify and obtain the temporary contract staffing needed to supplement the efforts of permanent team members. Contract staff will be assigned as necessary to ensure a total level of effort that will meet all schedules at the needed level of quality.

II.1.2 Develop Project Plan and Schedule

The Phase II project team will develop a detailed project plan for analysis of offsite EPZs. The plan will include identification of tasks, task interrelationships, critical path analysis, task scheduling, resource identification, and resource allocation. The plan will be summarized in a formal publication.

II.1.3 Monitor/Coordinate Project Progress

The Phase II project manager will coordinate technical efforts for the project. He will monitor the progress of all technical tasks on a continuous basis. The project manager will track the project progress against the schedule identified in the project plan and will adjust allocation of resources and staff efforts as necessary to ensure that the project objectives are met on schedule.

II.1.4 Act as Liaison Among Oversight Groups

The Phase II project coordinator and project manager will provide liaison among Rocky Flats management, U.S. Department of Energy, Rocky Flats Office (DOE-RFO) management, the CDH, the Colorado DODES, the EPA, and other external groups. They will conduct this liaison to the full extent necessary to ensure that Phase II satisfies the needs of the State of Colorado and reflects concurrence from all associated groups. The project manager will conduct oversight review meetings at two-week intervals to keep management and external groups informed of the progress of the project.

II.1.5 Provide Clerical/Administrative Support

Emergency Assessment Systems and contract personnel will provide clerical and administrative support to the technical teams performing tasks in this project. Support will include word processing, data compilation, filing, and research.

Task II.2 Confirm and Quantify Interim Release Fractions – Radiological

Task Leader: T. L. Foppe, Safety Analysis Engineering

The task team will review and confirm the interim release fractions that were developed during Phase I of the project. The team will ensure that the interim release fractions are calculated and formatted for use in source-term development and will produce detailed, unclassified draft documentation for inclusion in the Phase II final report.

Task II.3 Confirm and Quantify MCA Using Interim Release Fractions – Radiological

Task Leader: T.L. Foppe, Safety Analysis Engineering

Safety Analysis Engineering will complete all tasks that began in Phase I of the project to confirm and quantify the existing MCA for use in establishing EPZs. This task will focus on calculation and verification of source characteristics associated with the aircraft crash MCA. The team will also conduct a screening level investigation of other potential radioactive release scenarios.

II.3.1 Finalize All MCA Calculation Worksheets

Safety Analysis Engineering will calculate final source characteristics for the MCA using the interim release fractions. This analysis will also include calculation of release estimates and frequency of occurrence for Pu scenarios with release estimates greater than 100 grams.

II.3.2 Complete Tours of Buildings 774 and 707

These building tours will confirm the quantities and geometry of materials maintained in Buildings 774 and 707.

II.3.3 Issue Past Meeting Minutes

Safety Analysis Engineering will compile and formally issue the minutes from all Phase I task team meetings between December 1988 and April 30, 1990.

II.3.4 Discuss Criticality and Nonplutonium Materials

Safety Analysis Engineering will work with EG&G Rocky Flats, DOE-RFO, and the CDH to review design basis accidents for substances other than Rocky Flats Pu. The team will consider Americium-241 (Am), other transuranic radionuclides, and fission products from a criticality scenario, as well as other major radiation sources (for example, sealed calibration sources).

II.3.5 Produce Draft Documentation for Final Report

The technical task team will produce fully detailed, unclassified documentation of this task for inclusion in the final report for Phase II.

Task II.4 Establish Dosimetry Task Leader: N. M. Daugherty, Clean Air and Environmental Reporting

EG&G Rocky Flats, DOE-RFO, and CDH have selected International Commission of Radiological Protection (ICRP) 26³/30⁴ dosimetry methodology for evaluating impacts from the MCA on the public. In this task, a task team will select among options for implementation of ICRP 26/30 methodology, develop the dose conversion factors representing Rocky Flats Pu, and format the dose conversion factors for use in consequence modeling.

II.4.1 Resolve Americium Treatment

The task team will evaluate the need for including Am-241 in the composite dose conversion factors being developed for Rocky Flats Pu.

II.4.2 Choose Particle Size

The ICRP recommends 1.0 micrometer (μm) Activity Mean Aerodynamic Diameter (AMAD) as a default for particulate releases, while the RFP FEIS² uses an AMAD of 0.3 μm . The task team will evaluate and choose between these two options and support the State in the final selection.

II.4.3 Resolve Dose Commitment Period

The ICRP, DOE, and the EPA evaluate dose for a 50-year commitment period. The CDH, other groups within the EPA, and the FEIS² consider dose commitments over a 70-year period. The task team will evaluate the available options and support the State in selecting the one considered most appropriate.

II.4.4 Choose Inhalation Class

The release scenario postulated in the MCA can produce Class Y Pu, Class W Pu, or a mixture of both classes. The Phase II project team will review the scenario and recommend to the State the most appropriate class, or combination of classes, for development of dose conversion factors.

II.4.5 Choose Pathways

A number of environmental pathways can be considered for dose to the public (for example, inhalation, resuspension, immersion, etc.). The task team will evaluate the pathways appropriate for offsite emergency planning and support the State in the final selection.

II.4.6 Obtain Necessary Contract Staffing

The task team will identify and obtain the temporary contract staffing needed to supplement permanent team members. Contract staff will be assigned as needed to ensure a total level of effort that will meet all schedules at the necessary level of quality.

II.4.7 Calculate Dose Conversion Factors

The task team will combine the results of Tasks I.4.1 through II.4.6 along with ICRP 26³/30⁴ methodology to calculate dose conversion factors for evaluating public impacts from the MCA scenario.

II.4.8 Prepare Dose Conversion Factors for Consequence Modeling

The task team will convert the dose conversion factors calculated in Task II.4.7 to a format compatible with the consequence modeling to be conducted for this project. The data will be stored in computer files for automated processing.

II.4.9 Produce Draft Documentation for Final Report

The technical task team will produce fully detailed documentation of this task for inclusion in the final report for the Phase II project.

Task II.5 Develop
Consequence Modeling
Approach – Radiological

Task Leader: C. R. Hodgins, Emergency Assessment Systems

CDH, EG&G Rocky Flats, and the DOE-RFO have agreed that an approved atmospheric dispersion model must be used to evaluate the consequences of the MCA on offsite populations. The State of Colorado has determined that straight-line Gaussian models are inappropriate for use in evaluating impacts from the RFP. But at the

time of this project, straight-line Gaussian models will be the only approved methods available for emergency planning. Therefore, during Phase II of this project the task team will select and implement a model from among those straight-line Gaussian models. Approval and utilization of a model that more realistically treats the complex conditions around Rocky Flats will be a focus of Phase III.

II.5.1 Obtain Necessary Contract Staffing

The team will identify and obtain the temporary contract staffing needed to supplement permanent team members. Contract staff will be assigned as needed to ensure a total level of effort that will meet all schedules at the necessary level of quality.

II.5.2 Identify Consequence Modeling Methods

The task team will identify the dispersion modeling approaches that are approved for radiological emergency planning. These models will include the Nuclear Regulatory Commission's Regulatory Guide 1.1455 and any methods that may be identified in the 1980 Draft Protective Action Guide⁶ from the EPA.

II.5.3 Evaluate Consequence Modeling Methods

The task team will evaluate the atmospheric dispersion models identified in Task II.5.2. We will address the thoroughness of the approach, the technical sophistication of the method, and the appropriateness of the model for use in facilities and terrain such as Rocky Flats.

II.5.4 Choose Consequence Modeling

EG&G Rocky Flats and DOE-RFO will use the evaluations from Task II.5.3 to recommend to the State the atmospheric dispersion model most appropriate for Phase II emergency

planning. The team will use the following criteria in making this recommendation:

- Appropriateness to Rocky Flats,
- Thoroughness of approach,
- Technical sophistication,
- Availability for use, and
- Ease of implementation.

The task team will support the State in the final selection of a consequence assessment model.

II.5.5 Develop Software

The task team will develop any computer codes necessary to implement the atmospheric dispersion model selected in Task II.5.4. If software exists and is available, the team will modify the code to operate on RFP computing systems. The new code will accept input data available at the facility.

If computer codes do not exist or are not available, the task team will generate the software based on the theory documented for the approach. All software will be developed as FORTRAN 77 code operating in a Digital Equipment Corporation VAX environment.

II.5.6 Implement Software

The task team will implement the software developed under Task II.5.5 on the Unclassified VAX Cluster at the RFP. The team will ensure zero defects in the software through comprehensive verification and testing of the code. The team will develop and format all input data sets needed to operate the code and will format model outputs for ease of use in subsequent tasks.

II.5.7 Produce Draft Documentation for Final Report

The technical task team will produce fully detailed documentation of this task for inclusion in the final report for Phase II.

Task II.6 Establish Protective Action Guides – Radiological

Task Leader: N. M. Daugherty, Clean Air and Environmental Reporting

Protective Action Guides (PAG) are an objective means of converting the dose received from a radiological accident to actions needed for protection of public health. Current Rocky Flats PAGs for radiological releases are based on the risk of excess cancers or genetic defects among the population using ICRP 27 dose methodology. It will be necessary to develop new PAGs for use with the ICRP 26³/30⁴ dose methodology to be applied in Phase II. The task team will identify, evaluate, and recommend to the State evacuation and sheltering PAGs appropriate to Rocky Flats Pu.

II.6.1 Document Choice of Effective Dose Equivalent

The choice of ICRP 26/30 dose methodology leads automatically to selection of effective dose equivalent as the basis for PAGs in this project. The project team will document this choice and justification.

II.6.2 Obtain Necessary Contract Staffing

The team will identify and obtain the temporary contract staffing needed to supplement permanent team members. Contract staff will be assigned as necessary to ensure a total level of effort that will meet all schedules at the needed level of quality.

II.6.3 Identify Available PAGs

The task team will identify available options for evacuation and sheltering PAGs based on ICRP 26/30 dose methodology. This task will involve a literature search of existing methodology.

II.6.4 Evaluate Available PAGs

The task team will objectively evaluate each of the methods identified under Task II.6.3 for its appropriateness to the evacuation and sheltering PAGs for RFP.

II.6.5 Choose PAGs Approach

Using the results of the evaluation in Task II.6.4, EG&G Rocky Flats and DOE-RFO will recommend to the State a PAG approach for Phase II. The task team will make recommendations based on the following criteria:

- Appropriateness for use at Rocky Flats,
- Acceptance by the technical and regulatory community,
- Technical defensibility, and
- Thoroughness of documentation.

The task team will support CDH in its final choice of PAGs.

II.6.6 Prepare Draft Documentation for Final Report

The technical task team will produce fully detailed documentation of this task for inclusion in the final report for Phase II.

Task II.7 Develop Screening Level EPZs for Hazardous Materials

Task Leader: A. J. Petrocchi, Emergency Preparedness

RFP maintains and uses significant inventories of nonradiological hazardous materials (HAZMAT). Some of these substances are

used in sufficient quantities to represent a credible risk to the public in the event of an emergency at the facility. In Phase II, we will develop an initial set of recommended EPZs for nonradiological hazardous substances at the RFP. A screening-level analysis will be performed that will produce initial EPZs for those large-quantity hazardous substances stored or used at the facility. The screening-level analysis will be replaced with more refined evaluations during subsequent phases of the project.

II.7.1 Obtain Necessary Contract Staffing

The task team will identify and obtain the temporary contract staffing needed to supplement permanent team members. Contract staff will be assigned as necessary to ensure a total level of effort that will meet all schedules at the needed level of quality.

II.7.2 Select Potential Source Terms Using SARA Title III Reports

The task team will review Superfund Amendment and Reauthorization Act (SARA Title III)⁸ reports generated for the Rocky Flats Plant, identifying those hazardous chemicals where plant site use exceeds 10,000 pounds annually.

II.7.3 Select Potential Source Terms Using Occupational Health Information System (OHIS) Chemical Inventory

The task team will identify hazardous chemicals for evaluation from the OHIS chemical inventory maintained by the RFP. They will identify all substances that exceed 800 pounds, 100 gallons, or 10 four-foot (approximately four-foot high by one-foot diameter) gas cylinders (or their equivalents) in any single location.

II.7.4 Select Potential HAZMAT Source Terms

The task team will select recommended source terms from the list generated in Tasks II.7. and II.7.3 based on the following criteria:

- Extremely hazardous substances list (SARA Title III),
- Toxic chemicals list (SARA Title III), and
- Large-quantity chemicals not on above list (case-by-case basis).

II.7.5 Finalize HAZMAT Source Term List

The team will finalize the Potential HAZMAT Source Term List developed in Task II.7.4 based upon a generic prescreening modeling analysis designed to indicate which of the potential source terms may have significant offsite impact.

II.7.6 Field Verify Final HAZMAT Source Term List

The task team will field verify the final HAZMAT source term list with respect to each chemical, its location, and the maximum amount that could be present at that location.

II.7.7 Conduct Tour of HAZMAT Storage/Use Areas

The technical task team and representatives from the CDH and DODES will jointly confirm quantities and geometry of HAZMAT sources selected in Task II.7.4. The team will verify these sources through direct inspection during a tour of the plant site.

II.7.8 Select Model for Consequence Assessment

The task team will identify atmospheric dispersion models that are generally regarded as acceptable for HAZMAT emergency planning. The State of Colorado determined that

straight-line Gaussian models are inappropriate for use in evaluating impacts from the RFP. But at the time of this project, straight-line Gaussian models will be the only generally accepted methods available for emergency planning, therefore, during Phase II of this project the team will recommend to the State a model from among those straight-line Gaussian models. The team will implement the code upon approval from the State.

Approval and utilization of a model that more realistically treats the complex conditions around Rocky Flats will be a focus of Phase III.

II.7.9 Establish PAGs for EPZ Determination

EG&G Rocky Flats and DOE-RFO will jointly recommend PAGs to the State for the selected HAZMAT source terms. The task team will base the PAGs on exposure limits generally accepted as guidelines for exposure of the public to hazardous material concentrations during accidental release conditions.

The team will support the State in the final selection of the PAGs.

II.7.10 Model Consequences and Document Assumptions

The task team will operate the atmospheric dispersion model selected in Task II.7.8 for each substance and source term established in Task II.7.5. The team will prepare necessary input files, operate the models, and produce the outputs necessary for establishing EPZs.

This screening-level analysis will evaluate only simple ruptures as an initiating scenario. The team will treat other initiating scenarios (for example, aircraft crashes, explosions, etc.) in Phase III and Phase IV of the analysis of offsite EPZs.

II.7.11 Delineate EPZs for Each Source Term

The task team will use the results from Task II.7.10 to determine screening-level recommended EPZs (evacuation and/or sheltering) for each substance and source term identified in Task II.7.5.

II.7.12 Prepare Draft Documentation for Final Report

The technical task team will produce fully detailed documentation of this task for inclusion in the final report for the overall project.

Task II.8 Develop Final Contingency Plan for Water Releases

Task Leader: A. J. Petrocchi, Emergency Preparedness

Introduction of radionuclides and nonradioactive hazardous substances to the environment via unplanned surface water releases is another pathway requiring emergency planning. Rocky Flats Plant has developed a contingency plan for release of surface water to Walnut Creek or Woman Creek from the RFP Detention Pond system, the dominant mechanism for this scenario. This task will complete an upgrade of the water release contingency plan and submit the plan to the State of Colorado for possible inclusion in or reference by the State Radiological Emergency Response Plan.

II.8.1 Obtain Necessary Contract Staffing

The team will identify and obtain the temporary contract staffing needed to supplement permanent team members. Contract staff will be assigned as necessary to ensure a total

level of effort that will meet all schedules at the needed level of quality.

II.8.2 Update Plan for Current Conditions

The task team will update the existing contingency plan in response to current regulations and detention pond management practices at the RFP.

II.8.3 Incorporate DOE-requested Revisions

DOE-RFO has recently reviewed the existing contingency plan and has requested upgrades and revisions. The task team will complete these revisions for the final plan.

II.8.4 Incorporate 1989 State Exercise Revisions

In September 1989, the State of Colorado, Rockwell International, and DOE-RFO conducted a joint State radiological emergency response exercise for RFP. The exercise focused on a simulated release of surface water due to dam failure in the detention pond system. The exercise participants generated a series of critique action items based on their evaluation of the exercise. These action items will be resolved and incorporated in the revised contingency plan as applicable.

II.8.5 Produce and Publish Revised Contingency Plan

The task team will incorporate the results from Tasks II.8.2, II.8.3, and II.8.4 in a final contingency plan for unplanned surface water releases from the RFP. EG&G Rocky Flats and DOE-RFO will review and finalize the plan. The task team will then publish the plan as a formal RFP emergency plan.

II.8.6 Issue Plan as Controlled Document

The task team will issue the finalized contingency plan under controlled distribution. They will formally submit the plan to the State of Colorado for possible inclusion or reference by the State Radiological Response Plan for Rocky Flats.

Task II.9 Ensure Quality of Project

Task Leader: C. R. Hodgins, Emergency Assessment Systems

Because the EPZs developed in this project will be submitted to the State for use in emergency planning, our technical results must be of high quality and free of errors. The project team will implement a comprehensive quality control and assurance program to meet these objectives.

Specialists will be placed under contract to develop and implement a quality assurance plan for the program. The plan will meet quality requirements established by DOE, EPA, and other agencies as appropriate. These independent quality assurance specialists will audit the results of Phase I to ensure and document zero defects in that analysis. These specialists will also institute a comprehensive quality control and assurance process for all activities in Phase II of the project.

II.9.1 Obtain Necessary Staffing Resources

The team will identify and obtain the temporary contract staffing needed to supplement permanent team members. Contract staff will be assigned as necessary to ensure a total level of effort that will meet all schedules at the needed level of quality.

II.9.2 Develop Quality Assurance Plan

The quality assurance contractor will develop a comprehensive quality assurance and quality control plan for Phases I and II of the project.

Task II.10 Ongoing Documentation

Task Leader: C. R. Hodgins, Emergency Assessment Systems

Complete documentation of this project will be essential to its defensibility and usefulness in emergency planning for the RFP. EG&G Rocky Flats will establish a professional technical writing team to support the technical staff and ensure that our documentation goals are fully met. This staff will produce a comprehensive final report for Phase II of the program. The technical writing staff will also develop necessary documentation formats and style guides and produce detailed minutes for each project meeting in Phase II of the program. The technical writing team will research and fully document Phase I.

II.10.1 Obtain Necessary Contract Staffing

The team will identify and obtain the temporary contract staffing needed to supplement permanent team members. Contract staff will be assigned as necessary to ensure a total level of effort that will meet all schedules at the needed level of quality.

II.10.2 Develop Documentation Formats and Style Guide

The technical writing staff will review available documentation formats and style guides and select an approach to be used for documentation of this project.

II.10.3 Fully Document Phase I of the Project

The technical writing staff will review all meeting minutes, notes, and reports generated in Phase I of the overall project.

The technical writing staff will also conduct interviews with technical and management personnel from EG&G Rocky Flats, DOE-RFO, and CDH who conducted technical efforts during Phase I. The technical writing team will then compile a comprehensive report describing the analyses and results from this portion of the project.

II.10.4 Produce Minutes for Each Project Meeting

The technical writing staff will attend each review meeting during Phase II of the overall project. The staff will produce and distribute detailed minutes for each meeting that will become part of the archived records.

Task II.11
Conduct Consequence
Modeling – Radiological

Task Leader: C. R. Hodgins, Emergency Assessment Systems

The task team will utilize the atmospheric dispersion modeling approach developed in Task II.5 to evaluate the consequences on the offsite public of the MCA. The team will develop all inputs needed to run the model, conduct the atmospheric dispersion analyses, incorporate dosimetry, and produce full documentation for the final report.

II.11.1 Develop Input Data - Source

The team will verify the source characteristics produced in Task II.3 and modify the output files as necessary for input to the atmospheric dispersion model.

II.11.2 Develop Input Data - Meteorological

EG&G Rocky Flats, DOE-RFO, DODES, and CDH will jointly select a meteorological database to represent the RFP in the modeling analysis. The project team will compile the

database. They will then format it as a joint frequency function or in another appropriate format for input to the atmospheric dispersion model.

II.11.3 Conduct Atmospheric Dispersion Analyses

The task team will utilize the selected atmospheric dispersion model along with input data sets to quantify the impacts from the MCA on offsite populations. The team will simulate environmental exposures via selected pathways.

II.11.4 Incorporate Dosimetry

The task team will combine the exposure data produced in Task II.11.3 with the dose conversion factors from Task II.4 to finalize offsite doses to the public associated with the MCA scenario. These results will be produced in a format that can be used to directly establish EPZs.

II.11.5 Produce Draft Documentation for Final Report

The technical task team will produce fully detailed documentation of this task for inclusion in the final report for the overall project.

Task II.12 Establish Emergency Planning Zones

Task Leader: C. R. Hodgins, Emergency Assessment Systems

The project team will combine the doses projected for the MCA in Task II.11 with the PAGs developed in Task II.6 to establish recommended EPZs for radiological emergencies at the RFP. Two circular EPZs will be identified: one for consideration of evacuation, and one for consideration of sheltering. CDH will review the appropriateness of the EPZs determined in this process.

Task II.13 Prepare Final Report

Task Leader: C. R. Hodgkin, Emergency Assessment Systems

The technical writing staff will compile the draft documentation produced by each technical task team in a draft final report of the Phase II project. The technical writing staff and task team leader will review and revise the final report to ensure that the technical content is accurate and properly communicates the results of the project. The technical writing staff will then produce a final publication-quality report for the project.

Task II.14 Review and Accept the Report

Task Leader: C. R. Hodgkin, Emergency Assessment Systems

The project team will submit the final report to management at EG&G Rocky Flats, DOE-RFO, DODES, and CDH for review and concurrence. The project team and technical writing staff will incorporate any revisions requested by management as a result of their review.

Task II.15 Issue Final Report to State

After concurrence by EG&G Rocky Flats, DOE-RFO, DODES, and CDH, the project team will formally publish the report and issue it to the State of Colorado.

PROGRAM ORGANIZATION

The analysis of offsite EPZs for RFP will be conducted by an interagency team of professionals and administrative personnel. EG&G Rocky Flats will perform the bulk of the technical effort, supported by experts contracted specifically for this project. DOE-RFO, DODES, and CDH will also participate directly in the program. Figure 3 represents the organization of the project team for the offsite EPZ analysis. The structure shown has been specifically designed to meet the ambitious goals of this project.

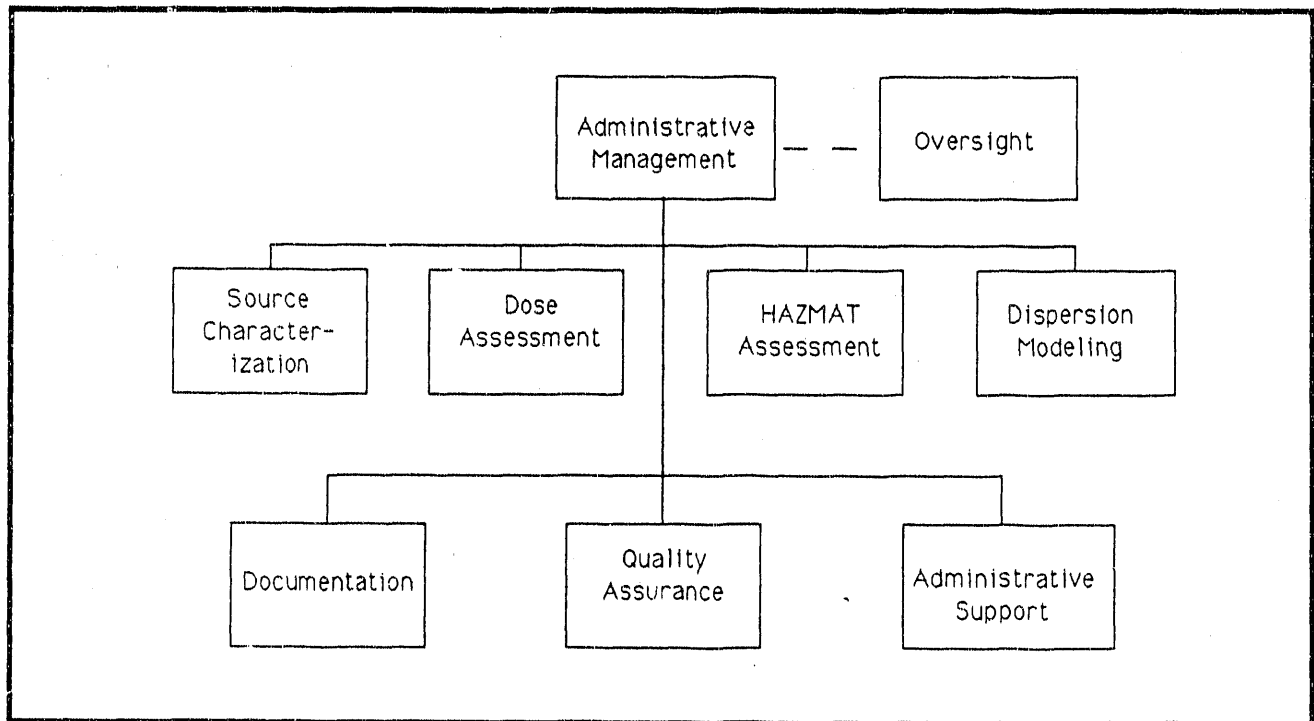


Figure 3. Organization of Offsite Project Team for EPZ Analysis Project

Administrative
Management

The project administrator and the project manager have overall responsibility for all technical products produced in the Analysis of Offsite EPZs project. They shall conduct an internal review of a report as part of the technical review cycle. The project administrator will have overall responsibility for financial, human resources, and logistical coordination of the project. The project manager will coordinate all technical efforts. The project manager will track project progress against the schedule identified in the project plan and adjust allocation of resources and staff efforts as necessary to ensure that the project objectives are met on schedule.

Oversight

The task team leader has overall technical responsibility for producing the results of a task as defined in the Analysis of Offsite EPZs Project Plan. The task team leader shall coordinate the effort of the technical team assigned to a task. The task team leader's responsibilities in the technical review cycle include final technical review of the draft product and evaluation/incorporation of review results following internal, technical, and oversight review.

The documentation support staff (DSS) is responsible for producing all draft and final documents associated with the Analysis of Offsite EPZs project. The DSS responsibilities during the technical review cycle include editing, revising, and issuing draft reports following each review and revision.

The Rocky Flats Plant Technical Information Office and "local" classifiers are responsible for classification review of all documents to be externally issued by the Rocky Flats Plant. They shall review and classify each task report prior to external distribution.

An independent oversight committee will be established to track project performance and ensure that the goals are being met at levels of detail and quality that will satisfy client, regulatory, and public needs.

Resources – Levels-of-effort

Completion of Phase II within required schedules will necessitate intensive effort in several technical areas. A multidisciplinary technical team has been assembled and dedicated to the program. This team includes EG&G Rocky Flats staff, long-term subcontract personnel, and temporary subcontract staff obtained specifically for this project. Table 3 lists each staff member assigned to Phase II along with the staff members' organization, area of expertise, and available level of effort. Appendix B presents a detailed task/time diagram for each identified resource. A scope of work for the special contract staffing for Phase II of this program is included as Appendix C of this document.

Approximately 25.6 person-months of effort will be required to complete Phase II of the overall EPZ project. Table 4 and Figure 4 present the task-by-task breakdown for the overall level-of-effort. Table 3 also presents a more detailed summary of the effort required on this project, showing the technical staff effort by and resource. A percentage of the overall project effort to be supplied by each resource is shown in Figure 5. Appendix D presents a diagram for each identified resource showing the level of effort loading on a day-by-day basis throughout the entire project.

Table 3. Technical Staff Assigned to Phase II Project Team

Resources	Organization	Expertise	Available Level of Effort (Full-time Equivalents)
C. Armstrong	EG&G - Clean Air Monitoring & Environmental Reporting	HAZMAT Assessment	0.3
B.L. Crist	DOE-RFO - Safeguards and Security Division	Oversight	0.1
Contract - Clerical Support	EG&G - Emergency Assessment Systems	Administrative Support	1.0
Contract - Dispersion Modeling Support	TENERA	Dispersion Modeling	0.0
Contract - HAZMAT Support	TENERA	HAZMAT Assessment	0.0
Contract - Health Physics Support	TENERA	Dose Assessment	0.0
Contract - Project Administration Support	TENERA	Administrative Management	1.0
Contract - Quality Assurance Support	TENERA	Quality Assurance	0.0
Contract - Technical Writer	L & M	Documentation	1.0
Contract - Word Processing Support	Express Temporary Services, Inc.	Documentation	1.0
N.M. Daugherty	EG&G - Clean Air & Environmental Reporting	Dose Assessment	0.3
V.L. Ealy	EG&G - Fire Department	Source Characterization	0.5
R.B. Falk	EG&G - Dosimetry	Dose Assessment	0.5
T.L. Foppe	EG&G - Safety Analysis Engineering	Source Characterization	0.5
J. Fox	EG&G - Emergency Assessment Systems	Administrative Support	0.5
J.C. Hayen	EG&G - Emergency Preparedness	Pond Contingency	0.5
A. Hazle	CDH - Radiation Protection	Oversight	0.1
C.R. Hodgkin	EG&G - Emergency Assessment Systems	Administrative Management, Dispersion Modeling	0.05
Industrial Hygiene	EG&G	HAZMAT Assessment	0.3
A.J. Petrocchi	EG&G - Emergency Assessment Systems	HAZMAT Assessment	0.05
B. Southward	EG&G - Safety Analysis Engineering	Source Characterization	0.5

Analysis of Offsite EPZs

Table 4. Level-of-effort in Days for Phase II by Resources and Tasks

TASK #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	TOTAL DAYS
RESOURCES																
STAFF																
C. Armstrong	6.50			3.00	0.50	1.50	14.87					0.50				14.87
B.L. Crist	5.00			8.75	0.50	1.87					2.00	0.50	1.00	0.50		12.50
N.M. Daugherty			3.37													19.62
V.L. Early				0.50												3.37
R.B. Falk																0.50
T.L. Foppe	3.00	0.30	0.73		0.30	0.30	0.30	0.30	0.30	0.50						4.53
J. Fox	15.00							6.25	2.00							18.50
J.C. Hayen				4.25	0.50	1.87						0.50		0.50		6.25
A. Hazle	9.00				1.78	0.10	0.10	0.10	1.20	0.80	1.50	0.50	1.00	0.20	0.10	16.62
C.R. Hodgins	15.50							1.11					1.00			22.68
A.J. Petrocchi	4.50		11.75				4.49						1.00			11.10
B. Southward	1.00								2.00				1.00			15.75
SUPPORT GROUP																
Clerical	31.00			2.00	19.50			1.00			18.00	0.50	1.00		1.00	33.00
Dispersion Modeling							56.25									41.00
HAZMAT				16.00		11.25					7.00	0.50				56.25
Health Physics							0.50									34.75
Industrial Hygiene									5.10	4.00			5.00	2.00	1.00	64.10
Project Administration	48.00	1.00							70.00							70.00
Quality Assurance				2.00	2.00	3.00	4.00	2.00	7.00	14.00	2.00		5.00		1.00	53.00
Technical Writing	10.00			2.00	2.00	3.00	4.00	11.75	7.00	11.50	2.00		5.00		1.00	53.00
Word Processing	4.00			2.00	2.00	3.00	4.00	7.00	7.00	11.50	2.00		5.00		1.00	54.75
TOTAL DAYS	150.5	1.3	18.35	38.5	27.08	22.89	84.51	22.51	90.6	34.8	32.5	3	20	3.2	4.1	553.84

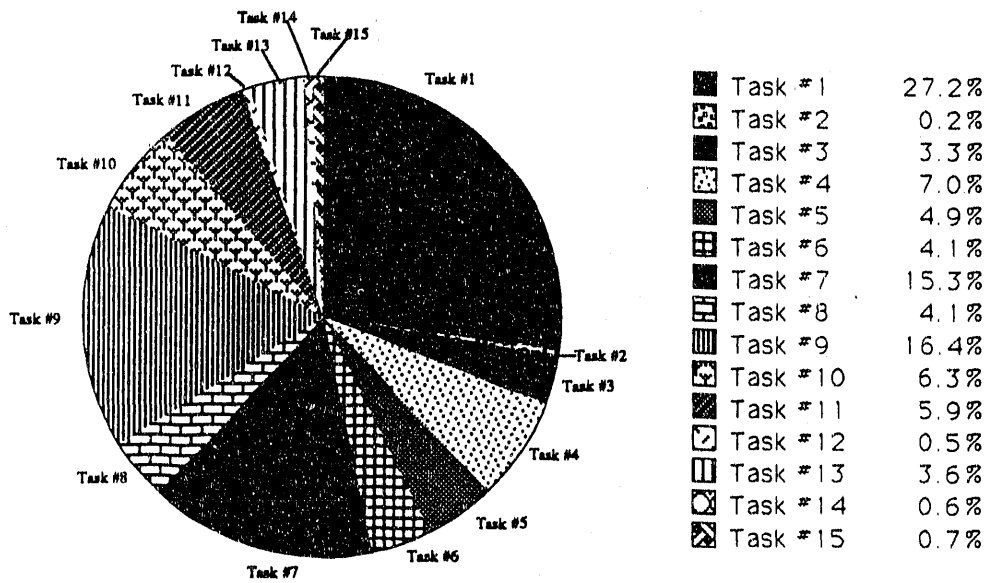


Figure 4. Task-by-task Percentage Breakdown of Level of Effort for Phase II

Analysis of Offsite EPZs

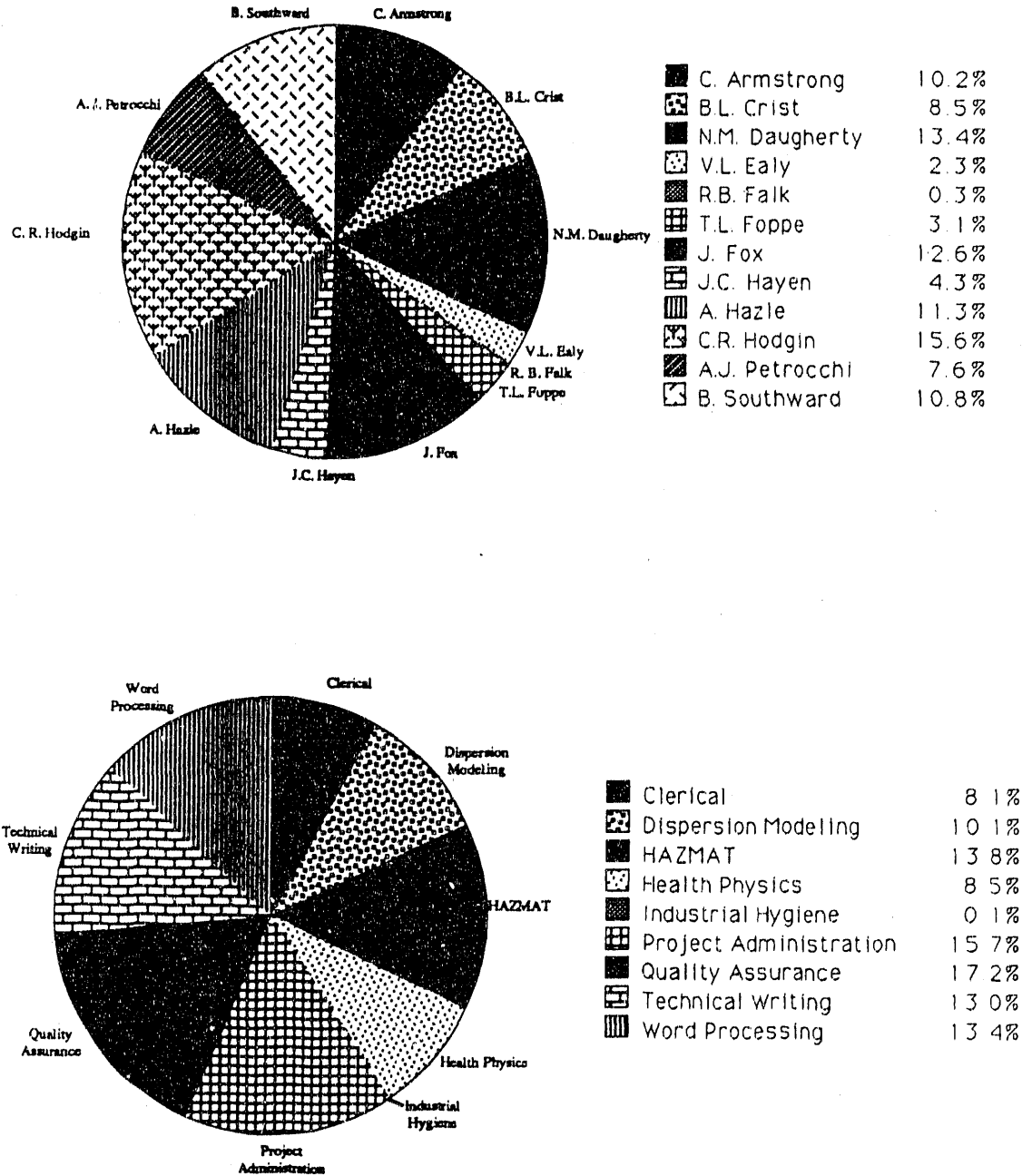


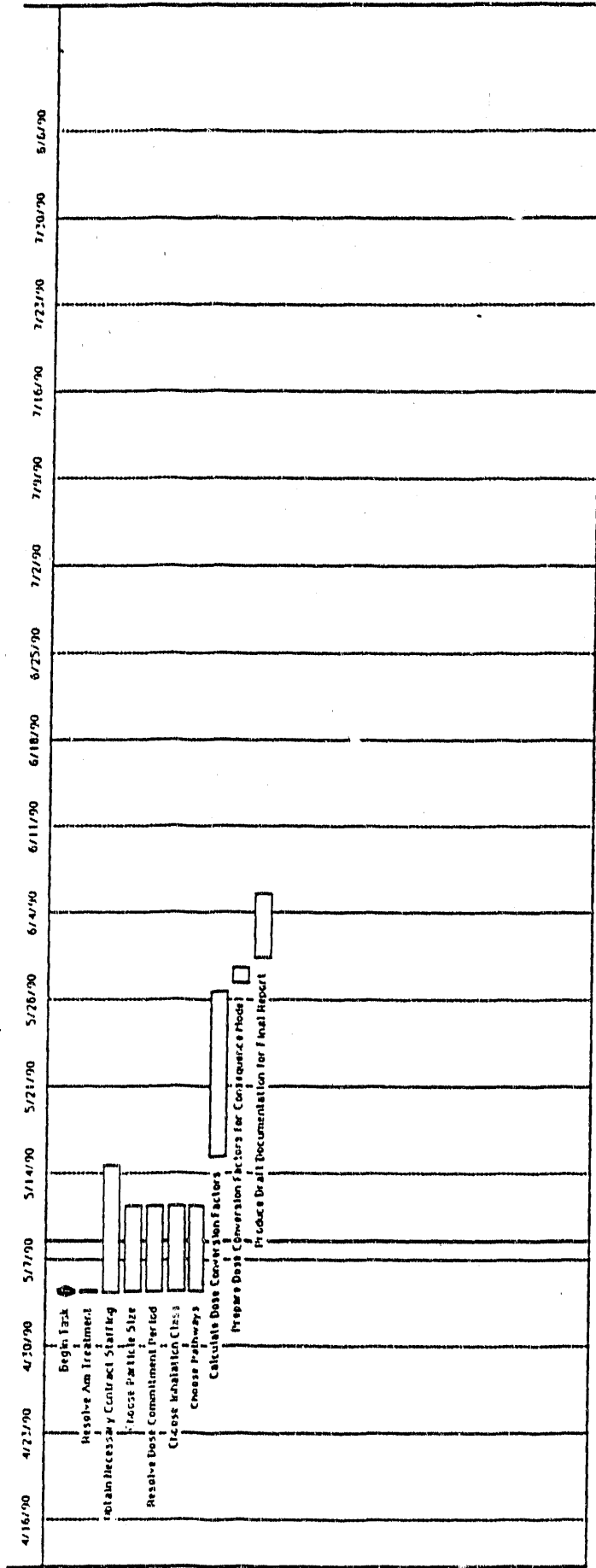
Figure 5. Percentage of the Overall Project Effort to be Supplied by Each Resource

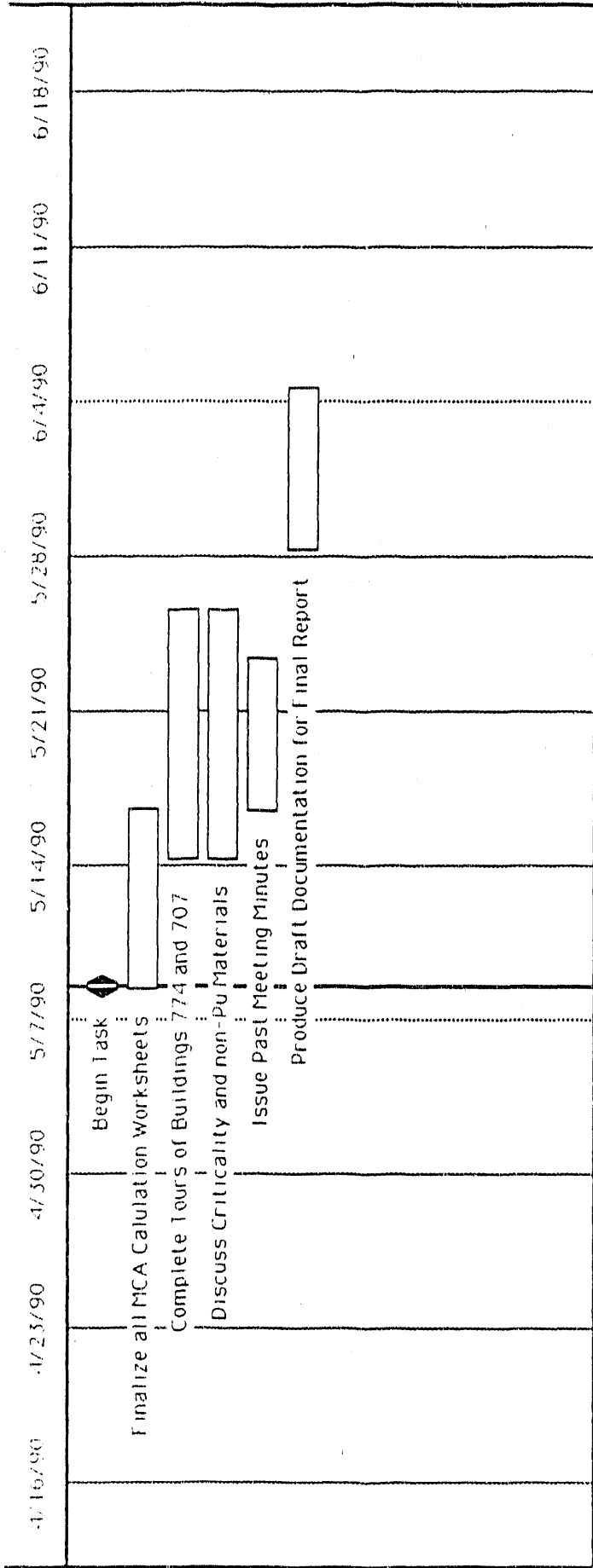
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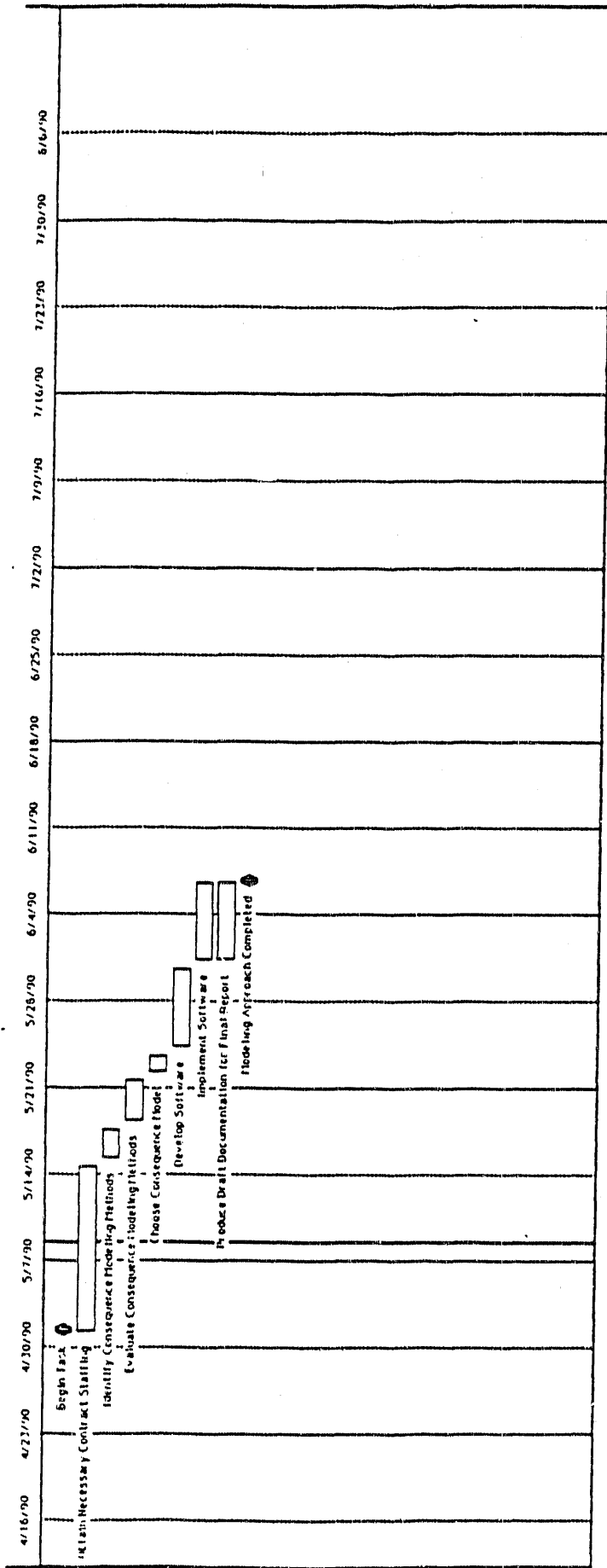
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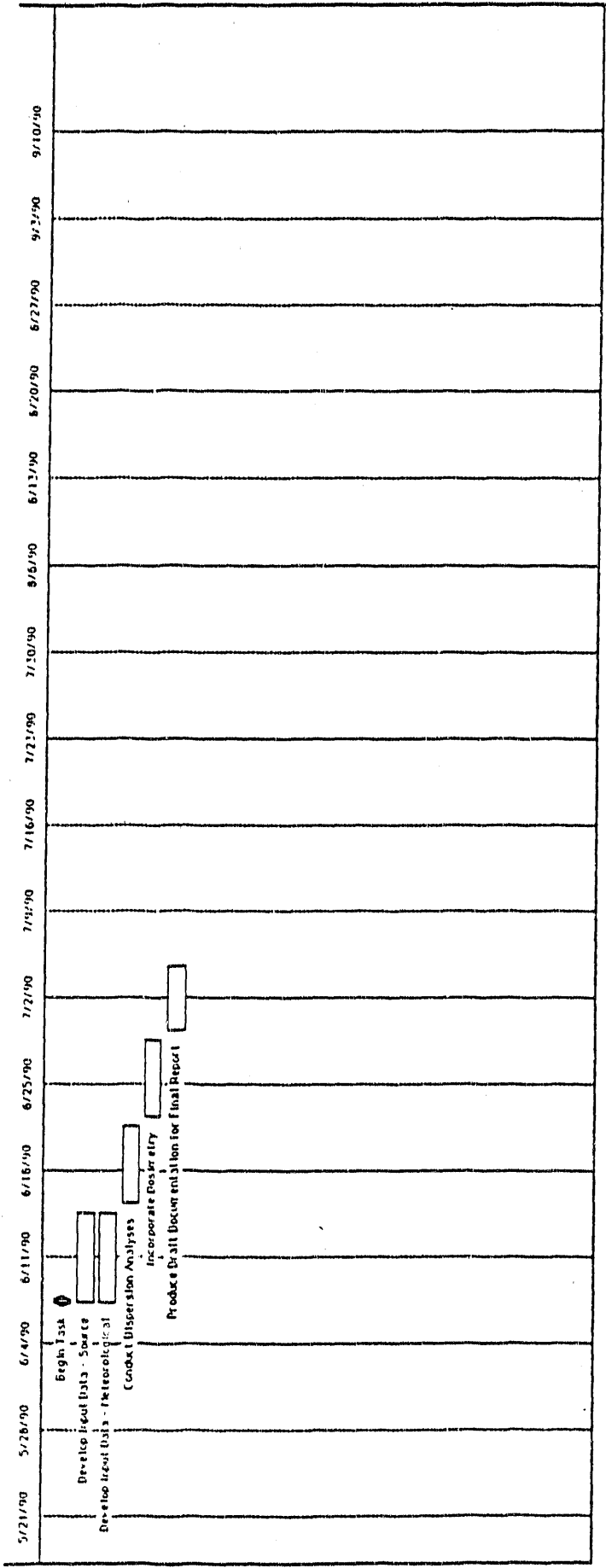
APPENDIX A

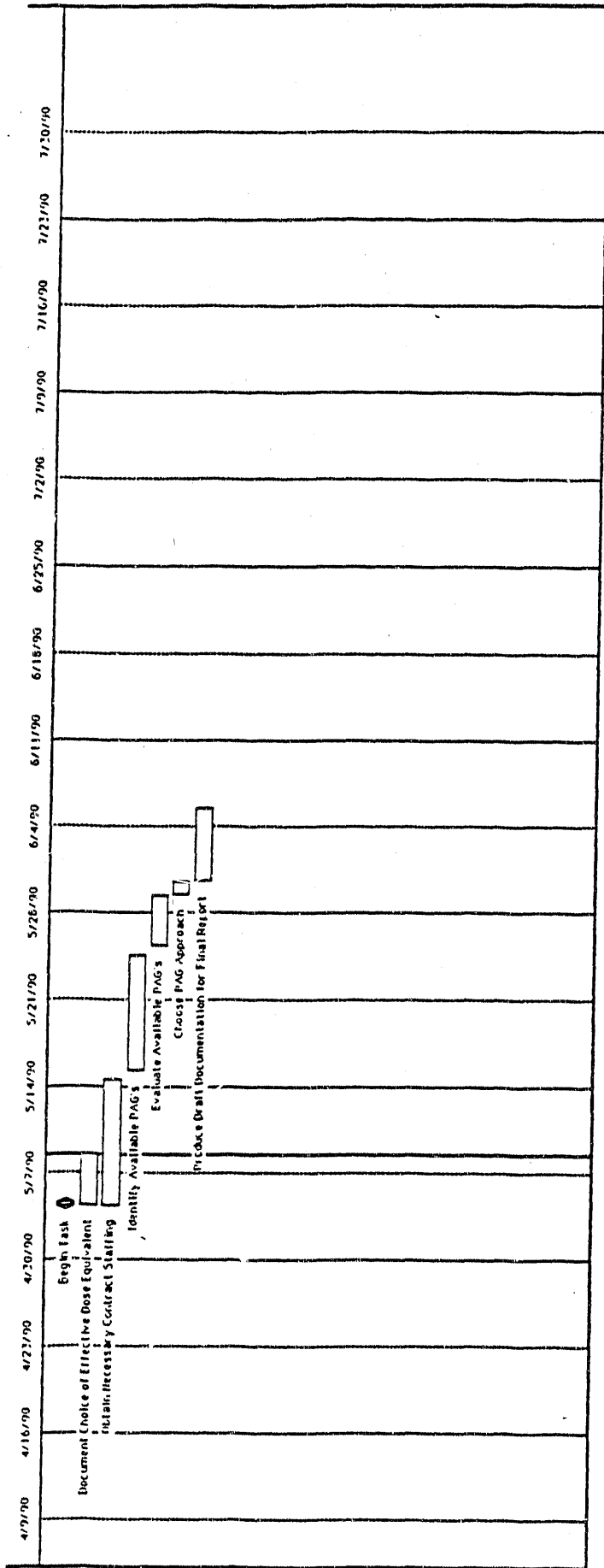
Subtask Level Network and Time/Task Diagrams

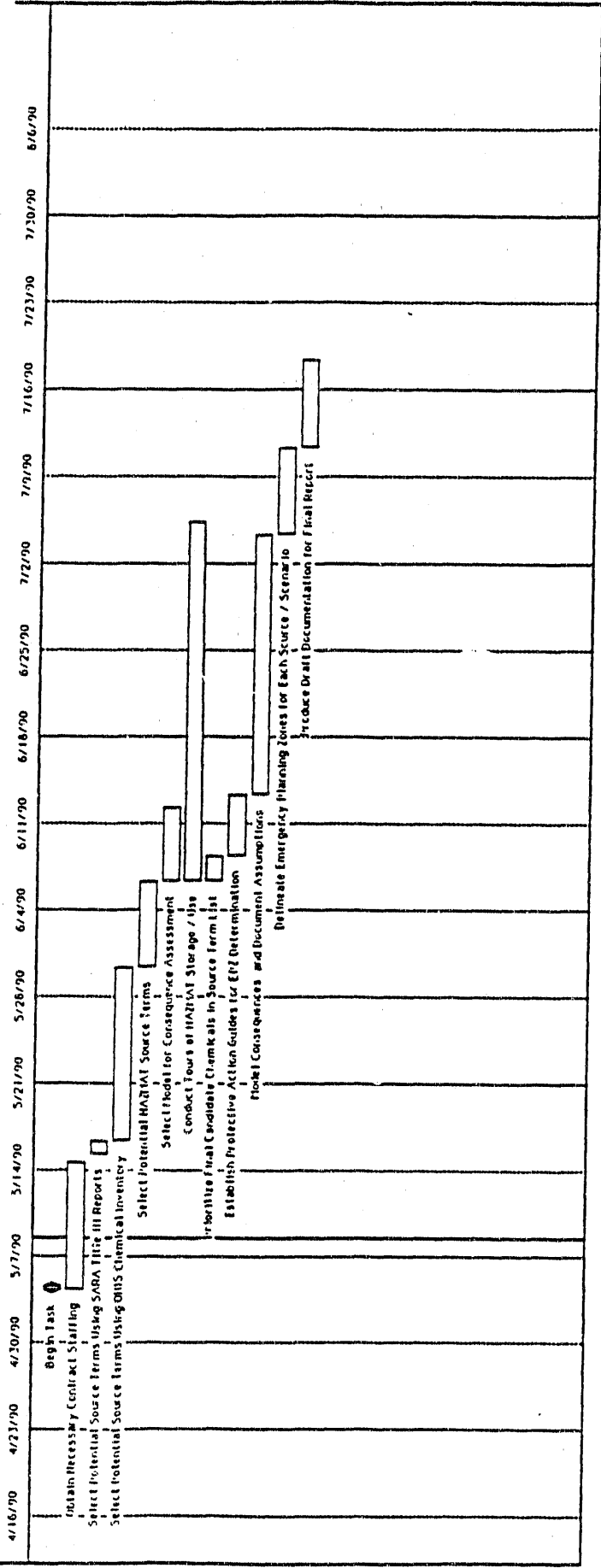


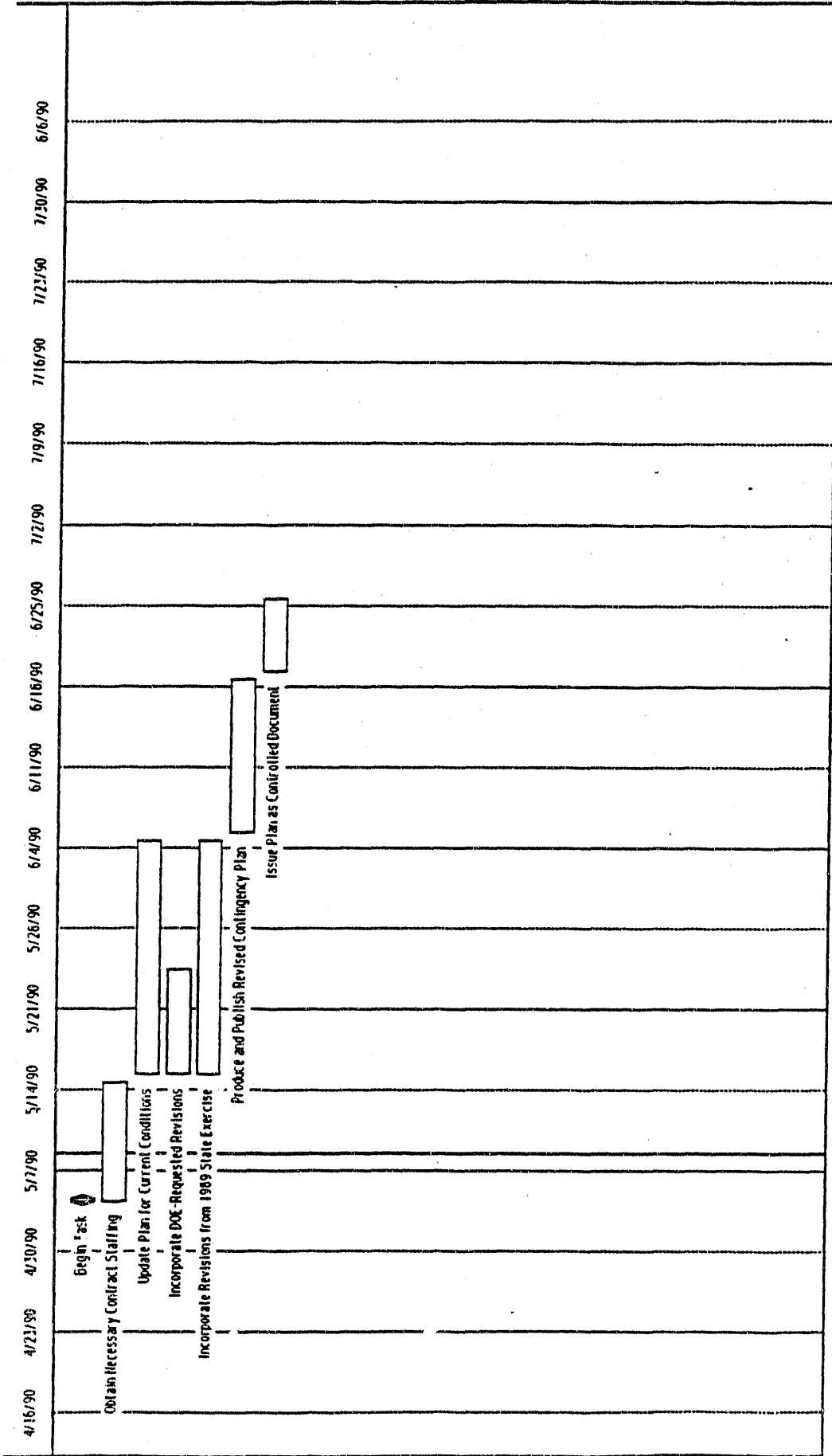


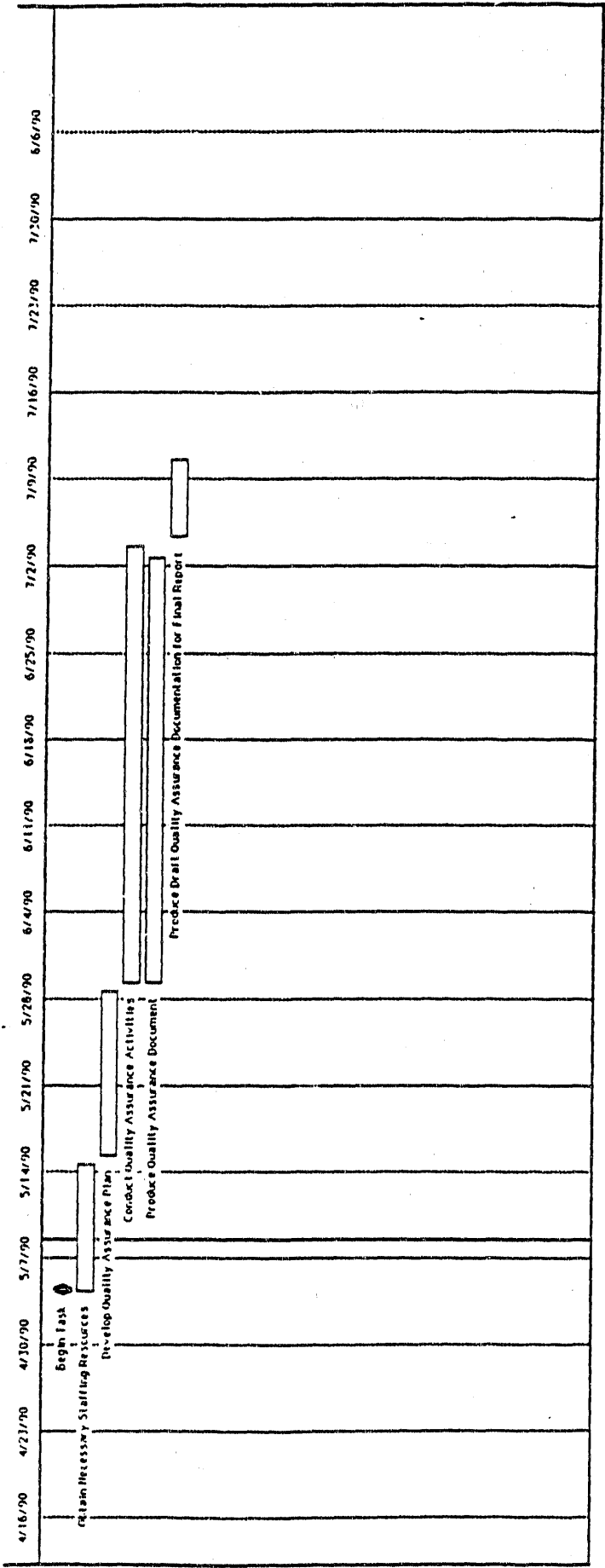


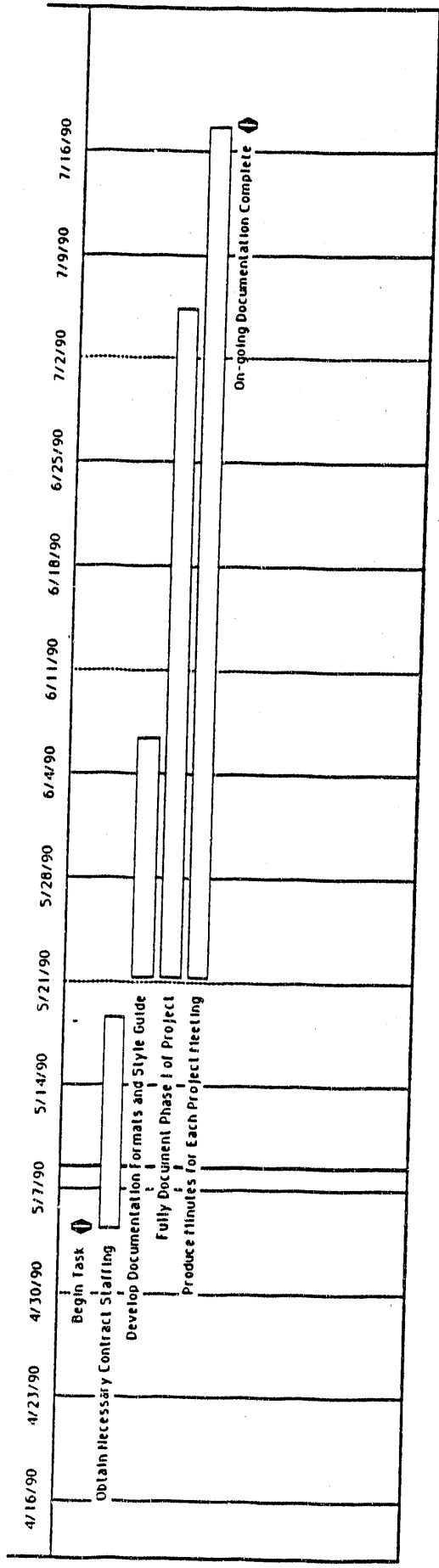






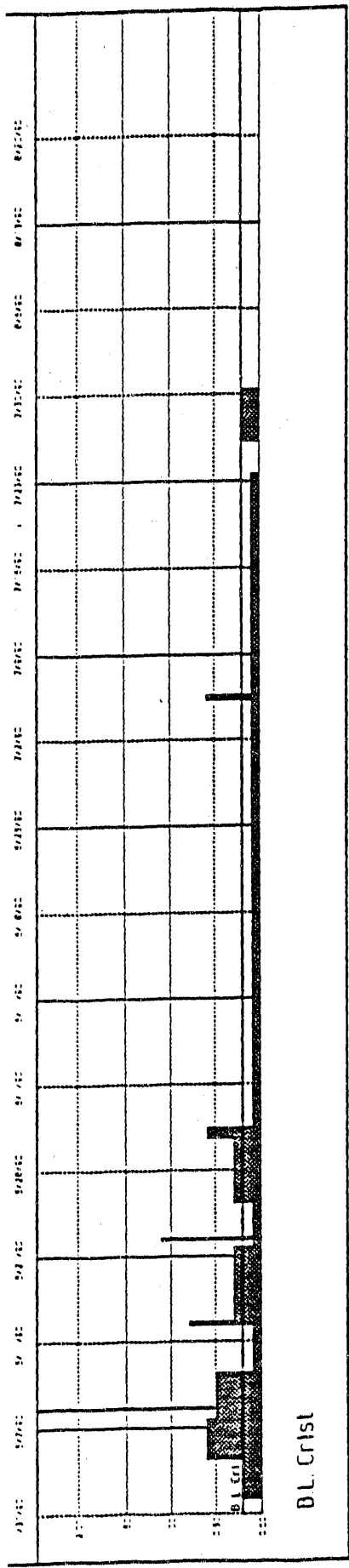






APPENDIX B

Detailed Time/Task Diagrams for Each Resource



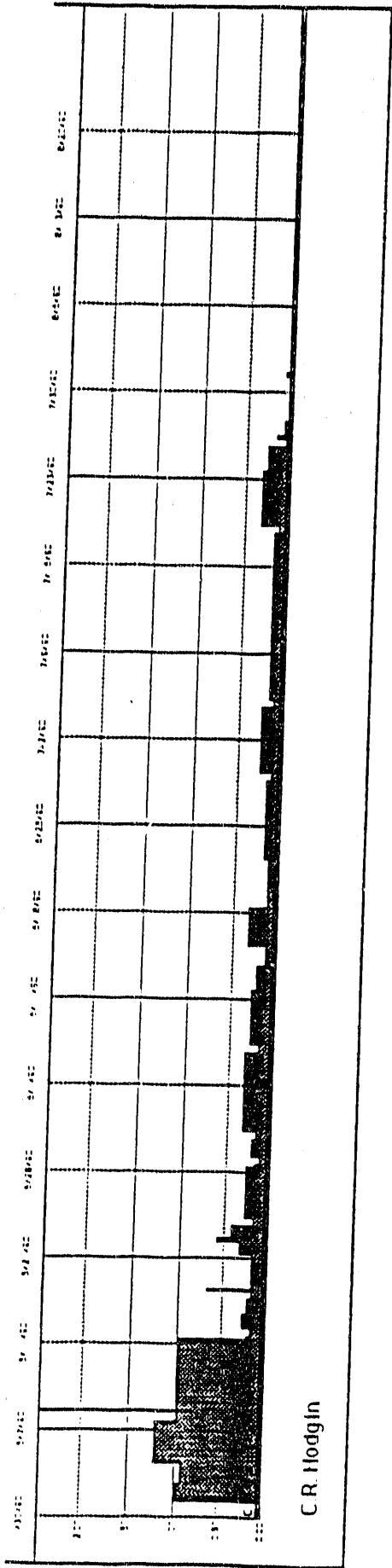
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AJ Petrocchi

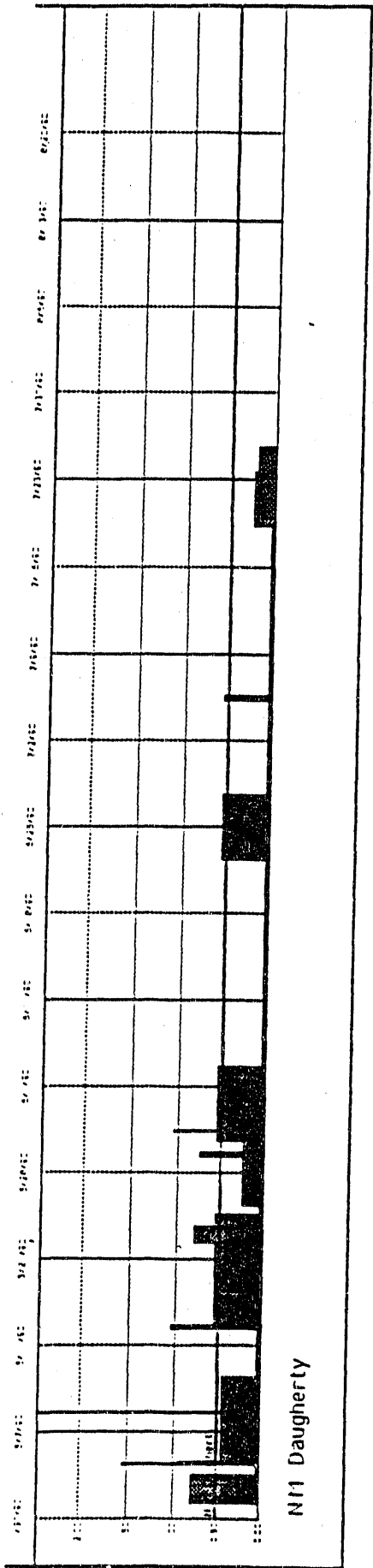
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B Southward



C. R. Hodgkin

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APPENDIX C

Scopes of Work for Contract Staffing

TECHNICAL WORK SCOPE FOR TENERA TO SUPPORT THE
ANALYSIS OF OFFSITE EMERGENCY PLANNING ZONES (G01913)

TENERA will provide senior level technical management and appropriate engineering support to assist EG&G with an analysis of offsite EPZs at the Rocky Flats Plant. TENERA will independently perform some tasks under the general guidance and oversight of the EG&G Project Manager. In other tasks, TENERA will provide the services of expert professionals to work under the direction of EG&G Task Leaders beginning May 8 through August 31, 1990.

TENERA will conduct efforts in eight major tasks as described below:

Task 1, Support Project Administration

Working under the direction of the EG&G Project Manager, TENERA will assist in coordination and administration of the program to ensure that the project objectives are fully met within the committed schedule. Efforts will include monitoring/coordinating project progress and liaison with oversight groups.

TENERA will track the progress of the overall project on a day-to-day basis using MacProject II software on the Macintosh IICx computer. TENERA will maintain contact with all task leaders and technical groups working on the project to maintain day-by-day knowledge of project progress. TENERA will present results of project tracking at daily meetings with the EG&G Project Manager, weekly meetings with EG&G Task Leaders, and meetings every 2 weeks with the EG&G Project Oversight Committee.

TENERA will coordinate meetings of the Project Oversight Committee and other briefings to external groups.

This task is estimated to begin on May 8, 1990, and end on August 31, 1990, with an estimated level of effort of 5 person-months.

Task 2, Support Dosimetry

The CDH, the DOE-RFO, and EG&G have selected International Commission on Radiation Protection Publications 26 and 30 (ICRP 26/30) dosimetry methodology for evaluating impacts on the public. TENERA will support an EG&G Task Team in establishing a dosimetry approach for the overall project and calculating appropriate dose conversion factors for use in dispersion modeling. Support will be required in the following areas:

- Calculate dose conversion factors for plutonium and selected radionuclide,
- Prepare dose conversion factors for a consequence model, and
- Produce draft documentation for final report.

TENERA personnel will work under the direction of the EG&G Task Leader for dosimetry. As appropriate, TENERA will arrange for a review by one or more experts in the field of radiological protection to evaluate the proposed dose conversion factors. This task is estimated to begin on May 8, 1990, and end on August 31, 1990, with an estimated level of effort of 4 person-months.

Task 3, Develop Consequence Modeling Approach – Radiological

Straight-line Gaussian models will be the only approved methods for emergency planning during Phase II of the overall project. TENERA will work independently, under the general guidance of the EG&G Project Manager, to select and implement a model from among those available, during the Phase II time frame.

TENERA will identify the dispersion modeling approaches which are approved for radiological emergency planning. These models will include the Nuclear Regulatory Commission's Regulatory Guide 1.145 and any methods that may be identified in the 1980 Draft Protection Action Guide from the Environmental Protection Agency (EPA).

Analysis of Offsite EPZs

TENERA will evaluate the atmospheric dispersion models as identified above. TENERA will address the thoroughness of each approach, the technical sophistication of the method, and the appropriateness of the model for use in facilities and terrain such as Rocky Flats.

TENERA will support the CDH, the DOE-RFO, and EG&G in selection of the most appropriate consequence model for Phase II of the overall project.

TENERA will develop any computer codes necessary to implement the atmospheric dispersion model selected above. If software already exists and is available, TENERA will modify the code as necessary to operate on the Rocky Flats Plant computing system, accepting input data available at the facility. If computer codes do not exist or are not available, TENERA will generate the software based on theory documented for the approach. All software will be developed as FORTRAN 77 code operating in a Digital Equipment Corporation VAXJVM environment.

TENERA will implement the software developed above on the Unclassified VAX Cluster at the Rocky Flats Plant. TENERA will ensure that any software developed under this task is defect-free or that any perceived defects do not significantly affect the quality of the product to the satisfaction of the EG&G Project Manager and the Project Oversight Committee through comprehensive verification and testing of the code. TENERA will develop and format all input data sets needed to operate the code and will format model outputs for ease of use in subsequent tasks.

TENERA will produce fully detailed documentation of this task for inclusion of the program final report.

This task is estimated to begin on May 8, 1990, and end on August 31, 1990, with an estimated level of effort of 3 person-months.

Task 4, Support Establishment of Protective Action Guides (PAGs) - Radiological

PAGs are an objective means of converting the dose received from a radiological accident to actions needed for protection of public health. PAGs for radiological releases are intended to assure that

emergency actions can be triggered at a low level to increase the opportunities to protect the public. It will be necessary to develop new PAGs for use with the ICRP 26/30 dose methodology to be applied in Phase II of this project.

Working under the direction of an EG&G Task Leader, TENERA will provide support in the following areas:

- Identify available options for evacuation and sheltering PAGs based on ICRP 26/30 dose methodology (including literature research),
- Evaluate available PAGs for appropriateness, and
- Prepare draft documentation for final report.

TENERA will conduct a literature search and provide the results to the EG&G Task Team. In all other respects, TENERA will provide staff support to the EG&G Task Team.

This task is estimated to begin on May 8, 1990, and end on August 31, 1990, with an estimated level of effort of 5 person-months.

Task 5, Support Identification of Hazardous Materials Sources and Scenarios

TENERA will provide staff support to an EG&G Task Team Leader for selecting a list of hazardous materials sources and scenarios to be evaluated for offsite emergency planning. TENERA will conduct a review of SARA Title III reports generated for the Rocky Flats Plant, identifying those hazardous chemicals where plantsite use exceeds 10,000 pounds annually. TENERA will also support selection of hazardous chemicals from the chemical inventory maintained by the Rocky Flats Plant. All substances that exceed 800 pounds or 100 gallons in each single location will be identified. TENERA will then support the EG&G Task Team in ranking the substances according to a release exposure index system developed at the Rocky Flats Plant. TENERA will not conduct any of these efforts independently, but will work as staff support to the EG&G Task Team.

Analysis of Offsite EPZs

This task is estimated to begin on May 8, 1990, and end on August 31, 1990, with an estimated level of effort of 2 person-months.

Task 6, Support Consequence Modeling for Hazardous Materials

TENERA will provide support to an EG&G-designated Task Leader for developing and conducting consequence modeling for hazardous materials. TENERA will support the EG&G Task Team in identifying atmospheric dispersion models that are approved for hazardous materials emergency planning. The EG&G Task Team will select and implement a model from among those available during the Phase II time frame for this project. The list of potential models will include the Cameo code and the Archie code.

TENERA will support the EG&G Task Team in operating the selected atmospheric dispersion model for each substance and source scenario identified under Task 5. TENERA will support the preparation of necessary input data, help to operate the models, and produce outputs necessary for establishing EPZs.

TENERA will support the EG&G Task Team in using the results of consequence modeling to establish an EPZ for each substance and scenario identified in Task 5. TENERA will support the EG&G Task Team in producing fully detailed documentation of the dispersion modeling efforts for inclusion in the final report for the overall project.

TENERA will not conduct any of these efforts independently, but will work as staff support to the EG&G Task Team. TENERA personnel for this task have knowledge and experience in the areas of hazardous materials characterization, risk evaluation, and atmospheric dispersion modeling. We anticipate that this task will begin on May 8, 1990, and end on August 31, 1990, with an estimated level of effort of 2 person-months.

Task 7, Conduct Consequence Modeling - Radiological

TENERA will work independently, under the guidance of the EG&G Project Manager, to conduct consequence modeling for development of radiological EPZs. TENERA will utilize the atmospheric

Analysis of Offsite EPZs

dispersion modeling approach developed in Task 3 needed to run the model, conduct the atmospheric dispersion analyses, incorporate dosimetry, and produce full documentation for the final report.

TENERA will verify that the source characteristics developed for the MCA are properly incorporated in the output files as necessary for input to the atmospheric dispersion model. TENERA will work with EG&G staff to compile a meteorological database and format it as a joint frequency function or in another appropriate format for input to the atmospheric dispersion model. TENERA will utilize a selected atmospheric dispersion model along with input data sets to quantify the impacts from the MCA on offsite populations. TENERA will simulate environmental exposures via selected pathways.

TENERA will combine the exposure data produced by the consequence model with the dose conversion factors developed under Task 2 to finalize offsite doses to the public associated with the MCA scenario. TENERA will produce fully detailed documentation of this task for inclusion in the final report for the overall project.

This task is estimated to begin on May 8, 1990, and end on August 31, 1990, with an estimated level of effort of 2 person-months.

Task 8, Ensure Quality of the Project

TENERA will work independently, under the general guidance of the Project Manager, to implement a comprehensive quality assurance plan consistent with NQA-1. TENERA will audit and institute a comprehensive quality control and assurance process for all activities to be conducted in Phase II of the program.

TENERA will document the quality assurance plan as a formal, published report.

TENERA will conduct a retroactive quality assurance audit of tasks performed in Phase I of the overall program. TENERA will also conduct on-going quality assurance audits, appraisals, and reviews for all technical activities under Phase II. TENERA will perform direct surveillance of the

Analysis of Offsite EPZs

Technical Project Team as they perform tasks associated with the overall project. TENERA will produce fully detailed draft documentation of these quality assurance activities for inclusion in the final report on the overall project. TENERA will conduct the efforts associated with this task as an independent, stand-alone effort, and will be solely responsible for the deliverables discussed above. This task is estimated to begin on May 8, 1990, and end on August 31, 1990, with an estimated level of effort of 4 person-months. TENERA's Project Manager will supervise this effort and assist the EG&G Project Manager, as required, to assure that the overall Phase II activity is seen as a quality effort.

PRESENTATIONS

TENERA will participate in briefings and presentations concerning its progress and results in the tasks described above. These briefings will include team meetings on a weekly basis and management/oversight briefings at 2-week intervals. Each presentation will be formally prepared using overhead transparencies as media, and will be developed for an approximate 10-minute delivery exclusive of audience questions.

DELIVERABLES

The deliverables for the Technical Support contract are discussed under each task heading above. TENERA should be prepared to conduct significant portions of the project effort at an unrestricted location at the Rocky Flats Plant. Approximately 80 to 90% of the technical effort in this contract can be conducted by uncleared personnel. The remainder of the effort must be conducted by personnel maintaining "Q" clearances.

DELIVERY SCHEDULE

Technical efforts for the Technical Support contract will commence on or about May 8, 1990. The bulk of the work for this contract will conclude on July 31, 1990, with delivery of the final project report. Additional "wrap-up" work will continue through August 31, 1990. Detailed milestones are discussed under the task headings above.

**Technical Writing Support
Scope of Work
May 1990**

1.0 OBJECTIVE

The objective of this contract is to provide documentation management, technical writing, technical editing, and production expertise to produce the products of an intensive research and analysis project at the Rocky Flats Plant.

2.0 SCOPE OF WORK

The vendor will provide technical writing and technical editing expertise for research, drafting, and production of a large (200-plus page) informational report that will be distributed to state and federal authorities as part of the Rocky Flats Plant Resumption Program. One vendor personnel will be assigned to work directly with the Emergency Assessment Systems (EAS) and the EAS subcontractor for the duration of this contract. The same vendor personnel will oversee the management of documentation for 15 different tasks performed and documented by a team of task leaders gathered on site (some subcontractors, some EG&G Rocky Flats, Inc. employees). The vendor will support EAS and its subcontractor in the following areas:

- Development, editing, scheduling, production, and control of formal reports under formal cover that document results or the products of this project:
 - Assist authors in writing draft documentation,
 - Edit draft copy and format for presentation to the oversight committee,
 - Insert appropriate edits based on the comments received from the oversight committee,
 - Make all necessary changes in finalizing document following technical review,
 - Oversee production of the final draft document, and
 - Have final report reviewed for classification and reproduced for public dissemination.

Analysis of Offsite EPZs

- Development, publication, and control of supporting documentation such as fact sheets and meeting minutes:
 - Assist authors in writing draft documents and
 - Edit draft copy and format for presentation.

The vendor will work with Macintosh II computers operating WordPerfect or Microsoft Word word processing software. The vendor will act as liaison directly with the Rocky Flats Plant Technical Information Office Classification and Technical Editing staff, EAS, and EAS subcontractor.

3.0 DELIVERABLES

The deliverables for the contract will consist of:

- Written reports and communications detailing progress and interim results of assigned tasks,
- Detailed daily logs of all development, testing, and implementation activities,
- Draft and final reports as assigned, and
- Camera-ready copy as assigned.

The vendor should be prepared to conduct full-time project effort at an unrestricted location at the Rocky Flats Plant. A security clearance will not be required for this project.

4.0 PROJECT STAFFING

EG&G desires that the vendor accomplish the above tasks by assigning a properly qualified technical writer/editor to work with and under the direction of EAS.

The assigned technical writer/editor must meet the following required qualifications:

- BS or equivalent in technical writing or related discipline,
- Ten or more years' experience in professional writing (three years' general experience, seven years' specialized experience in managing intensive, technical reports that involve quick turn around schedules,
- Demonstrated experience in preparation of technical reports,
- Demonstrated experience with production scheduling preparation plans and procedure,

Analysis of Offsite EPZs

- Demonstrated experience with layout, table and figure design, and preparation of camera-ready copy, and
- Demonstrated experience with Macintosh II Systems operating Pagemaker and WordPerfect software.

The assigned technical writer/editor should also meet the following desired qualifications, if possible:

- Demonstrated experience in technical writing and editing for physical sciences, engineering, and/or state and federal regulations,
- Familiarity with intensive team projects, and finalizing the written output of many specialists into a cohesive and coherent whole, and
- Managerial expertise necessitated by administering large defense contract proposals.

Documentation Support

Scope of Work

May 1990

1.0 OBJECTIVE

The objective of this contract is to provide graphic, word processing and desktop publishing, and large document production expertise in support of the documentation staff to produce the products of an intensive, interagency research and analysis project at the Rocky Flats Plant. The deliverable products include, but are not limited to, a 200 to 300 page final report, nine task reports that are each 15 to 25 pages long and that require two review production cycles, and numerous graphics for viewgraphs, organization charts, and schedule spreadsheets.

2.0 SCOPE OF WORK

The prospective vendor, under the current contract, provides word processing, desktop publishing, and production support as part of the Documentation Support Staff.

3.0 QUALIFICATIONS

Education Required

A High School diploma or equivalent is required. Formal education/ training in automated office systems, filing systems, and desktop publishing is also required.

Experience Required

Two to three years' experience in business/office support with demonstrated ability to manage multiple assignments and to work effectively under pressure is required. Also required of the documentation support person is two to three years' experience in computer operations, word processing, desktop publishing, electronic file management, and documentation.

Job Duties

The candidate shall support the Emergency Assessment Systems Document Support Staff for the duration of the project in the following areas:

- Provide word processing support using WordPerfect and Microsoft Word,
- Implement and operate PageMaker desktop publishing on the Macintosh system,
- Implement and operate a filing system for configuration management audits on a Macintosh system,
- Update and operate a document tracking system for configuration management audits,
- Provide troubleshooting expertise in setting up Macintosh hardware and Macintosh software (PageMaker, WordPerfect, and Microsoft Word as well as small programs like Superclock),
- Provide word processing and other office automation support, and
- Provide general office support, including photocopying.

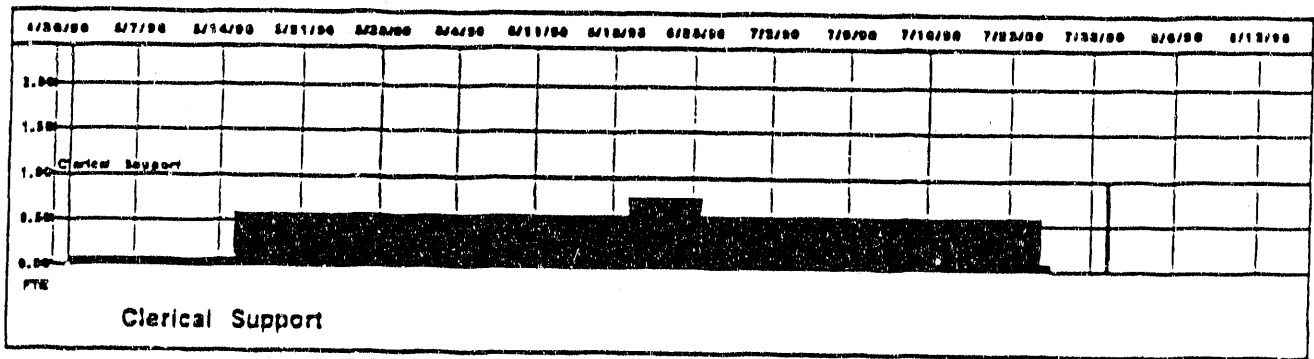
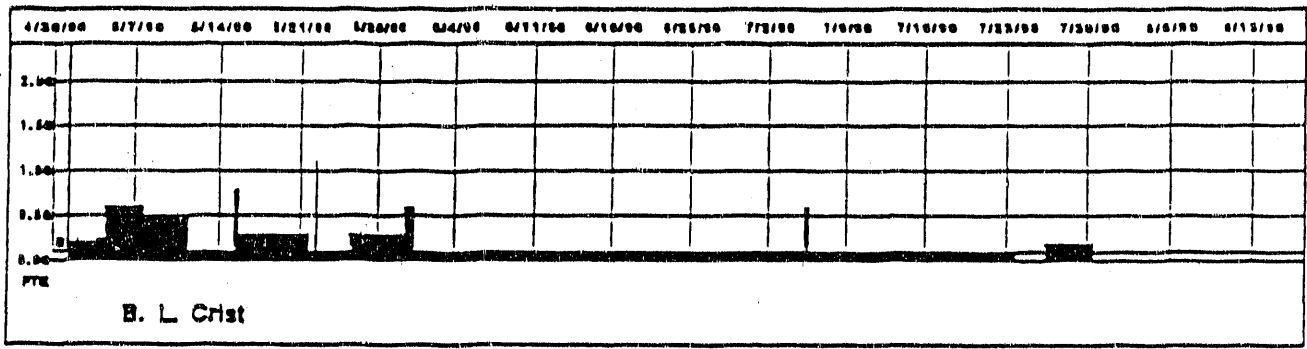
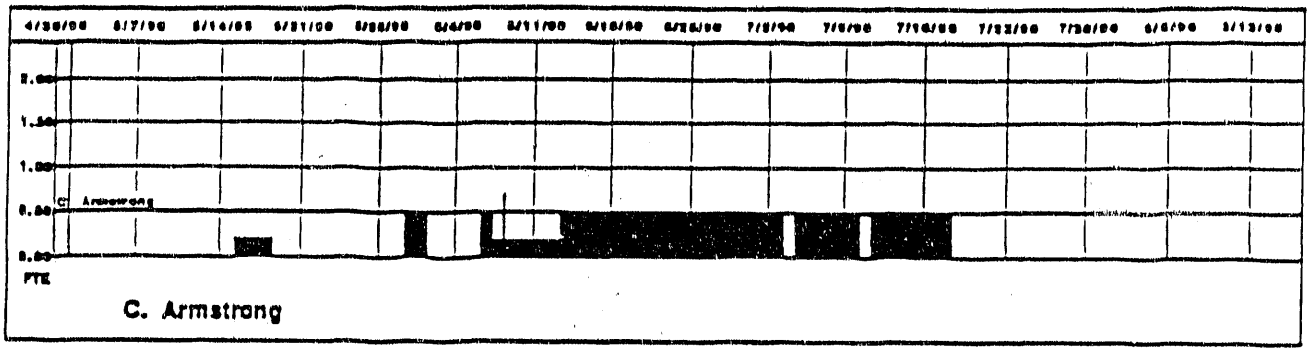
Skills Required

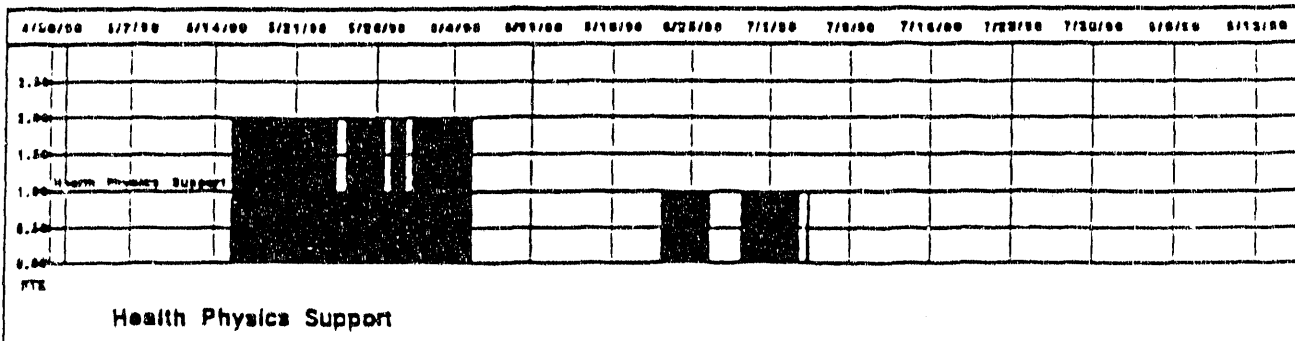
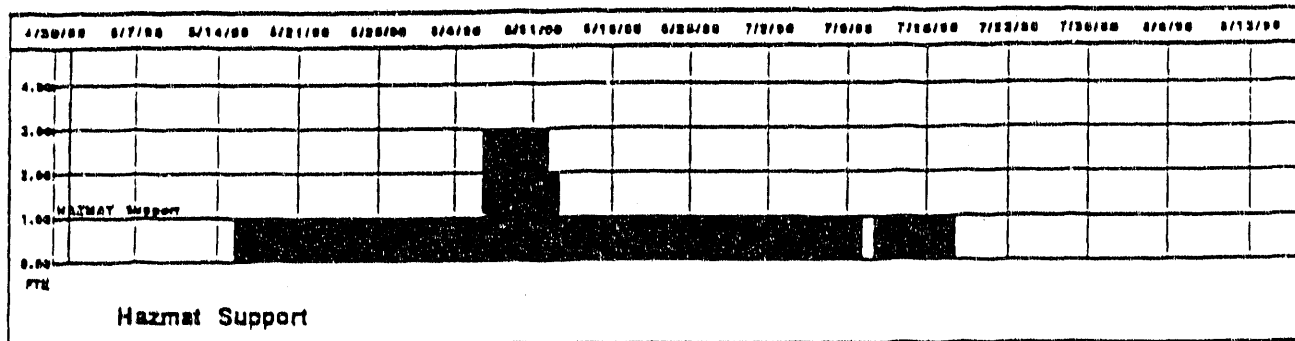
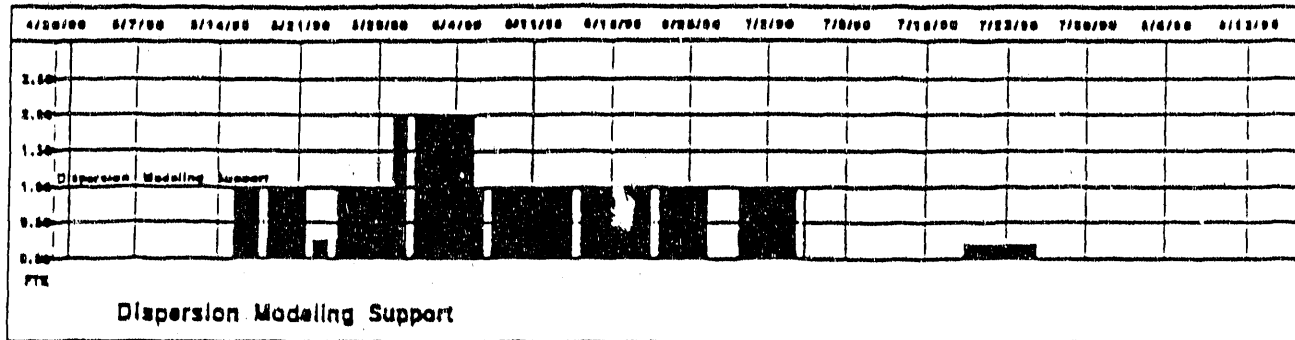
The documentation support person must be familiar with the following technical skills:

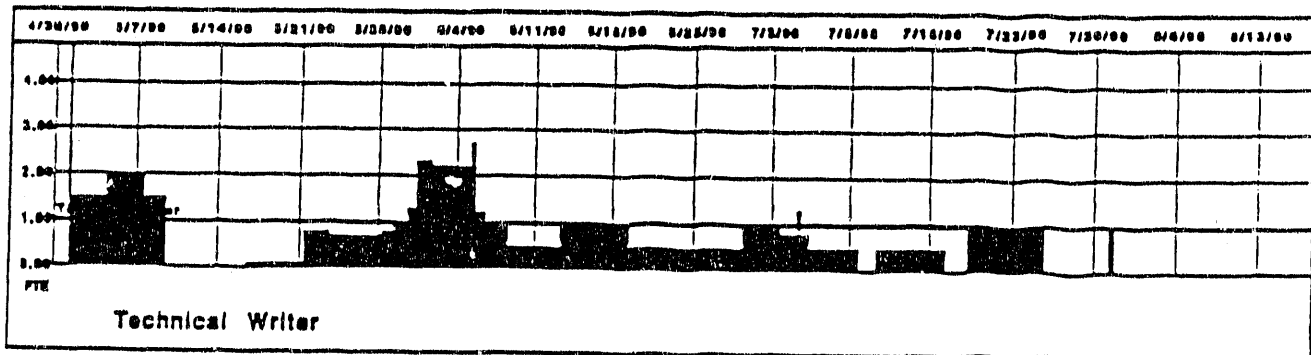
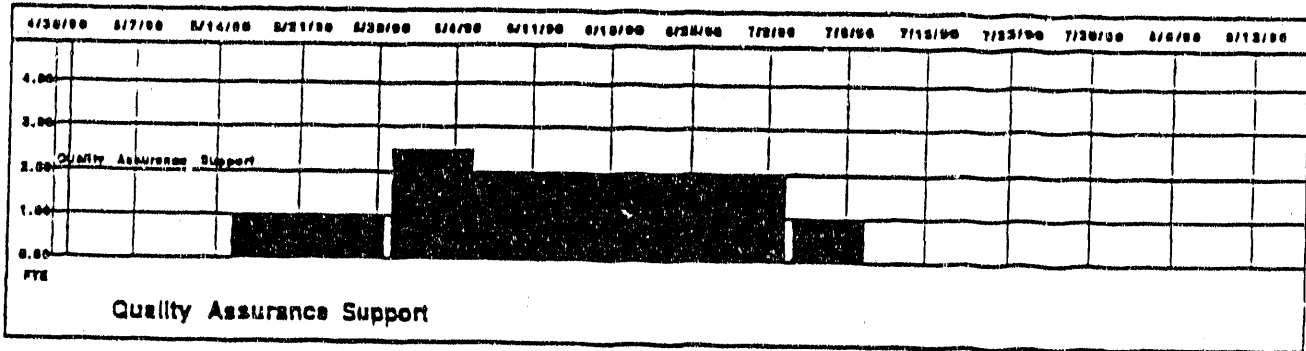
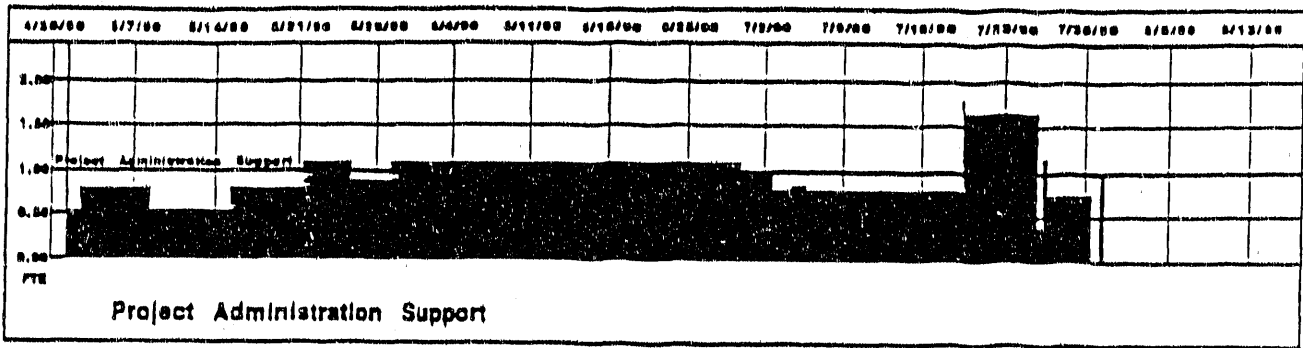
- Operate the Macintosh personal computer, including an understanding of the operating principles,
- Word Processing management using WordPerfect and Microsoft Word software capabilities of the Macintosh,
- Operate PageMaker using the Macintosh,
- Type and keyboard at a minimum of 55 wpm,
- Operate standard office automation equipment such as photocopiers and facsimile machines, and
- Design and maintain filing and tracking systems for a multiphased interagency project.

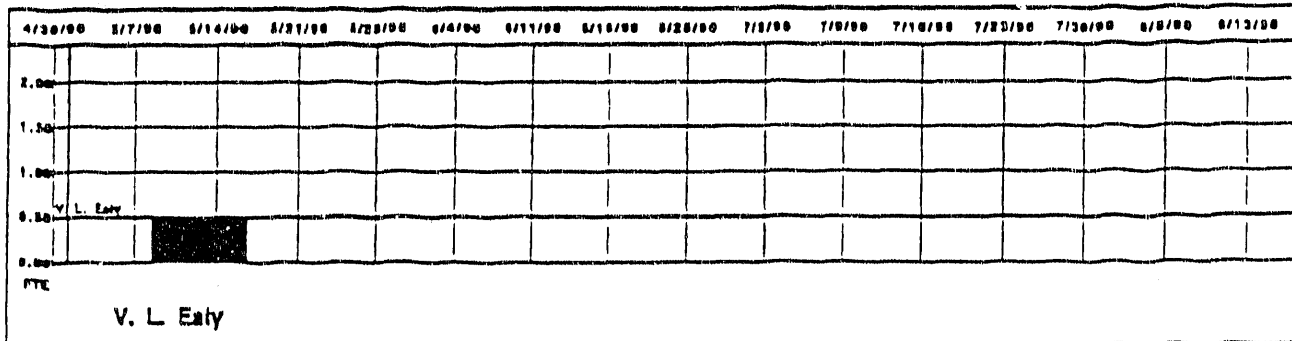
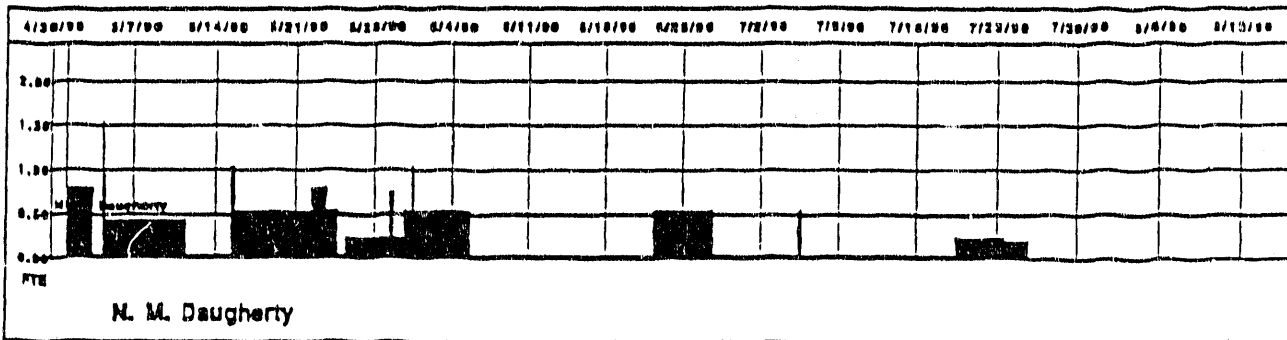
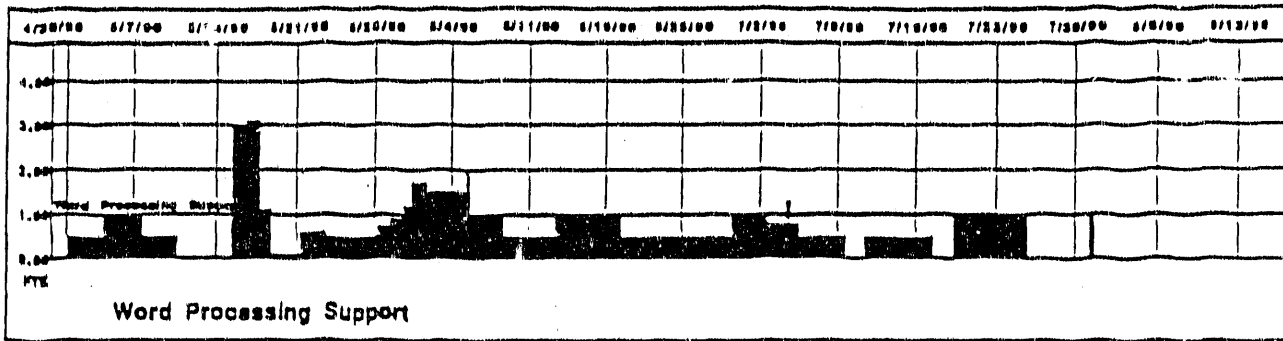
APPENDIX D

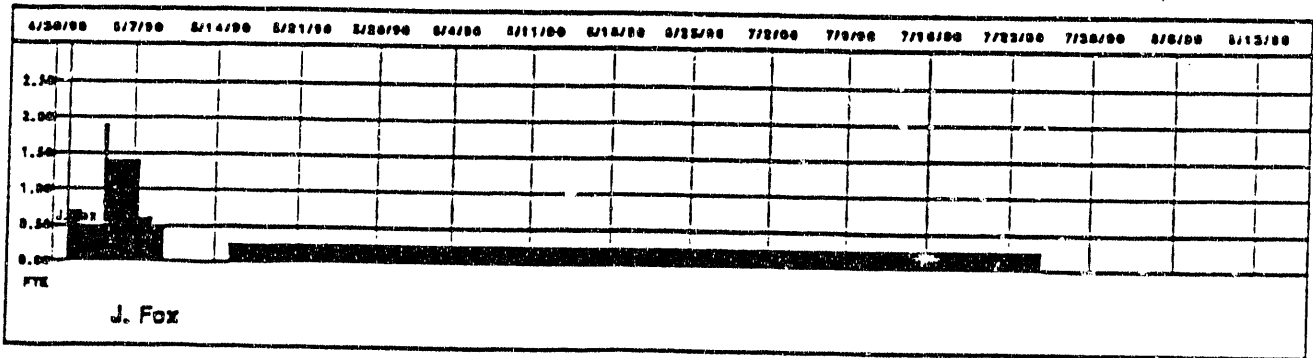
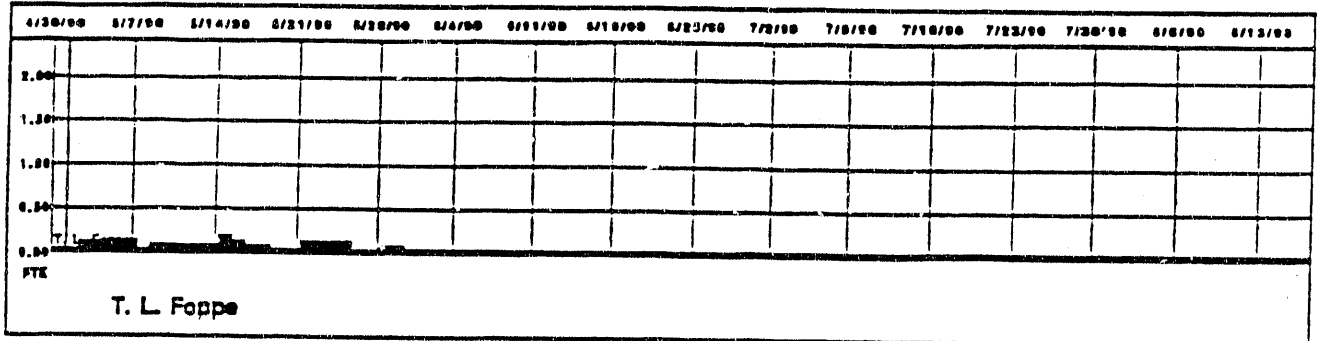
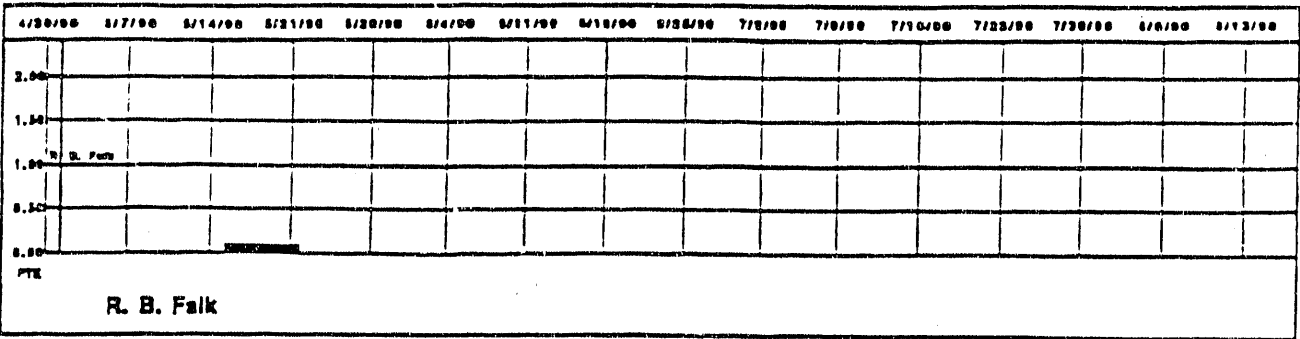
Level-of-effort Diagram for Each Identified Resource

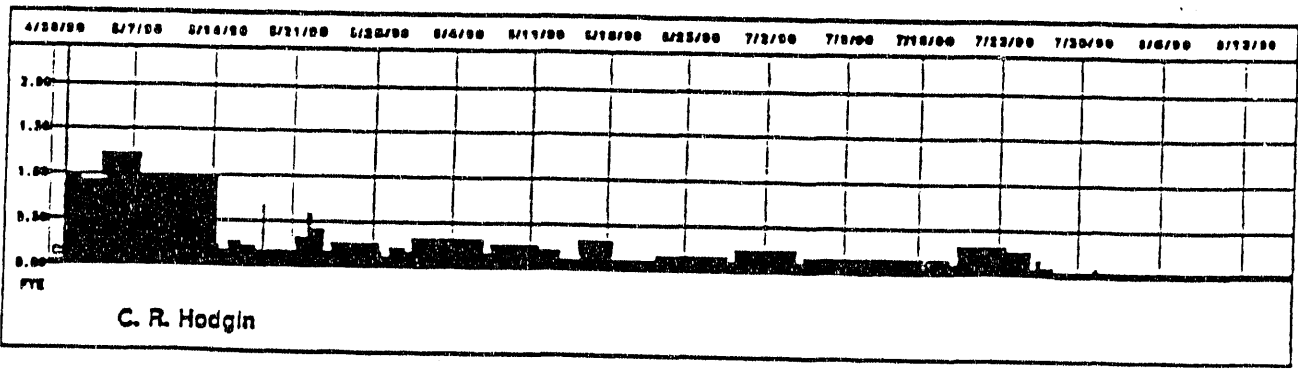
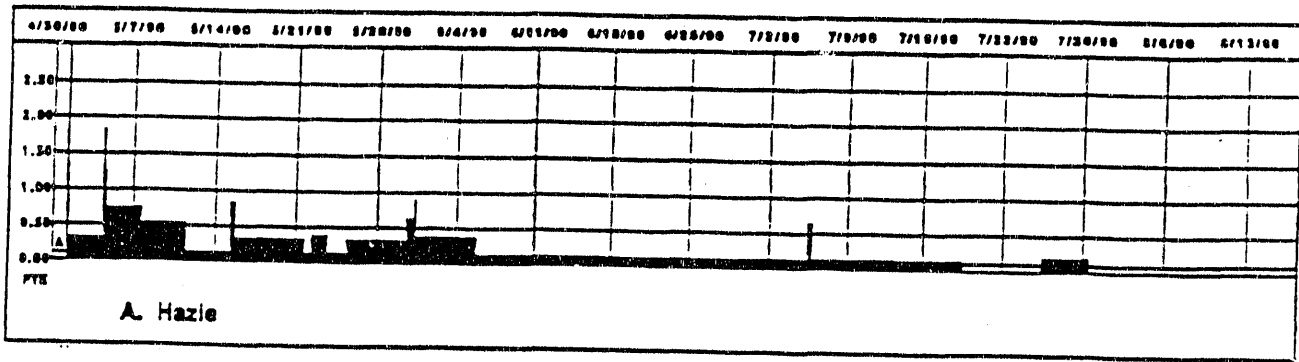
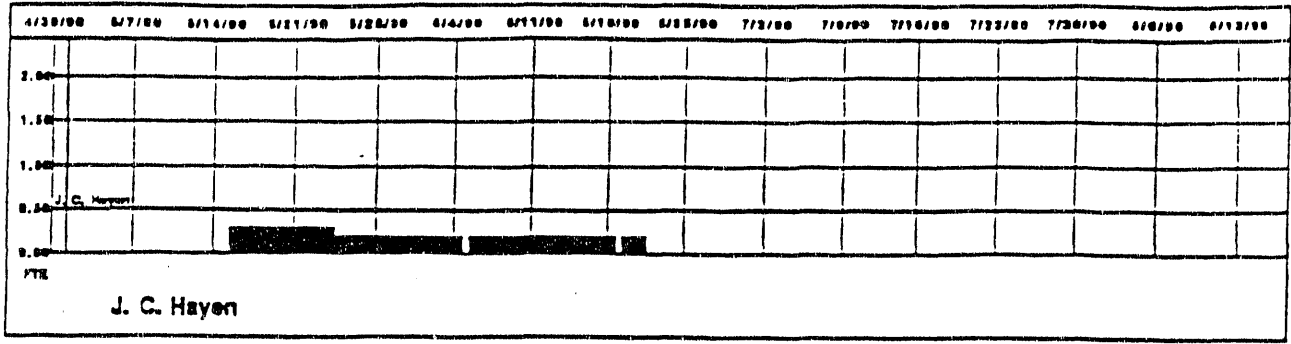


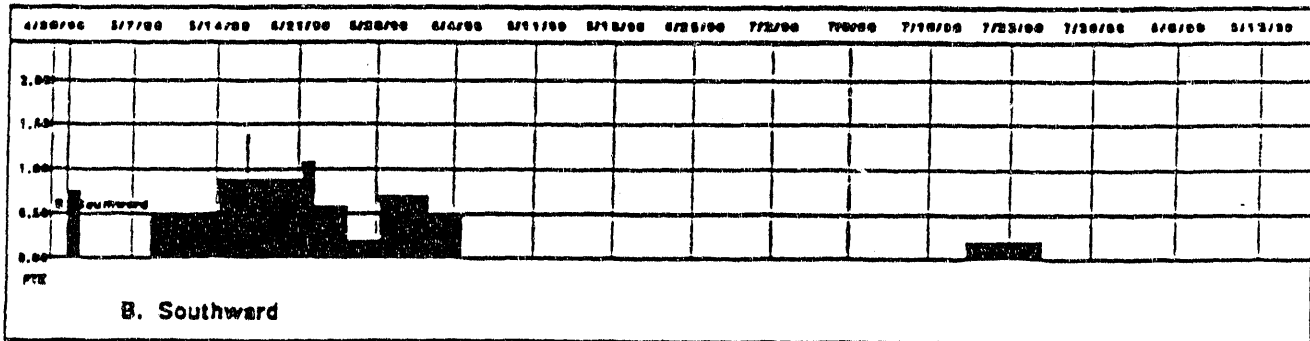
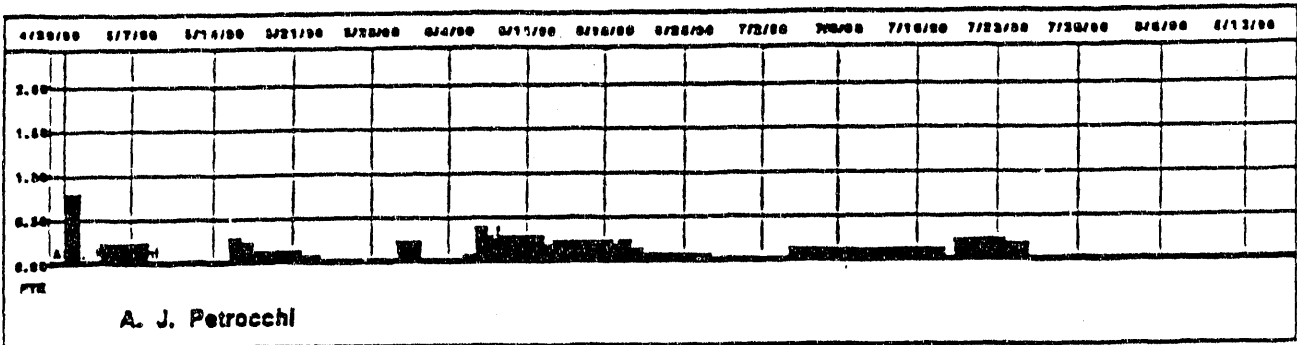
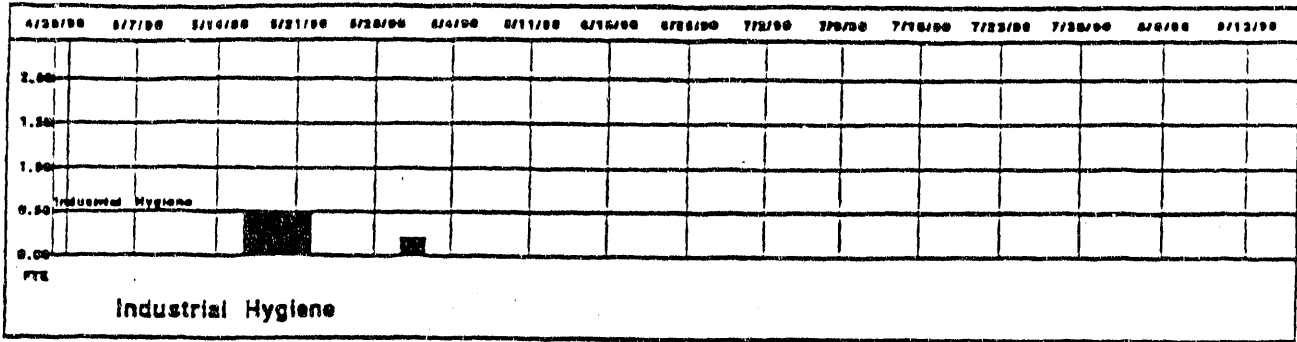












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