October 2000

ER Project
Management Assessment Overview
for
Groundwater Investigations Focus Area

October 3, 2000

Andrew E. Gallegos
Quality Liaison

Management Assessment Topics

- Assessment Scope
- Assessment Results
- Corrective Actions
- Recurrence Prevention, and Lessons Learned
- Conclusions

Assessment Scope

- The Management Assessment focused on the ER Project Groundwater Investigations Focus Area's effectiveness in meeting the requirements of the ER Project Quality Management Plan, specifically drilling activities associated with Wells R-25 and CdV-R-15-3.

Management Assessment Results

ER Project
Quality Management Plan

1. Program
2. Personnel Training and Qualification
3. Quality Improvement
4. Documents and Records
5. Work Processes
6. Design
7. Procurement
8. Inspection and Acceptance Testing
9. Management Assessment
10. Independent Assessments

Management Assessment Results (cont'd)

ER Project
Quality Management Plan

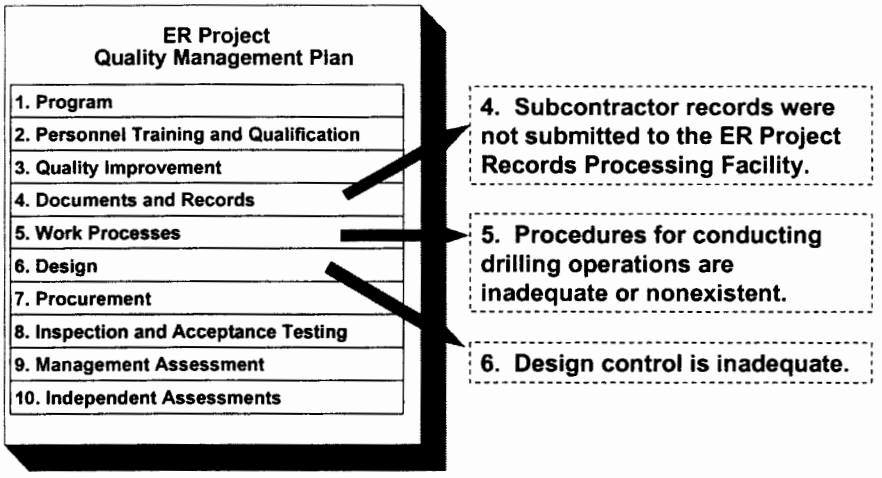
1. Program
2. Personnel Training and Qualification
3. Quality Improvement
4. Documents and Records
5. Work Processes
6. Design
7. Procurement
8. Inspection and Acceptance Testing
9. Management Assessment
10. Independent Assessments

1. Roles/responsibilities/ liabilities are not adequately addressed.

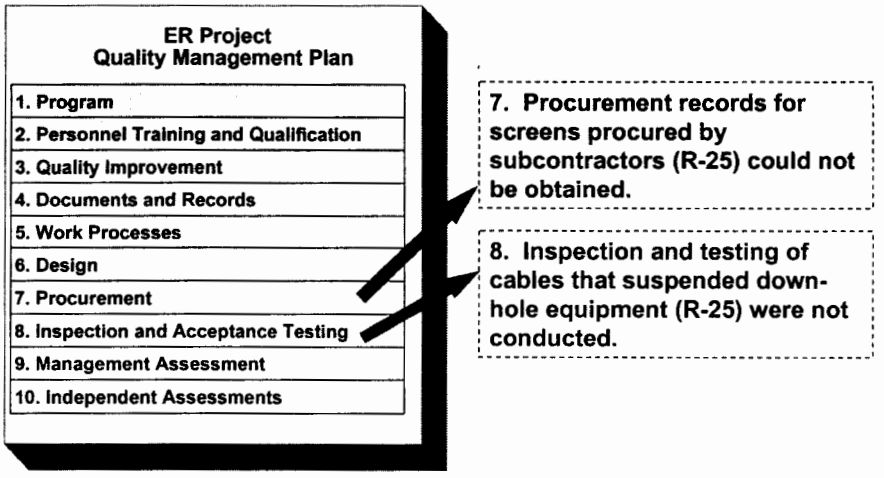
2. QA training documentation does not exist for any of the six primary UC management and staff overseeing drilling operations.

3. Documented "Lessons Learned" were not submitted in accordance with the Lessons Learned procedure.

Management Assessment Results (cont'd)



Management Assessment Results (cont'd)



Root Cause Analysis

- **Weakness in program management and understanding of quality requirements as they apply to work being performed.**

Corrective Actions

- **Address all identified nonconforming conditions (e.g., root cause analysis, corrective action plan, tracking system).**
- **Expedite the development and implementation of the ER Project Training Program.**
- **Improve product quality by adherence to quality requirements.**

Recurrence Prevention

- Identify, document and report nonconforming conditions.
- Conduct self-assessments of processes.
- Conduct Management Walk Arounds.
- Management visual/verbal support of quality requirements, and improvement processes.

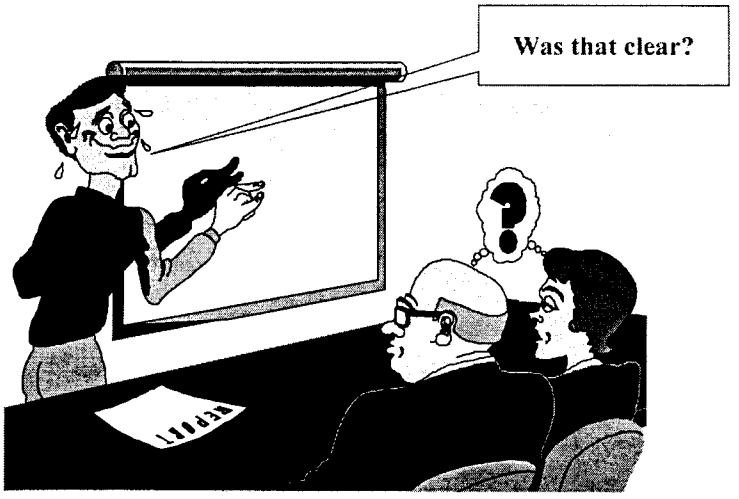
Lessons Learned

- Submit noted lessons learned per QP-3.2, Lessons Learned.
- Identify, document, and submit future lessons learned.
- Make lessons learned a work place culture.

Conclusions

- **The Past:** ***Noted lessons learned and corrective actions were not implemented as expected and/or required.***
- **The Present:** ***Noted nonconforming conditions are being address by management (e.g., corrective action document being prepared and implemented).***
- **The Future:** ***"Quality Improvement", An all day, everyday process!***

Questions



ER Project
Management Assessment Overview
for
Groundwater Investigations Focus Area

October 3, 2000

Andrew E. Gallegos
Quality Liaison

Management Assessment Topics

- Assessment Scope
- Assessment Results
- Corrective Actions
- Recurrence Prevention, and Lessons Learned
- Conclusions

Assessment Scope

- The Management Assessment focused on the ER Project Groundwater Investigations Focus Area's effectiveness in meeting the requirements of the ER Project Quality Management Plan, specifically drilling activities associated with Wells R-25 and CdV-R-15-3.

Management Assessment Results

ER Project
Quality Management Plan

1. Program
2. Personnel Training and Qualification
3. Quality Improvement
4. Documents and Records
5. Work Processes
6. Design
7. Procurement
8. Inspection and Acceptance Testing
9. Management Assessment
10. Independent Assessments

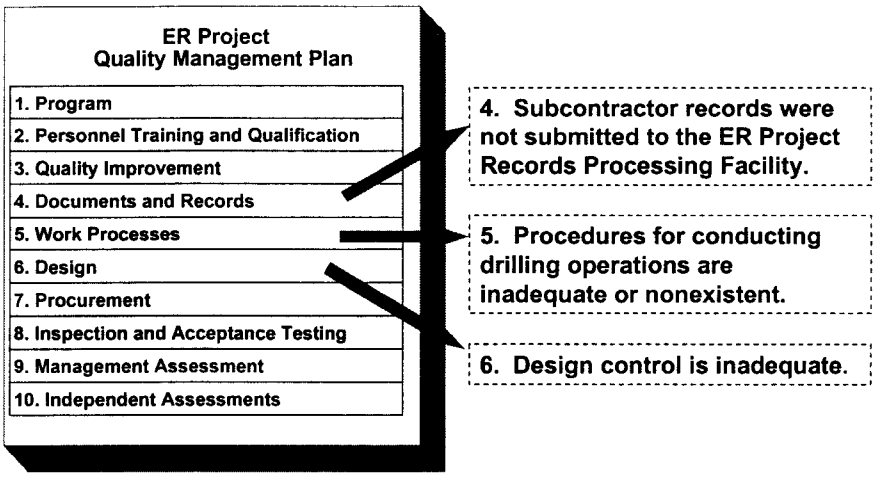
Management Assessment Results (cont'd)

ER Project
Quality Management Plan

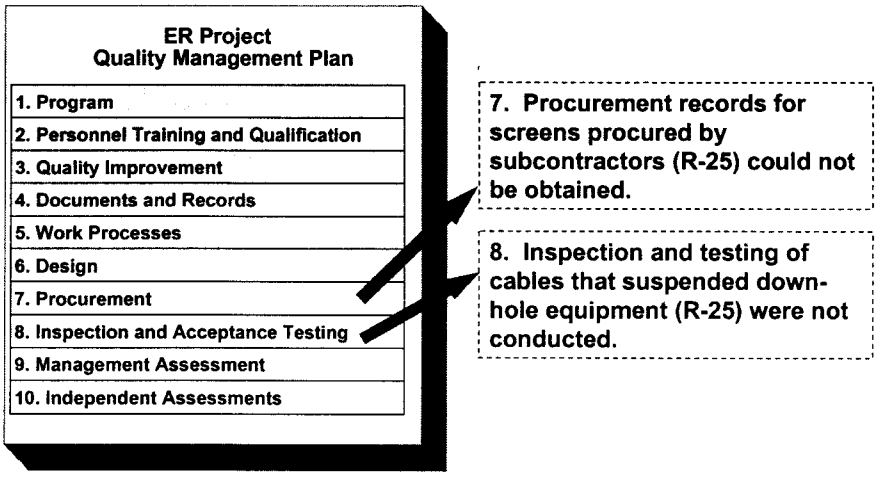
1. Program
2. Personnel Training and Qualification
3. Quality Improvement
4. Documents and Records
5. Work Processes
6. Design
7. Procurement
8. Inspection and Acceptance Testing
9. Management Assessment
10. Independent Assessments

1. Roles/responsibilities/ liabilities are not adequately addressed.
2. QA training documentation does not exist for any of the six primary UC management and staff overseeing drilling operations.
3. Documented "Lessons Learned" were not submitted in accordance with the Lessons Learned procedure.

Management Assessment Results (cont'd)



Management Assessment Results (cont'd)



Root Cause Analysis

- Weakness in program management and understanding of quality requirements as they apply to work being performed.

Corrective Actions

- Address all identified nonconforming conditions (e.g., root cause analysis, corrective action plan, tracking system).
- Expedite the development and implementation of the ER Project Training Program.
- Improve product quality by adherence to quality requirements.

Recurrence Prevention

- Identify, document and report nonconforming conditions.
- Conduct self-assessments of processes.
- Conduct Management Walk Arounds.
- Management visual/verbal support of quality requirements, and improvement processes.

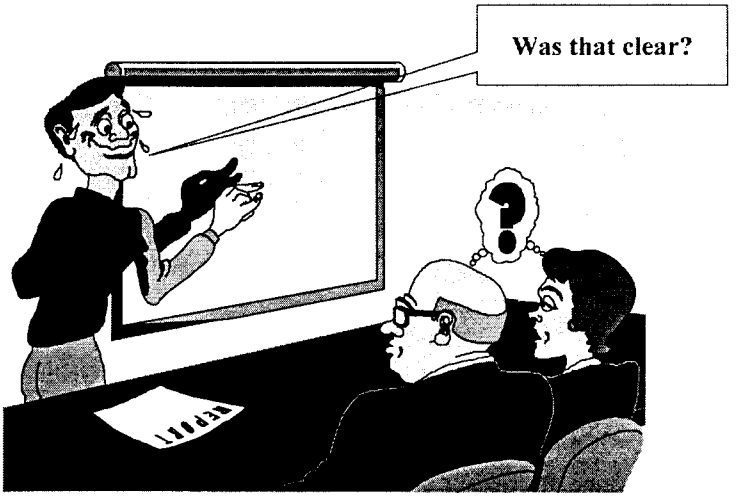
Lessons Learned

- Submit noted lessons learned per QP-3.2, Lessons Learned.
- Identify, document, and submit future lessons learned.
- Make lessons learned a work place culture.

Conclusions

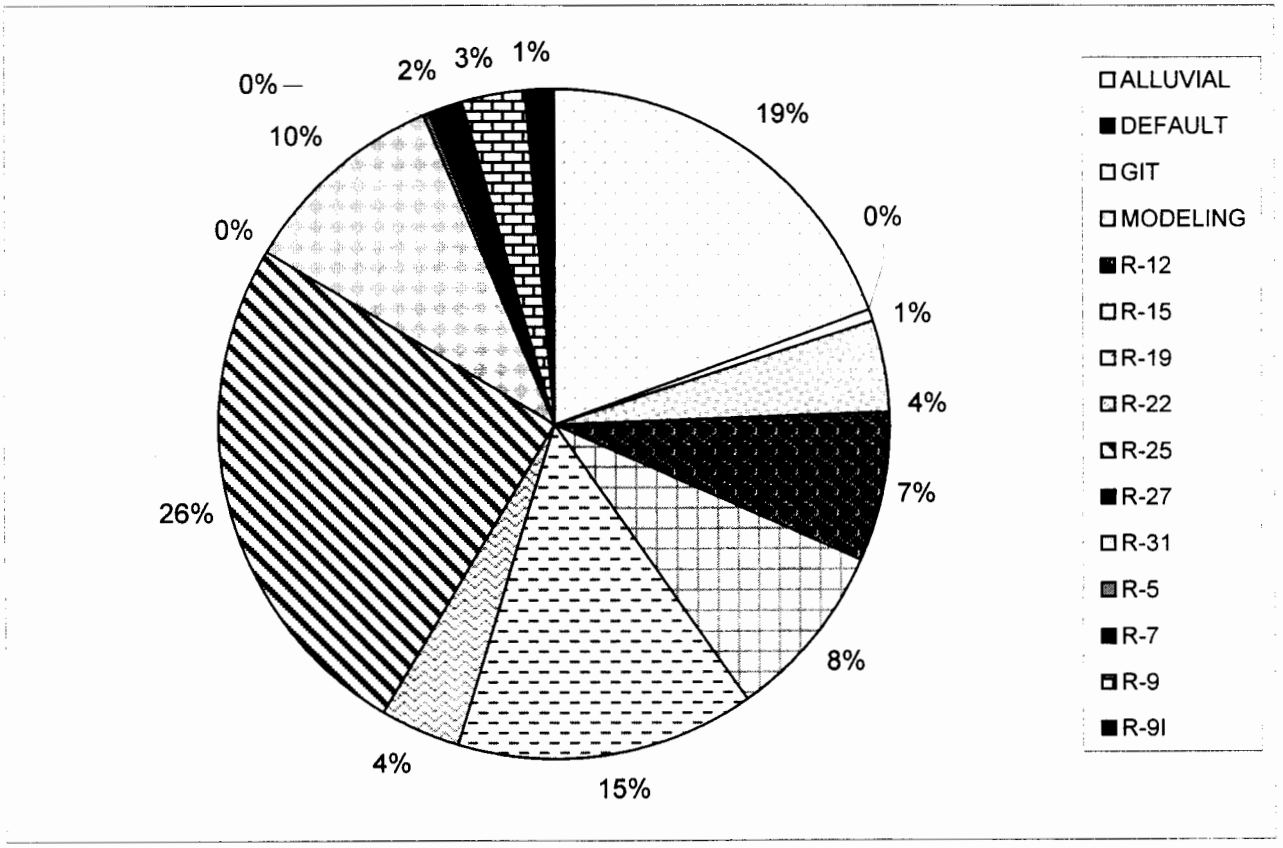
- **The Past:** ***Noted lessons learned and corrective actions were not implemented as expected and/or required.***
- **The Present:** ***Noted nonconforming conditions are being address by management (e.g., corrective action document being prepared and implemented).***
- **The Future:** ***"Quality Improvement", An all day, everyday process!***

Questions



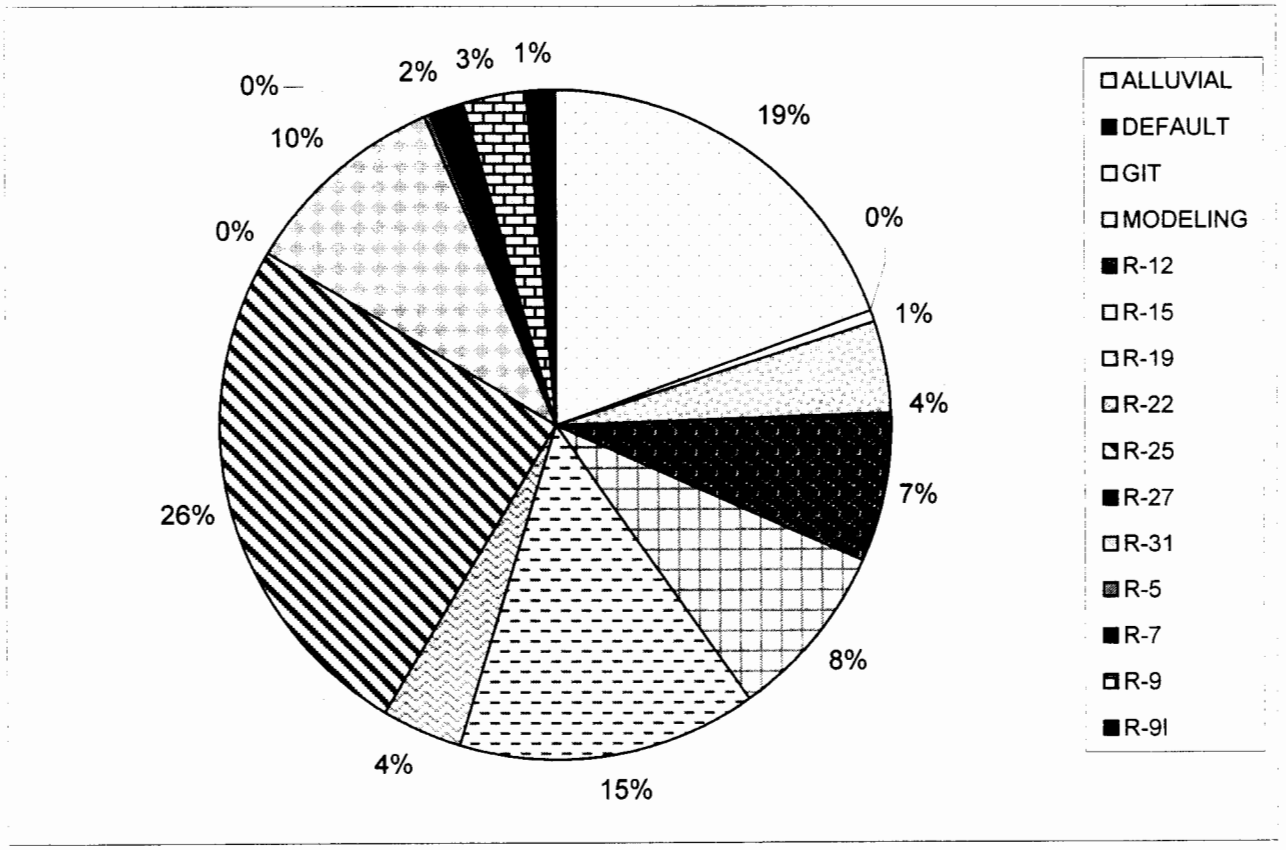
TOTAL COST OF PROGRAM - FY 97-00

FY COST	FY			
WELL/ACTIVITY	FY 97/98	FY 99	FY 00	Grand Total
ALLUVIAL	3,231,000	372,747		3,603,747
DEFAULT	8,185	(3,931)	(17,113)	(12,858)
GIT	38,825	26,507	37,240	102,573
MODELING	254,923	268,017	314,072	837,012
R-12		234,659	1,129,031	1,363,690
R-15	21,000	1,141,431	415,926	1,578,357
R-19			2,717,391	2,717,391
R-22			724,535	724,535
R-25	1,181,907	2,879,351	587,212	4,648,469
R-27			12,672	12,672
R-31		119,612	1,766,118	1,885,730
R-5		3,635	21,809	25,444
R-7			331,139	331,139
R-9		85,033	455,692	540,725
R-9I			277,683	277,683
Grand Total	4,735,840	5,127,062	8,773,408	18,636,309



TOTAL COST OF PROGRAM - FY 97-00

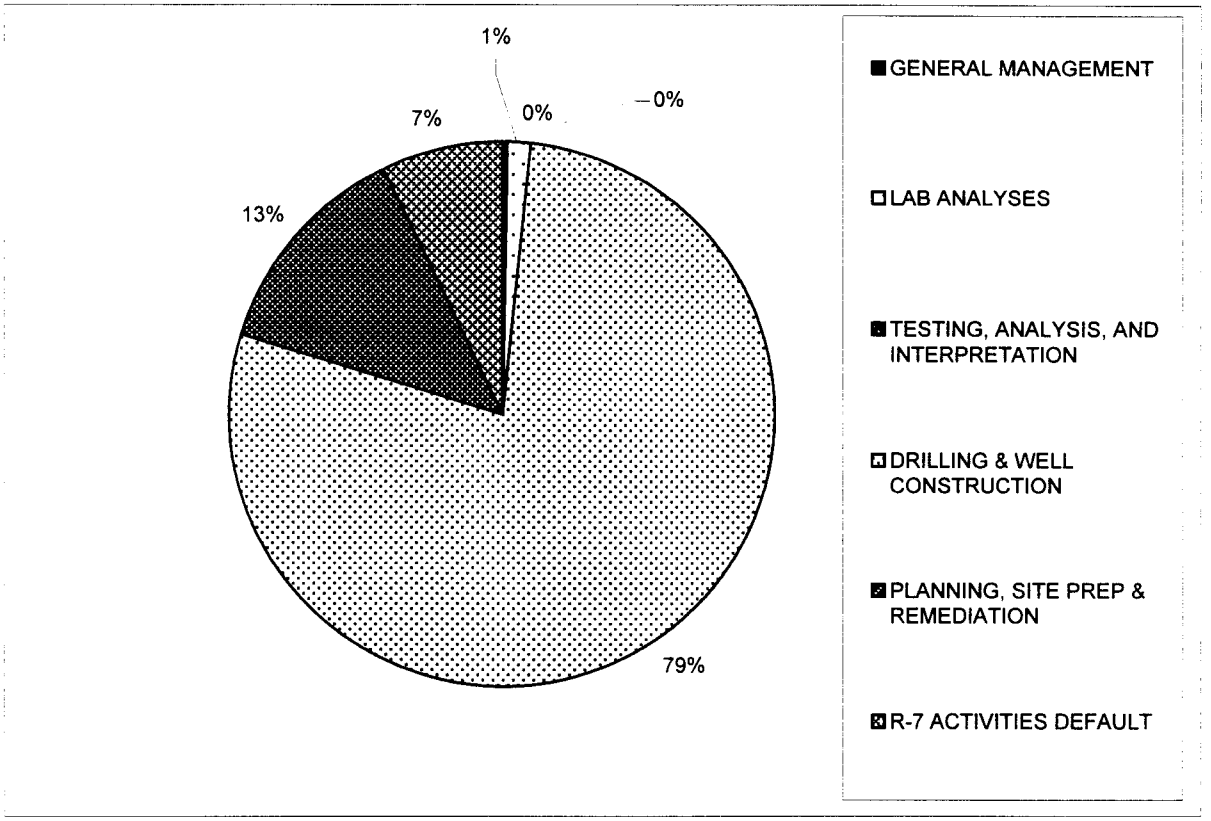
FY COST	FY			
WELL/ACTIVITY	FY 97/98	FY 99	FY 00	Grand Total
ALLUVIAL	3,231,000	372,747		3,603,747
DEFAULT	8,185	(3,931)	(17,113)	(12,858)
GIT	38,825	26,507	37,240	102,573
MODELING	254,923	268,017	314,072	837,012
R-12		234,659	1,129,031	1,363,690
R-15	21,000	1,141,431	415,926	1,578,357
R-19			2,717,391	2,717,391
R-22			724,535	724,535
R-25	1,181,907	2,879,351	587,212	4,648,469
R-27			12,672	12,672
R-31		119,612	1,766,118	1,885,730
R-5		3,635	21,809	25,444
R-7			331,139	331,139
R-9		85,033	455,692	540,725
R-9I			277,683	277,683
Grand Total	4,735,840	5,127,062	8,773,408	18,636,309



FY 00 R-7

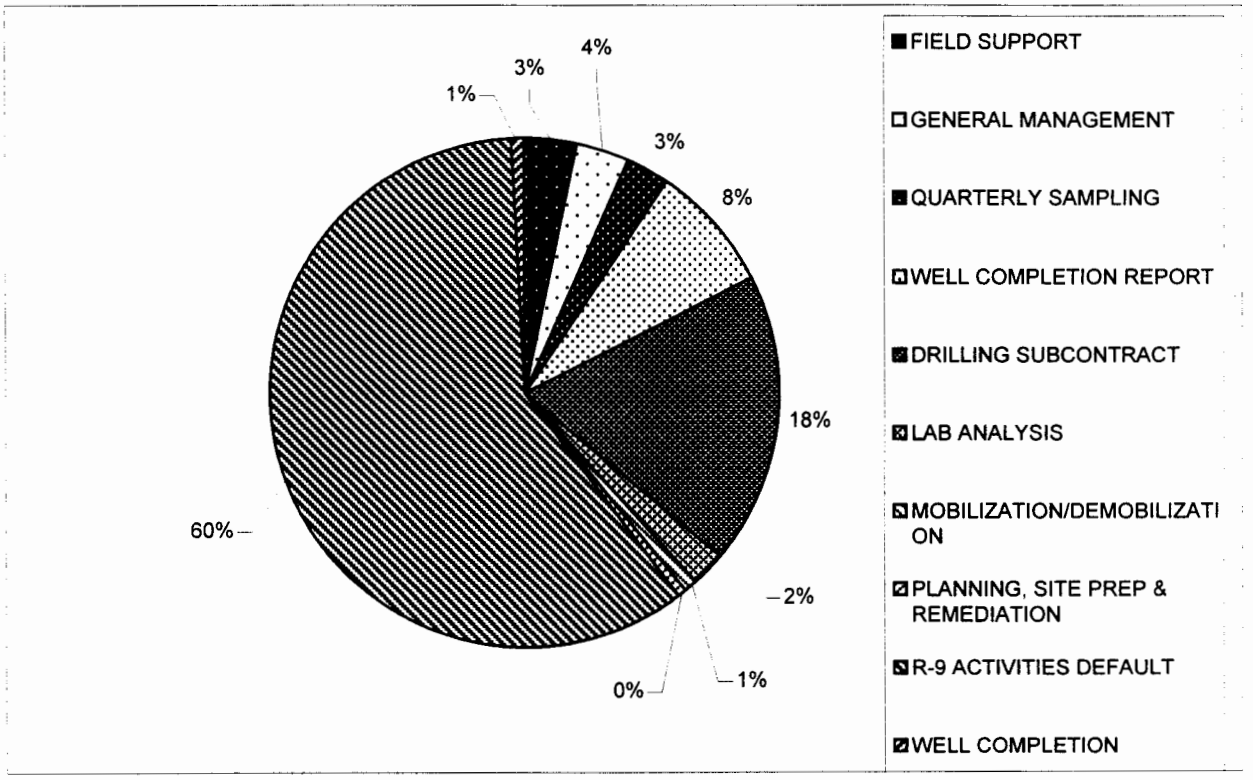
COSTS BY ACTIVITY

GENERAL MANAGEMENT	880
LAB ANALYSES	4,191
TESTING, ANALYSIS. AND INTERPRETATION	585
DRILLING & WELL CONSTRUCTION	258,662
PLANNING, SITE PREP & REMEDIATION	42,816
R-7 ACTIVITIES DEFAULT	24,005
Grand Total	331,139



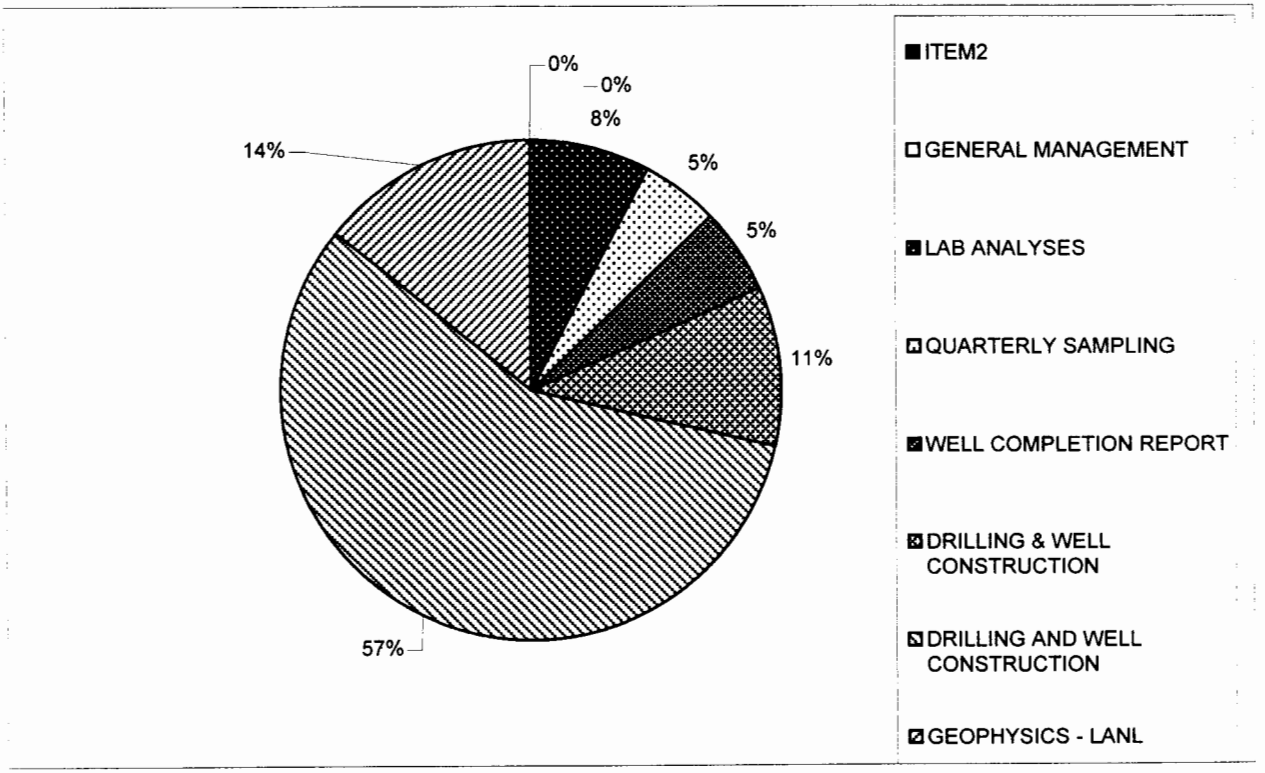
FY 00 R-9
COSTS BY ACTIVITY

FIELD SUPPORT	15,000
GENERAL MANAGEMENT	16,488
QUARTERLY SAMPLING	11,716
WELL COMPLETION REPORT	38,372
DRILLING SUBCONTRACT	85,328
LAB ANALYSIS	11,339
MOBILIZATION/DEMOBILIZATION	(4,005)
PLANNING, SITE PREP & REMEDIATION	1,419
R-9 ACTIVITIES DEFAULT	276,636
WELL COMPLETION	3,399
Grand Total	455,692



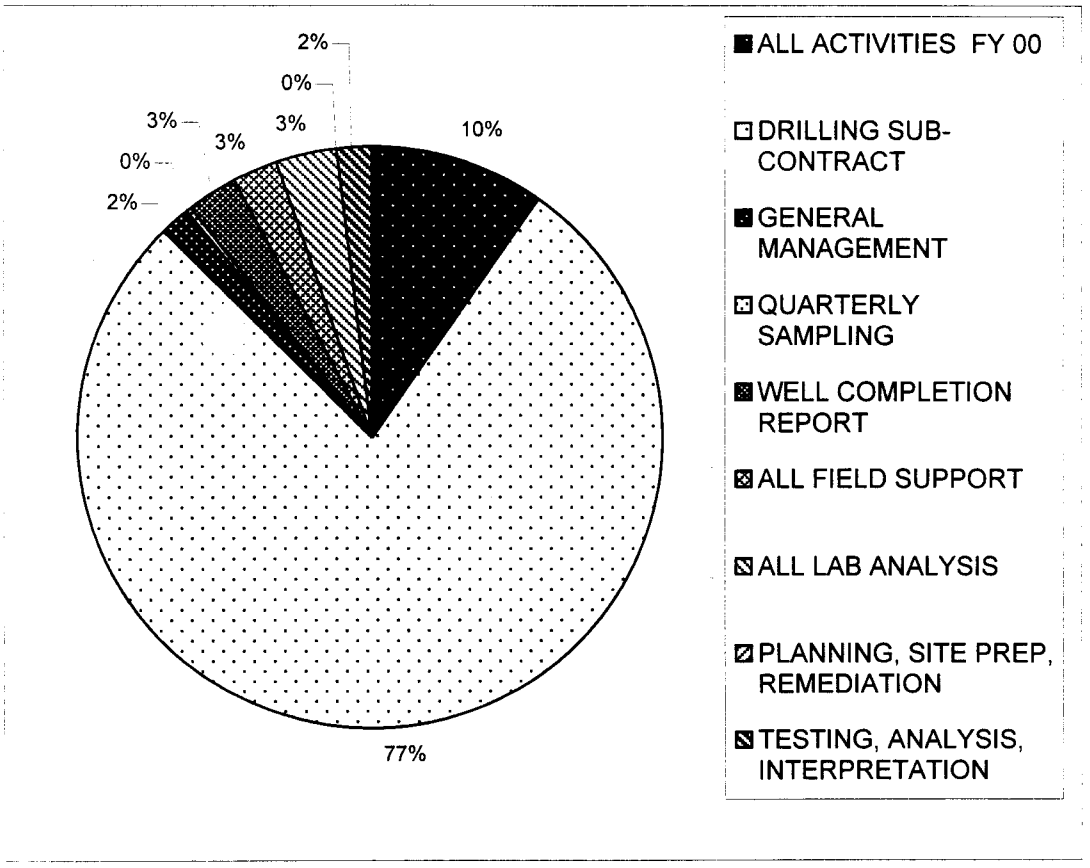
FY 00 R-9i
COSTS BY ACTIVITY

GENERAL MANAGEMENT	0
LAB ANALYSES	17,835
QUARTERLY SAMPLING	10,971
WELL COMPLETION REPORT	12,284
DRILLING & WELL CONSTRUCTION	23,720
DRILLING AND WELL CONSTRUCTION	128,666
GEOPHYSICS - LANL	32,098
PLANNING, SITE PREP & REMEDIATION	41,585
TESTING, ANALYSIS & INTERPRETATION	10,523
Grand Total	277,683



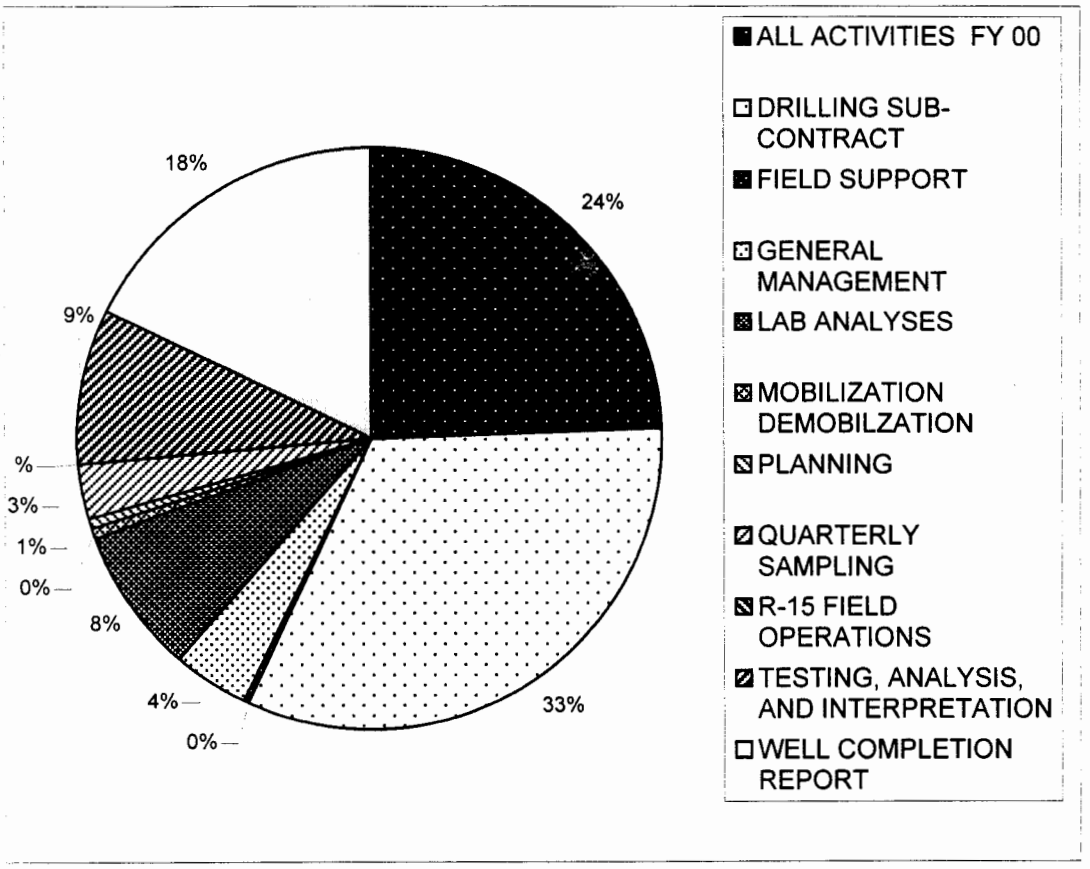
FY 00 R-12 COSTS BY ACTIVITY

ALL ACTIVITIES FY 00	108,934
DRILLING SUB-CONTRACT	879,839
GENERAL MANAGEMENT	17,787
QUARTERLY SAMPLING	3,065
WELL COMPLETION REPORT	32,022
ALL FIELD SUPPORT	28,791
ALL LAB ANALYSIS	35,633
PLANNING, SITE PREP, REMEDIATION	1,090
TESTING, ANALYSIS, INTERPRETATION	21,870
Grand Total	1,129,031



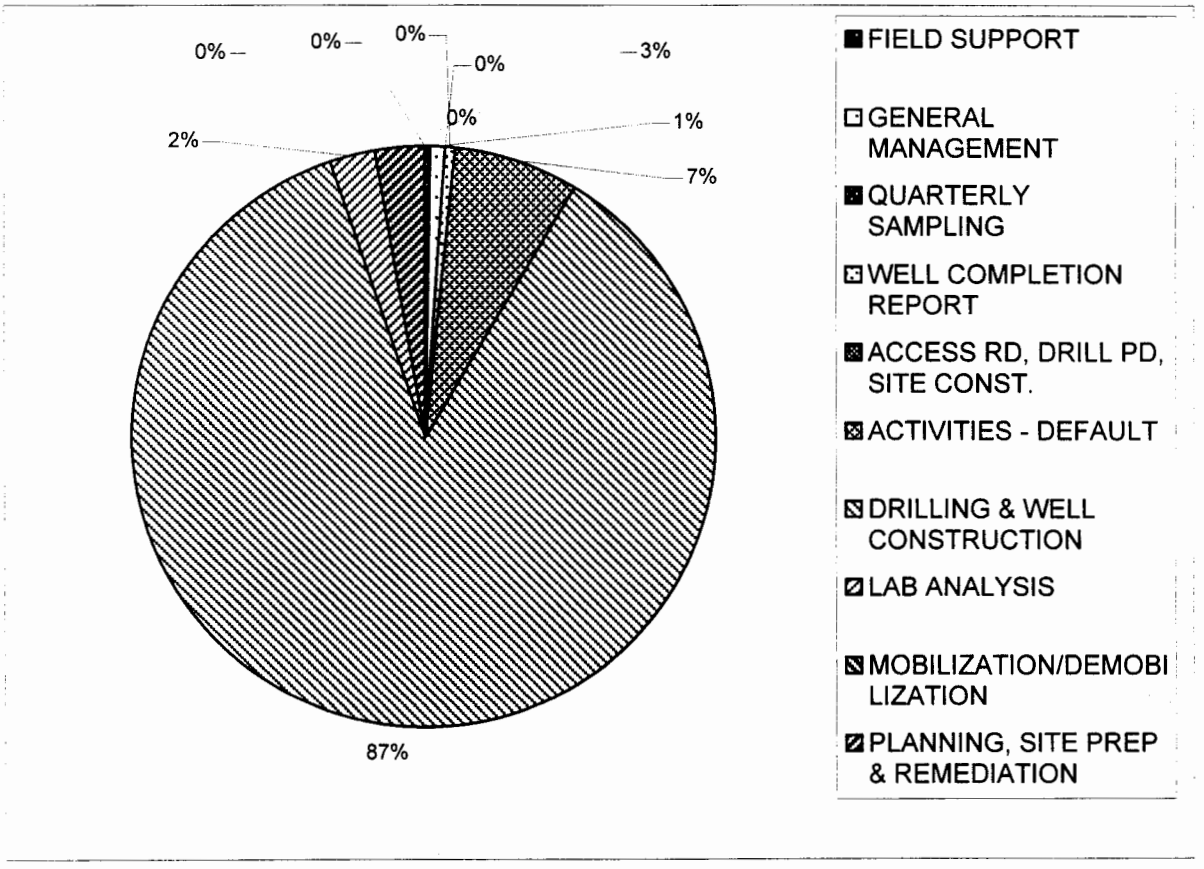
FY 00 R-15 COSTS BY ACTIVITY

ALL ACTIVITIES FY 00	101,796
DRILLING SUB-CONTRACT	134,514
FIELD SUPPORT	1,859
GENERAL MANAGEMENT	16,885
LAB ANALYSES	34,325
MOBILIZATION DEMOBILZATION	1,585
PLANNING	2,327
QUARTERLY SAMPLING	13,204
R-15 FIELD OPERATIONS	3
TESTING, ANALYSIS, AND INTERPRETATION	35,745
WELL COMPLETION REPORT	73,682
Grand Total	415,926



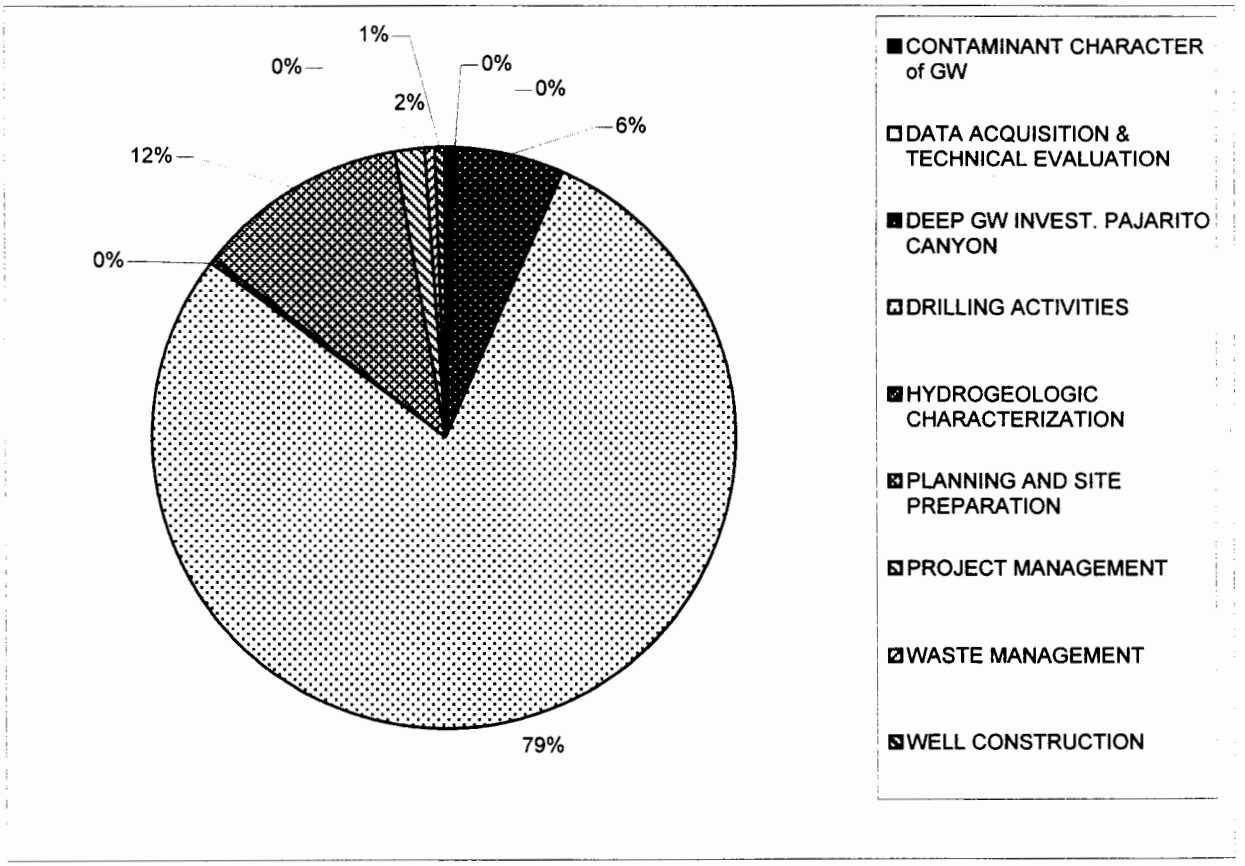
FY 00 R-19 COSTS BY ACTIVITY

FIELD SUPPORT	8,171
GENERAL MANAGEMENT	22,813
QUARTERLY SAMPLING	469
WELL COMPLETION REPORT	9,486
ACCESS RD, DRILL PD, SITE CONST.	99
ACTIVITIES - DEFAULT	184,459
DRILLING & WELL CONSTRUCTION	2,291,882
LAB ANALYSIS	63,367
MOBILIZATION/DEMOBILIZATION	0
PLANNING, SITE PREP & REMEDIATION	76,625
TESTING, ANALYSIS AND INTERPRETATION	60,021
Grand Total	2,717,391



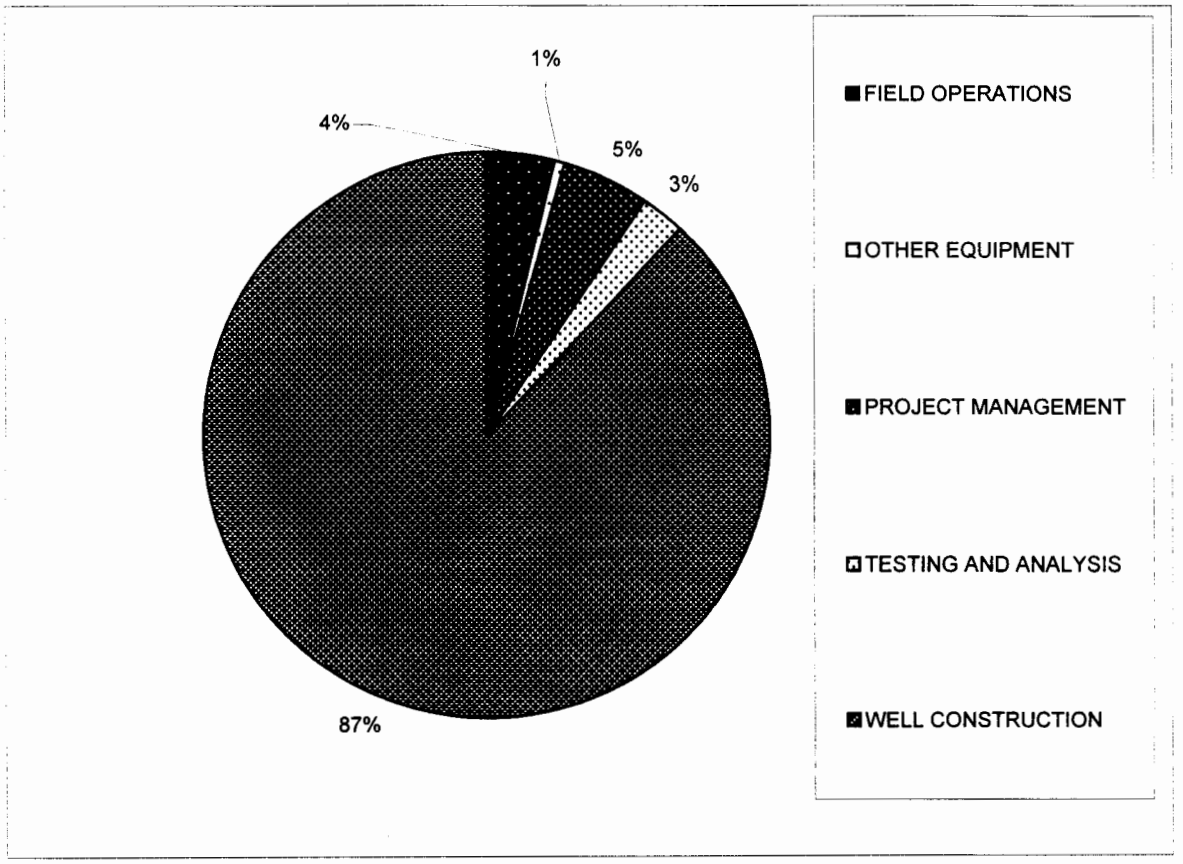
FY 00 R-22 COSTS BY ACTIVITY

CONTAMINANT CHARACTER of GW	3,096
DATA ACQUISITION & TECHNICAL EVALUATION	1,663
DEEP GW INVEST. PAJARITO CANYON	43,620
DRILLING ACTIVITIES	570,201
HYDROGEOLOGIC CHARACTERIZATION	1,586
PLANNING AND SITE PREPARATION	85,039
PROJECT MANAGEMENT	12,046
WASTE MANAGEMENT	2,465
WELL CONSTRUCTION	4,821
Grand Total	724,535



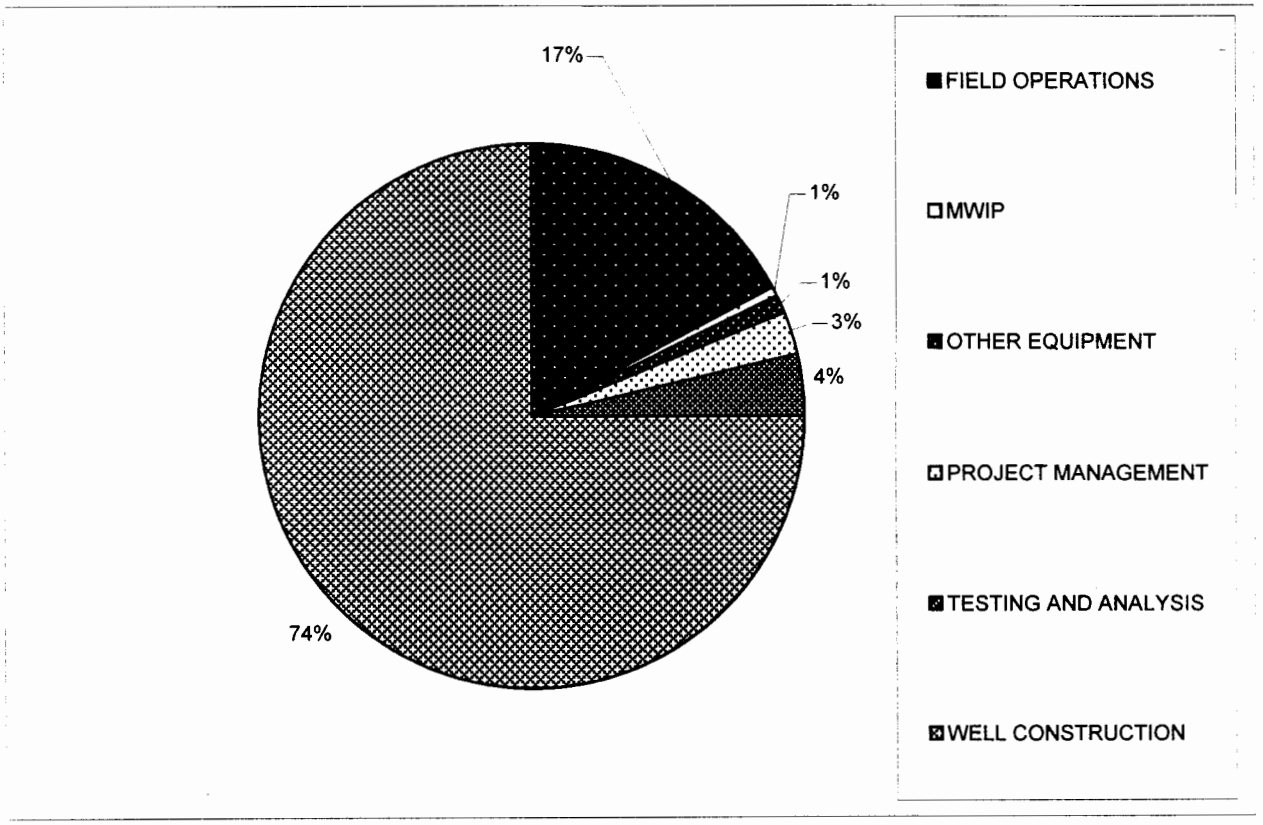
FY 00 R-25
COSTS BY ACTIVITY

FIELD OPERATIONS	22,175
OTHER EQUIPMENT	4,615
PROJECT MANAGEMENT	28,762
TESTING AND ANALYSIS	15,349
WELL CONSTRUCTION	516,311
Grand Total	587,212



FY 00 R-31
COSTS BY ACTIVITY

FIELD OPERATIONS	303,643
MWIP	9,115
OTHER EQUIPMENT	18,638
PROJECT MANAGEMENT	46,336
TESTING AND ANALYSIS	61,845
WELL CONSTRUCTION	1,326,542
Grand Total	1,766,118

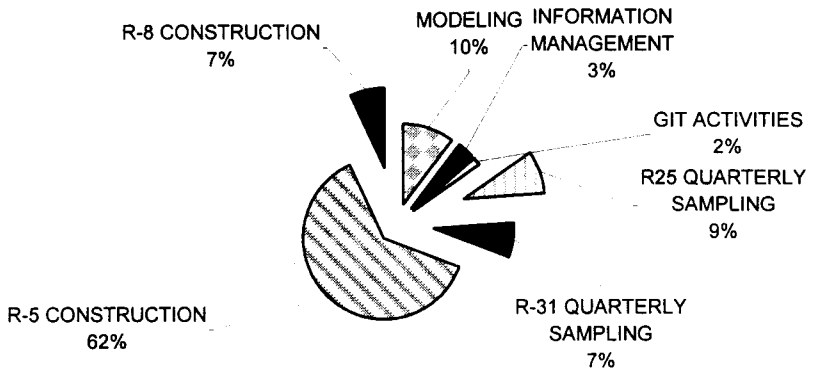


FY 01 BUDGET FOR DP FUNDED WELLS

DP FUNDING

MODELING	300
INFORMATION MANAGEMENT	100
GIT ACTIVITIES	50
WELLS:	
R25 QUARTERLY SAMPLING	250
R-31 QUARTERLY SAMPLING	200
R-5 CONSTRUCTION	1,819
R-8 CONSTRUCTION	200
TOTAL FY 01 BUDGET	2,919

DP FUNDS BUDGET DISTRIBUTION

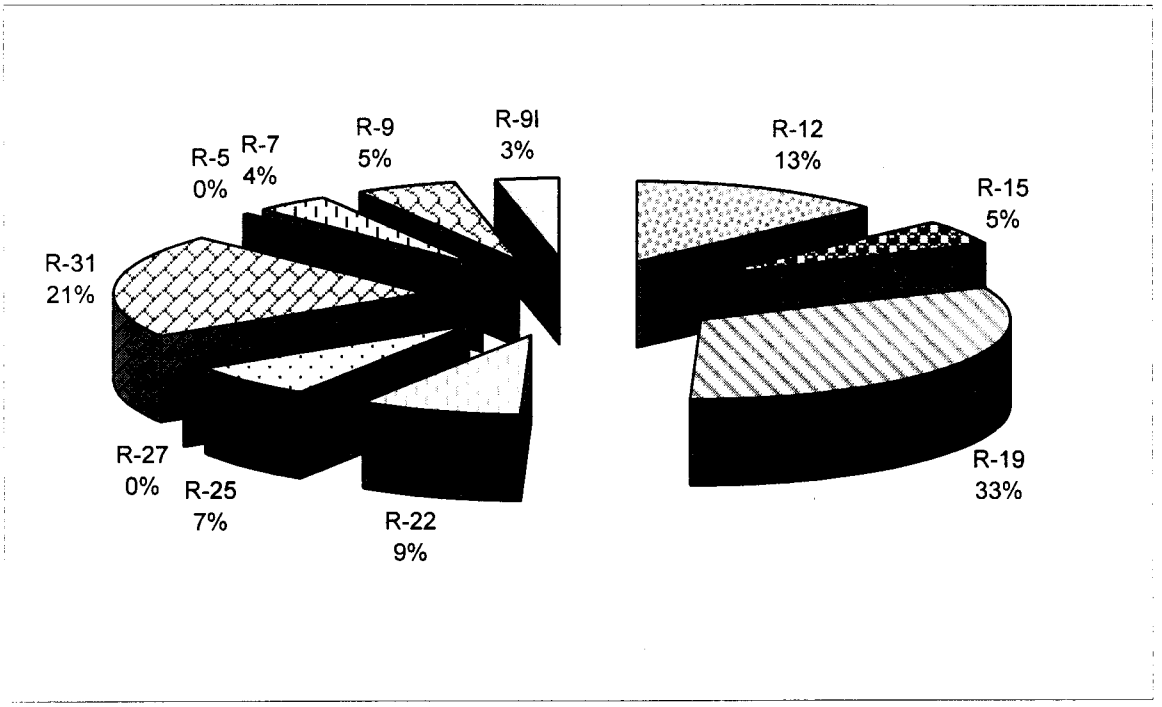


OTHER GIT FUNDING

ESH-18	120
ESH-D0	100
ER	75
TOTAL	295

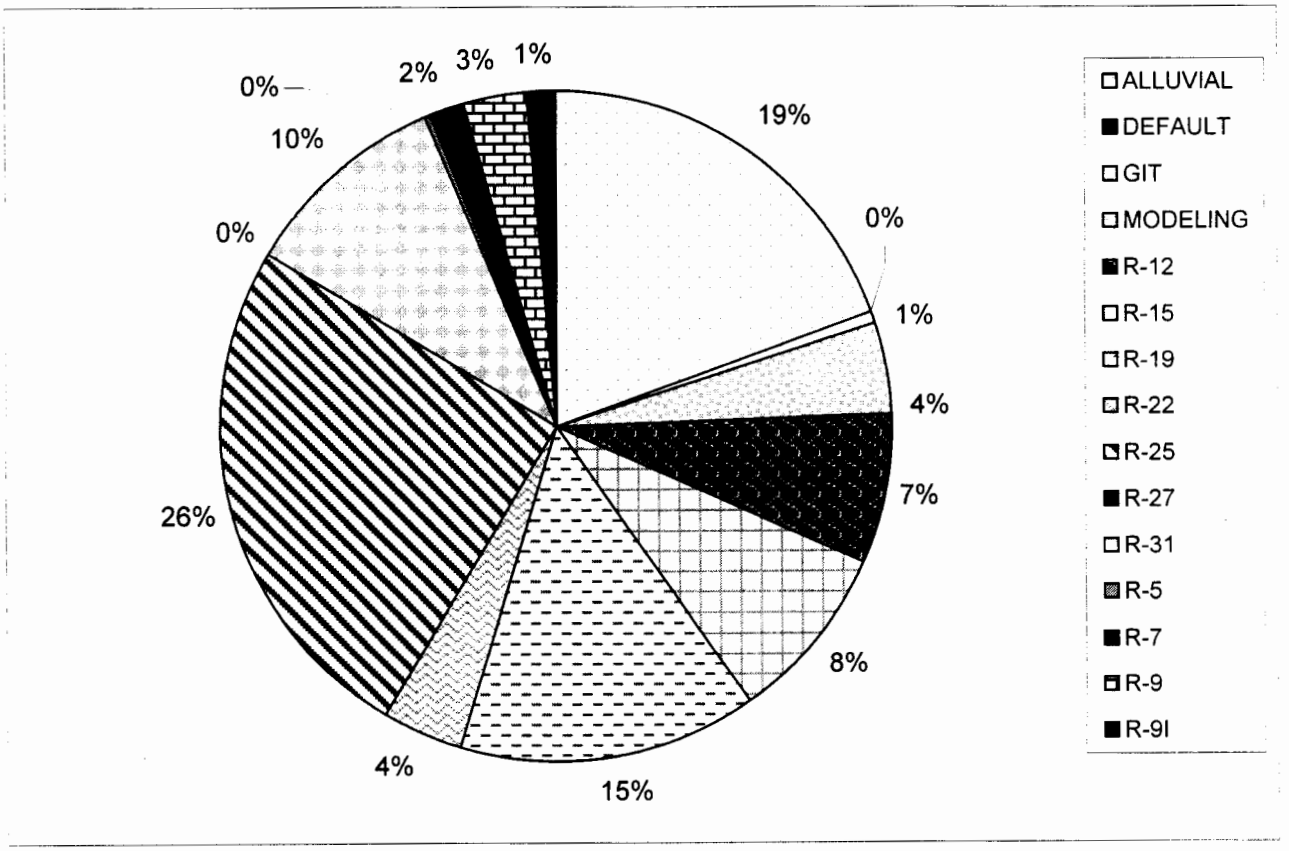
FY 00 DP and ER FUNDED WELLS COSTS

WELL	COST
R-12	1,129,031
R-15	415,926
R-19	2,717,391
R-22	724,535
R-25	587,212
R-27	12,672
R-31	1,766,118
R-5	21,809
R-7	331,139
R-9	455,692
R-9I	277,683
TOTAL	8,439,208



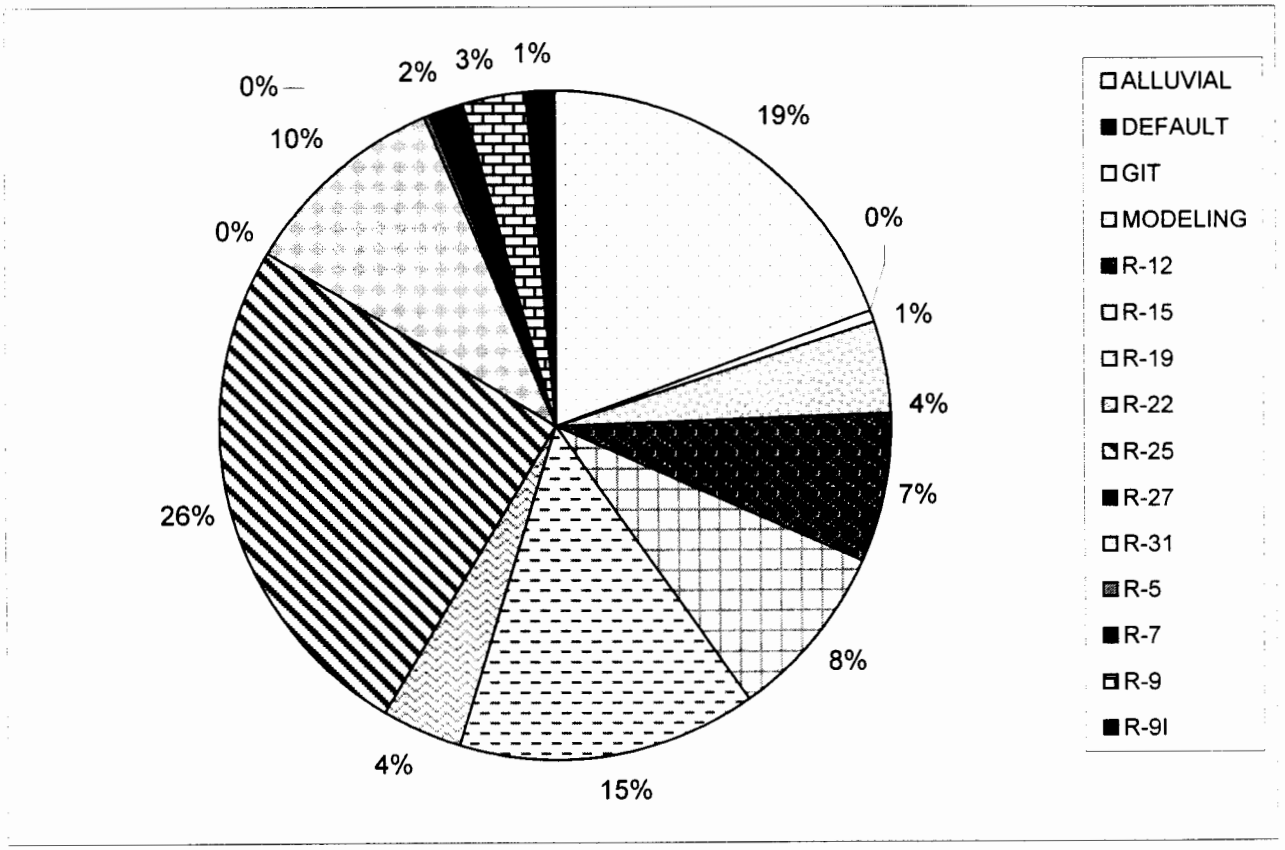
TOTAL COST OF PROGRAM - FY 97-00

FY COST	FY			
WELL/ACTIVITY	FY 97/98	FY 99	FY 00	Grand Total
ALLUVIAL	3,231,000	372,747		3,603,747
DEFAULT	8,185	(3,931)	(17,113)	(12,858)
GIT	38,825	26,507	37,240	102,573
MODELING	254,923	268,017	314,072	837,012
R-12		234,659	1,129,031	1,363,690
R-15	21,000	1,141,431	415,926	1,578,357
R-19			2,717,391	2,717,391
R-22			724,535	724,535
R-25	1,181,907	2,879,351	587,212	4,648,469
R-27			12,672	12,672
R-31		119,612	1,766,118	1,885,730
R-5		3,635	21,809	25,444
R-7			331,139	331,139
R-9		85,033	455,692	540,725
R-9I			277,683	277,683
Grand Total	4,735,840	5,127,062	8,773,408	18,636,309



TOTAL COST OF PROGRAM - FY 97-00

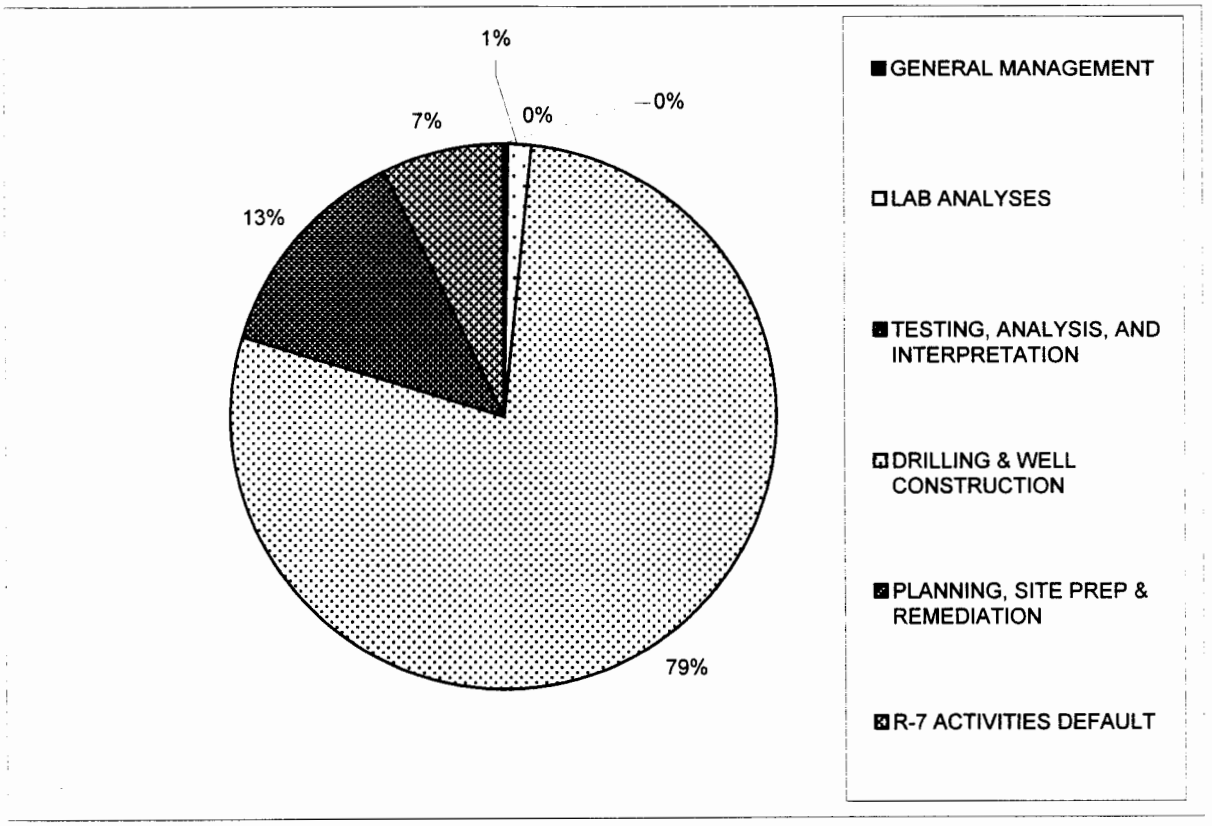
FY COST	FY			
WELL/ACTIVITY	FY 97/98	FY 99	FY 00	Grand Total
ALLUVIAL	3,231,000	372,747		3,603,747
DEFAULT	8,185	(3,931)	(17,113)	(12,858)
GIT	38,825	26,507	37,240	102,573
MODELING	254,923	268,017	314,072	837,012
R-12		234,659	1,129,031	1,363,690
R-15	21,000	1,141,431	415,926	1,578,357
R-19			2,717,391	2,717,391
R-22			724,535	724,535
R-25	1,181,907	2,879,351	587,212	4,648,469
R-27			12,672	12,672
R-31		119,612	1,766,118	1,885,730
R-5		3,635	21,809	25,444
R-7			331,139	331,139
R-9		85,033	455,692	540,725
R-9I			277,683	277,683
Grand Total	4,735,840	5,127,062	8,773,408	18,636,309



FY 00 R-7

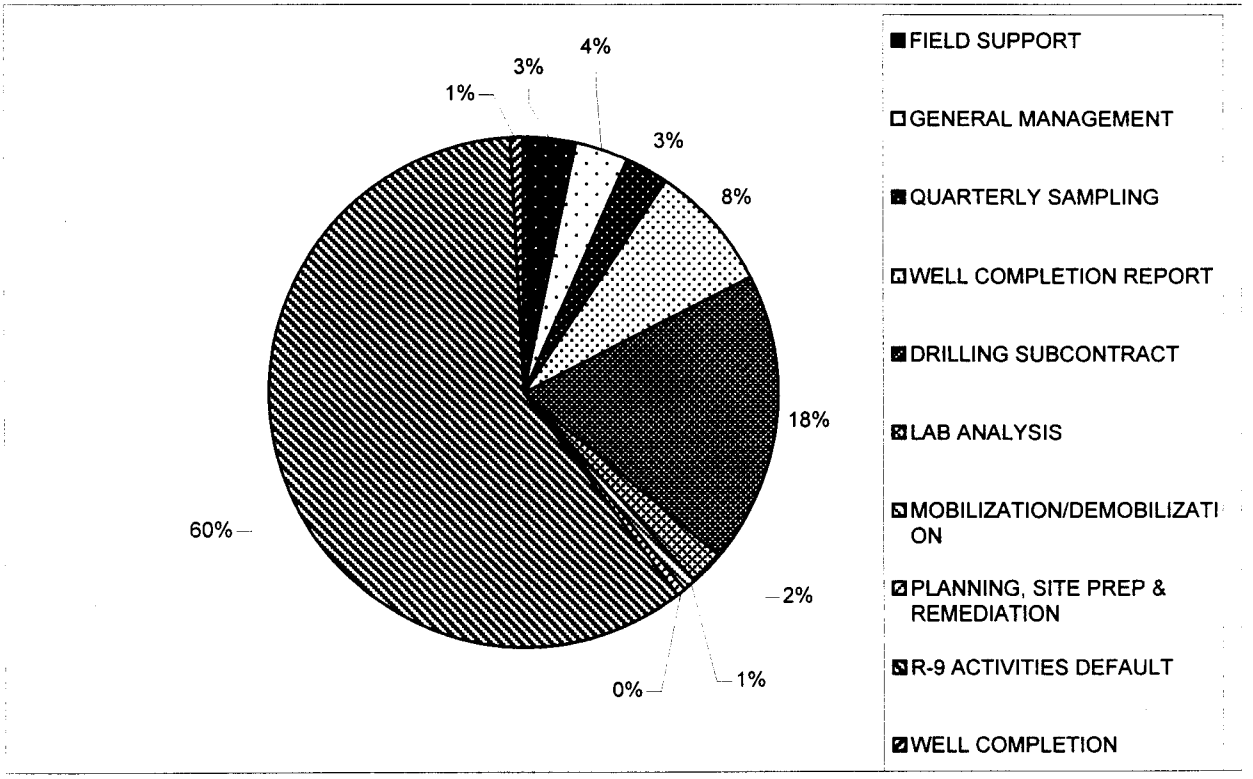
COSTS BY ACTIVITY

GENERAL MANAGEMENT	880
LAB ANALYSES	4,191
TESTING, ANALYSIS, AND INTERPRETATION	585
DRILLING & WELL CONSTRUCTION	258,662
PLANNING, SITE PREP & REMEDIATION	42,816
R-7 ACTIVITIES DEFAULT	24,005
Grand Total	331,139



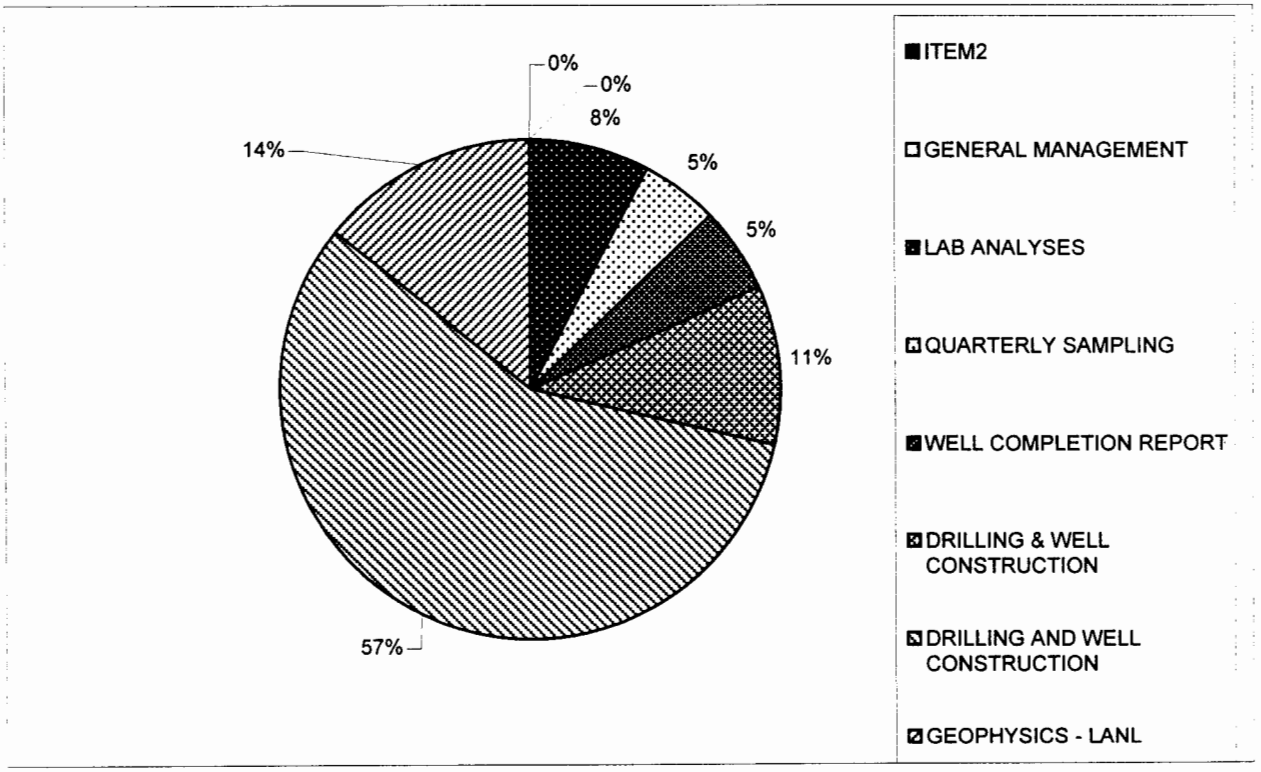
FY 00 R-9
COSTS BY ACTIVITY

FIELD SUPPORT	15,000
GENERAL MANAGEMENT	16,488
QUARTERLY SAMPLING	11,716
WELL COMPLETION REPORT	38,372
DRILLING SUBCONTRACT	85,328
LAB ANALYSIS	11,339
MOBILIZATION/DEMOBILIZATION	(4,005)
PLANNING, SITE PREP & REMEDIATION	1,419
R-9 ACTIVITIES DEFAULT	276,636
WELL COMPLETION	3,399
Grand Total	455,692



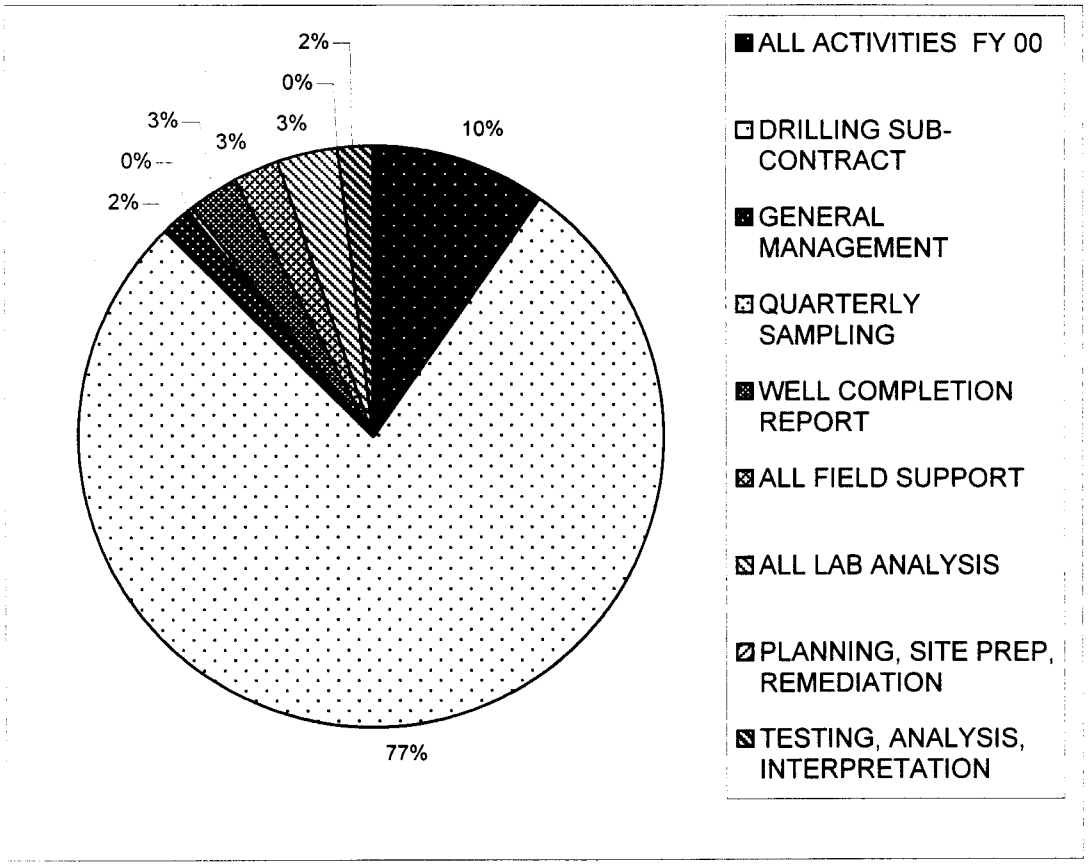
FY 00 R-9i
COSTS BY ACTIVITY

GENERAL MANAGEMENT	0
LAB ANALYSES	17,835
QUARTERLY SAMPLING	10,971
WELL COMPLETION REPORT	12,284
DRILLING & WELL CONSTRUCTION	23,720
DRILLING AND WELL CONSTRUCTION	128,666
GEOPHYSICS - LANL	32,098
PLANNING, SITE PREP & REMEDIATION	41,585
TESTING, ANALYSIS & INTERPRETATION	10,523
Grand Total	277,683



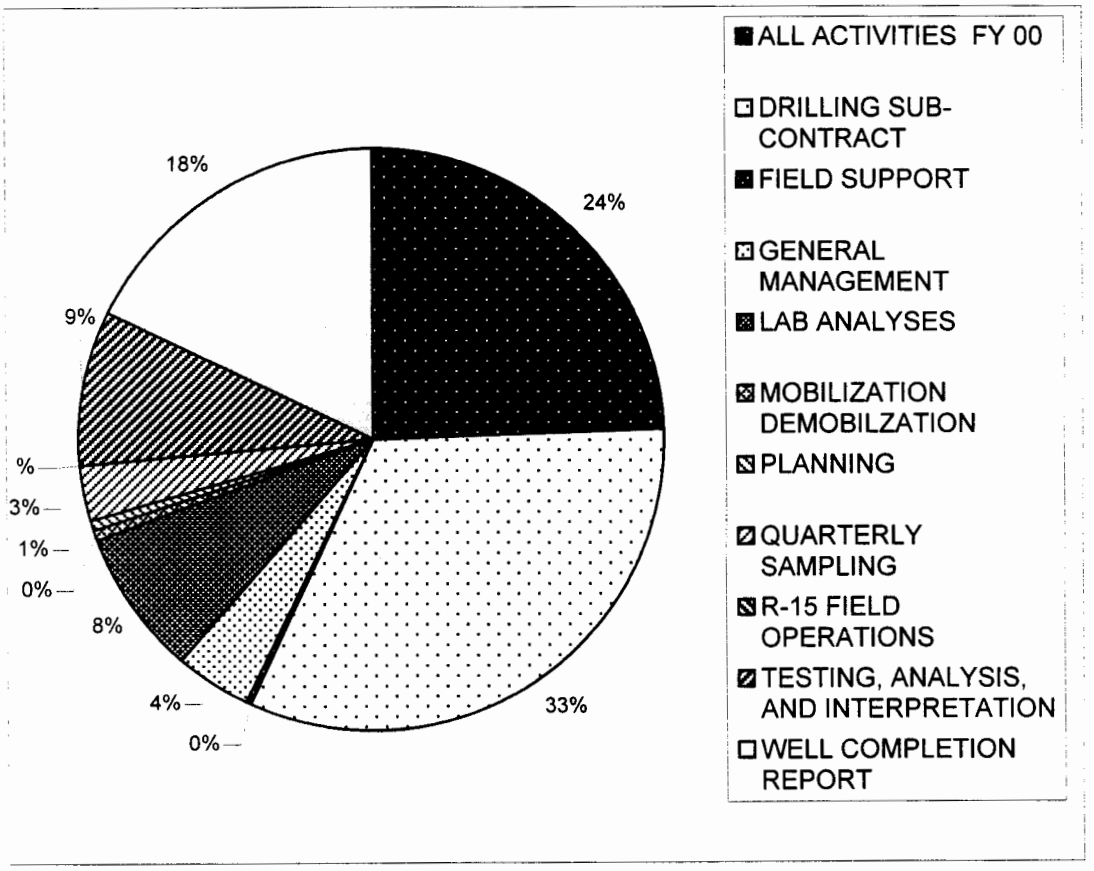
FY 00 R-12 COSTS BY ACTIVITY

ALL ACTIVITIES FY 00	108,934
DRILLING SUB-CONTRACT	879,839
GENERAL MANAGEMENT	17,787
QUARTERLY SAMPLING	3,065
WELL COMPLETION REPORT	32,022
ALL FIELD SUPPORT	28,791
ALL LAB ANALYSIS	35,633
PLANNING, SITE PREP, REMEDIATION	1,090
TESTING, ANALYSIS, INTERPRETATION	21,870
Grand Total	1,129,031



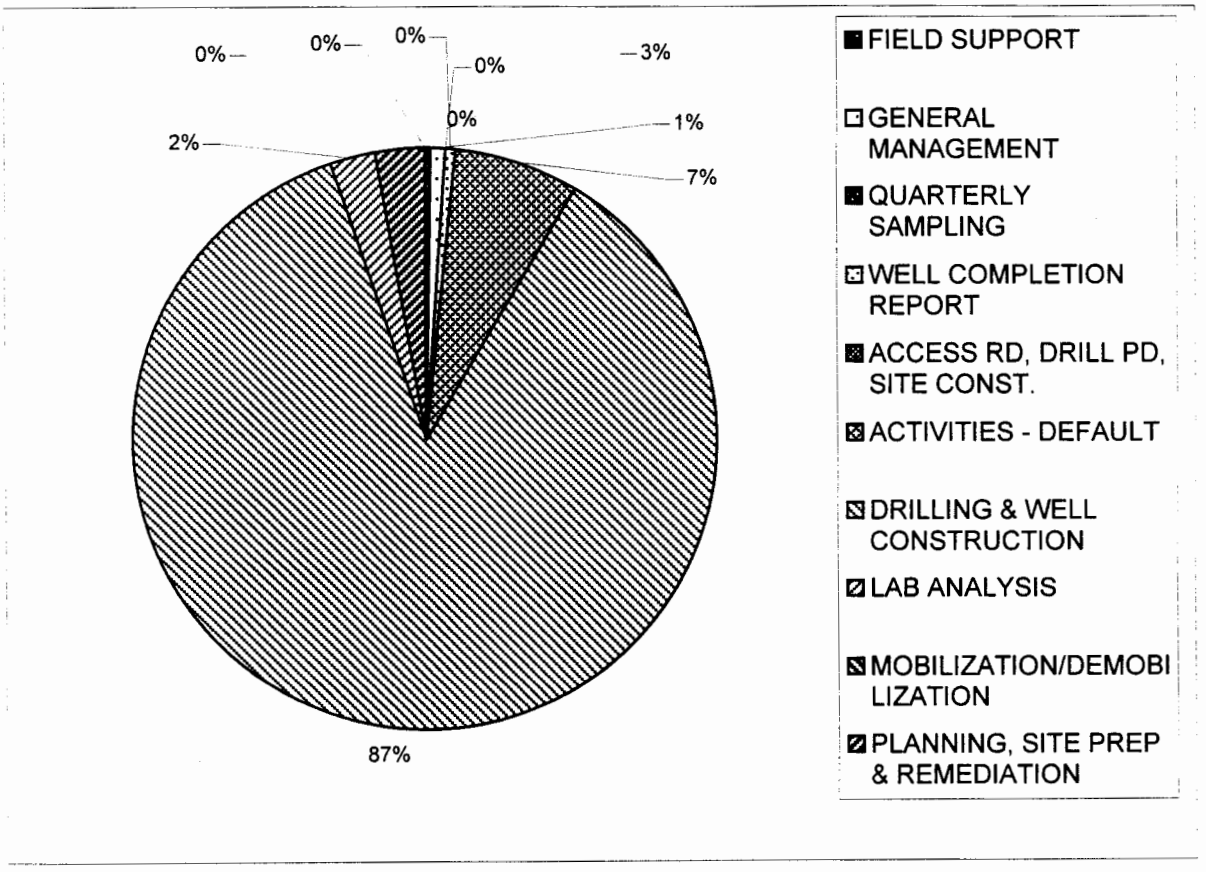
FY 00 R-15 COSTS BY ACTIVITY

ALL ACTIVITIES FY 00	101,796
DRILLING SUB-CONTRACT	134,514
FIELD SUPPORT	1,859
GENERAL MANAGEMENT	16,885
LAB ANALYSES	34,325
MOBILIZATION DEMOBILZATION	1,585
PLANNING	2,327
QUARTERLY SAMPLING	13,204
R-15 FIELD OPERATIONS	3
TESTING, ANALYSIS, AND INTERPRETATION	35,745
WELL COMPLETION REPORT	73,682
Grand Total	415,926



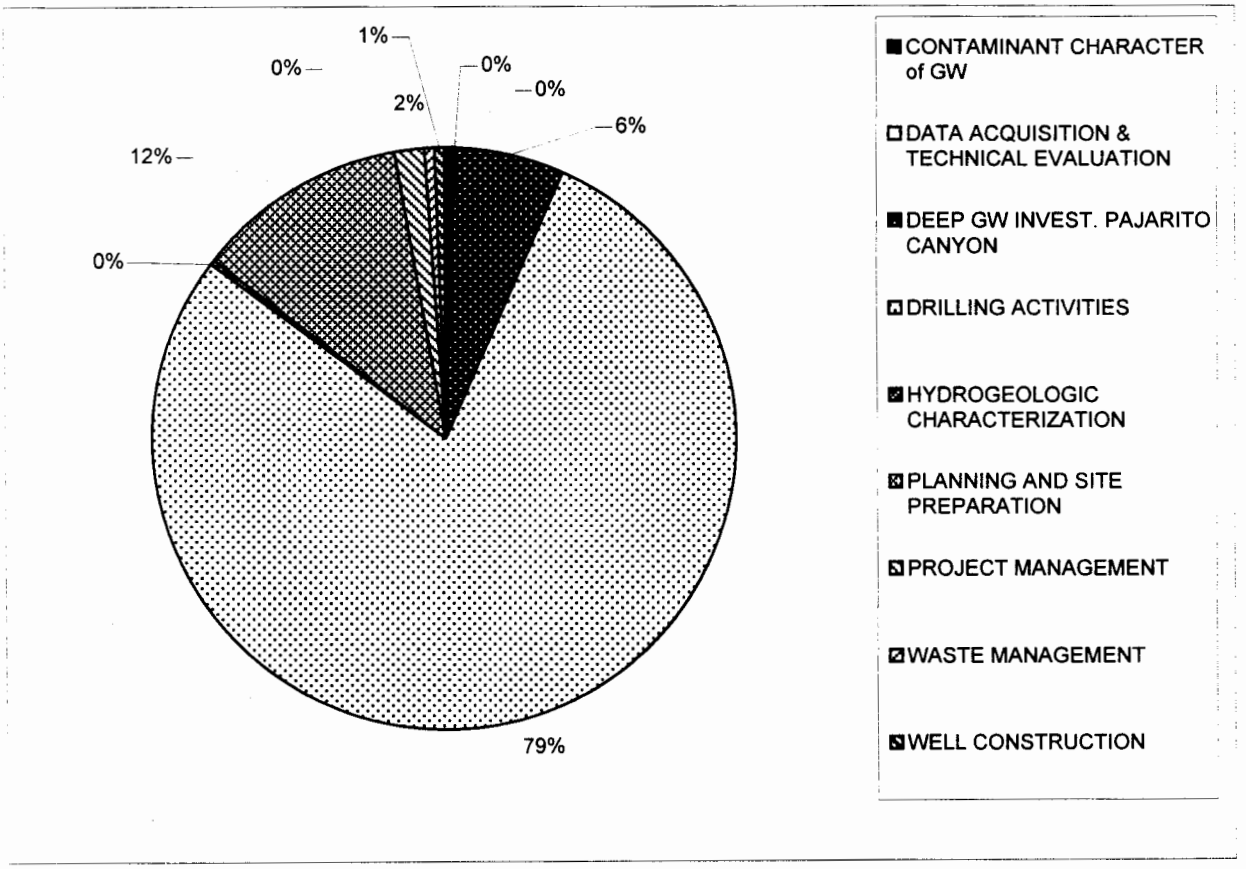
FY 00 R-19 COSTS BY ACTIVITY

FIELD SUPPORT	8,171
GENERAL MANAGEMENT	22,813
QUARTERLY SAMPLING	469
WELL COMPLETION REPORT	9,486
ACCESS RD, DRILL PD, SITE CONST.	99
ACTIVITIES - DEFAULT	184,459
DRILLING & WELL CONSTRUCTION	2,291,882
LAB ANALYSIS	63,367
MOBILIZATION/DEMOBILIZATION	0
PLANNING, SITE PREP & REMEDIATION	76,625
TESTING, ANALYSIS AND INTERPRETATION	60,021
Grand Total	2,717,391



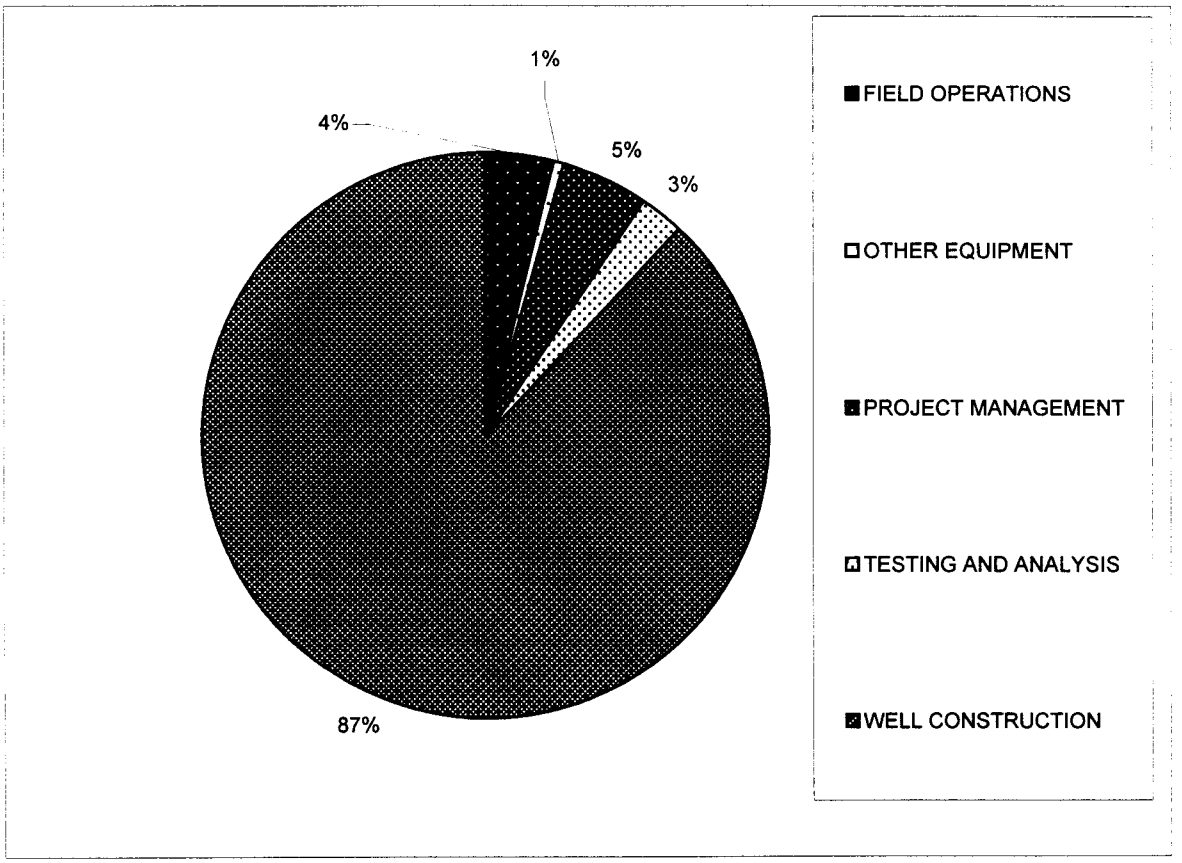
FY 00 R-22 COSTS BY ACTIVITY

CONTAMINANT CHARACTER of GW	3,096
DATA ACQUISITION & TECHNICAL EVALUATION	1,663
DEEP GW INVEST. PAJARITO CANYON	43,620
DRILLING ACTIVITIES	570,201
HYDROGEOLOGIC CHARACTERIZATION	1,586
PLANNING AND SITE PREPARATION	85,039
PROJECT MANAGEMENT	12,046
WASTE MANAGEMENT	2,465
WELL CONSTRUCTION	4,821
Grand Total	724,535



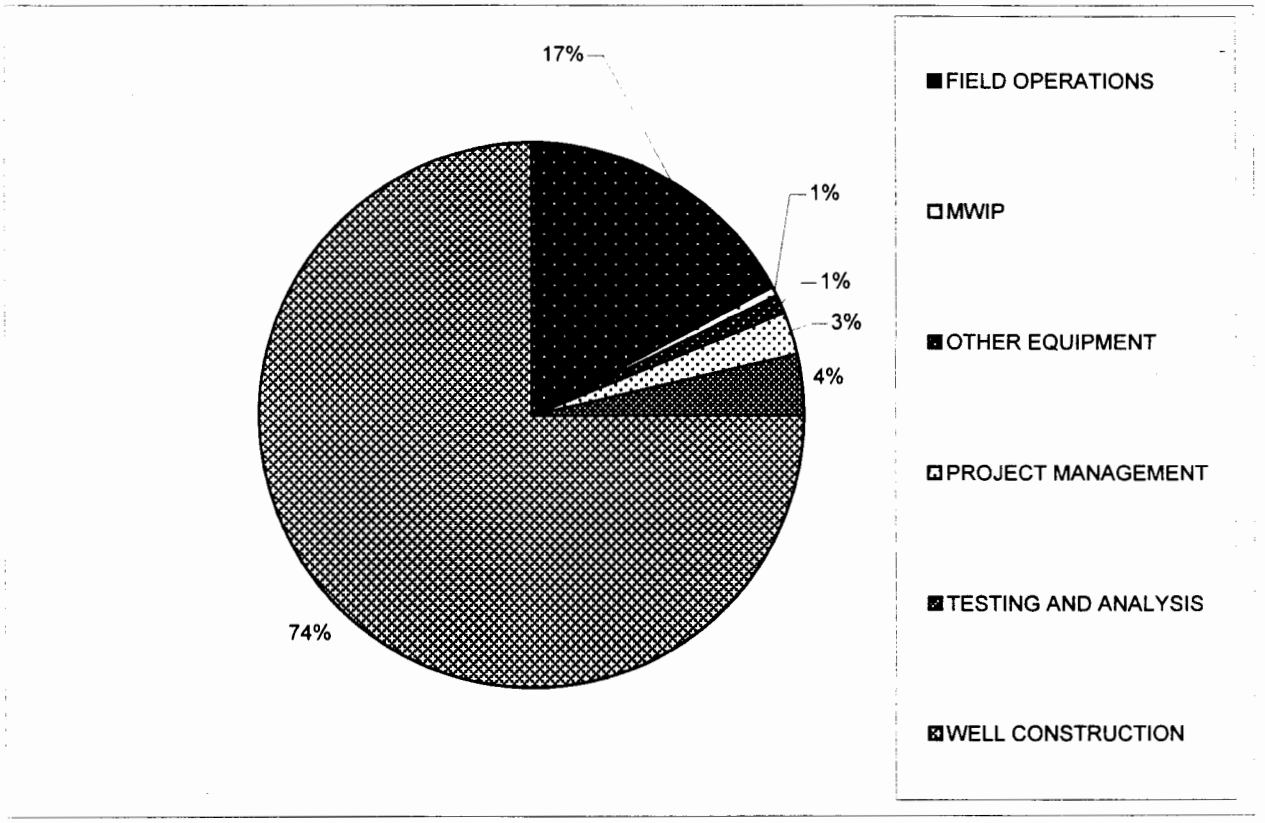
FY 00 R-25
COSTS BY ACTIVITY

FIELD OPERATIONS	22,175
OTHER EQUIPMENT	4,615
PROJECT MANAGEMENT	28,762
TESTING AND ANALYSIS	15,349
WELL CONSTRUCTION	516,311
Grand Total	587,212



FY 00 R-31
COSTS BY ACTIVITY

FIELD OPERATIONS	303,643
MWIP	9,115
OTHER EQUIPMENT	18,638
PROJECT MANAGEMENT	46,336
TESTING AND ANALYSIS	61,845
WELL CONSTRUCTION	1,326,542
Grand Total	1,766,118

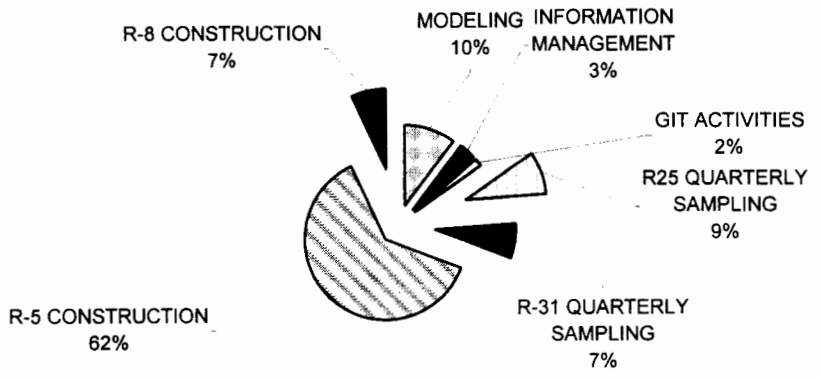


FY 01 BUDGET FOR DP FUNDED WELLS

DP FUNDING

MODELING	300
INFORMATION MANAGEMENT	100
GIT ACTIVITIES	50
WELLS:	
R25 QUARTERLY SAMPLING	250
R-31 QUARTERLY SAMPLING	200
R-5 CONSTRUCTION	1,819
R-8 CONSTRUCTION	200
TOTAL FY 01 BUDGET	2,919

DP FUNDS BUDGET DISTRIBUTION

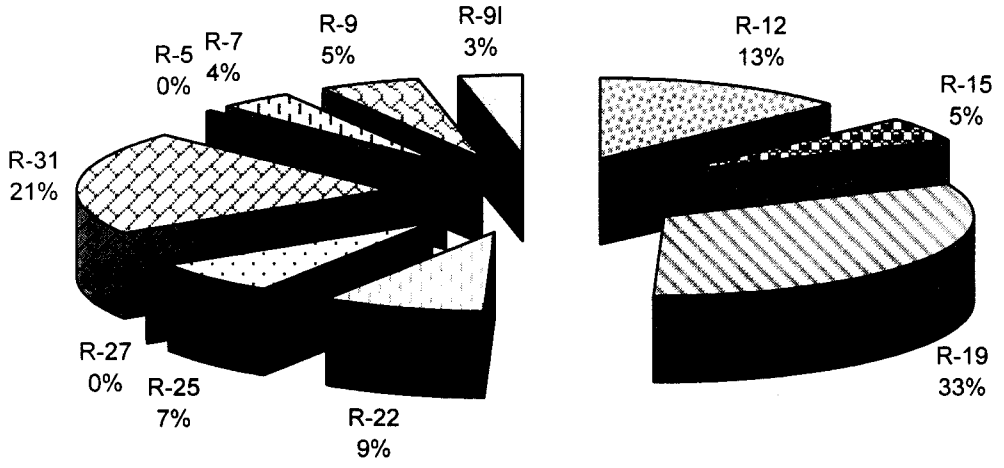


OTHER GIT FUNDING

ESH-18	120
ESH-D0	100
ER	75
TOTAL	295

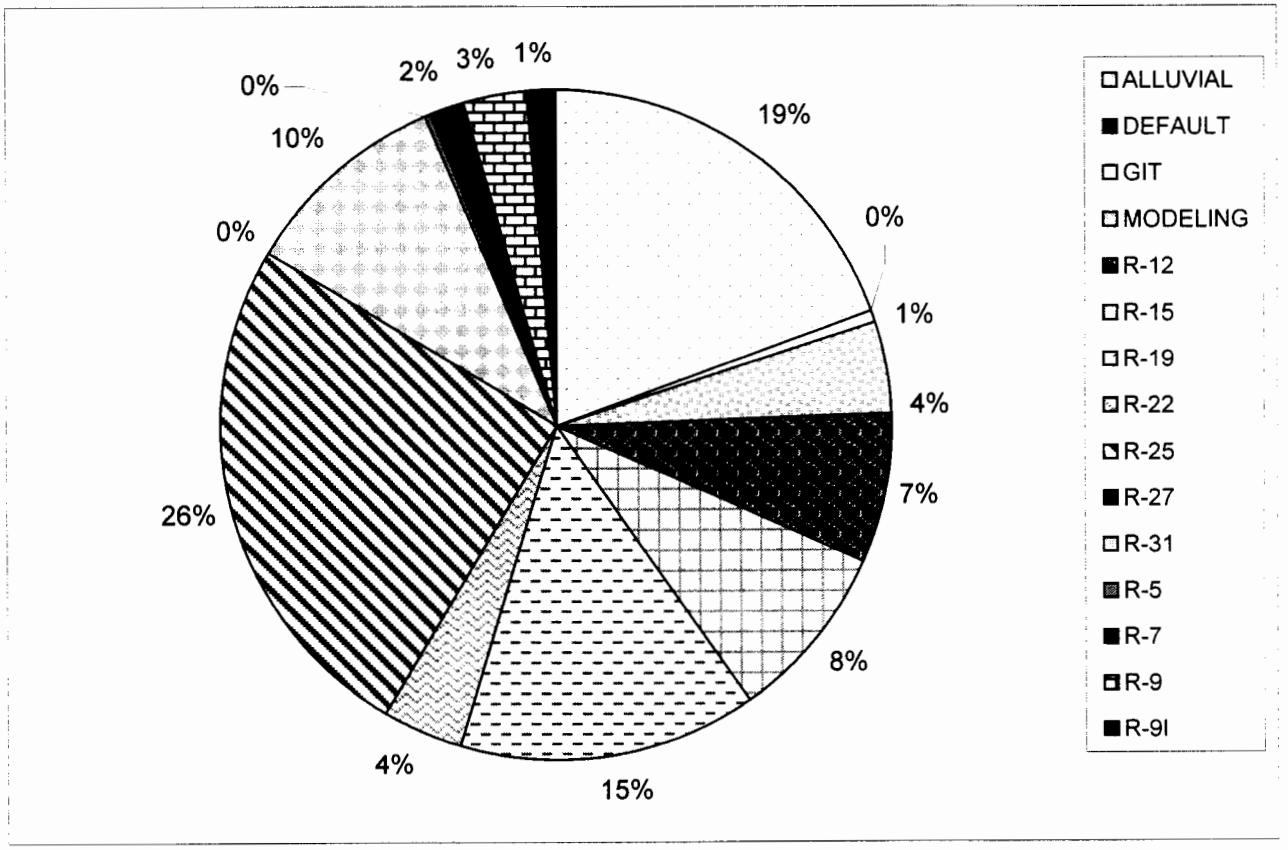
FY 00 DP and ER FUNDED WELLS COSTS

WELL	COST
R-12	1,129,031
R-15	415,926
R-19	2,717,391
R-22	724,535
R-25	587,212
R-27	12,672
R-31	1,766,118
R-5	21,809
R-7	331,139
R-9	455,692
R-9I	277,683
TOTAL	8,439,208



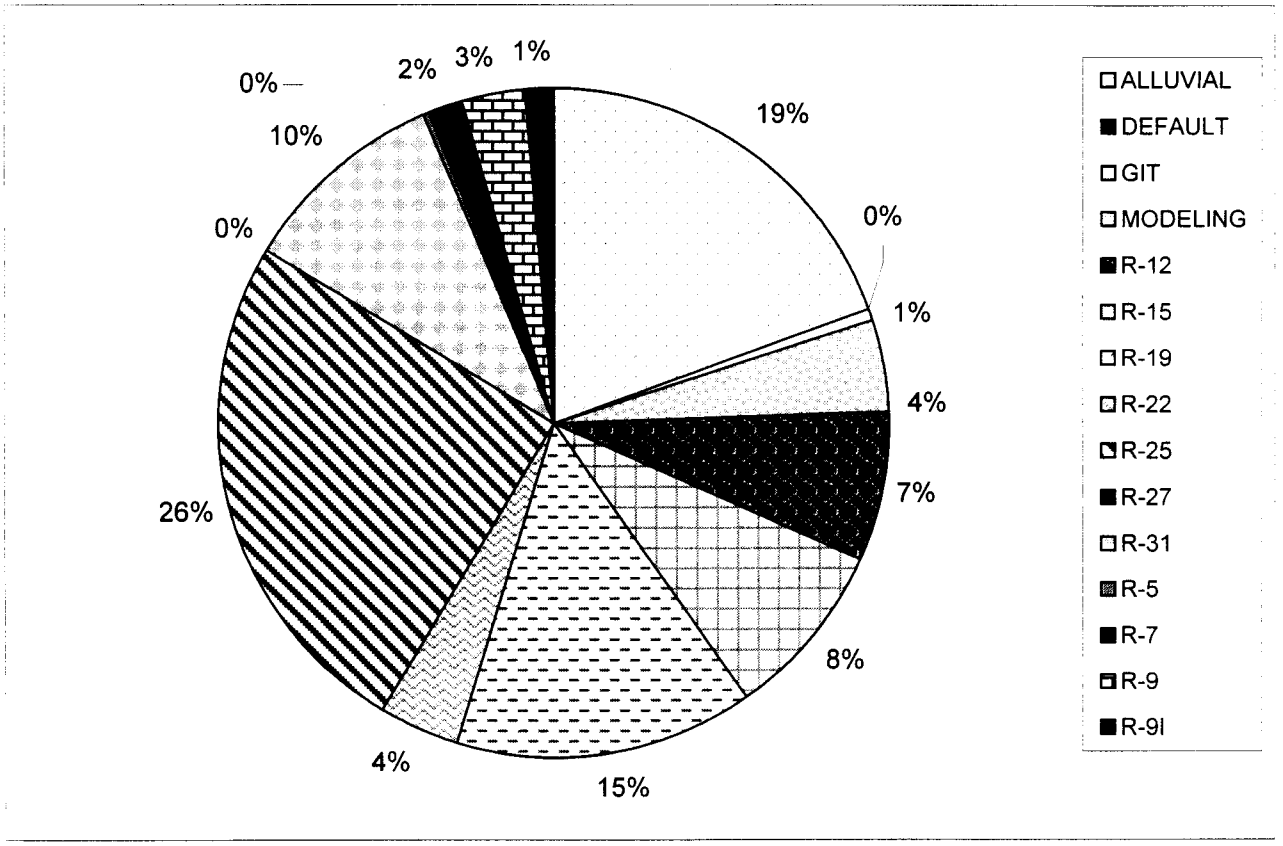
TOTAL COST OF PROGRAM - FY 97-00

FY COST	FY			
WELL/ACTIVITY	FY 97/98	FY 99	FY 00	Grand Total
ALLUVIAL	3,231,000	372,747		3,603,747
DEFAULT	8,185	(3,931)	(17,113)	(12,858)
GIT	38,825	26,507	37,240	102,573
MODELING	254,923	268,017	314,072	837,012
R-12		234,659	1,129,031	1,363,690
R-15	21,000	1,141,431	415,926	1,578,357
R-19			2,717,391	2,717,391
R-22			724,535	724,535
R-25	1,181,907	2,879,351	587,212	4,648,469
R-27			12,672	12,672
R-31		119,612	1,766,118	1,885,730
R-5		3,635	21,809	25,444
R-7			331,139	331,139
R-9		85,033	455,692	540,725
R-9I			277,683	277,683
Grand Total	4,735,840	5,127,062	8,773,408	18,636,309



TOTAL COST OF PROGRAM - FY 97-00

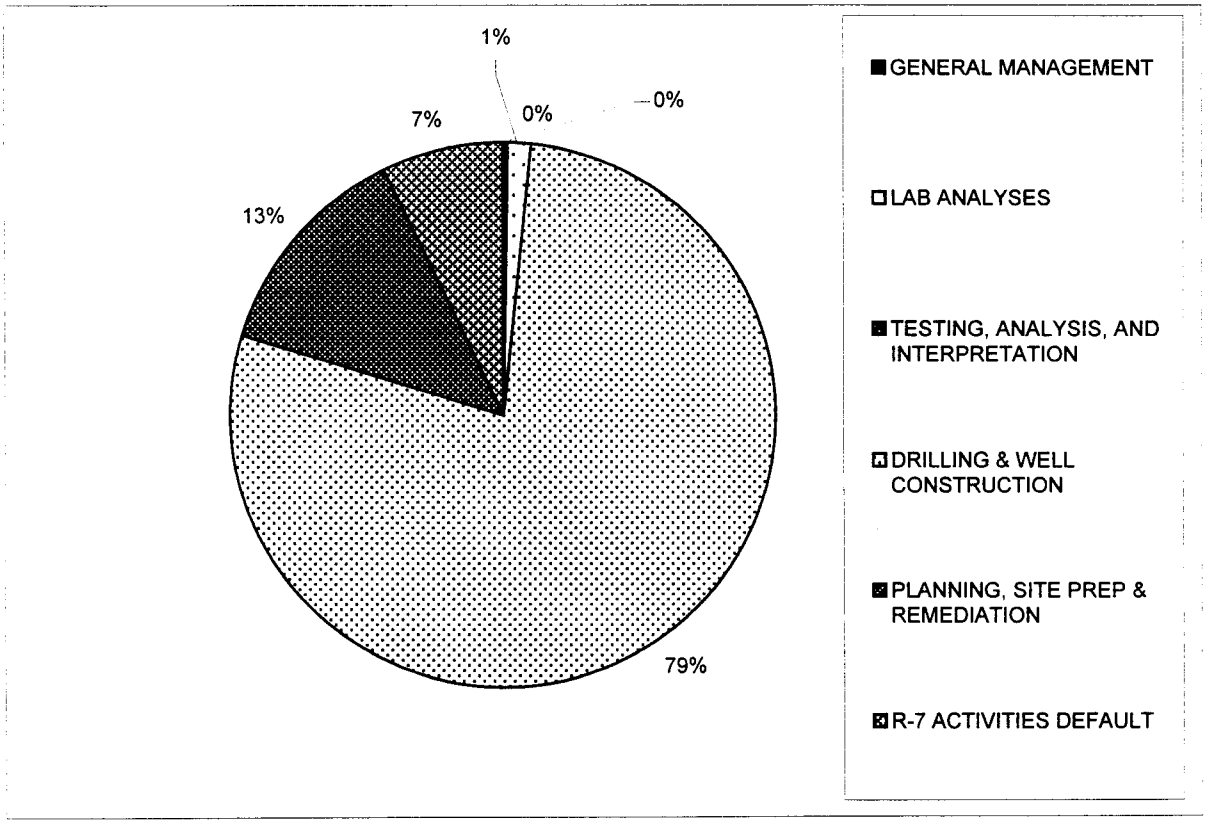
FY COST	FY			
WELL/ACTIVITY	FY 97/98	FY 99	FY 00	Grand Total
ALLUVIAL	3,231,000	372,747		3,603,747
DEFAULT	8,185	(3,931)	(17,113)	(12,858)
GIT	38,825	26,507	37,240	102,573
MODELING	254,923	268,017	314,072	837,012
R-12		234,659	1,129,031	1,363,690
R-15	21,000	1,141,431	415,926	1,578,357
R-19			2,717,391	2,717,391
R-22			724,535	724,535
R-25	1,181,907	2,879,351	587,212	4,648,469
R-27			12,672	12,672
R-31		119,612	1,766,118	1,885,730
R-5		3,635	21,809	25,444
R-7			331,139	331,139
R-9		85,033	455,692	540,725
R-9I			277,683	277,683
Grand Total	4,735,840	5,127,062	8,773,408	18,636,309



FY 00 R-7

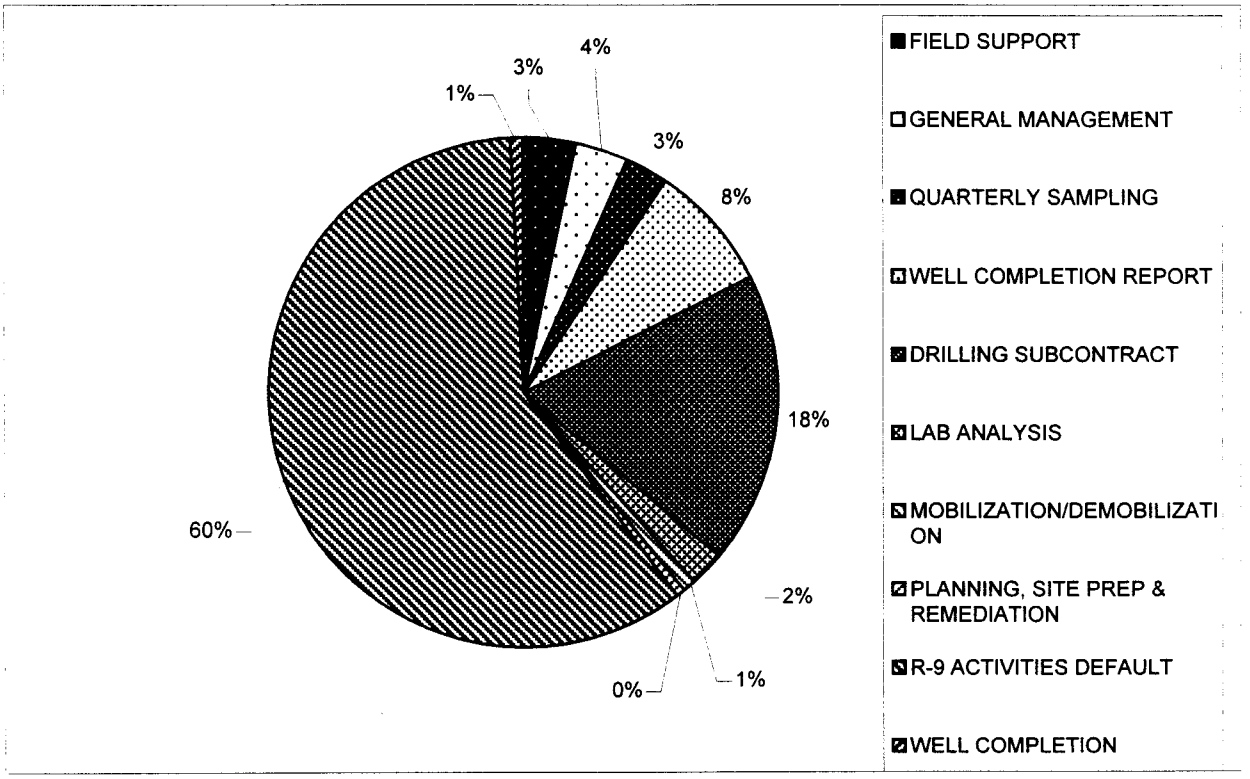
COSTS BY ACTIVITY

GENERAL MANAGEMENT	880
LAB ANALYSES	4,191
TESTING, ANALYSIS, AND INTERPRETATION	585
DRILLING & WELL CONSTRUCTION	258,662
PLANNING, SITE PREP & REMEDIATION	42,816
R-7 ACTIVITIES DEFAULT	24,005
Grand Total	331,139



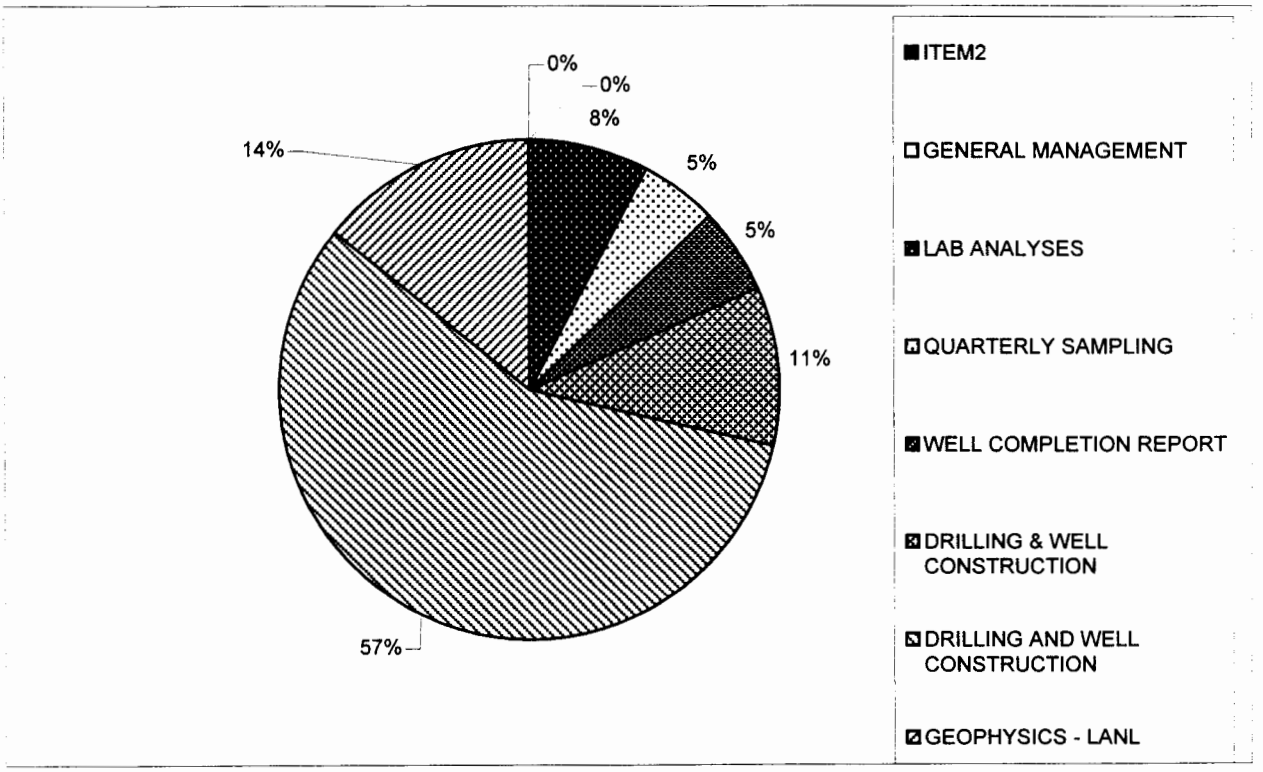
FY 00 R-9
COSTS BY ACTIVITY

FIELD SUPPORT	15,000
GENERAL MANAGEMENT	16,488
QUARTERLY SAMPLING	11,716
WELL COMPLETION REPORT	38,372
DRILLING SUBCONTRACT	85,328
LAB ANALYSIS	11,339
MOBILIZATION/DEMOBILIZATION	(4,005)
PLANNING, SITE PREP & REMEDIATION	1,419
R-9 ACTIVITIES DEFAULT	276,636
WELL COMPLETION	3,399
Grand Total	455,692



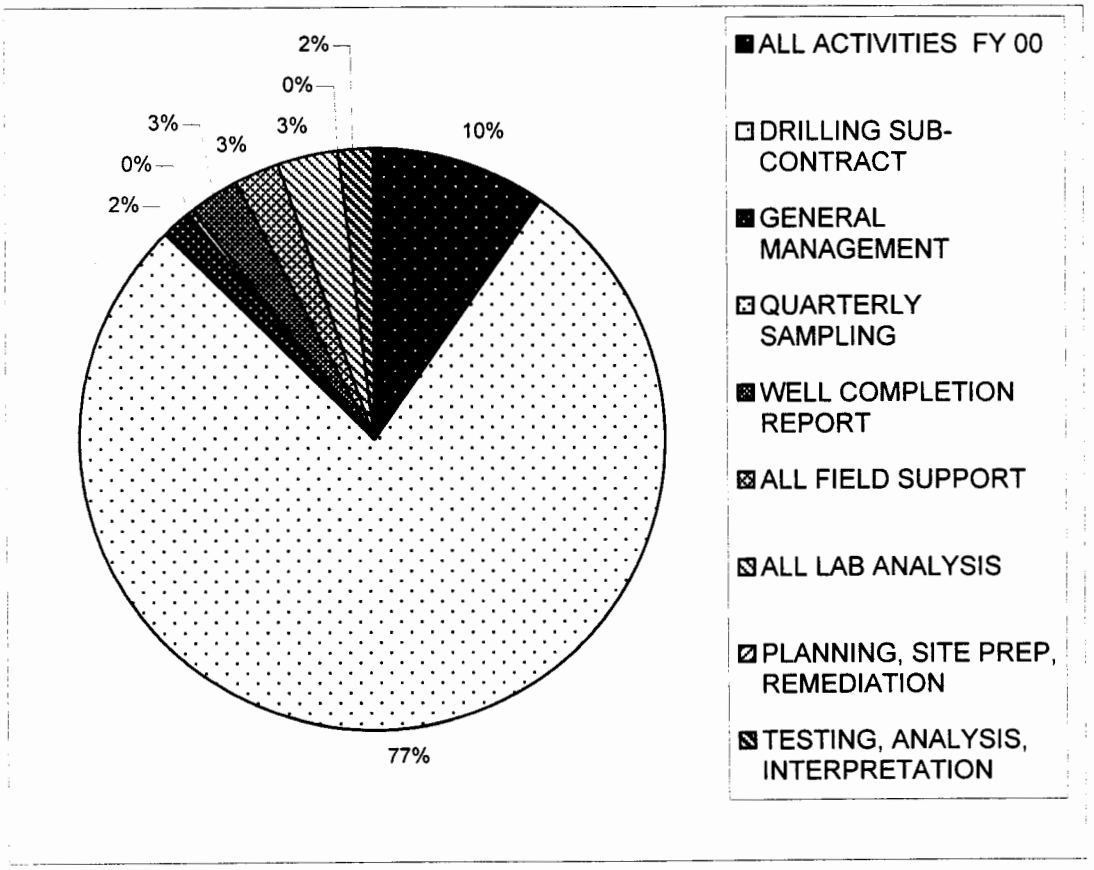
FY 00 R-9i
COSTS BY ACTIVITY

GENERAL MANAGEMENT	0
LAB ANALYSES	17,835
QUARTERLY SAMPLING	10,971
WELL COMPLETION REPORT	12,284
DRILLING & WELL CONSTRUCTION	23,720
DRILLING AND WELL CONSTRUCTION	128,666
GEOPHYSICS - LANL	32,098
PLANNING, SITE PREP & REMEDIATION	41,585
TESTING, ANALYSIS & INTERPRETATION	10,523
Grand Total	277,683



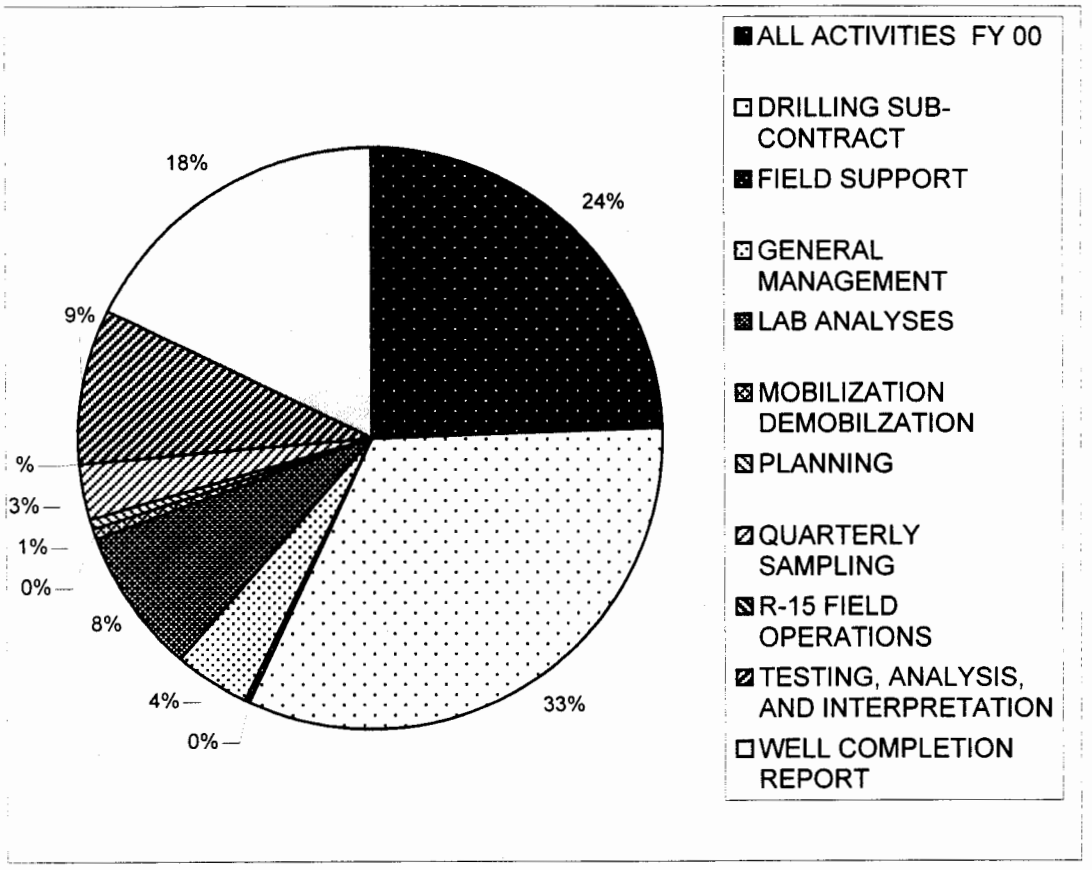
FY 00 R-12 COSTS BY ACTIVITY

ALL ACTIVITIES FY 00	108,934
DRILLING SUB-CONTRACT	879,839
GENERAL MANAGEMENT	17,787
QUARTERLY SAMPLING	3,065
WELL COMPLETION REPORT	32,022
ALL FIELD SUPPORT	28,791
ALL LAB ANALYSIS	35,633
PLANNING, SITE PREP, REMEDIATION	1,090
TESTING, ANALYSIS, INTERPRETATION	21,870
Grand Total	1,129,031



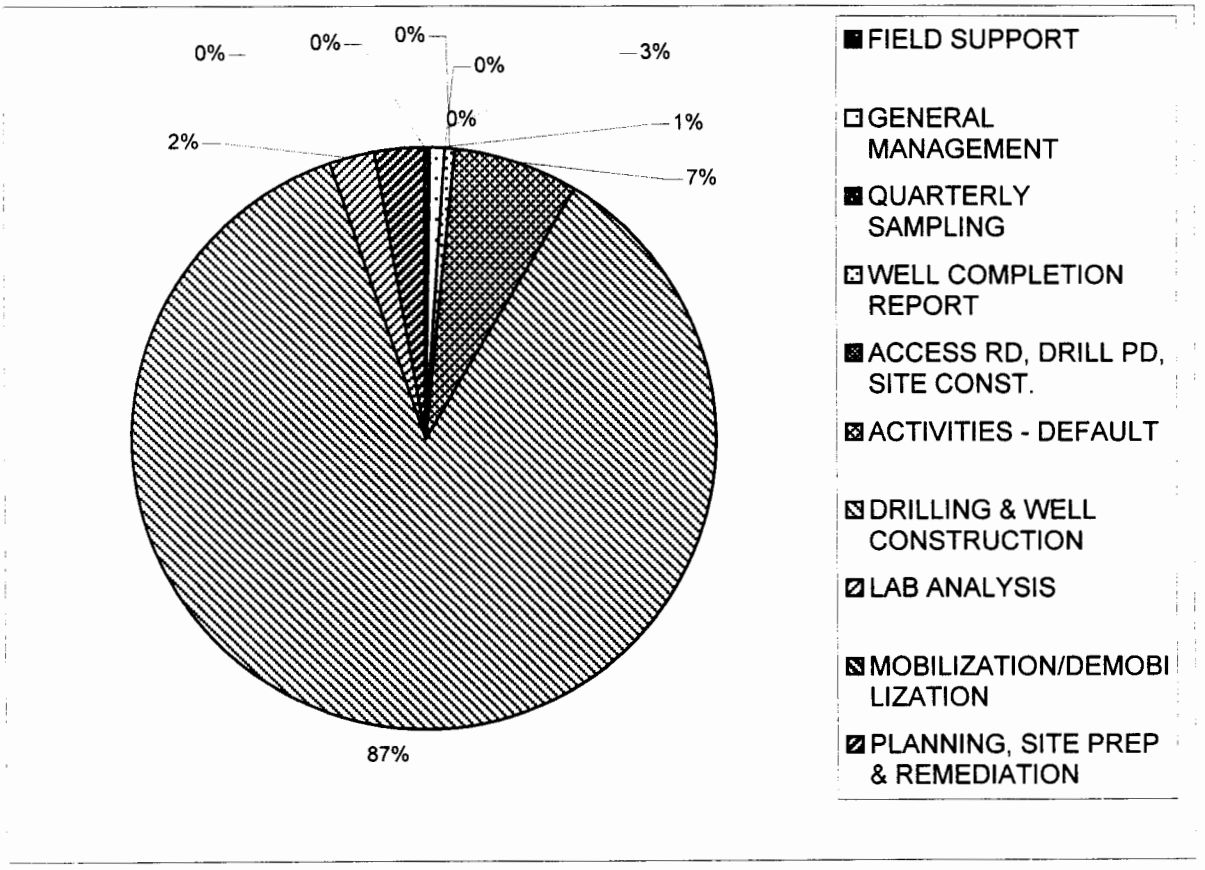
FY 00 R-15 COSTS BY ACTIVITY

ALL ACTIVITIES FY 00	101,796
DRILLING SUB-CONTRACT	134,514
FIELD SUPPORT	1,859
GENERAL MANAGEMENT	16,885
LAB ANALYSES	34,325
MOBILIZATION DEMOBILZATION	1,585
PLANNING	2,327
QUARTERLY SAMPLING	13,204
R-15 FIELD OPERATIONS	3
TESTING, ANALYSIS, AND INTERPRETATION	35,745
WELL COMPLETION REPORT	73,682
Grand Total	415,926



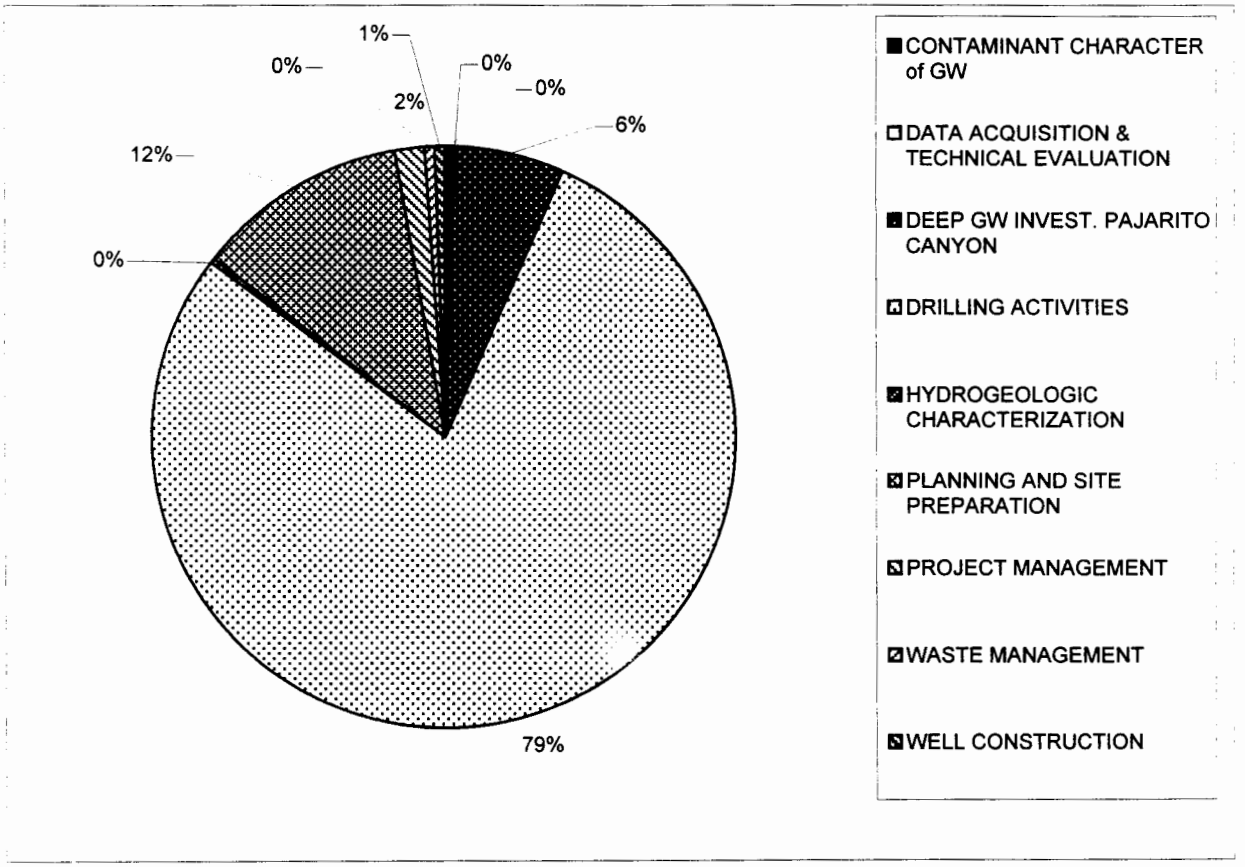
FY 00 R-19 COSTS BY ACTIVITY

FIELD SUPPORT	8,171
GENERAL MANAGEMENT	22,813
QUARTERLY SAMPLING	469
WELL COMPLETION REPORT	9,486
ACCESS RD, DRILL PD, SITE CONST.	99
ACTIVITIES - DEFAULT	184,459
DRILLING & WELL CONSTRUCTION	2,291,882
LAB ANALYSIS	63,367
MOBILIZATION/DEMOBILIZATION	0
PLANNING, SITE PREP & REMEDIATION	76,625
TESTING, ANALYSIS AND INTERPRETATION	60,021
Grand Total	2,717,391



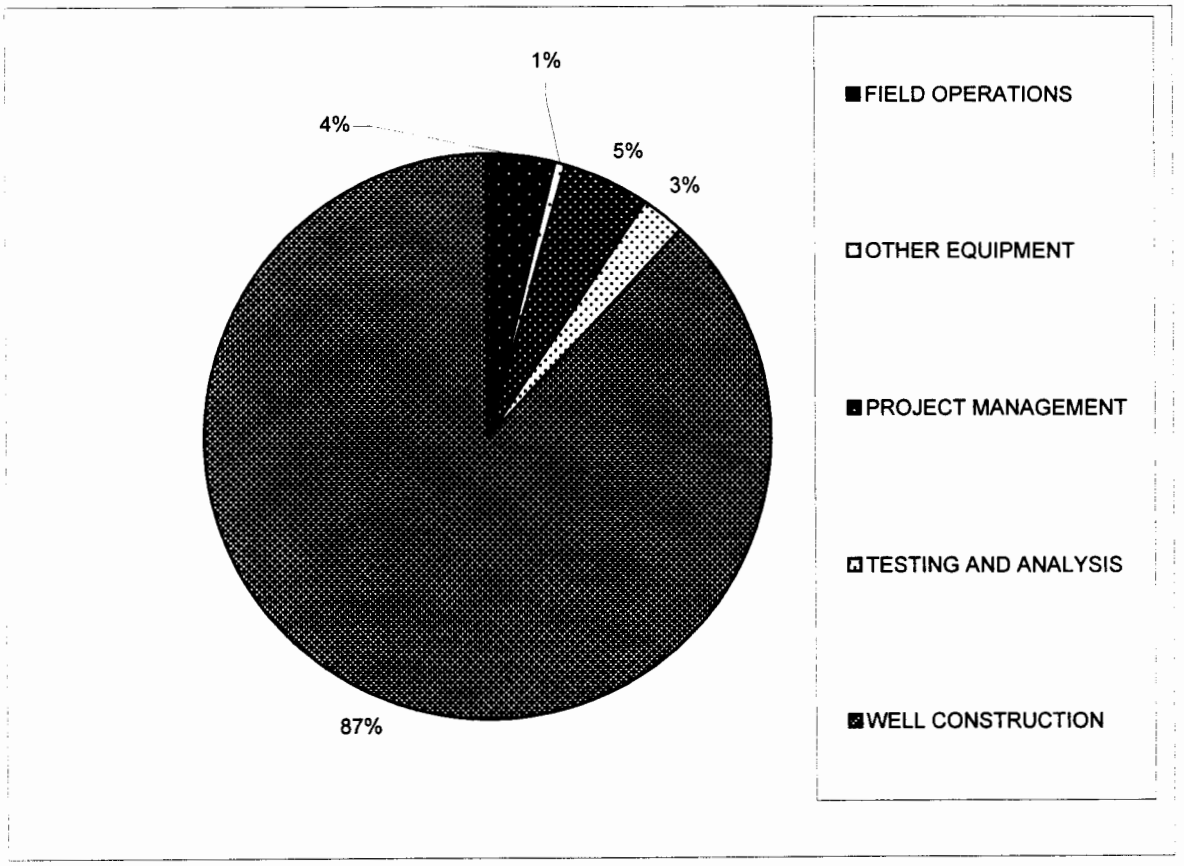
FY 00 R-22 COSTS BY ACTIVITY

CONTAMINANT CHARACTER of GW	3,096
DATA ACQUISITION & TECHNICAL EVALUATION	1,663
DEEP GW INVEST. PAJARITO CANYON	43,620
DRILLING ACTIVITIES	570,201
HYDROGEOLOGIC CHARACTERIZATION	1,586
PLANNING AND SITE PREPARATION	85,039
PROJECT MANAGEMENT	12,046
WASTE MANAGEMENT	2,465
WELL CONSTRUCTION	4,821
Grand Total	724,535



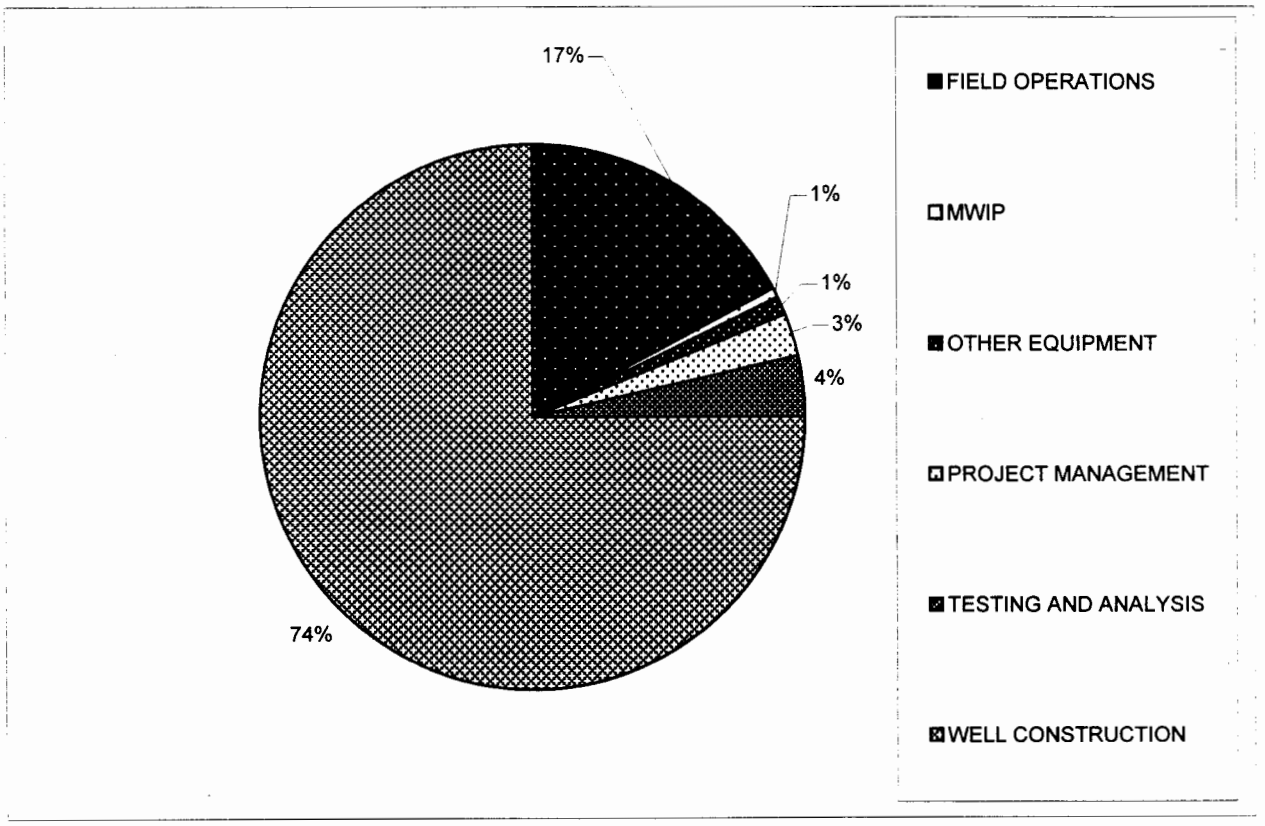
FY 00 R-25
COSTS BY ACTIVITY

FIELD OPERATIONS	22,175
OTHER EQUIPMENT	4,615
PROJECT MANAGEMENT	28,762
TESTING AND ANALYSIS	15,349
WELL CONSTRUCTION	516,311
Grand Total	587,212



FY 00 R-31
COSTS BY ACTIVITY

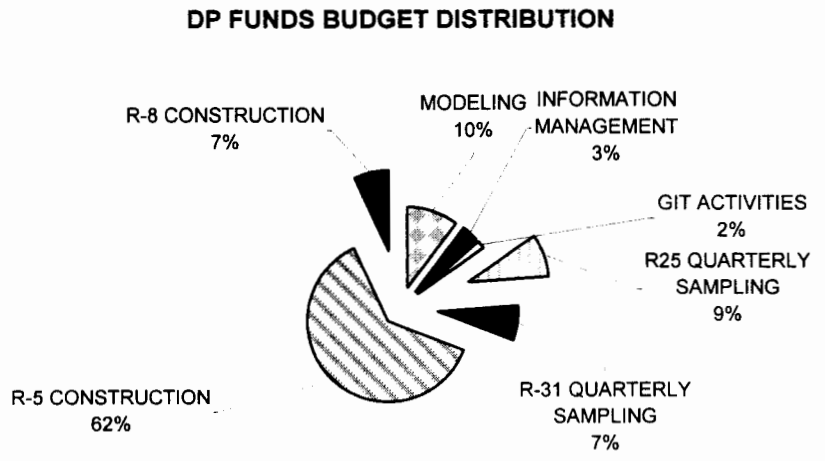
FIELD OPERATIONS	303,643
MWIP	9,115
OTHER EQUIPMENT	18,638
PROJECT MANAGEMENT	46,336
TESTING AND ANALYSIS	61,845
WELL CONSTRUCTION	1,326,542
Grand Total	1,766,118



FY 01 BUDGET FOR DP FUNDED WELLS

DP FUNDING

MODELING	300
INFORMATION MANAGEMENT	100
GIT ACTIVITIES	50
WELLS:	
R25 QUARTERLY SAMPLING	250
R-31 QUARTERLY SAMPLING	200
R-5 CONSTRUCTION	1,819
R-8 CONSTRUCTION	200
TOTAL FY 01 BUDGET	2,919

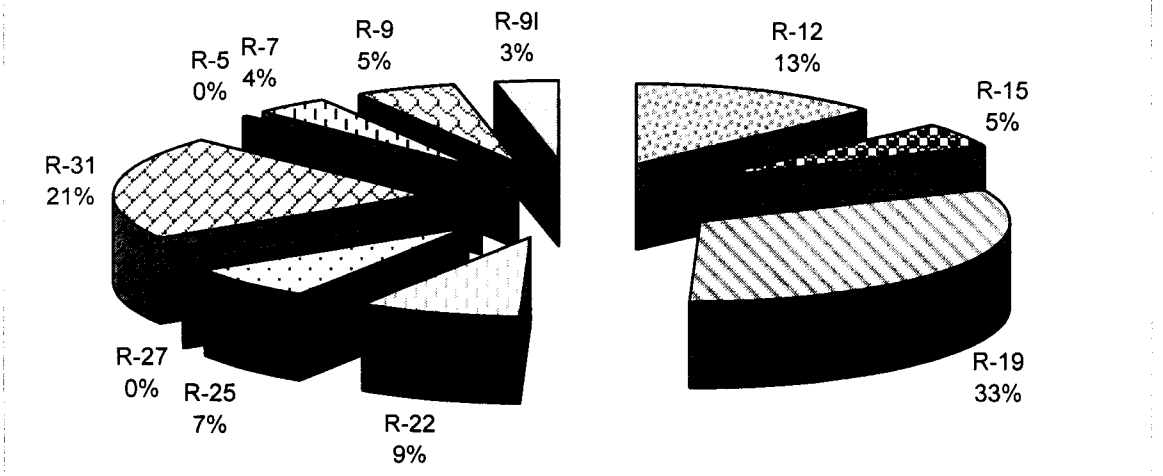


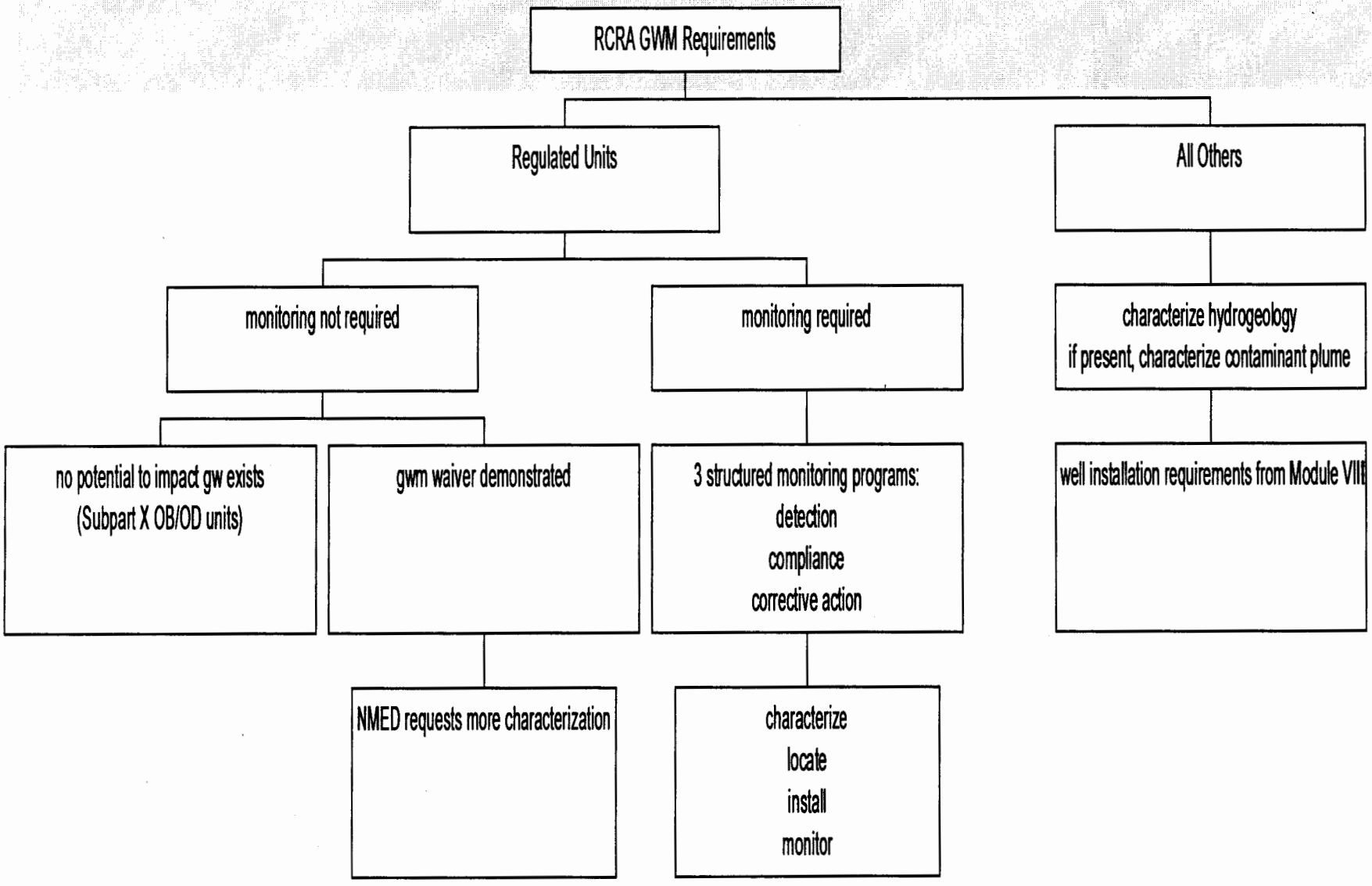
OTHER GIT FUNDING

ESH-18	120
ESH-D0	100
ER	75
TOTAL	295

FY 00 DP and ER FUNDED WELLS COSTS

WELL	COST
R-12	1,129,031
R-15	415,926
R-19	2,717,391
R-22	724,535
R-25	587,212
R-27	12,672
R-31	1,766,118
R-5	21,809
R-7	331,139
R-9	455,692
R-9I	277,683
TOTAL	8,439,208




RCRA GWM Requirements
Regulated Units
All Others
monitoring not required
monitoring required
characterize hydrogeology
if present, characterize contaminant plume
no potential to impact gw exists
(Subpart X OB/OD units)
gwm waiver demonstrated
3 structured monitoring programs:
detection
compliance
corrective action
well installation requirements from Module VIII
NMED requests more characterization
characterize
locate
install
monitor

- following denial, 1995 NMED letter requested comprehensive gw plan for RCRA compliance that would also address HSWA requirements

- identified 4 major concerns:
  1. inadequate delineation of saturated zones
  2. inadequate identification of recharge areas
  3. effect of pumping production wells on gw flow
  4. more wells needed to adequately determine aquifer characteristics

- Hydrogeologic Workplan developed and NMED approved

- Plan's aggregate concept reflects "point of compliance" (POC) principle of line circumscribing several units

- preserves options to:
  - adequately demonstrate gwm waivers;
  - propose alternatives to gwm, e.g., vadose zone monitoring for early detection
  - locate long term gwm wells using iterative process

Detection Monitoring Program

- parameters or constituents to be monitored based on:
  1. type, quantity, concentration of waste constituents in unit;
  2. mobility, stability, & persistence in unsaturated zone;
  3. detectability in gw;
  4. concentration in background

- if "detected", institute compliance monitoring program

- "detected" defined as statistically significant evidence of contamination based on comparison of gw quality upgradient and unaffected by unit to gw that passes beneath unit measured at POC

Compliance Monitoring Program

- gw protection standard established that includes:
  1. list of constituents;
  2. concentration limits;
  3. point of compliance;
  4. period of compliance

- if concentration limits are being exceeded, institute corrective action program

- "exceeded" is defined as statistically significant evidence of increased contamination

Corrective Action Program

- requires action taken to prevent hazardous constituents from exceeding concentration limits and gwm program established to demonstrate effectiveness

Ground-water Monitoring Program Requirements

- system must consist of sufficient wells at appropriate locations & depths to yield samples from uppermost aquifer representative of:
  - background quality unaffected by unit
  - gw quality passing POC, and
- must be:
  - capable of detecting contamination that migrated from waste management area to uppermost aquifer

- wells must:
  - be cased to maintain borehole integrity
  - be screened & packed to enable gw sample collection
  - have sealed annular space above sampling depth to prevent sample &/or gw contamination

- program must include:
  - adequate sampling and analysis procedures
  - statistical methods for evaluation of data
  - depth to gw determinations

Corrective Action Requirements

HSWA portion of RCRA permit requires:

- evaluation of hydrogeologic conditions of facility

- a ground-water investigation to characterize any plumes of contamination

Regulation:

- actions driven by occurrence of an actual release for which a threat to human health and the environment has been established and corrective action is necessary

Hydrogeologic Conditions

Shall conduct program that provides information:

- regional & facility-specific geologic/hydrogeologic characteristics affecting gw flow beneath facility
- topographic features that might influence gw flow
- fractures within tuff
- classification & description of hydrogeologic units which may be part of migration pathways
- structural geology & hydrogeologic cross sections showing depth, thickness & lateral extent of hydrogeologic units which may be part of migration pathways
- water levels
- manmade influences
- available geophysical & remote sensing information

Ground-water Contamination

if identified, characterize:

- horizontal & vertical extent
- direction & velocity of contaminant movement
- horizontal & vertical concentration profiles
- evaluation of factors influencing plume movement
- extrapolation of future movement

Module VII Requirements

- stem partly from EPA's Technical Enforcement Guidance Document

- because originating from guidance, certain degree of flexibility could be developed in application

- adequacy and appropriateness of monitoring well installation & development requirements under evaluation with NMED

Summary

- RCRA regulations not very specific regarding well construction - emphasis is on retrieving representative samples

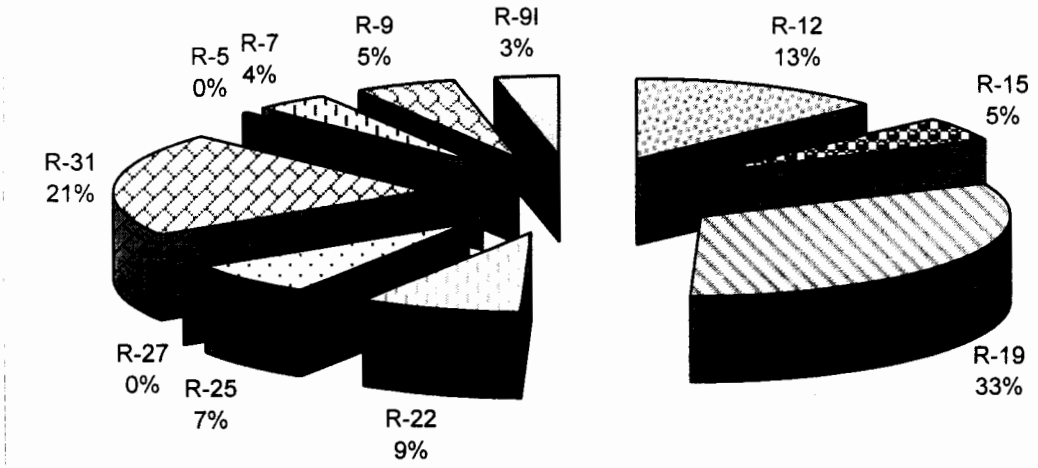
- Director has flexibility in applying requirements

- LANL is in "characterization" mode & whether regulated units or not, no repetitive RCRA monitoring requirements established yet

- Attempted to locate and construct characterization wells such that they may be usable in a monitoring program should it be determined to be appropriate/necessary

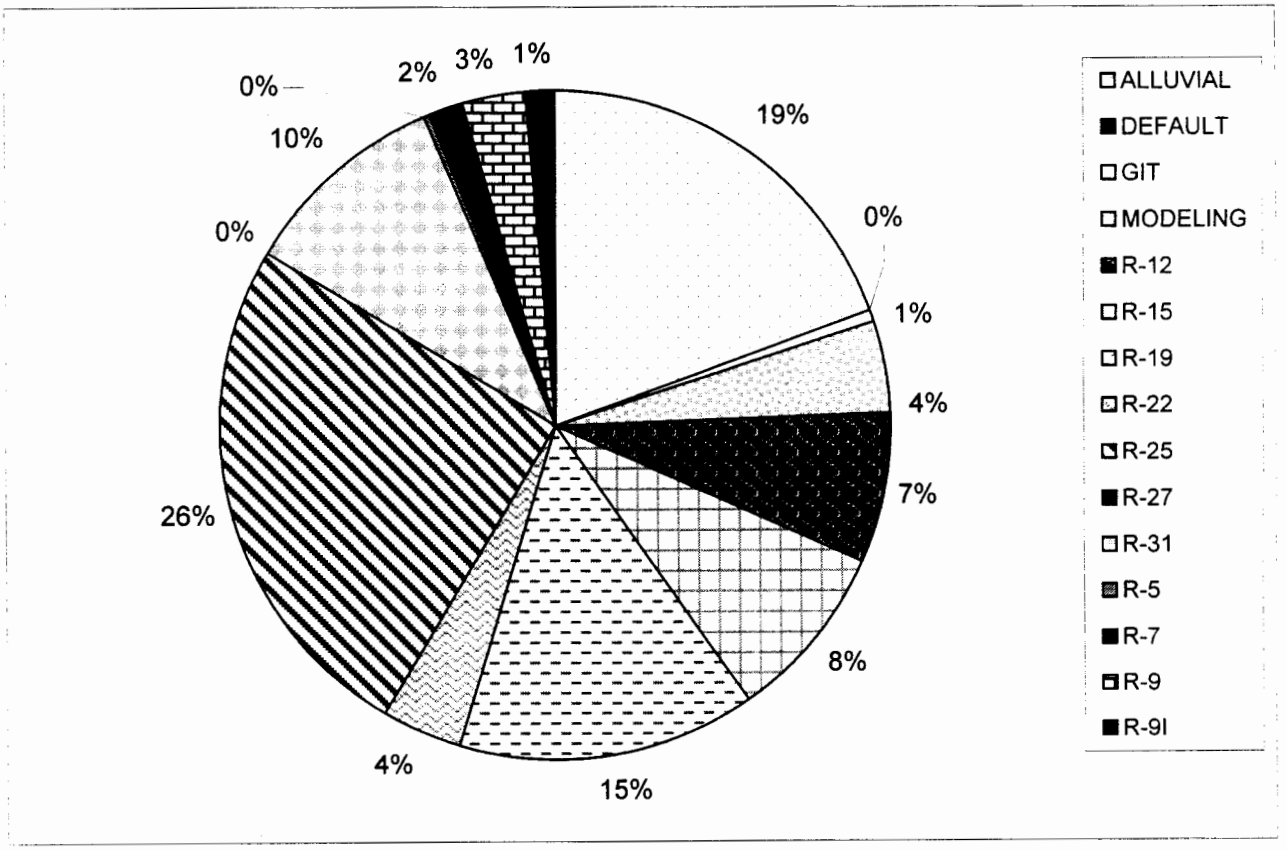
FY 00 DP and ER FUNDED WELLS COSTS

WELL	COST
R-12	1,129,031
R-15	415,926
R-19	2,717,391
R-22	724,535
R-25	587,212
R-27	12,672
R-31	1,766,118
R-5	21,809
R-7	331,139
R-9	455,692
R-9I	277,683
TOTAL	8,439,208



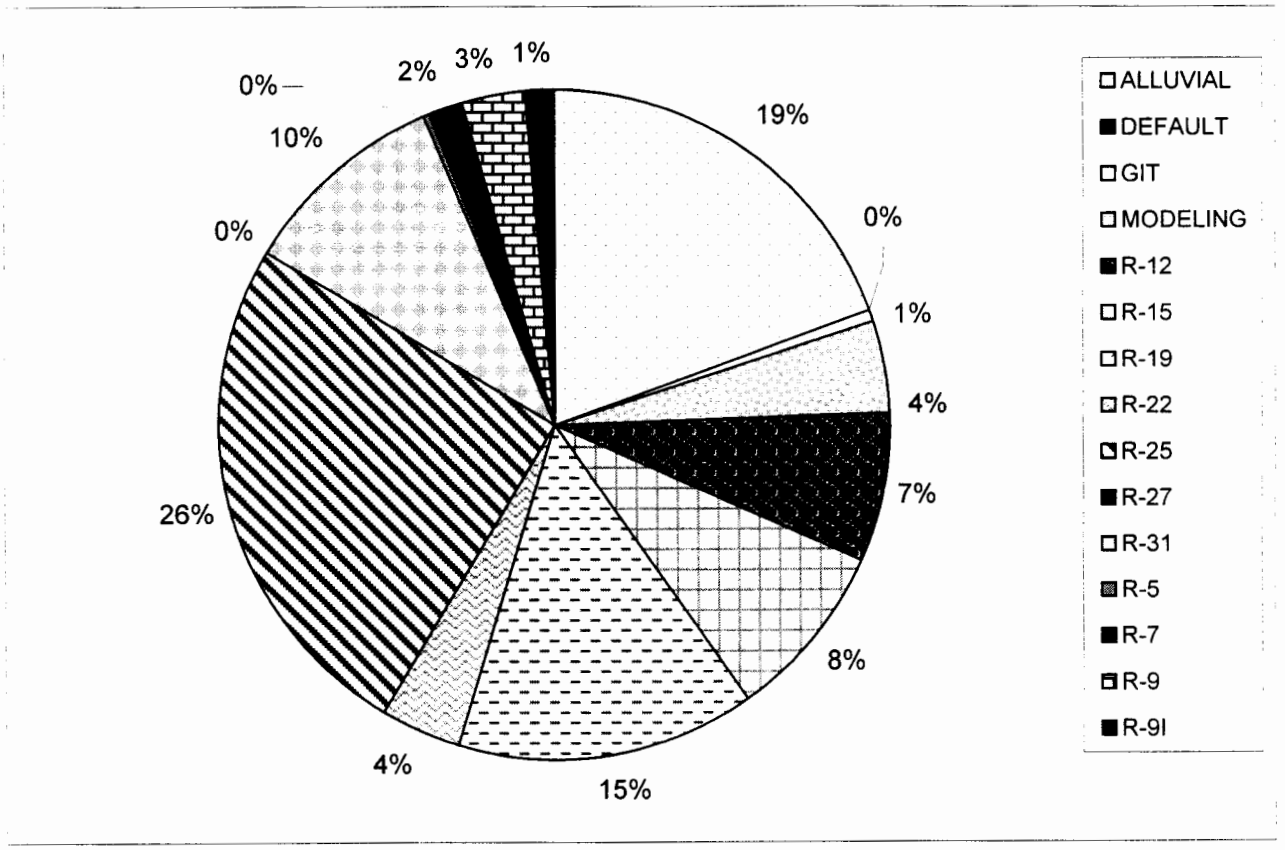
TOTAL COST OF PROGRAM - FY 97-00

FY COST	FY			
WELL/ACTIVITY	FY 97/98	FY 99	FY 00	Grand Total
ALLUVIAL	3,231,000	372,747		3,603,747
DEFAULT	8,185	(3,931)	(17,113)	(12,858)
GIT	38,825	26,507	37,240	102,573
MODELING	254,923	268,017	314,072	837,012
R-12		234,659	1,129,031	1,363,690
R-15	21,000	1,141,431	415,926	1,578,357
R-19			2,717,391	2,717,391
R-22			724,535	724,535
R-25	1,181,907	2,879,351	587,212	4,648,469
R-27			12,672	12,672
R-31		119,612	1,766,118	1,885,730
R-5		3,635	21,809	25,444
R-7			331,139	331,139
R-9		85,033	455,692	540,725
R-9I			277,683	277,683
Grand Total	4,735,840	5,127,062	8,773,408	18,636,309



TOTAL COST OF PROGRAM - FY 97-00

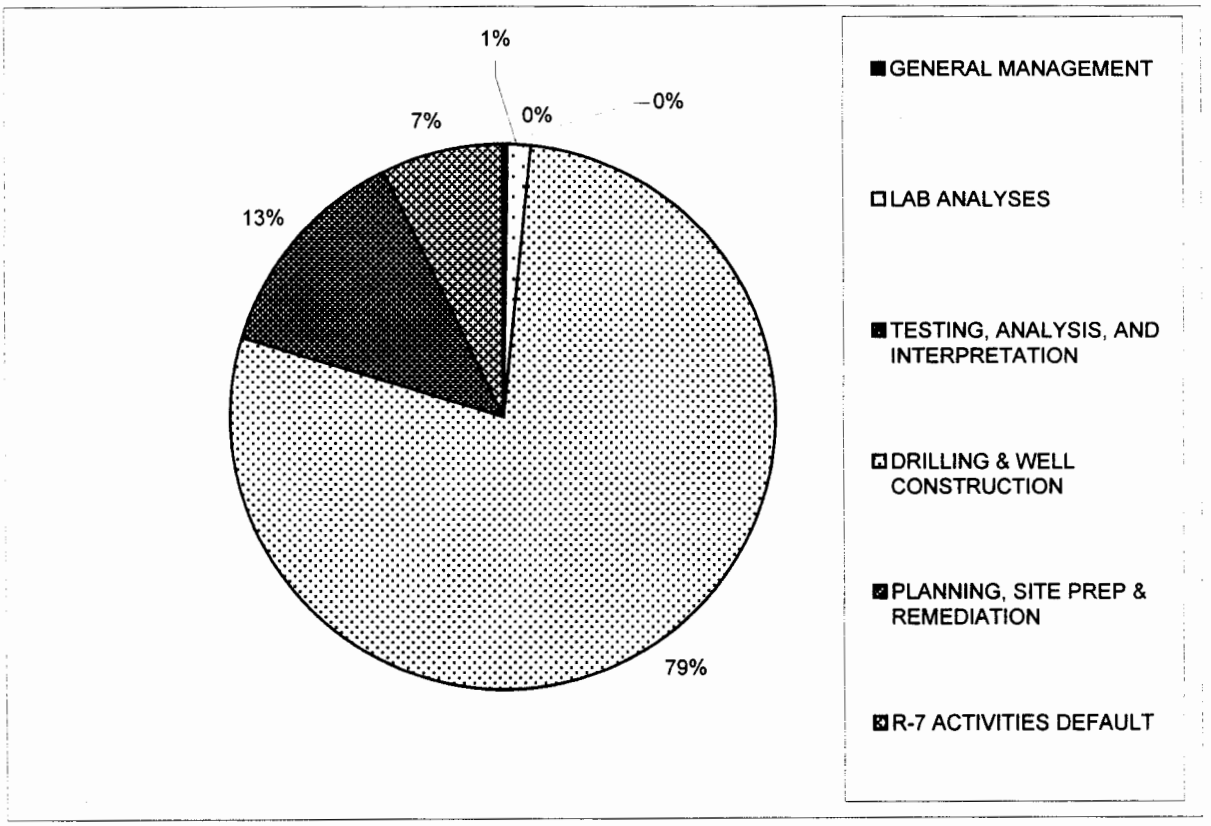
FY COST	FY			
WELL/ACTIVITY	FY 97/98	FY 99	FY 00	Grand Total
ALLUVIAL	3,231,000	372,747		3,603,747
DEFAULT	8,185	(3,931)	(17,113)	(12,858)
GIT	38,825	26,507	37,240	102,573
MODELING	254,923	268,017	314,072	837,012
R-12		234,659	1,129,031	1,363,690
R-15	21,000	1,141,431	415,926	1,578,357
R-19			2,717,391	2,717,391
R-22			724,535	724,535
R-25	1,181,907	2,879,351	587,212	4,648,469
R-27			12,672	12,672
R-31		119,612	1,766,118	1,885,730
R-5		3,635	21,809	25,444
R-7			331,139	331,139
R-9		85,033	455,692	540,725
R-9I			277,683	277,683
Grand Total	4,735,840	5,127,062	8,773,408	18,636,309



FY 00 R-7

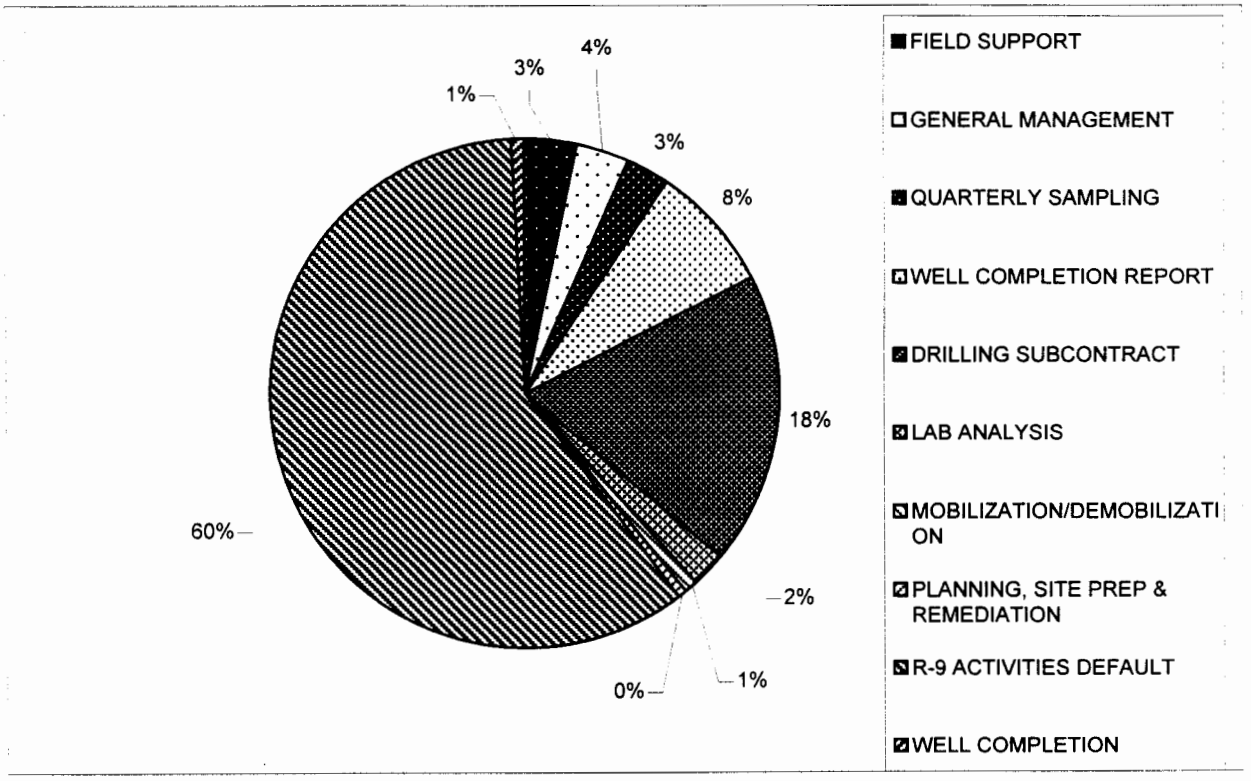
COSTS BY ACTIVITY

GENERAL MANAGEMENT	880
LAB ANALYSES	4,191
TESTING, ANALYSIS, AND INTERPRETATION	585
DRILLING & WELL CONSTRUCTION	258,662
PLANNING, SITE PREP & REMEDIATION	42,816
R-7 ACTIVITIES DEFAULT	24,005
Grand Total	331,139



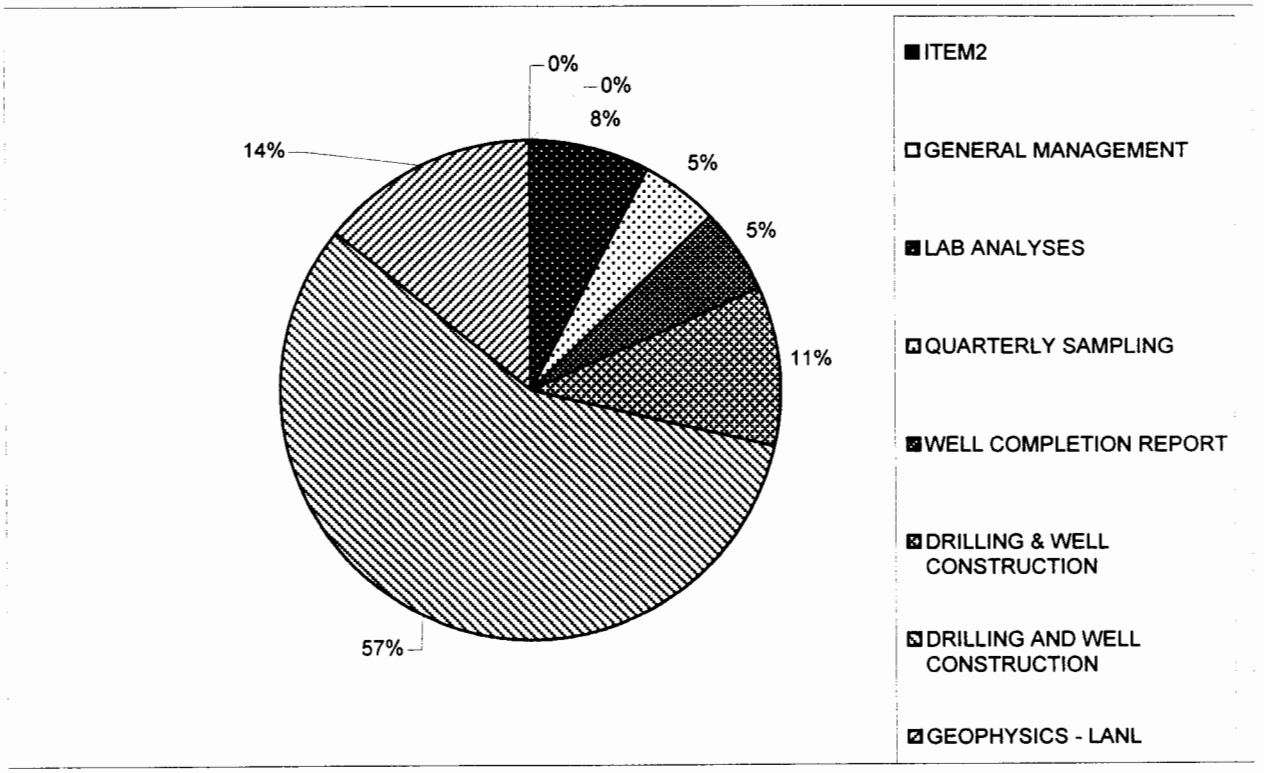
FY 00 R-9
COSTS BY ACTIVITY

FIELD SUPPORT	15,000
GENERAL MANAGEMENT	16,488
QUARTERLY SAMPLING	11,716
WELL COMPLETION REPORT	38,372
DRILLING SUBCONTRACT	85,328
LAB ANALYSIS	11,339
MOBILIZATION/DEMOBILIZATION	(4,005)
PLANNING, SITE PREP & REMEDIATION	1,419
R-9 ACTIVITIES DEFAULT	276,636
WELL COMPLETION	3,399
Grand Total	455,692



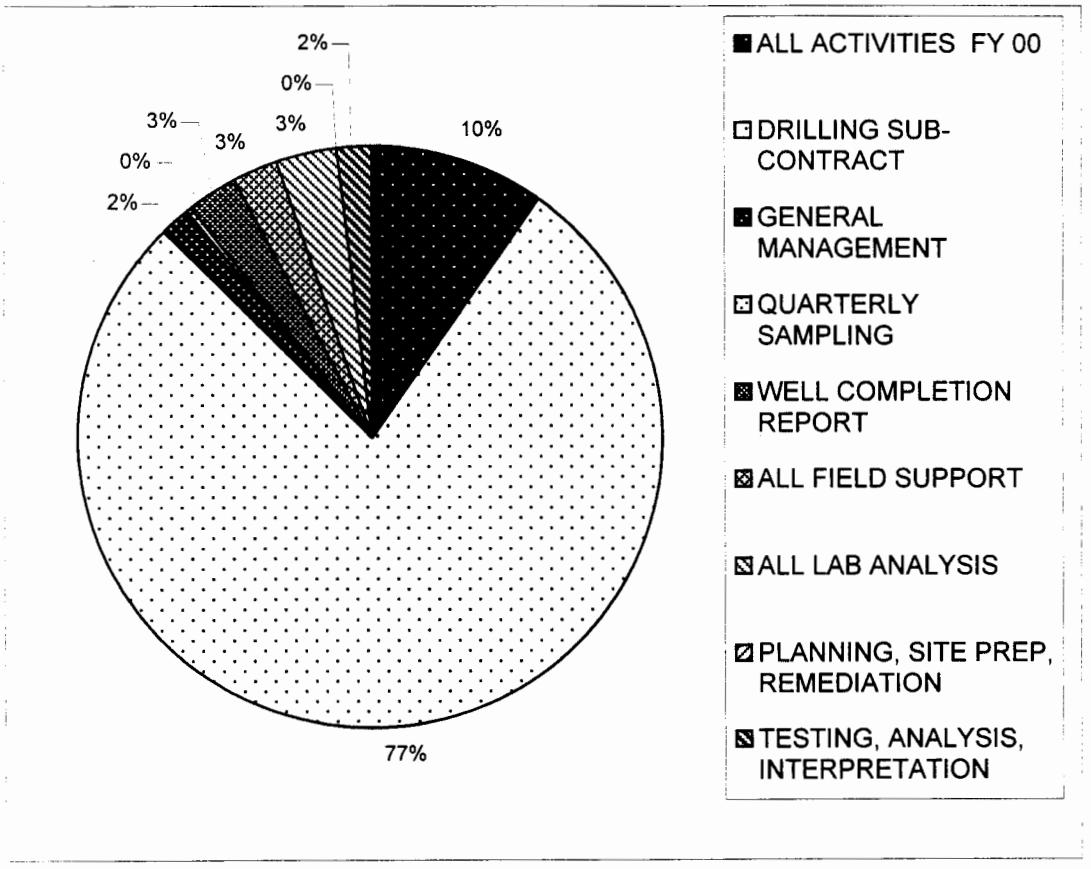
FY 00 R-9i
COSTS BY ACTIVITY

GENERAL MANAGEMENT	0
LAB ANALYSES	17,835
QUARTERLY SAMPLING	10,971
WELL COMPLETION REPORT	12,284
DRILLING & WELL CONSTRUCTION	23,720
DRILLING AND WELL CONSTRUCTION	128,666
GEOPHYSICS - LANL	32,098
PLANNING, SITE PREP & REMEDIATION	41,585
TESTING, ANALYSIS & INTERPRETATION	10,523
Grand Total	277,683



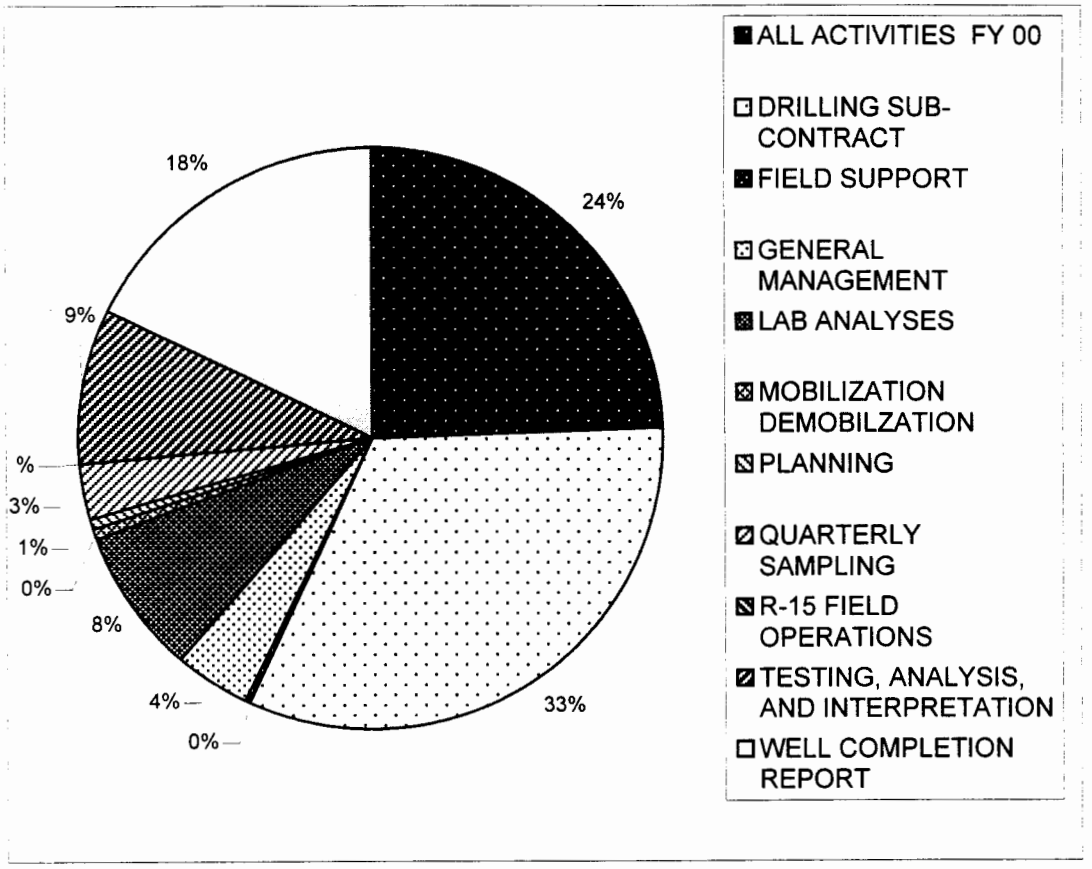
FY 00 R-12 COSTS BY ACTIVITY

ALL ACTIVITIES FY 00	108,934
DRILLING SUB-CONTRACT	879,839
GENERAL MANAGEMENT	17,787
QUARTERLY SAMPLING	3,065
WELL COMPLETION REPORT	32,022
ALL FIELD SUPPORT	28,791
ALL LAB ANALYSIS	35,633
PLANNING, SITE PREP, REMEDIATION	1,090
TESTING, ANALYSIS, INTERPRETATION	21,870
Grand Total	1,129,031



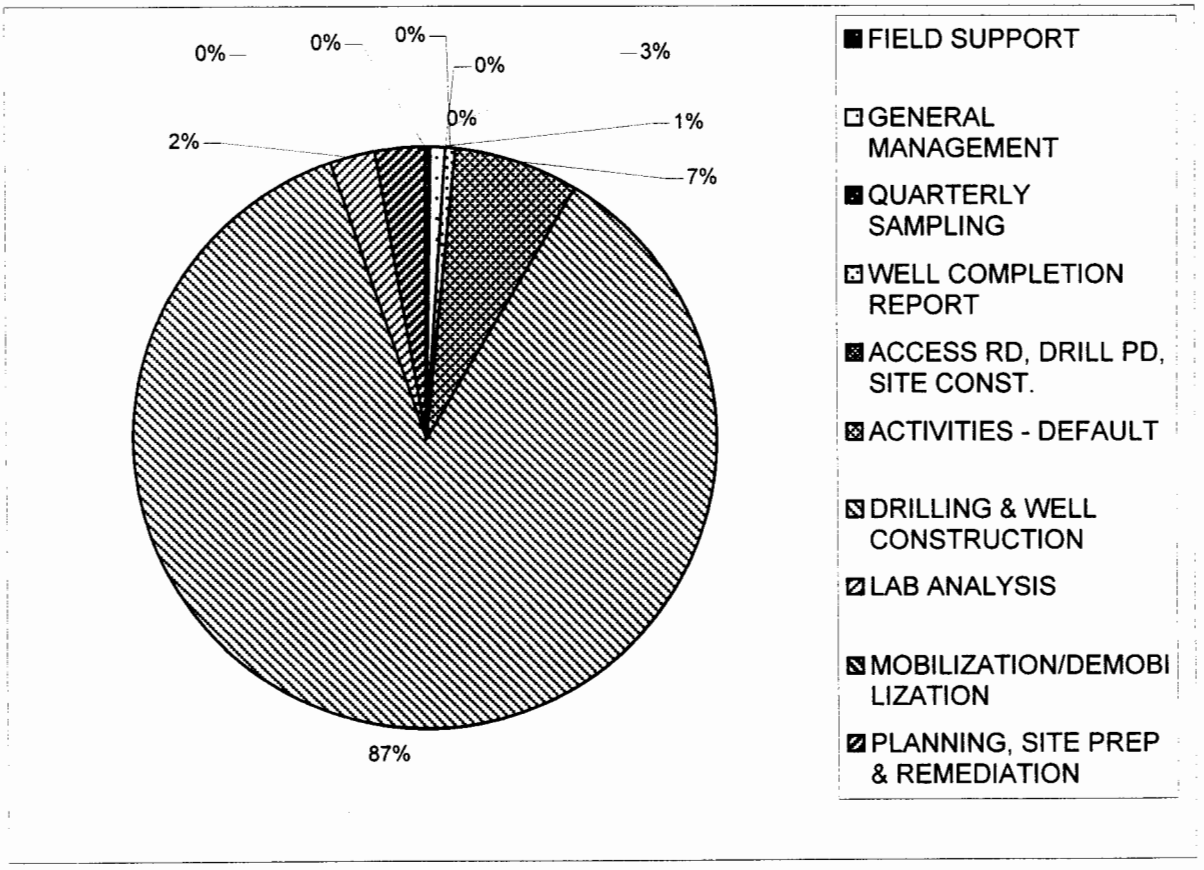
FY 00 R-15 COSTS BY ACTIVITY

ALL ACTIVITIES FY 00	101,796
DRILLING SUB-CONTRACT	134,514
FIELD SUPPORT	1,859
GENERAL MANAGEMENT	16,885
LAB ANALYSES	34,325
MOBILIZATION DEMOBILZATION	1,585
PLANNING	2,327
QUARTERLY SAMPLING	13,204
R-15 FIELD OPERATIONS	3
TESTING, ANALYSIS, AND INTERPRETATION	35,745
WELL COMPLETION REPORT	73,682
Grand Total	415,926



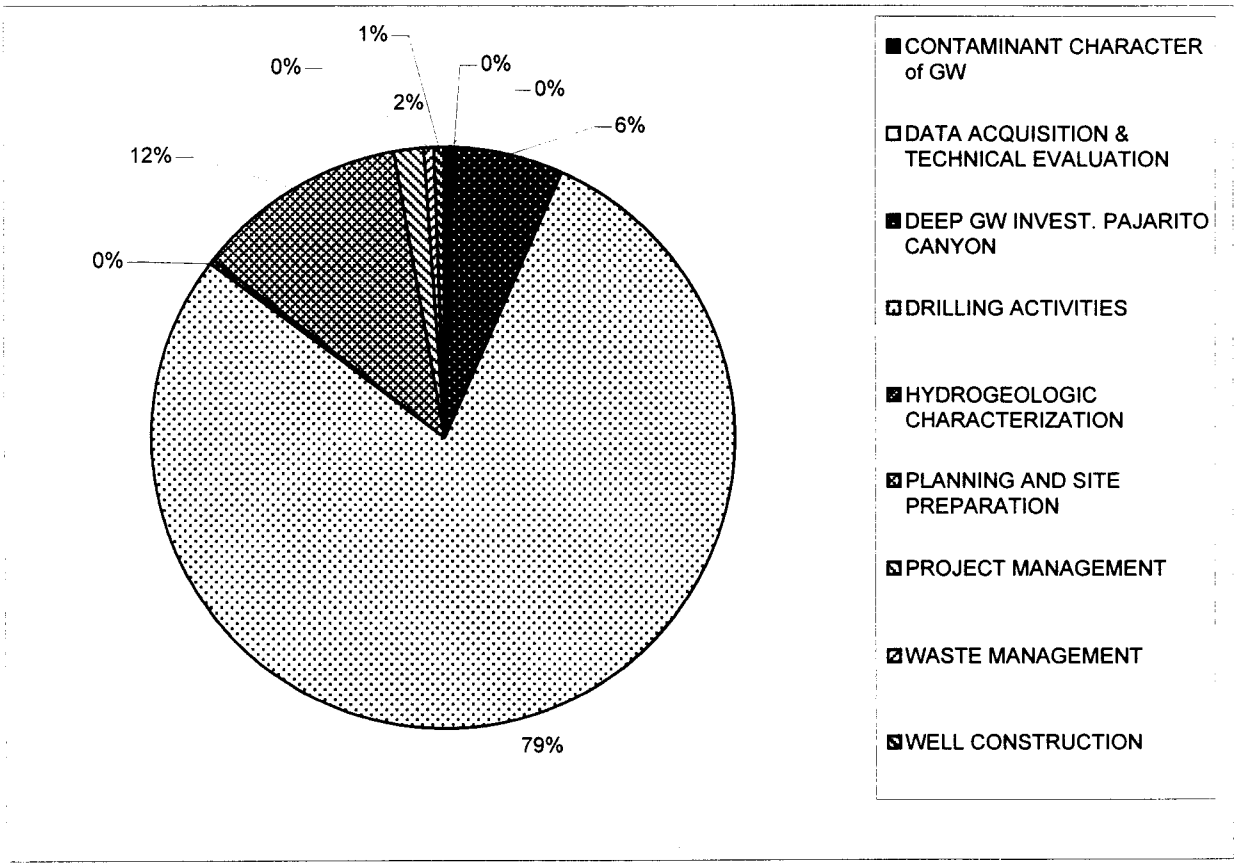
FY 00 R-19 COSTS BY ACTIVITY

FIELD SUPPORT	8,171
GENERAL MANAGEMENT	22,813
QUARTERLY SAMPLING	469
WELL COMPLETION REPORT	9,486
ACCESS RD, DRILL PD, SITE CONST.	99
ACTIVITIES - DEFAULT	184,459
DRILLING & WELL CONSTRUCTION	2,291,882
LAB ANALYSIS	63,367
MOBILIZATION/DEMOBILIZATION	0
PLANNING, SITE PREP & REMEDIATION	76,625
TESTING, ANALYSIS AND INTERPRETATION	60,021
Grand Total	2,717,391



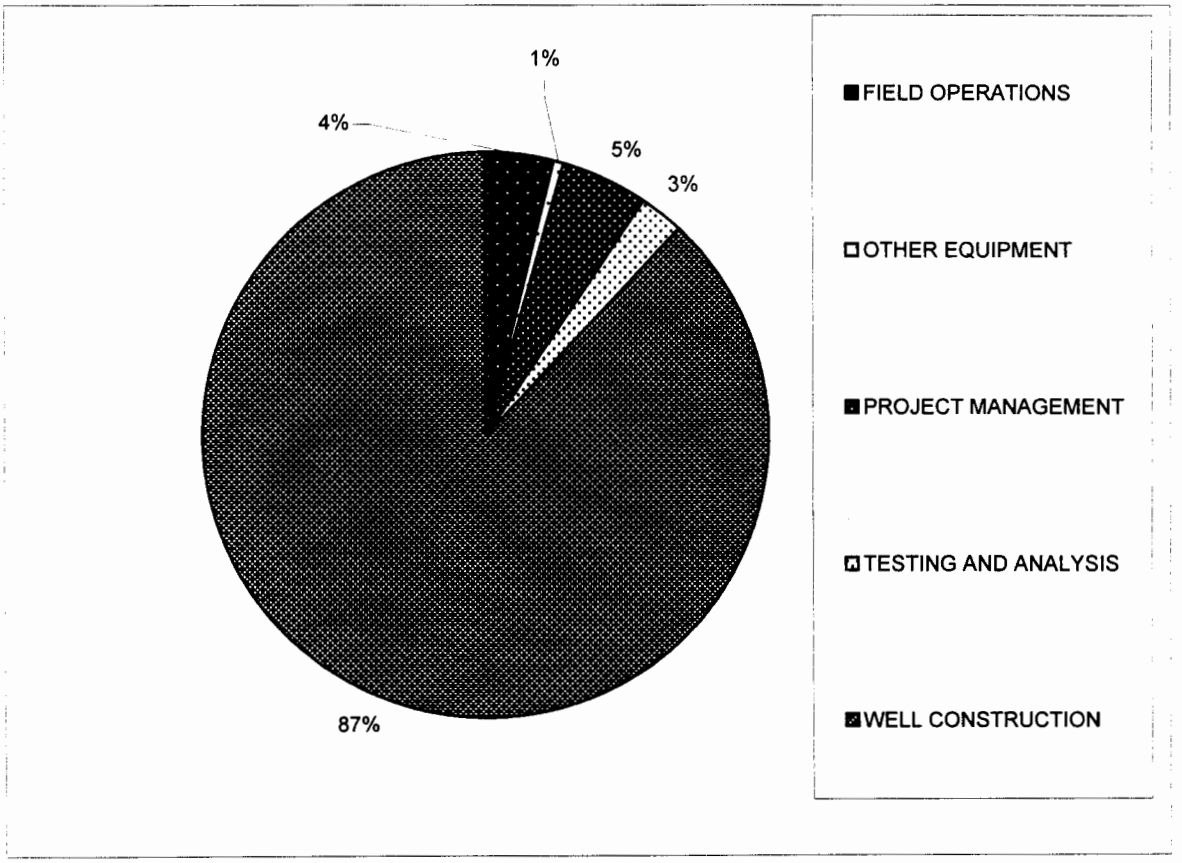
FY 00 R-22 COSTS BY ACTIVITY

CONTAMINANT CHARACTER of GW	3,096
DATA ACQUISITION & TECHNICAL EVALUATION	1,663
DEEP GW INVEST. PAJARITO CANYON	43,620
DRILLING ACTIVITIES	570,201
HYDROGEOLOGIC CHARACTERIZATION	1,586
PLANNING AND SITE PREPARATION	85,039
PROJECT MANAGEMENT	12,046
WASTE MANAGEMENT	2,465
WELL CONSTRUCTION	4,821
Grand Total	724,535



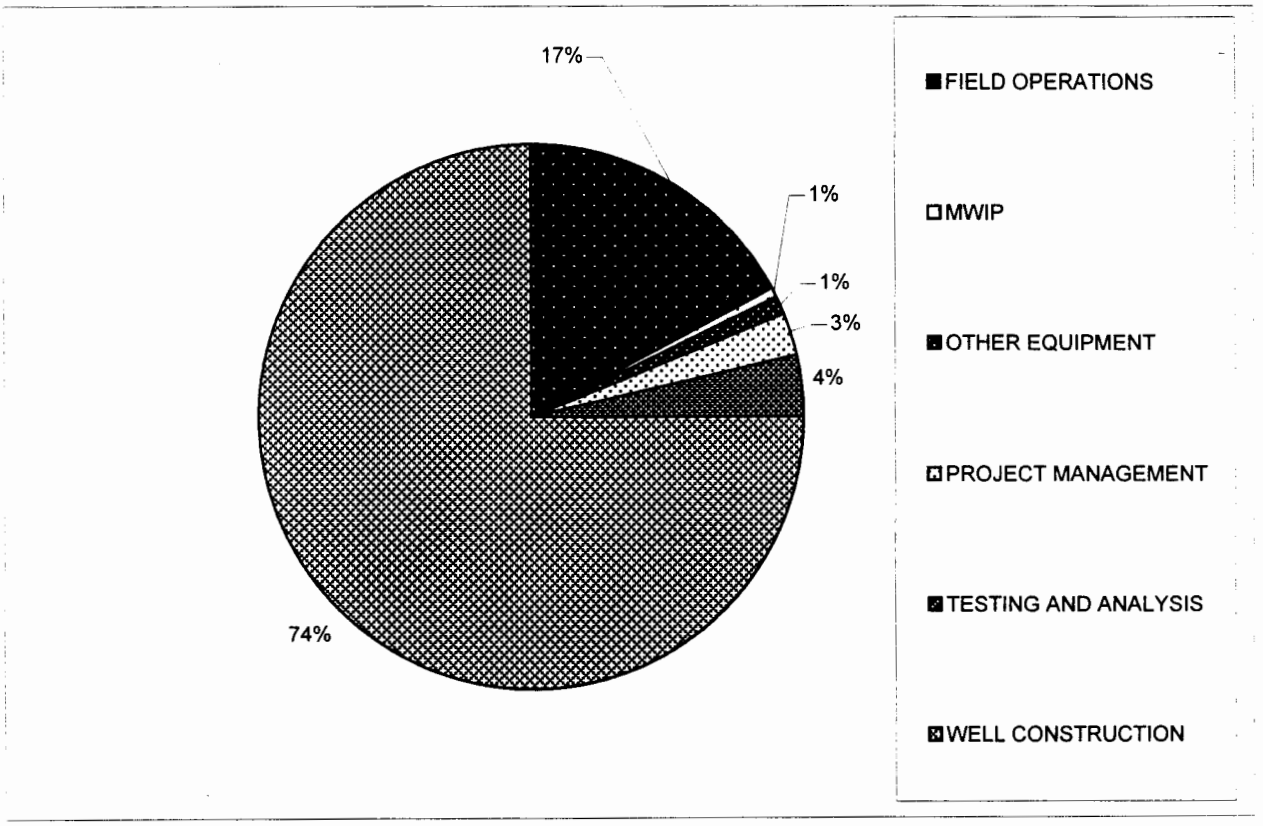
FY 00 R-25
COSTS BY ACTIVITY

FIELD OPERATIONS	22,175
OTHER EQUIPMENT	4,615
PROJECT MANAGEMENT	28,762
TESTING AND ANALYSIS	15,349
WELL CONSTRUCTION	516,311
Grand Total	587,212



FY 00 R-31
COSTS BY ACTIVITY

FIELD OPERATIONS	303,643
MWIP	9,115
OTHER EQUIPMENT	18,638
PROJECT MANAGEMENT	46,336
TESTING AND ANALYSIS	61,845
WELL CONSTRUCTION	1,326,542
Grand Total	1,766,118

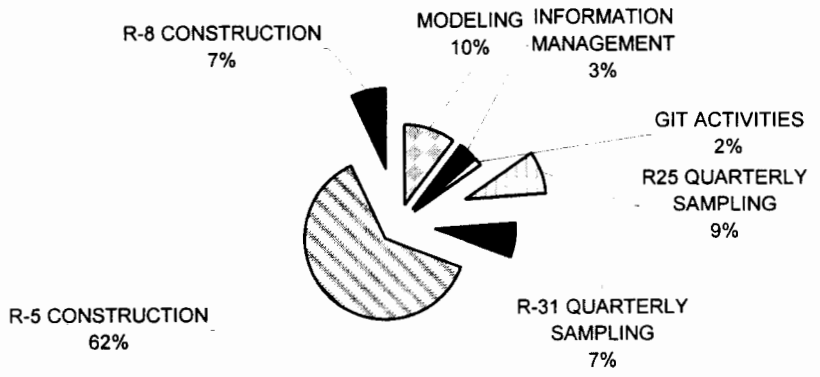


FY 01 BUDGET FOR DP FUNDED WELLS

DP FUNDING

MODELING	300
INFORMATION MANAGEMENT	100
GIT ACTIVITIES	50
WELLS:	
R25 QUARTERLY SAMPLING	250
R-31 QUARTERLY SAMPLING	200
R-5 CONSTRUCTION	1,819
R-8 CONSTRUCTION	200
TOTAL FY 01 BUDGET	2,919

DP FUNDS BUDGET DISTRIBUTION



OTHER GIT FUNDING

ESH-18	120
ESH-D0	100
ER	75
TOTAL	295

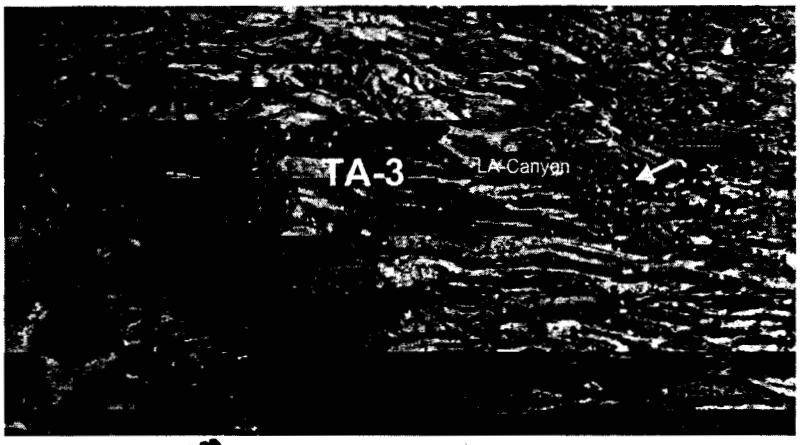
Los Alamos Canyon Low-Head Weir Monitoring Site

Gilles Bussod[1]
Charlie Nylander[2]
Bill Stone[1]

[1] Earth and Environmental Sciences Division
[2] Environmental Safety and Health Division

Los Alamos National Laboratory

The Cerro Grande Fire: Watershed Damage



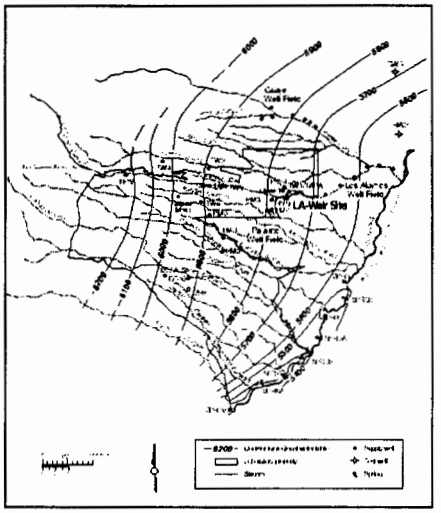
Construction of Los Alamos Canyon Weir June-July 2000

LA-Weir Monitoring Site: August 2000

environmental restoration project

Los Alamos NATIONAL LABORATORY

LA-Weir Location Map



environmental restoration project

Los Alamos NATIONAL LABORATORY

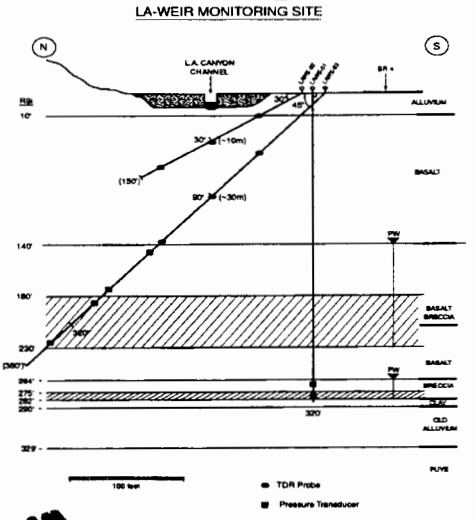
LA-Weir Monitoring Objectives

- Monitor infiltrating waters and contaminant chemistry through vadose zone
- Monitor hydrologic and hydrochemical characteristics of perched waters
- Characterize the hydrochemical evolution of the vadose zone and assess the impact of flooding in LA-Canyon

LA-Weir Monitoring Objectives (continued)

- Verify and validate models of flow and transport through Cerros del Rio basalt
- Integrate findings with Regional well characterization program
- Assess surface contaminant redistribution and the impact on subsurface migration
- Provide recommendation on viability of low-head weir

LA-Weir Conceptual Design



environmental restoration project

Los Alamos NATIONAL LABORATORY

LA-Weir Monitoring: Construction Plan

(1) 09-04-00 to 09-29-00:

- Finalize Drilling and Construction Contracts
- SOW, FIP and SHASPs

(2) 10-04-00 to 10-18-00:

- Obtain Permits (Safety, Land etc..)
- Equipment procurements

environmental restoration project

Los Alamos NATIONAL LABORATORY

LA-Weir Monitoring: Construction Plan (Continued)

(3) 10-16-00 to 11-22-00:

- Construction of 3 Wells:
  - LAWS-01: cased 320 ft. vertical well
  - LAWS-02: open-hole 150 ft. 30° slant well
  - LAWS-03: open-hole 380 ft. 45° slant well
- Core sample collection, LAWS-01
- Geophysical and video well logs

LA-Weir Monitoring: Construction Plan (Continued)

(3) 10-16-00 to 11-22-00 (cont'd):

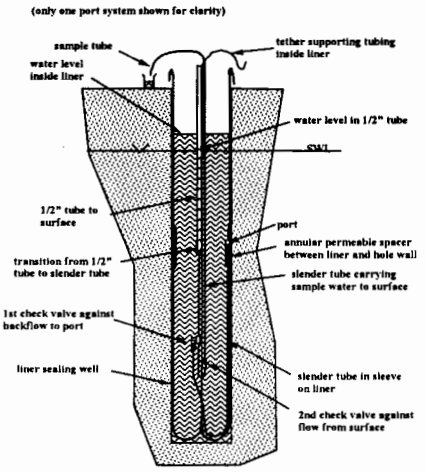
- Construction of membranes and data-logging systems (FLUTe, Inc., and SEA)
- Interpretation of hydrologic system from cores, geophysics and drilling data
- Installation of surface monitoring stations

LA-Weir Monitoring: Construction Plan (Continued)

(4) 11-27-00 to 12-18-00:

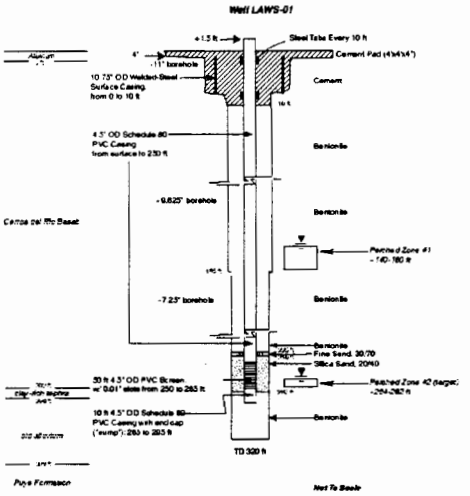
- Mapping of vadose zone
- Installation of LAWS-01 perched water sampling well
- Installation of LAWS-02, 03 vadose and perched water monitoring stations

Water Sampling System



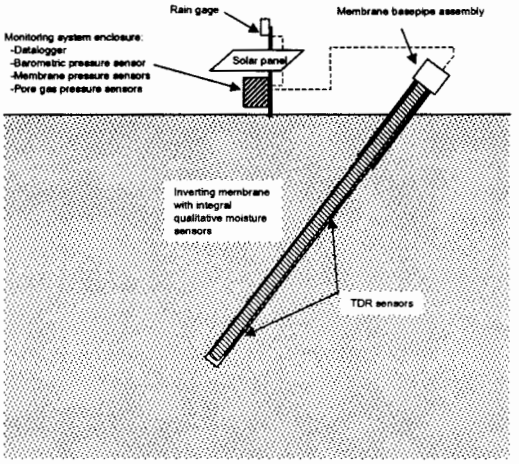
FLUTE, Inc.

LA-Weir Well Design: LAWS-01



LA-Weir Slant Well Installation

LAWS-02: 150 ft., 30°
LAWS-03: 380 ft, 45°



Ensuring Acceptable Risk: The Ultimate DQO

Diana Hollis
Strategic Decision Analysis Team Leader
LANL Environmental Restoration Project

Los Alamos NATIONAL LABORATORY

Presentation Content

- ER's Risk-Based Decision Support Task
- ER's Integrated Modeling Task
- ER's Integration with the GIT

Los Alamos NATIONAL LABORATORY

Risk-Based Decisions Support Task

- Ensures and enables a risk-based approach to corrective actions, as endorsed by EPA and NMED
- Uses risk assessment as the ultimate DQO for decisions regarding site characterization and site remediation
- Addresses groundwater contamination in both site-specific and cumulative (multiple sites) risk assessments

Los Alamos NATIONAL LABORATORY

Risk-Based Decisions Support Task

- Keeps pace with conceptual model revisions under HWP
- Implements processes and tools developed by the international radioactive waste repository community to document and justify conceptual and simulation models
  - Hazard Identification
  - Decision Logic
  - F(eatures), E(vents), P(rocesses) lists
  - Interaction matrix

Risk-Based Decision Support Task

"Risk-based decision-making offers a scientifically sound and administratively effective way to respond to the pressures for timely action at large numbers of sites and efficient use of both public and private resources."

-DOE, (Can't find ref!)

Risk-Based Decision Support Task

- Risk-based corrective actions for contamination in groundwater is borrowed from EPA
- Focus attention and resources on groundwater contamination that poses the greatest risk
- Understand the system to ensure that remediation decisions provide the greatest risk reduction within the system
- Make decisions that provide the greatest real risk reduction per dollar invested

Risk-Based Decision Support Task

- "Decouple" corrective actions for surface, vadose-zone and shallow groundwater from corrective actions for deep groundwater to ensure parallel progress
- Integrate investigations of regional aquifer contamination with hydrogeologic characterization project (R-wells)
- Assimilate "R-well data" with all other ER data into a conceptual exposure model to support risk assessment

Risk-Based Decision Support Task

- When contamination is found in *validated* samples from R-wells, compare concentrations to applicable risk-based threshold
- If contaminant concentration exceed threshold, evaluate potential *accessibility* of water (exposure routes)
- If contaminant concentration exceed threshold and water is accessible, alert Administrative Authority

Risk-Based Decision Support Task

- In iterative manner as R-well data are collected, evaluate cumulative risk of all contaminants present in groundwater accessible by common receptor
- If cumulative risks are determined to exceed EPA risk thresholds at accessible locations, determine optimal mitigation actions

Risk-Based Decision Support Task

"If there is no risk, there is no need to do anything else. Any actions and modeling are governed by the risk assessment."

- *Charlie McLane, GIT EAG*

Integrated Modeling Task

- Ensures that "models" used to support risk-based corrective-action decisions are
  - documented
  - validated (to the extent possible)
  - transparent
  - based on site-specific data
- Ensures integrated development of data models and simulation models

Integrated Modeling Task

- Ensures documented and reproducible ("third-party implementable") processes and procedures for
  - data collection (with risk-based DQOs)
  - data management (FIMAD, ERDB, 2D hydrology atlas)
  - data modeling (geochemistry, geology, hydrology)
  - fate and transport modeling (CAD-based grid generation, FEHM, GoldSim)
  - risk modeling (RAGS, RAGS3)

Integrated Modeling Task

- Ensures integration of geologic, hydrologic, geochemical and contaminant data
  - 2D hydrogeology atlas
  - 3D geology model
  - Geochemical data model (e.g.,uranium reactive transport model)
- Beginning with vadose zone processes and working down (stratigraphically)

Los Alamos
NATIONAL LABORATORY

Integrated Modeling Task

- Ensures development of calibrated (validated) site-specific groundwater models
  - Injection Well Test, TA-50
  - Vapor plume, TA-54
  - Los Alamos Canyon
- Ensures development of models that provide information to support risk-based decisions
  - MDA G, TA-54
  - MDA AB, TA-49
  - GoldSim

Los Alamos
NATIONAL LABORATORY

Integrated Modeling Task

"EPA believes that... use of fate and transport models to establish risk levels can be appropriate ... EPA today announces that it is changing its 1987 policy ... under RCRA to allow use of fate and transport models..."

-EPA, September 4, 1996

Los Alamos
NATIONAL LABORATORY

Integrated Modeling Task

"Of course, one needs to know when to stop studying a particular site or process... The proper way to make such decisions is through a well integrated risk assessment activity that uses the data and modeling to assess uncertainty in the risk... The risk assessment modeling will drive the process-level modeling and the data collection activities..."

- Bruce Robinson, LANL EAG

Los Alamos NATIONAL LABORATORY

ER Integration with GIT

- GIT integrates many ER and HWP activities
  - Jointly funded R-well installation and field tests
  - ER in (risk-based) decision phase
  - HWP in "pre-decisional" characterization phase
- ER supports applied data collection ("plume-chasing" wells, alluvial wells), data analysis (EPA labs), data management (FSF, SMO, FIMAD) and data interpretation (modeling, risk assessment) activities
- HWP supports data collection, analysis (internal labs), data management (WQDB) and interpretive tasks (modeling)

Los Alamos NATIONAL LABORATORY

ER Integration with GIT

- Contamination found in groundwater
  - some from past ("EM") operations
  - some from ongoing ("DP") operations
- Groundwater protection (risk reduction) is mutual EM/DP (ER/HWP or GIT) objective
- Risk reduction is *THE* DQO for characterization and monitoring for
  - ongoing and planned DP programs
  - corrective actions planned for EM sites

Los Alamos NATIONAL LABORATORY

ER Integration with GIT

- ER's risk-based decision process can focus HWP characterization
- EAG recommendations regarding risk assessment and "risk as a DQO" for geochemistry and groundwater modeling support this assertion by
  - validating ER approach for risk assessment and modeling
  - identifying need for concrete integration of risk assessment and other GIT activities

ER Integration with GIT

- Risk-Based Decision Support subcommittee of GIT could ensure necessary integration
- Risk-Based Decision Support subcommittee could include
  - ER Team Leader(s)
  - GIT Chair
  - GIT Subcommittee Chairs
  - NMED, DOE-OB, Pueblos
- Subcommittee must be supported (financially and philosophically) by DP and EM
- Without risk "endpoint," when is characterization done?

ER Project
Management Assessment Overview
for
Groundwater Investigations Focus Area

October 3, 2000

Andrew E. Gallegos
Quality Liaison

Management Assessment Topics

- Assessment Scope
- Assessment Results
- Corrective Actions
- Recurrence Prevention, and Lessons Learned
- Conclusions

Assessment Scope

- The Management Assessment focused on the ER Project Groundwater Investigations Focus Area's effectiveness in meeting the requirements of the ER Project Quality Management Plan, specifically drilling activities associated with Wells R-25 and CdV-R-15-3.

Management Assessment Results

ER Project
Quality Management Plan

1. Program
2. Personnel Training and Qualification
3. Quality Improvement
4. Documents and Records
5. Work Processes
6. Design
7. Procurement
8. Inspection and Acceptance Testing
9. Management Assessment
10. Independent Assessments

Management Assessment Results (cont'd)

ER Project
Quality Management Plan

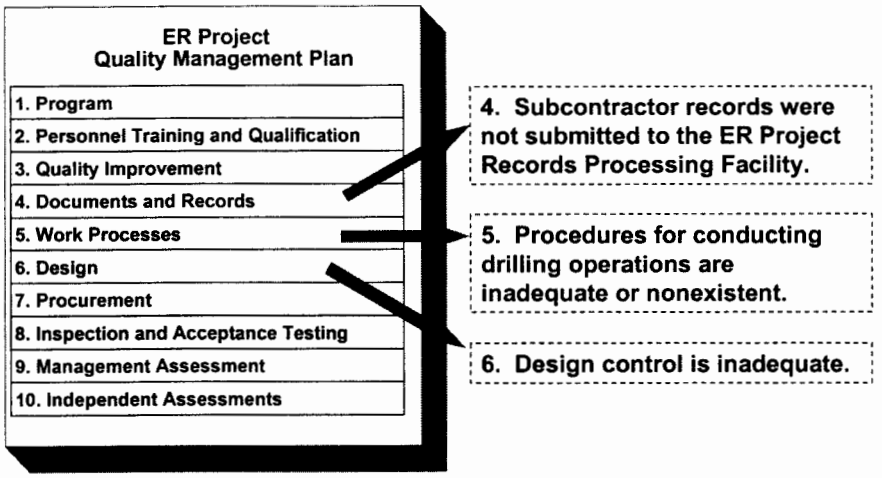
1. Program
2. Personnel Training and Qualification
3. Quality Improvement
4. Documents and Records
5. Work Processes
6. Design
7. Procurement
8. Inspection and Acceptance Testing
9. Management Assessment
10. Independent Assessments

1. Roles/responsibilities/ liabilities are not adequately addressed.

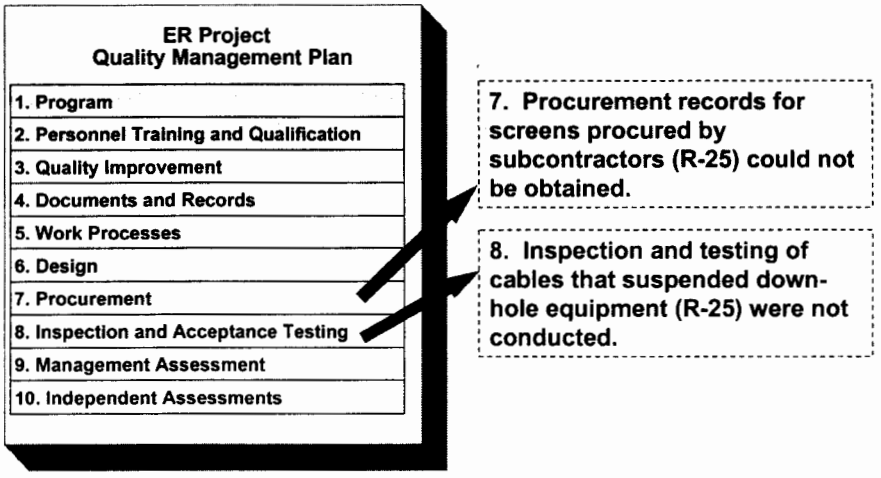
2. QA training documentation does not exist for any of the six primary UC management and staff overseeing drilling operations.

3. Documented "Lessons Learned" were not submitted in accordance with the Lessons Learned procedure.

Management Assessment Results (cont'd)



Management Assessment Results (cont'd)



Root Cause Analysis

- Weakness in program management and understanding of quality requirements as they apply to work being performed.

Corrective Actions

- Address all identified nonconforming conditions (e.g., root cause analysis, corrective action plan, tracking system).
- Expedite the development and implementation of the ER Project Training Program.
- Improve product quality by adherence to quality requirements.

Recurrence Prevention

- Identify, document and report nonconforming conditions.
- Conduct self-assessments of processes.
- Conduct Management Walk Arounds.
- Management visual/verbal support of quality requirements, and improvement processes.

Lessons Learned

- Submit noted lessons learned per QP-3.2, Lessons Learned.
- Identify, document, and submit future lessons learned.
- Make lessons learned a work place culture.

Conclusions

- **The Past:** ***Noted lessons learned and corrective actions were not implemented as expected and/or required.***
- **The Present:** ***Noted nonconforming conditions are being address by management (e.g., corrective action document being prepared and implemented).***
- **The Future:** ***"Quality Improvement", An all day, everyday process!***

Questions