DOE/NV--1037

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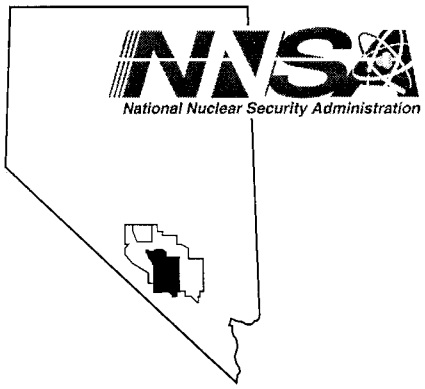

Post-Closure Inspection and Monitoring Report for Corrective Action Unit 91: Area 3 U-3fi Injection Well, Nevada Test Site, Nevada For the Period November 2003 - October 2004

Controlled Copy No.:_____

Revision: 0

January 2005

Environmental Restoration
Division

U.S. Department of Energy
National Nuclear Security Administration
Nevada Site Office

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DOE/NV--1037

POST-CLOSURE INSPECTION AND MONITORING REPORT FOR CORRECTIVE ACTION UNIT 91: AREA 3 U-3fi INJECTION WELL, NEVADA TEST SITE, NEVADA

FOR THE PERIOD NOVEMBER 2003 - OCTOBER 2004

Prepared for:
U.S. Department of Energy
National Nuclear Security Administration
Nevada Site Office
Under Contract No. DE-AC08-96NV11718

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FOR THE PERIOD NOVEMBER 2003 - OCTOBER 2004

Approved By: _____ Date: 1/19/05
Kevin Cabble, Acting Project Manager
Industrial Sites Project

Approved By: _____ Date: 1/19/05
Janet L. Appenzeller-Wing, Acting Director
Environmental Restoration Division

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ACRONYMS AND ABBREVIATIONS

bgs	below ground surface
BN	Bechtel Nevada
BJY	Buster Jangle Y
CAU	Corrective Action Unit
CFR	Code of Federal Regulations
cm	centimeter(s)
DOE	U.S. Department of Energy
DOE/NV	U.S. Department of Energy, Nevada Operations Office
ft	foot (feet)
in	inch(es)
km	kilometer(s)
LANL	Los Alamos National Laboratory
m	meter(s)
mi	mile(s)
NDEP	Nevada Division of Environmental Protection
NTS	Nevada Test Site
NOAA/ARL/SORD	National Oceanographic and Atmospheric Administration, Air Resources Laboratory, Special Operations and Research Division
RCRA	Resource Conservation and Recovery Act
REECo	Reynolds Electrical and Engineering Co, Inc.

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EXECUTIVE SUMMARY

This Post-Closure Inspection and Monitoring report provides an analysis and summary of inspections, meteorological information, and neutron soil moisture monitoring for Corrective Action Unit (CAU) 91: Area 3 U-3fi Injection Well, Nevada Test Site (NTS), Nevada. This report covers the annual period November 2003 through October 2004.

Site inspections of CAU 91 are performed every six months to identify any significant changes that could impact the proper operation of the waste disposal unit. Inspection results for the current period indicate that the overall condition of the concrete pad, perimeter fence, and warning signs is good.

A subsidence survey was completed in July 2004. The monument elevation was 1,230.836 meters (m) (4,038.175 feet [ft]), which indicated a decrease in elevation of -0.152 centimeters (cm) (-0.060 inches [in]) compared to the baseline survey of September 1996, and an increase in elevation of 0.305 cm (0.120 in) compared to the previous year, July 2003. The indicated subsidence is most likely due to instrument error, and there is no clear evidence of any true subsidence of the monument.

A directional borehole survey was conducted in October 2004 to determine if settling or subsidence within the U-3fi Injection Well is occurring. No changes are seen between the 2000 and 2004 year surveys. The survey data are at the resolution limit of the instrument and indicate stable conditions with no evidence of subsidence or stresses within the U-3fi Injection Well.

The total precipitation over the current monitoring period of November 2003 through October 2004 was 25.0 cm (9.86 in). The average precipitation over the same period from 1960 to 2004 is 16.3 cm (6.43 in).

Neutron soil moisture monitoring is performed quarterly to detect changes that may indicate moisture movement in the regulated interval extending 73 to 82 m (240 to 270 ft) below ground surface. The data collected during the current monitoring period indicate that the unit is performing as expected. The soil moisture data are below the action level of 200 residual raw counts within the regulated interval, and the well remains dry and stable.

Since monitoring began in 1995, the unit has been stable, well within compliance, and is performing as designed. Therefore, it is recommended to discontinue the soil moisture monitoring, subsidence surveys, and directional borehole surveys. Visual site inspections and maintenance will continue as scheduled to ensure the condition of the fence, warning signs, concrete pad, and use restrictions have been maintained. The results of the visual inspections and maintenance activities will be submitted to the NDEP in an annual letter report following the standardized Federal Facilities and Consent Order format. The inspection checklists and field notes will be included with this letter report.

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1.0 INTRODUCTION

1.1 SCOPE AND OBJECTIVES

Corrective Action Unit (CAU) 91, Area 3 U3-fi Injection Well, is located in Area 3 of the Nevada Test Site (NTS), Nye County, Nevada. This report provides an analysis and summary of site inspections, subsidence surveys, meteorological information, directional survey results, and soil moisture monitoring data obtained at CAU 91 for the period November 2003 through October 2004.

Inspections of CAU 91 are conducted every six months to determine and document the physical condition of the concrete pad, facilities, and any unusual conditions that could impact the proper operation of the waste disposal unit cover.

The objective of the soil moisture monitoring program is to monitor the stability of soil moisture conditions along the 128 meters (m) (420 feet [ft]) of the ER3-3 monitoring well and detect changes that may indicate moisture movement in the regulated depth interval between 73.2 and 82.3 m (240 and 270 ft).

1.2 SITE HISTORY

The CAU 91 Area 3 U-3fi Injection Well is located in Area 3 of the NTS approximately 105 kilometers (km) (65 miles [mi]) northwest of Las Vegas, Nevada (Figure 1). The site is an abandoned Los Alamos National Laboratory (LANL) emplacement hole (Figure 2). It was drilled by Reynolds Electrical and Engineering Co., Inc. (REECo) between March 27, 1967, and April 24, 1967, for emplacement of a nuclear explosive device. A detailed history of the emplacement hole drilling program is found in the U-3fi Injection Well Closure Plan (U.S. Department of Energy, Nevada Operations Office [DOE/NV], 1995b). On April 11, 1967, the hole reached a depth of 256 m (841 ft) below ground surface (bgs). Due to formation conditions, the hole collapsed, and the drill bit was trapped at 254.8 m (836 ft) bgs. All attempts to retrieve the drill bit failed. The top of the collapsed section of the emplacement hole was found at 73.2 m (240 ft) bgs, and the hole was abandoned on April 24, 1967.

The U-3fi Injection Well was established in 1970 as a disposal site for radiologically contaminated waste, primarily post-shot "high-grading" wash water, which was solidified with cement and drill cores (Tattro, 1989). The U-3fi Injection Well primarily received core samples and solidified decontamination wastes. Core samples consisted of mixed fission and activation products from the solidification of detonation debris/melt during post-shot drilling (U.S. Department of Energy [DOE], 1988). While under LANL control, only LANL solid drillback waste was disposed of in the U-3fi Injection Well. Control of the U-3fi Injection Well was assumed in 1977 by the U.S. Atomic Energy Commission, the predecessor of the DOE. At that time, four additional waste generators, Lawrence Livermore National Laboratory, Area 6 Decontamination Pad, Area 12 Tunnels, and LRY3 (an unspecified generator of weapons test program waste), began disposing of their waste in the U-3fi Injection Well.

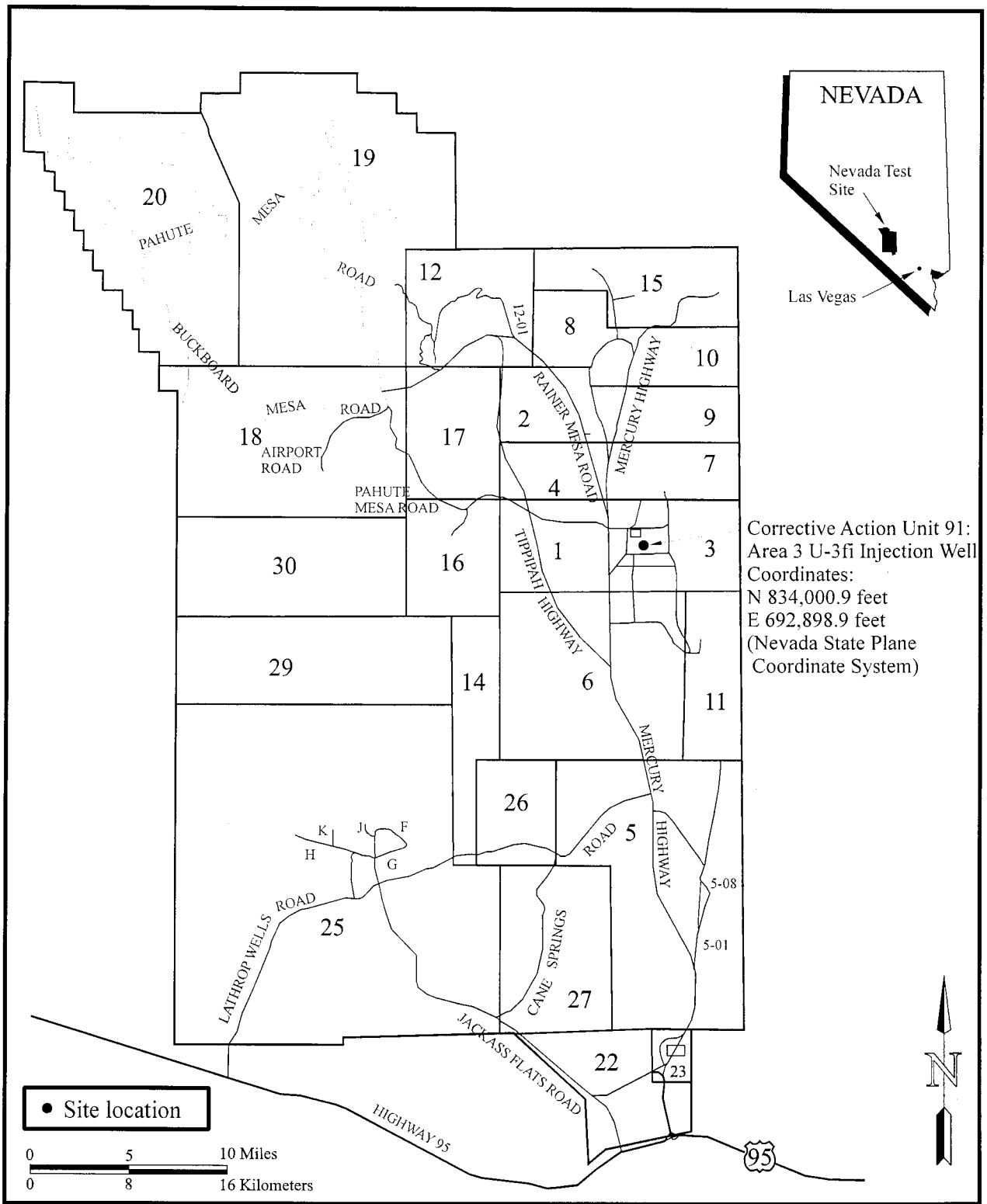

FIGURE 1
LOCATION OF CAU 91: AREA 3 U-3fi INJECTION WELL

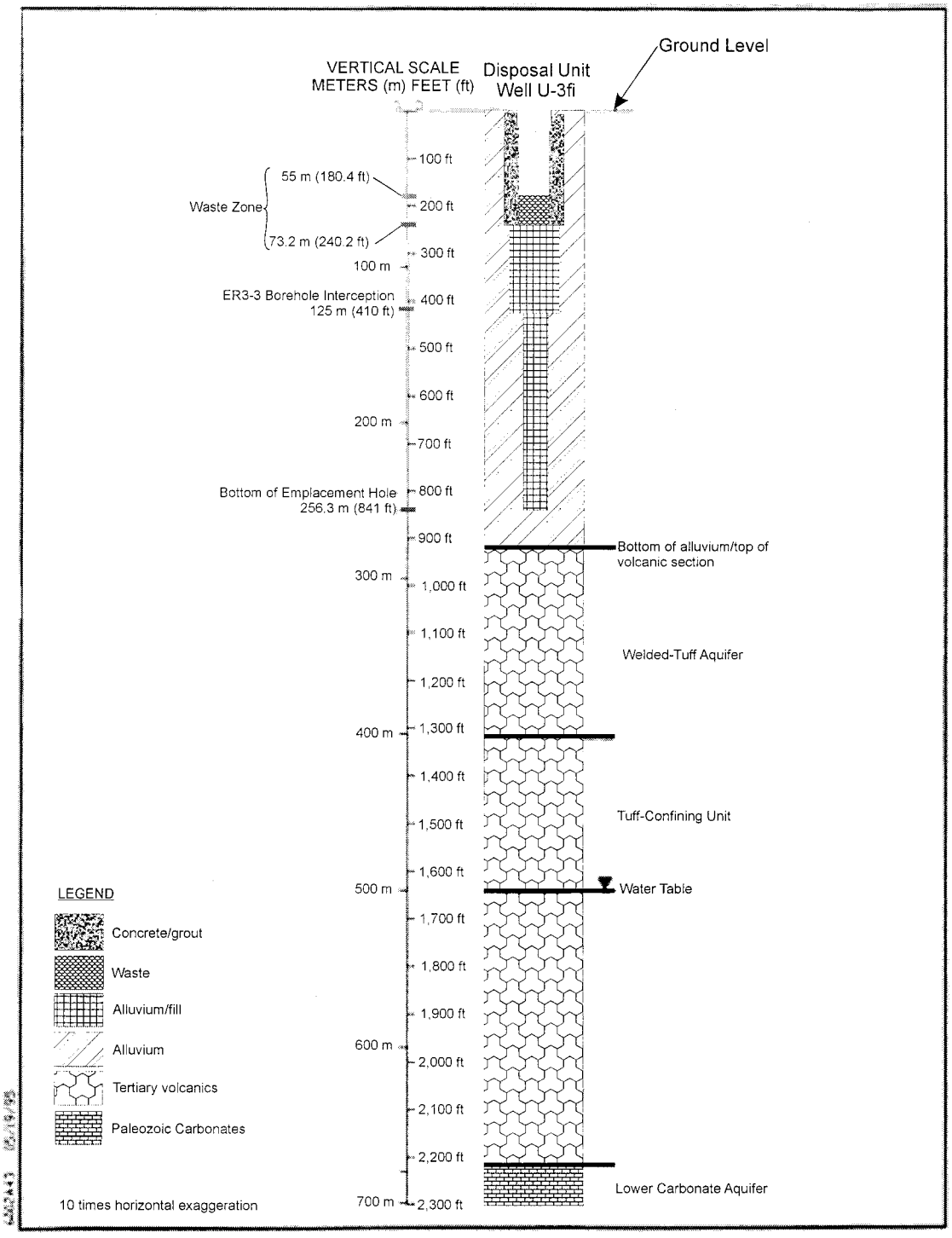

FIGURE 2
CROSS SECTIONAL VIEW OF THE CAU 91 U-3fi INJECTION WELL

Waste disposal record keeping for the U-3fi Injection Well began in 1977. The database, established and maintained by the DOE/NV M&O contractor, has 102 entries between January 11, 1977, and November 28, 1988. Access to the U-3fi Injection Well from 1977 to 1989 was through both REECo Radiation Safety and Wackenhut Services, Inc. Copies of the waste disposal documents are found in Appendix C of the Area 3 U-3fi Closure Plan (DOE/NV, 1995c).

According to waste disposal records, it is estimated that 86.34 curies (3,181 gigabecquerel) (1.7 kilograms [3.7 pounds]) of fission products from drilling activities were placed in the U-3fi Injection Well. Chromium from drilling mud and lead from pipe lubricant, stemming, and shielding materials may also be present. Waste was placed at a depth interval of 54.9 m (180 ft) to approximately 73.2 m (240 ft) bgs.

Subsurface characterization activities began in November 1994 with the installation of the ER3-3 borehole. The objectives of this study were to determine if constituents of concern were present in the subsurface and to assess the potential for migration of these constituents of concern from the waste zone to the surrounding formation.

The ER3-3 borehole is located 18.3 m (60 ft) south of the U-3fi Injection Well and was drilled at a design angle of 6 degrees from the vertical in order to intercept the U-3fi Injection Well at approximately 183 m (600 ft) bgs. In practice, the U-3fi Injection Well was intercepted at a depth of 125 m (410 ft) bgs due to drilling conditions that increased the ER3-3 borehole angle. The ER3-3 borehole reached a total drilled depth of 130 m (425 ft) in February 1995.

Cuttings and core samples, recovered during drilling operations, were used to study the geologic, lithologic, and hydrologic soil properties surrounding the U-3fi Injection Well. The results of these studies are discussed in the U-3fi Post-Closure Plan (DOE/NV, 1995d), which was approved by the Nevada Division of Environmental Protection (NDEP) on August 28, 1995. The DOE/NV Project Manager authorized closure of the U-3fi Injection Well at that time.

The ER3-3 borehole was completed as a neutron probe soil moisture monitoring well by removing the casing and stemming a single-wall steel casing in place. The monitoring well is located entirely within the vadose zone and extends from the surface to a drilled depth of 128 m (420 ft). Its purpose is to provide post-closure monitoring for changes in soil moisture content that would indicate moisture migration in the vicinity of the waste and to detect subsidence of material in the U-3fi Injection Well.

On September 6, 1995, the stemming activities in the U-3fi Injection Well began with the placement of a layer of 20/40 sand 2.13 m (7 ft) thick and an expanding cement grout plug 4.6 m (15 ft) thick. Once this plug was set, the casing was filled with 32.6 m (107 ft) of NTS fine stemming sand and grouted to the ground surface with an expanding cement plug 13.7 m (45 ft) thick. On September 28, 1995, the U-3fi Injection Well was declared closed.

The first neutron log from the ER3-3 monitoring well was obtained in July 1995. The first year of monitoring established the baseline conditions. The first quarterly monitoring was conducted in October 1996. Significant events for the U-3fi Injection Well are summarized in Table 1.

TABLE 1: CHRONOLOGY OF THE AREA 3 U-3FI INJECTION WELL

DATE	SIGNIFICANT EVENTS
1970	U-3fi Injection Well established as disposal site for radiologically contaminated waste consisting of solidified post-shot wastewater and drill cores.
1989	Waste no longer accepted for disposal in U-3fi Injection Well.
1994	Subsurface site characterization studies began in November 1994 with installation of the ER3-3 borehole. The ER3-3 borehole was drilled 13.3 m (60 ft) south of the U-3fi Injection Well at an angle of 6^0 to a depth of 130 m (425 ft).
1995	Resource Conservation and Recovery Act Industrial Site Environmental Restoration Closure Plan, Area 3 U-3fi Waste Unit, issued June 1995 (DOE/NV, 1995c).
	Resource Conservation and Recovery Act Industrial Sites Environmental Restoration Post-Closure Plan, Area 3 U-3fi Waste Unit, issued August 1995 (DOE/NV, 1995d).
	First-year neutron baseline data set obtained in July 1995.
	Stemming and grouting activities in U-3fi Injection Well began on September 6, 1995.
	U-3fi Injection Well was declared closed on September 28, 1995.
	Area 3 U-3fi Waste Unit Resource Conservation and Recovery Act Closure Report, issued November 1995 (DOE/NV, 1995a).
1996	DOE/NV petitions NDEP to change the action level to 200 counts above baseline conditions in the regulated interval (DOE/NV, 1996).
	First quarterly monitoring began in October 1996.
1997	First Annual Report RCRA Post-Closure Monitoring and Inspections for the U-3fi Waste Unit for the Period July 1995 - October 1996, issued in January 1997 (DOE/NV, 1997).
	A Class One Modification to adjust the monitoring criterion in Section V of the Historic RCRA Units (Permit No. NEV HW009) for the U-3fi Injection Well was adopted on May 31, 1997.
	During first-quarter neutron logging, the logging tool #7074 separated from cable and was irreparably damaged in the fall. A backup instrument was calibrated to replace #7074.
2000	Required five-year directional survey run on ER3-3 access casing. No subsidence of casing was indicated.
2004	Required five-year directional survey run on ER3-3 access casing in October. No subsidence of casing was indicated.

1.3 SITE GEOLOGY AND HYDROLOGY

The U-3fi Injection Well is located in the west central portion of Yucca Flat in Area 3 of the NTS, Nye County, Nevada (N 834,004, E 692,900; Nevada State Plane coordinate system). Yucca Flat is located within the Ash Meadows hydrologic sub-basin (Waddell, 1982). Regional

groundwater flow is assumed to be south-southwest. Discharge occurs primarily in Ash Meadows, located approximately 80 km (50 mi) to the south-southwest.

The U-3fi Injection Well extends to approximately 256 m (841 ft) bgs and penetrates Quaternary and Tertiary alluvial deposits which extend locally to about 274 m (900 ft) bgs. These deposits are variably cemented, moderately sorted sand and gravel derived from local hills. Beneath the alluvium, a Tertiary volcanic sequence extends from about 274 m (900 ft) to about 671 m (2,200 ft) bgs. These rocks form two hydrogeologic units: the welded-tuff aquifer and the tuff confining unit (Winograd et al., 1975). The water table beneath U-3fi occurs within the tuff confining unit at approximately 488 m (1,600 ft) bgs. Underlying the volcanic sequence is the lower carbonate aquifer comprised of Paleozoic limestones and dolomites. These rocks are complexly faulted and form the primary groundwater transport path towards the Ash Meadows discharge point. The lower carbonate aquifer is estimated to be approximately 1,000 m (3,300 ft) thick beneath the U-3fi Injection Well. Vertical migration of groundwater beneath the U-3fi Injection Well is controlled by the tuff-confining unit. Lateral (regional) migration is controlled by the lower carbonate aquifer.

The average annual precipitation at Well ER 6-1, located approximately 10 km (6.2 mi) south of the U-3fi Injection Well, is 16.03 centimeters (cm) (6.31 inches [in]). Estimates of potential evapotranspiration obtained from characterization studies in Area 5 indicate potential evapotranspiration of about 157.5 cm/year (62 in/year), which is significantly higher than the mean annual precipitation (DOE/NV, 1995b). Recharge to the subsurface is believed to be nonexistent.

2.0 REGULATORY CRITERIA

2.1 BACKGROUND

Section 4.0 of the U-3fi Post-Closure Plan (DOE/NV, 1995d) specified a neutron monitoring program that is to be based upon monitoring and reporting changes in absolute volumetric soil moisture content. An action criterion for tracking and reporting to the NDEP was specified as observing a 5 percent relative increase in volumetric moisture content for two or more consecutive monitoring periods. Because the well was designed for obtaining raw neutron counts, this specification would have required a complicated and expensive calibration for determining absolute soil moisture content in the telescoping, sand-packed borehole. Implementation of this strategy would be both costly and technically problematic.

In December 1995, a meeting was held with representatives from the NDEP, DOE/NV, and REECo to discuss changing the monitoring strategy. This was necessary for two reasons: (1) the benefits of obtaining a compound calibration for absolute moisture content are offset by the high cost of calibrating for the ER3-3 well geometry, and (2) considering the depth of the regulated interval and dry climatic conditions at the NTS, changes in moisture content are not expected. Therefore, a relatively simple program of monitoring changes in raw neutron counts would be both conservative and sufficient. It was agreed that it is unnecessary to calibrate the neutron probe for the ER3-3 well geometry, but that any alternative proposal must be more conservative than the absolute volumetric moisture content action levels initially presented. In addition, it was agreed to obtain up to 12 months of baseline neutron data and then propose an alternative monitoring plan to the NDEP.

The proposed alternative to an absolute calibration was to use "statistically significant" changes in raw counts from the neutron tool to determine when an increase in moisture content occurred in the regulated interval. The philosophy in using this approach is guided by two statements:

1. Considering both the depth to the regulated interval and the arid site conditions, no change is expected due to surface rainfall events and infiltration. Therefore, any changes above the system noise level could be considered significant regardless of the change in absolute moisture content. Consequently, calibration of the neutron gauge to local geometries and soil conditions would not be required.

2. Because the proposed monitoring is based on changes in raw counts, and not on the absolute moisture content, the criteria for setting an action level should be more conservative than what would be set when using an absolute soil moisture content.

Considering these statements, a conservative choice for the action level would be "any statistically significant changes greater than some small multiple of the system noise level." A statistical method called Bootstrap (Bradley and Tibshirani, 1993) was run using the one-year baseline data set to provide the statistical character of the system noise and a 20-year acceptance rate of about 2 percent for both false positives and false negatives. The simulation was carried out to 2,000 years of quarterly monitoring (8,000 observations) in the 73.2 to 82.3-m (240 to 270-ft) regulated interval. For an acceptance rate of 2 percent, an action level of a 200 count

deviation from baseline conditions was found to meet the design criterion. Details of this process can be found in the U-3fi First Annual Post-Closure Monitoring and Inspection Report (DOE/NV, 1997) and a letter discussing the technical basis for establishing the action level (DOE/NV, 1996).

In October 1996, a formal proposal (DOE/NV, 1996) from DOE/NV was submitted to the NDEP requesting that the post-closure monitoring activities be modified to reflect an action level based on a deviation in raw neutron counts of 200 counts in the regulated interval for two or more consecutive monitoring periods. NDEP approved this request on December 9, 1996 (NDEP, 1996). A Class One Permit Modification incorporating the criterion provided in the December 1996 letter requesting changes in the U-3fi Post-Closure Plan (DOE/NV, 1995d) was issued on May 31, 1997 (NDEP, 1997).

2.2 Site Inspection Criteria

Inspections are conducted every six months (March and September) according to criteria specified in Section 5.0 of the U-3fi Post-Closure Plan (DOE/NV, 1995d). Prior to conducting a post-closure inspection, a review of design drawings, aerial photographs, and site maintenance records is performed to provide a basis for evaluating site conditions. The site inspection encompasses the entire site within 300 m (1,000 ft) of the U-3fi Injection Well and includes photographic documentation. The Post-Closure Inspection Checklist (Appendix A) details items of concern under the following topics:

- Adjacent off-site features in the watershed areas up-slope of the unit, such as new roads and erosion channels
- Access roads, fences, gates, and signs
- Monuments and other permanent features
- U-3fi waste unit within the fenced area
- Site drainage features
- ER3-3 monitoring well access

2.3 Soil Moisture Monitoring Criteria

The CAU 91 post-closure monitoring is performed quarterly and requires notification to the NDEP if the residual raw neutron counts (quarterly raw counts minus baseline raw counts) exceeds 200 in the regulated interval extending between 73.2 to 82.3 m (240 to 270 ft) for two or more consecutive monitoring periods. The post-closure monitoring criterion also requires notification to the NDEP if settling in the U-3fi Injection Well has occurred on a scale large enough to cause shearing of the lower portion of the ER3-3 monitoring well. A subsidence survey is conducted at the U-3fi elevation monument annually, and a borehole gyroscopic survey is conducted every five years to determine if the borehole casing is being subjected to stresses which may indicate subsidence within the U-3fi Injection Well.

3.0 SITE INSPECTIONS, SUBSIDENCE SURVEY, AND DIRECTIONAL BOREHOLE SURVEY

3.1 INTRODUCTION

To comply with the post-closure care requirements, formal site inspections have been conducted twice a year, in March and September, since the closure of the unit in September 1995. The inspections are completed to evaluate the performance and maintenance needs of the unit in accordance with the requirements of Title 40 Code of Federal Regulations Section 265.15 and the RCRA Part B Permit (NDEP, 1997). A complete inspection package includes copies of the inspection checklists, field notes, site photographs, and the inspector's current resume. Copies of the inspection checklists, associated field notes, and photographs for the March 2004 and September 2004 site inspections are included in Appendix A. Copies of the inspectors' resumes can be obtained by contacting the U.S. Department of Energy National Nuclear Security Administration, Nevada Site Office, Environmental Restoration Division.

3.2 SITE INSPECTION RESULTS

The first post-closure inspection was conducted on March 22, 2004. All access roads, fences, gates, and signs were in excellent condition. Light, hairline, radial cracks were noted on the monument pad. They do not affect the integrity of the unit but should be watched closely for further cracking. No issues or concerns were noted.

The second post-closure inspection was conducted on September 14, 2004. All access roads, fences, gates, and signs were in excellent condition. No issues were noted on the cover.

The unit is in good condition. No issues or concerns were noted, and site inspections should continue as scheduled.

3.3 SUBSIDENCE SURVEY

A subsidence monument was installed in the cement plug on the U-3fi cover and surveyed on September 18, 1995. This monument provides elevation control to determine if subsidence of the U-3fi Injection Well is occurring. The Subsidence Survey Plat is included in Appendix B. The first-year subsidence survey was conducted on September 5, 1996. It had been determined that the original 1995 survey was invalid because the survey had been done without a proper closure (DOE/NV, 1997). Therefore, the September 5, 1996, survey, with a control elevation of 1,230.84 m (4,038.18 ft), was selected to represent the baseline elevation of the subsidence monument. All subsequent surveys will record subsidence relative to this elevation.

A subsidence survey was completed in July 2004 with a monument elevation of 1,230.836 m (4,038.175 ft), which indicated a slight subsidence of -0.152 cm (-0.060 in) compared to the baseline survey of September 5, 1996, and a slight upheaval of 0.305 cm (0.120 in) compared to the previous year, July 31, 2003. The magnitude of these changes is small enough to be at the level of resolution for the survey instrument; therefore, it is not clear if the changes represent actual subsidence or measurement error. There is no clear evidence of any subsidence of the monument. The survey results are provided in Table 2.

TABLE 2: U-3FI SUBSIDENCE MONUMENT COORDINATES AND ELEVATIONS

SURVEY DATE	COORDINATES[a]		ELEVATION[b] AT TOP OF MONUMENT (Feet)	SUBSIDENCE FROM 1996 CONTROL ELEVATION (Feet)	
	NORTHING	EASTING			
September 18, 1995	N 834,004.00	E 692,900.30	(4,038.1)[c]	-	
September 5, 1996	N 834,004.00	E 692,900.35	4,038.180	-	
July 30, 1997	N 834,004.00	E 692,900.35	4,038.180	0.000	
August 3, 1998	N 834,004.00	E 692,900.35	4,038.151	-0.029	Avg. -0.025
September 1, 1998[d]	N 834,004.00	E 692,900.35	4,038.159	-0.021	
July 12, 1999	N 834,004.00	E 692,900.35	4,038.160	-0.020	
July 31, 2000	N 834,004.00	E 692,900.35	4,038.168	-0.012	
July 23, 2001	N 834,004.00	E 692,900.35	4,038.166	-0.014	
July 8, 2002	N 834,004.00	E 692,900.35	4,038.165	-0.015	
July 31, 2003	N 834,004.00	E 692,900.35	4,038.165	-0.015	
July 8, 2004	N 834,004.00	E 692,900.35	4,038.175	-0.005	

[a] All coordinates based on the Nevada State Plane Grid, Central Zone - North American Datum of 1983 in feet.
[b] All elevations based on the National Geodetic Vertical Datum of 1929 in feet.
[c] Elevation cannot be proven due to failure to perform a proper closure on the original survey. September 5, 1996, survey will be used for the elevation control datum.
[d] Re-run confirmation survey.

3.4 DIRECTIONAL BOREHOLE SURVEY

The CAU 91 closure plan and RCRA permit require that a directional survey be conducted on the ER3-3 access casing every five years to determine if settling or subsidence within the U-3fi Injection Well is occurring. Directional borehole surveys were conducted by Wellbore Navigation Inc., Tustin, California, in July 2000 and again in October 2004. The objective of these surveys was to document deviations in the inclination and vertical depth from conditions determined in the February 1995 completion baseline survey. Changes in these parameters would indicate subsidence within the U-3fi Injection Well. The October 2004 survey was conducted one year earlier than required so that the directional survey data could be used in an evaluation of the performance of the closure and the requirements for future monitoring.

The current directional survey was run using the same equipment and techniques as previous surveys. Gyroscope readings on the in-run were taken at 6.1-m (20-ft.) intervals from a measured depth (casing length) of 0 to 107 m (0 to 350 ft), and at 0.61-m (2-ft.) intervals between 107 to 126 m (350 to 414 ft). The out-run data were offset by 0.30 m (1 ft) and 3.05 m (10 ft) from the in-run positions and then collected on a 0.61-m (2-ft) and 6.10-m (20-ft) interval. In 2004, six runs were conducted interleaving the even interval in-runs and odd interval out-runs. The final run was taken reading the even and odd intervals on the in-run only. The interleaving

of the data allowed a quality control check to be performed on the survey results. All the parameters collected were within instrument design specifications except for the azimuth, which had a noisy character due to interleaving of the in and out runs. Figure 3 shows the inclination data collected from 0 to 126 m (0 to 414 ft) from the 1995, 2000, and 2004 surveys. The overall repeatability is about 0.45 degrees, while the precision is better. The 2004 inclination shows an offset of 0.26 degrees relative to the 2000 survey. The 2004 data were corrected by removing this offset. This offset is attributed to small errors in setting up the zero on the tool. The offset used was calculated taking the average difference between the 2000 and 2004 inclination. The resulting correction indicates that the best resolution expected of the inclinometer is approximately 0.1 degree, which agrees with the published tool specification.

In addition to the inclination data, the vertical depth data is used to monitor for changes over time in the absolute vertical depth relative to the access casing. The vertical depth is the actual vertical depth measured at a point along the access casing (measured depth) to the ground surface. Changes over time are observed by taking the difference between the original and the subsequent surveys. The vertical depth is calculated from the inclination and azimuth using the minimum curvature method. Figure 4 is a plot of the Vertical Depth Difference versus Measured Depth over the length of the ER3-3 access casing. Note that the original survey, which was run in February 1995, was only sampled on a 3-m (10-ft) interval, which did not provide adequate detail in the area of the U3-3fi Injection Well. The 2000 and 2004 surveys were run using a 0.3-m (1-ft) interval from 107 m (350 ft) to total depth to increase the resolution in this area.

3.4.1 Directional Survey Results

A comparison of the inclinations from all the directional surveys is shown in Figures 3 and 5. Inclination is measured from vertical where a 0-degree inclination of the access casing would be pointing straight down and a 90-degree inclination would be horizontal. The small deviations (Figure 3) noted just beneath the cement wellhead protection plug at 15 m (50 ft), and along the access casing from 43 to 49 m (140 to 160 ft), from 70 to 79 m (230 to 260 ft), and from 104 to 119 m (340 to 390 ft) appear unchanged and repeatable from the 2000 survey to the 2004 survey, indicating stable conditions along the overall length of the access tube. Figure 6 is a graph of Inclination Difference. This data set shows the changes in inclination between each survey period. Differences between the 2000 and 2004 surveys are less than ±0.15 degrees, which is at the offset corrected resolution (0.1 degrees) of the survey instrument.

The subsurface change observed at 76 m (250 ft) between the 1995 and 2000 surveys occurred in close proximity to the change in the borehole diameter from 25 to 15 cm (10 to 6 in). The sand stemming material can be seen in the neutron logs to change to the smaller diameter borehole at approximately 79 m (260 ft). The changes observed in those data were small and were attributed to normal settling within the sand pack stemming material after the initial installation. A comparison of the 2000 and 2004 surveys indicate no change, and the intersection of the telescopic borehole is stable.

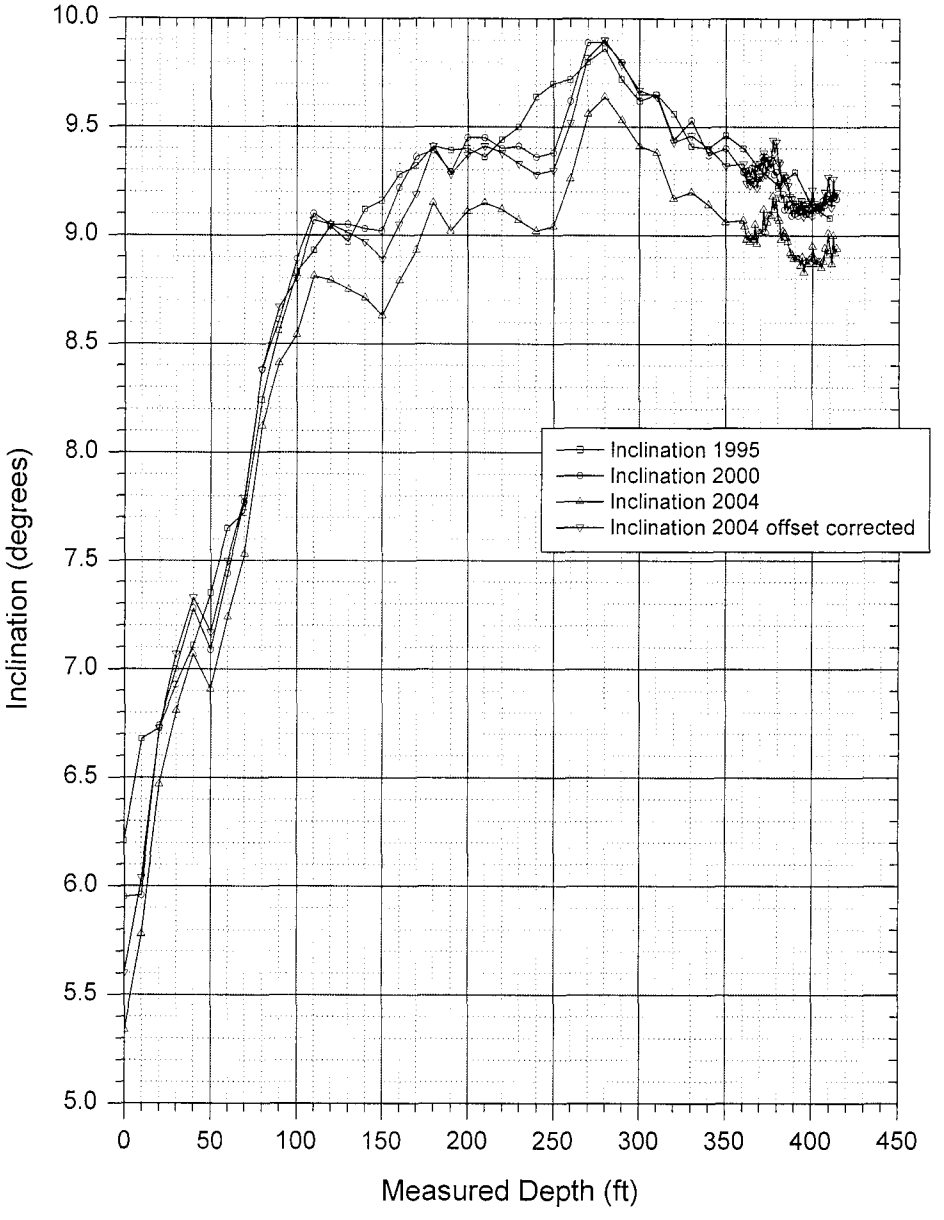

FIGURE 3
ER3-3 INCLINATION

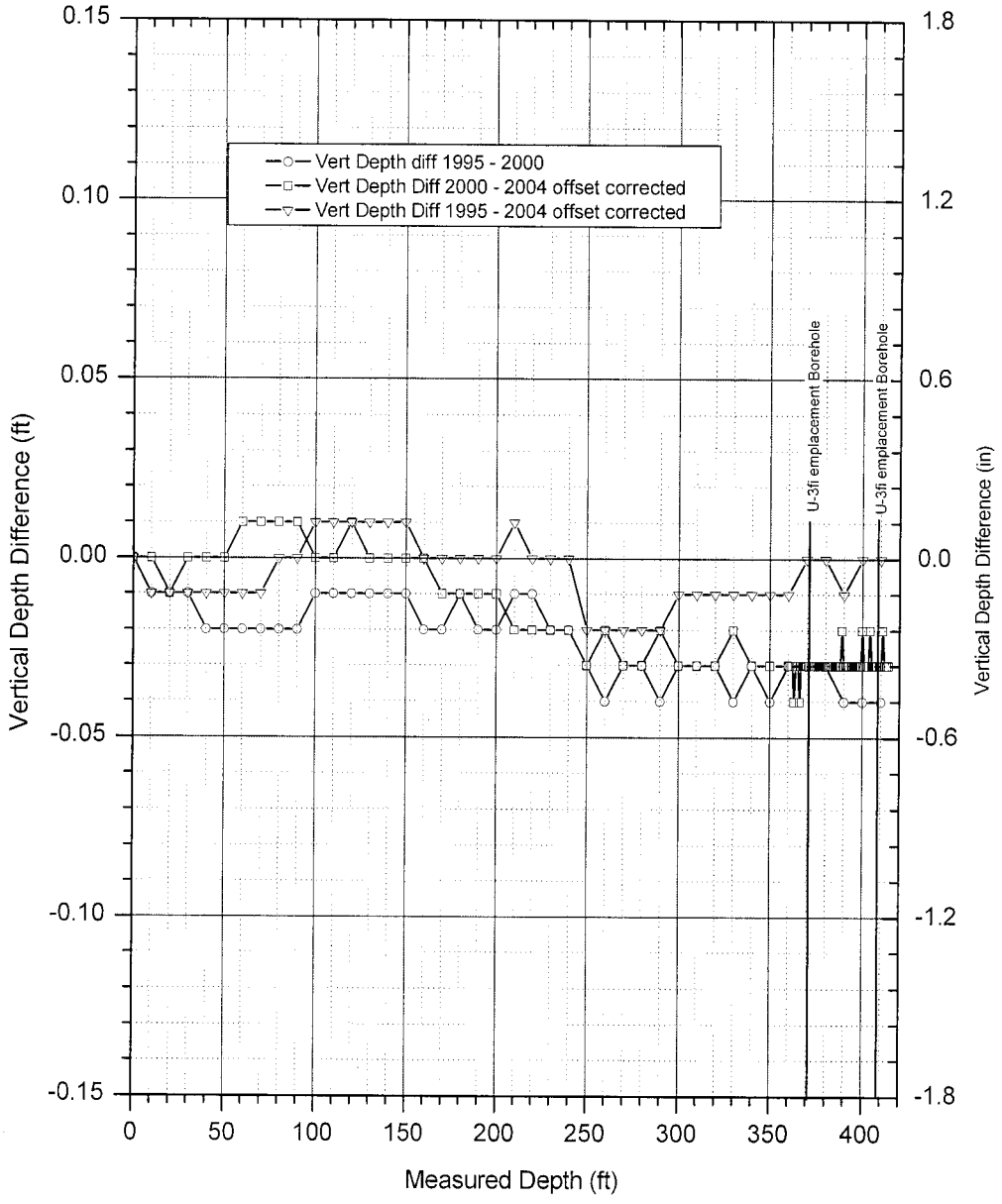

FIGURE 4
ER3-3 VERTICAL DEPTH DIFFERENCE

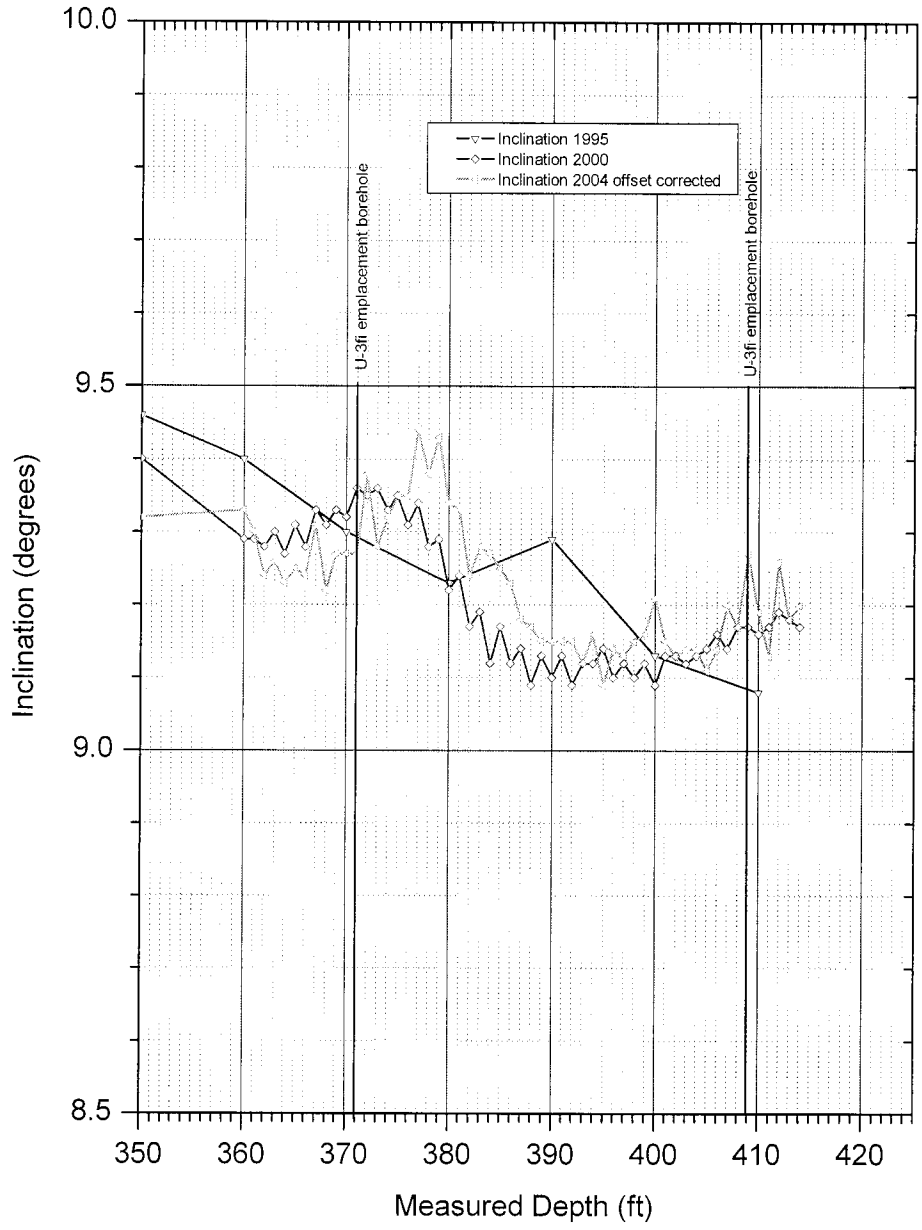

FIGURE 5
U-3fi INCLINATION

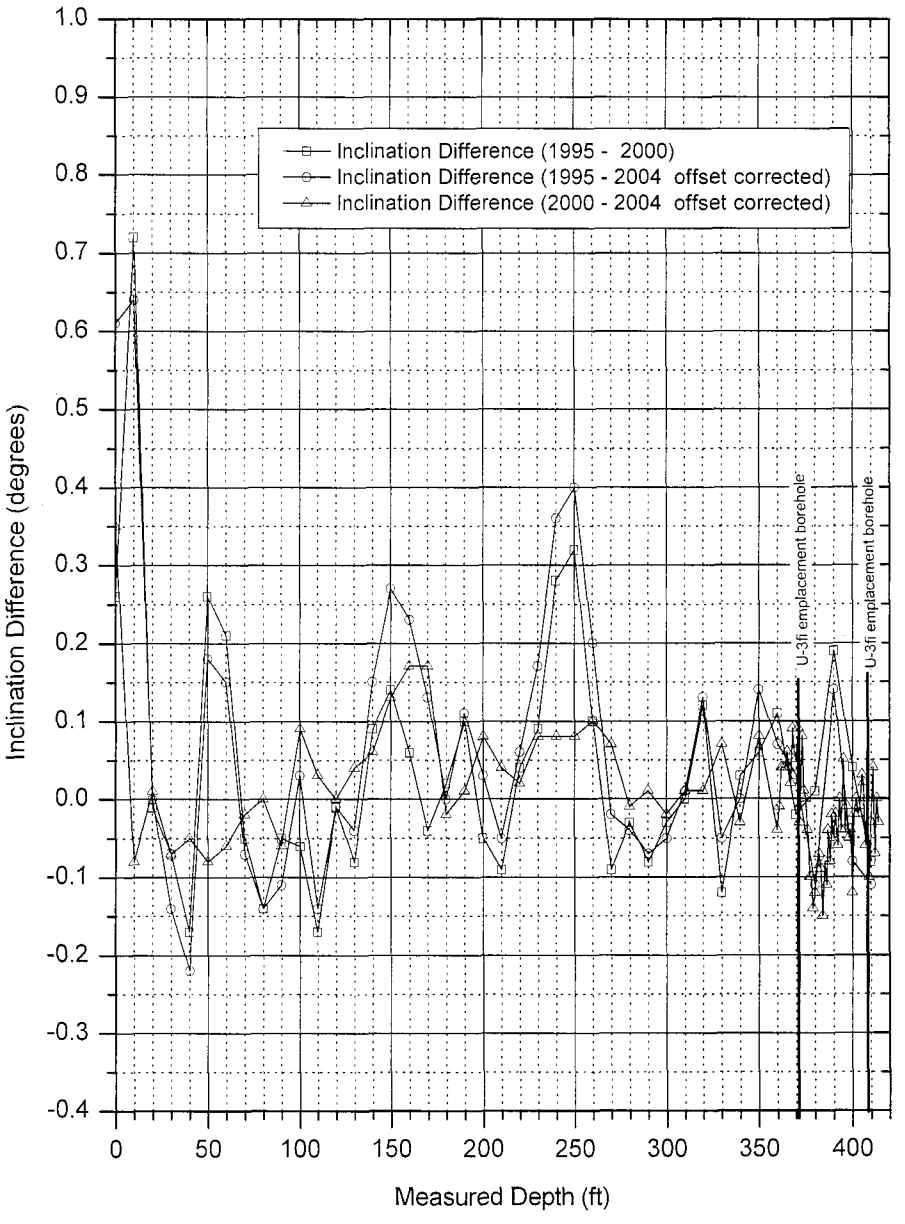

FIGURE 6
ER3-3 INCLINATION DIFFERENCE

Figure 5 is a graph of the inclination difference across the U-3fi Injection Well. These data also show excellent repeatability between the 2000 and 2004 surveys, indicating stable conditions within the U-3fi Injection Well.

The Vertical Depth Difference versus Measured Depth is shown in Figures 4 and 7. Vertical depths are calculated from a summation using the inclination and azimuth at each measured depth and the errors are, therefore, cumulative. The difference plot displays the changes from the original survey (1995) to the latest survey in terms of vertical subsidence of the access tube. A negative number indicates subsidence (i.e., the current data are deeper). Evident in this data is the quantization (discrete steps) of the vertical depth differences, which is due to measuring changes at the resolution limits of the electronic instrumentation. The ER3-3 Vertical Depth Difference (Figure 4) indicates the casing had a very slight change at 76 m (250 ft) in 2000, which, as noted previously in the inclination data, occurred very close to the change in diameter of the sand pack stemming material. No changes are seen between the 2000 and 2004 surveys. The survey data are at the resolution limit of the instrument and offset correction. No changes are noted within the U-3fi Injection Well (Figure 7) between 113 to 125 m (371 to 409 ft). The data obtained within the U-3fi Injection Well (measured depth 113 to 125 m [371 to 409 ft]) show no evidence of subsidence or stresses acting on the access casing.

The directional survey data indicate stable conditions and show no evidence of subsidence or stresses within the U-3fi Injection Well.

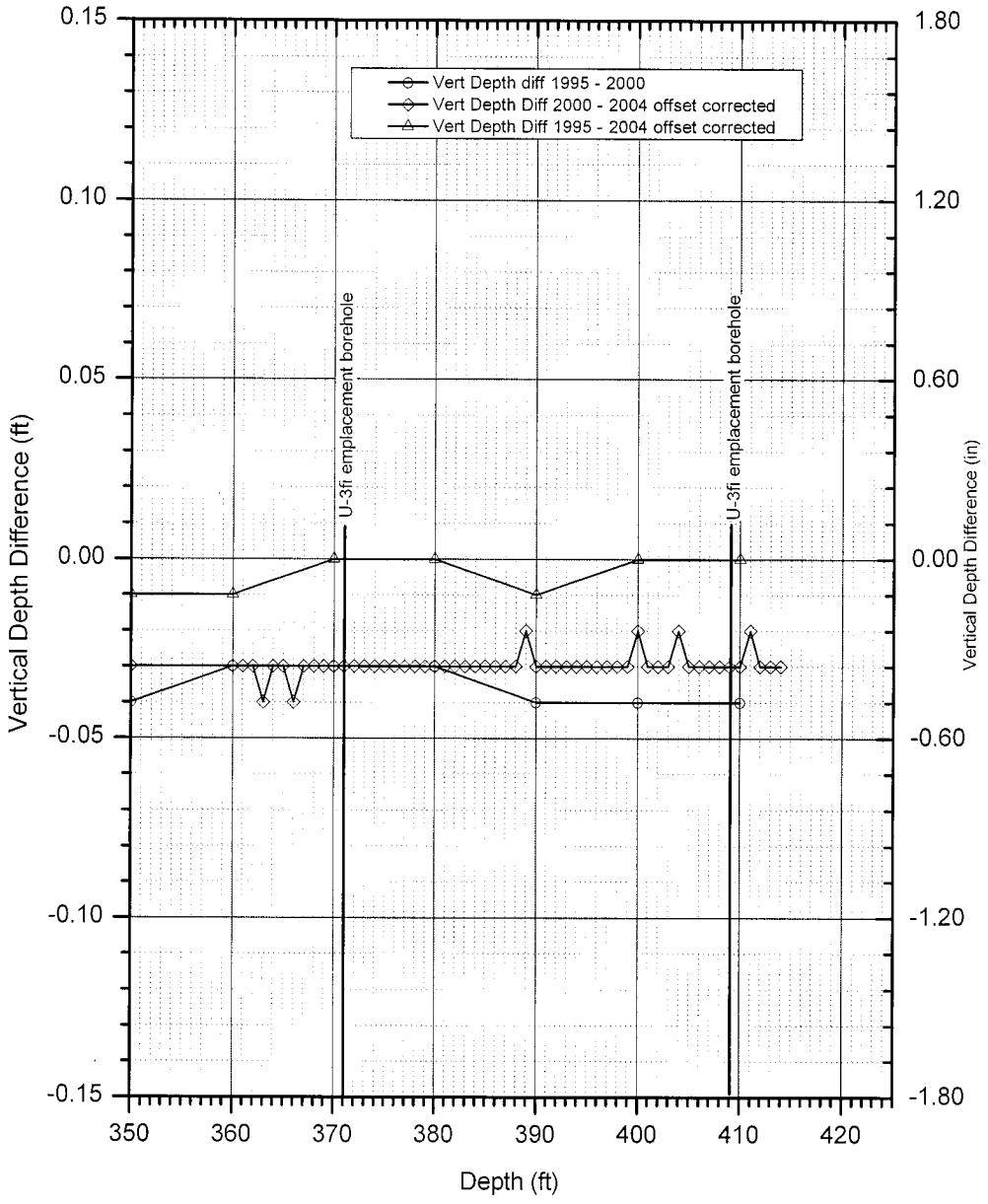

FIGURE 7
U-3fi VERTICAL DEPTH DIFFERENCE

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4.0 SOIL MOISTURE MONITORING

4.1 INTRODUCTION

The objective of the CAU 91 monitoring program is to monitor the soil moisture condition in the regulated interval of 73.2 to 82.3 m (240 to 270 ft) and to provide an early warning of the potential for leachate migration from the closed U-3fi Injection Well into the subsurface. In addition, the monitoring program is used to indicate subsurface subsidence within the U-3fi Injection Well.

A portable neutron moisture logging tool is used to determine changes in the moisture content in the soil surrounding the ER3-3 monitoring well, which intersects the U-3fi Injection Well. By monitoring changes in soil moisture content, it is possible to detect the movement of wetting fronts in the soil beneath the U-3fi casing. The detection of changes in soil moisture content in this area provides an early warning of the potential movement of leachate from the closed U-3fi Injection Well into the surrounding environment, indicating possible failure of the unit.

The ER3-3 monitoring well is located 18.3 m (60 ft) south of the U-3fi Injection Well and is drilled at an angle approximately 6 degrees from the vertical. The ER3-3 monitoring well intersects the U-3fi Injection Well at a vertical depth of 125 m (410 ft) bgs, and the total depth of the ER3-3 monitoring well is 129.5 m (425 ft). Neutron logging is done from the surface to 128 m (420 ft) to avoid the possibility of losing the neutron probe at the bottom of the monitoring well.

A Campbell Pacific Nuclear Hydroprobe (Model 503DR) containing a 50-millicurie (1.85 gigabecquerel) Americium-241/Beryllium neutron source is used to obtain moisture logs in the monitoring well. The tool records raw neutron counts in 16-second time intervals. The tool is operated without a soil moisture calibration (See Section 2.1).

4.2 OPERATING PROCEDURES

Neutron logging operations adhere to BN Organization Instruction OI-2152.105, "Environmental Restoration Neutron Moisture Logging" (BN, 1999). The logging procedure was modified so that the downhole tool may be operated without a centralizer. This was done because the monitoring well is inclined at a 6-degree angle. Field quality control operations require a daily standard count test to be run at the start and end of the day. Failure to pass this statistical test requires stopping operations, notifying the supervisor, and determining the cause.

Using this procedure, neutron logs are obtained by lowering the neutron tool to within 1.5 m (5 ft) of the bottom of the access tube. The raw neutron count is obtained using a 16-second count time at 0.3-m (1-ft) intervals along the length of the access tube. The data are recorded by hand on field log sheets and stored in the data logger of the neutron probe as raw counts. The data logger is then downloaded to a personal computer. Once the data have been reviewed, they are presented as two graphs: Cumulative Residual Raw Neutron Counts and Baseline Difference. These graphs are discussed in Section 4.4.1, Data Presentation.

4.3 PRECIPITATION DATA

Precipitation data are collected from the National Oceanographic and Atmospheric Administration, Air Resources Laboratory, Special Operations and Research Division's (NOAA/ARL/SORD) station Buster Jangle Y (BJY) located at 37° 03' 46" N, 116° 03' 09" W, in Area 3 of the NTS (NOAA/ARL/SORD, 2004). BJY is located approximately 4.8 km (3 mi) northwest of the ER3-3 monitoring well. Precipitation records for this station for the period November 2003 through October 2004 are included in Appendix C and summarized in Figure 3.

The total precipitation over the current monitoring period of November 2003 through October 2004 was 25.0 cm (9.86 in). The average precipitation over the same period from 1960 to 2004 is 16.3 cm (6.43 in).

4.4 SOIL MOISTURE MONITORING RESULTS

4.4.1 Data Presentation

The graph of Cumulative Residual Raw Neutron Counts is presented in Figure 4. The residual raw counts, which are calculated by subtracting the first-year average raw neutron count (baseline) from the raw neutron count of the current period, are plotted versus logging date. While the data are collected at 0.3-m (1-ft) intervals along the entire length of the monitoring well, the graph displays only the residual raw counts every 1.5 m (5 ft) in the regulated interval of 73.2 to 82.3 m (240 to 270 ft). A positive residual raw count indicates conditions are wetter than baseline conditions, while a negative residual raw count indicates dryer conditions. The action level of 200 residual raw counts is indicated as a bold line. Below the cumulative residual plot is the monthly precipitation for the BJY weather station (NOAA/ARL/SORD, 2004).

The Baseline Difference graphs are presented in Figures 5 through 8 for the four quarterly monitoring periods. The residual raw counts (current minus baseline) are plotted versus depth for the entire length of the monitoring well. The actual raw counts of both the current period and the baseline year are also plotted. The action level of 200 residual raw counts is indicated as a bold line. Repeatability and instrumentation noise are approximately ±100 counts. As a result, the graphs have a noisy, chaotic character.

The Baseline Difference graphs provide detailed information on the overall performance of the unit during the current monitoring period, while the Cumulative Residual Raw Neutron Counts graph focuses on cumulative trends over time only in the regulated interval.

4.4.2 Discussion of Data Trends

The Cumulative Residual Raw Neutron Counts (Figure 4) are plotted for every 1.5 m (5 ft) in the regulated interval of the monitoring well, by date, and indicate dry and stable conditions with no trends evident. The unit remains in compliance at less than the action level of 200 residual raw counts within the regulated interval of 73.2 to 82.3 m (240 to 270 ft).

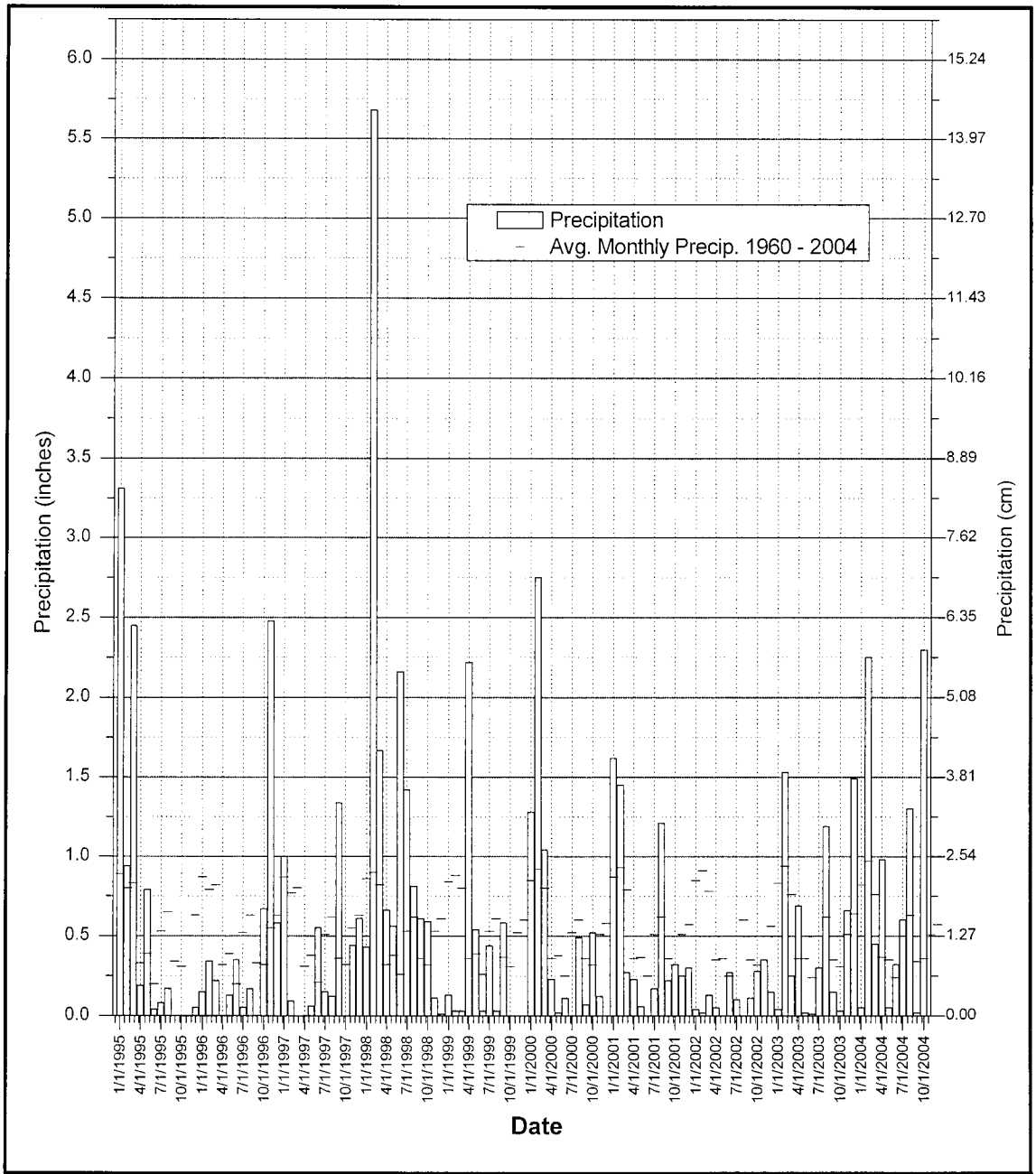

FIGURE 8
PRECIPITATION DATA FOR METEOROLOGICAL STATION BUSTER JANGLE Y

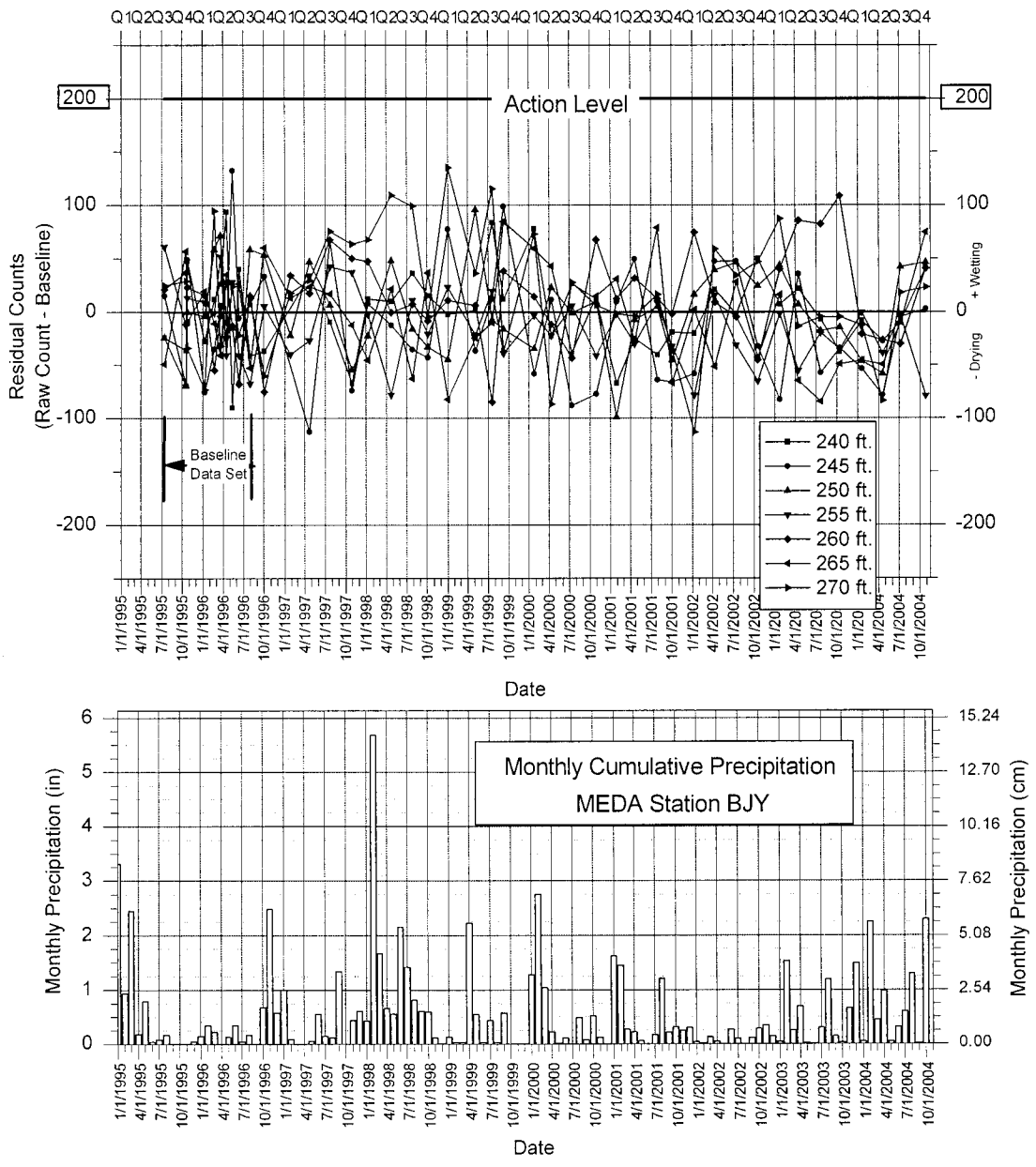

FIGURE 9
ER3-3 CUMULATIVE RESIDUAL RAW NEUTRON COUNTS

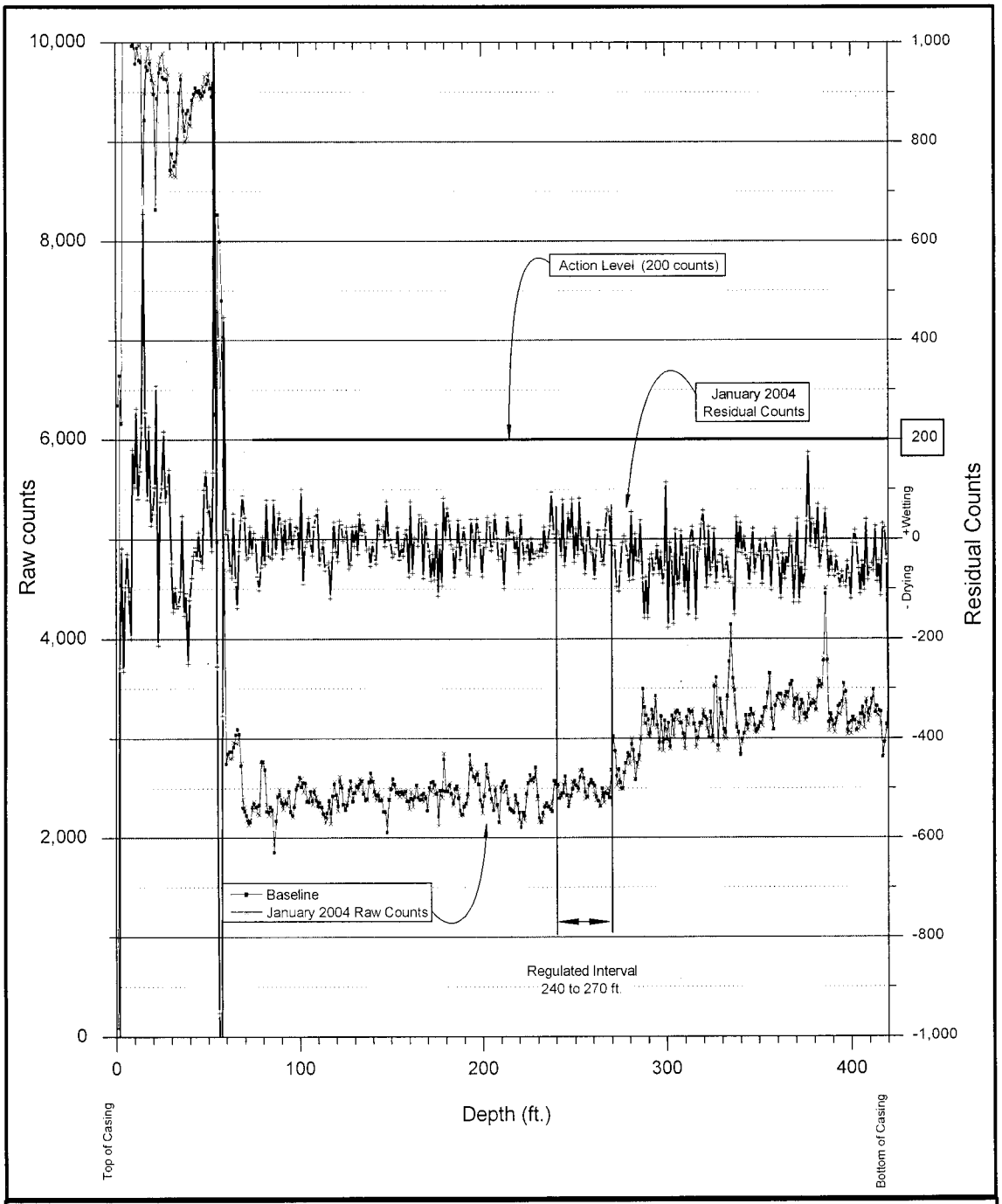

FIGURE 10
BASELINE DIFFERENCE FIRST QUARTER

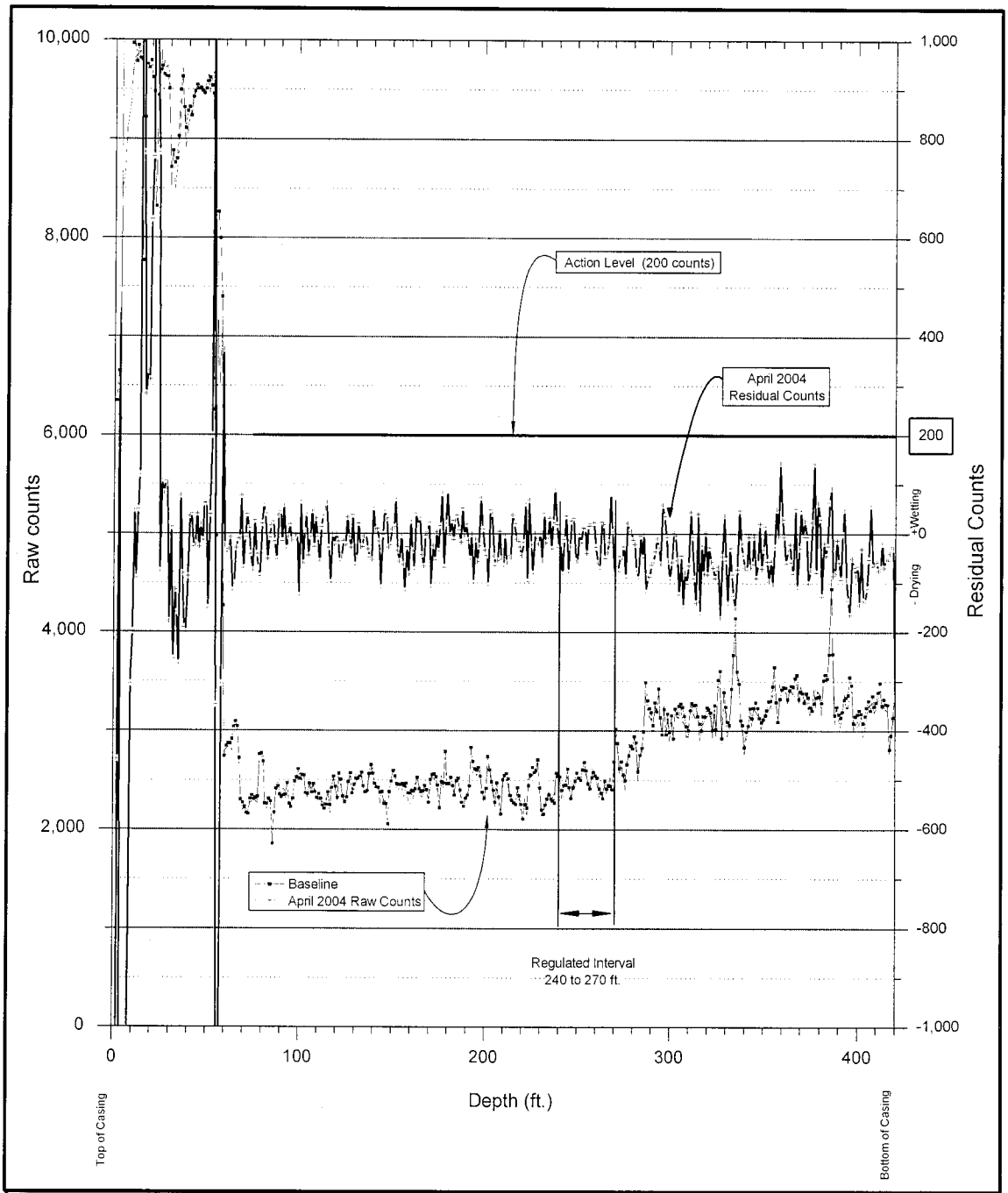

FIGURE 11
BASELINE DIFFERENCE SECOND QUARTER

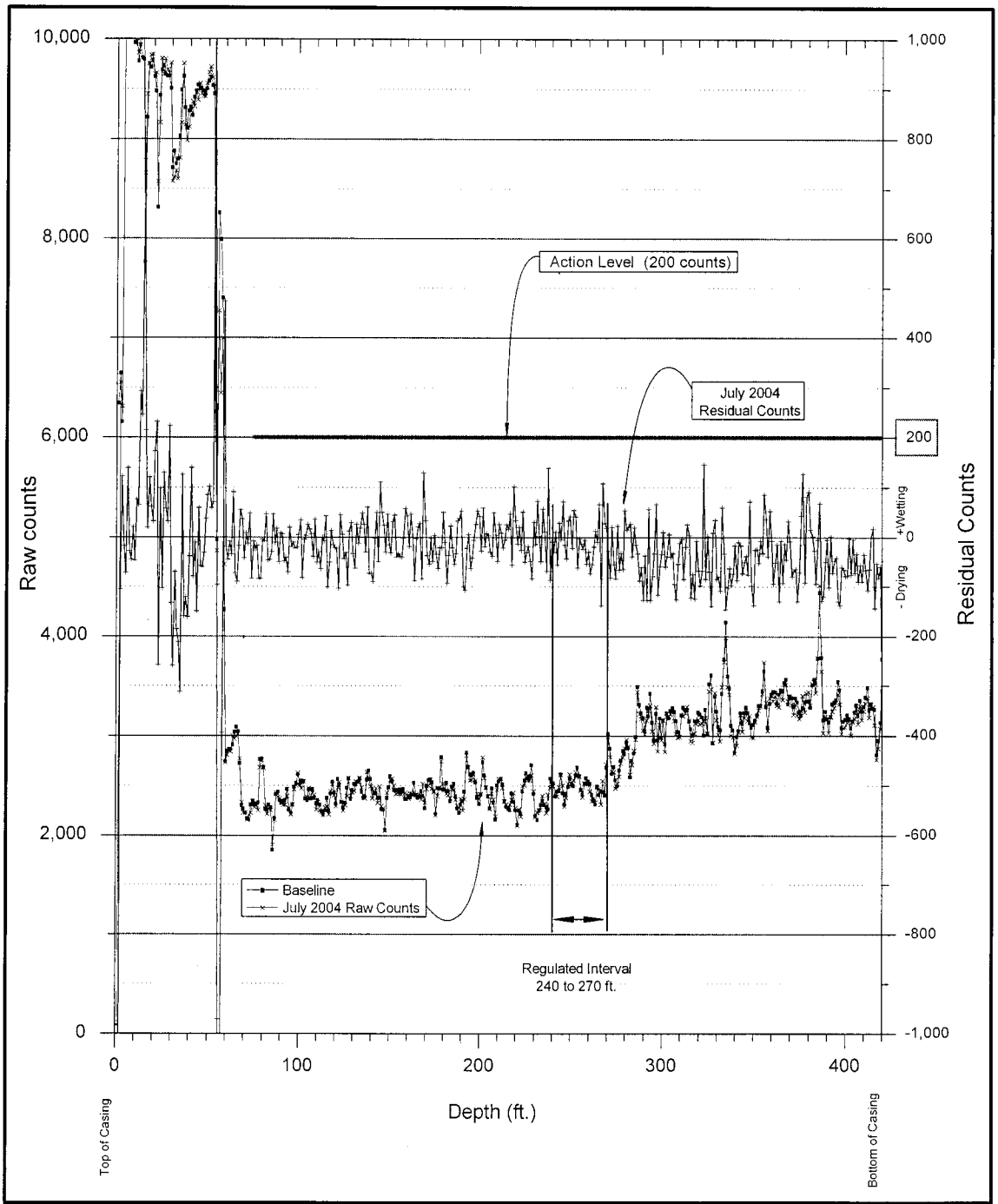

FIGURE 12
BASELINE DIFFERENCE THIRD QUARTER

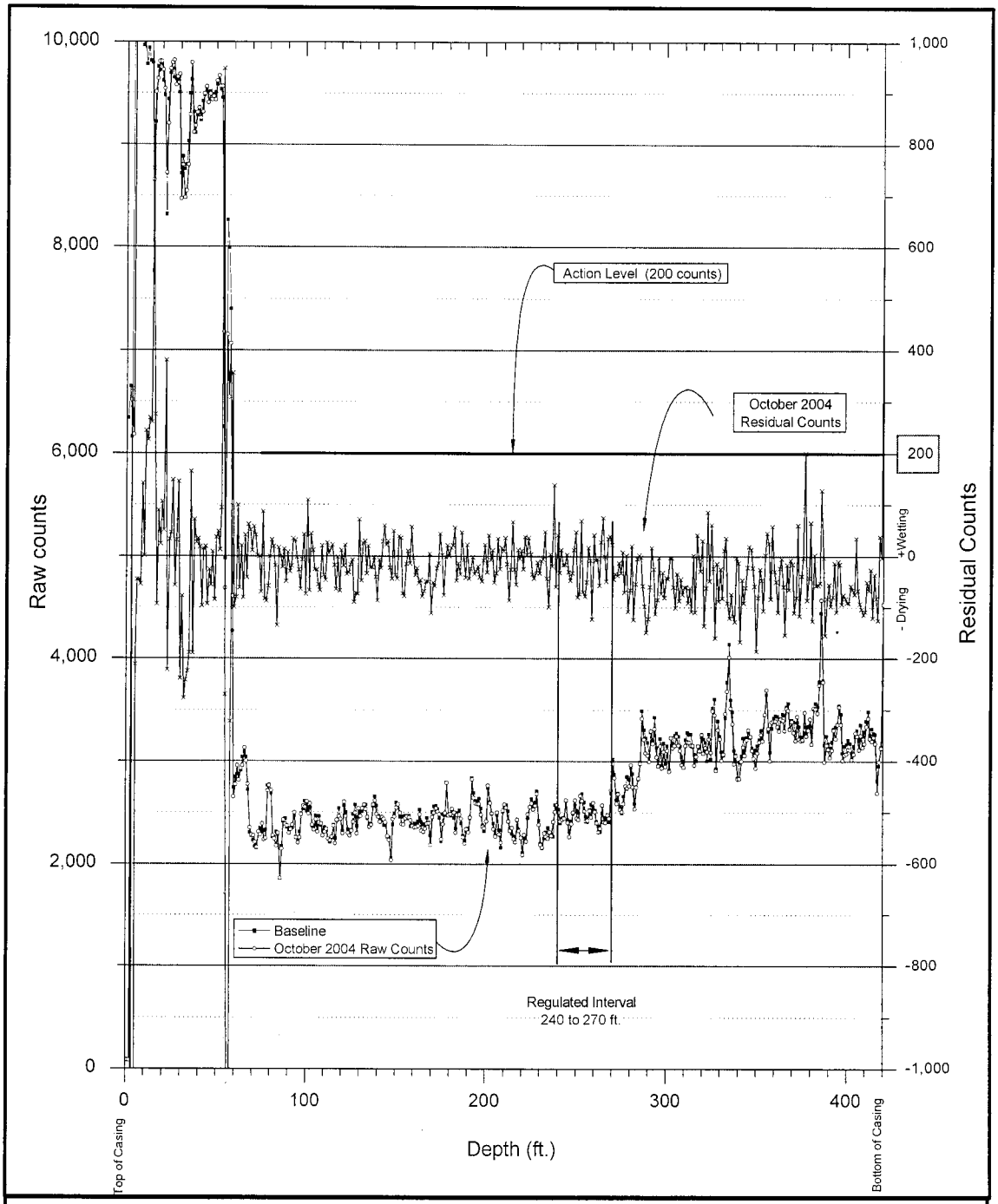

FIGURE 13
BASELINE DIFFERENCE FOURTH QUARTER

Performance along the entire length of the monitoring well is found in the Baseline Difference graphs (Figures 5 through 8). A discussion of these data is presented in the following sections.

4.4.2.1 January 2004 - First Quarter

The January 2004 Baseline Difference graph is shown in Figure 5. Conditions are observed to be dry and stable, with no trends or indications of subsidence evident in the data. At 144.9 m (377 ft), a residual count of 174 was recorded. This point was first noted to exceed 200 residual counts in July 2002 and remained above 200 residual counts throughout 2003. This reading was due to a combination of counting statistics and tool positioning error along an area that has a large change in counts over a short distance. This steep gradient resulted in a large change in the residual count from a small positioning error. This singular point ranges in value over the four current monitoring quarters from 127 counts in July 2004 to 201 counts in October 2004. This point is not in the regulated interval.

The area immediately beneath the cement plug shows an air gap with apparent "drying," probably due to the settling of the backfill in this area. This apparent drying trend extends from approximately 16.8 to 17.7 m (55 to 58 ft) in January and subsequent monitoring quarters. There is no change in this trend from the previous monitoring period.

No significant change is noted from the prior October 2003 monitoring period. The soil moisture content for the regulated interval, 73.2 to 82.3 m (240 to 270 ft), remains dry and is below the action level of 200 residual counts. There is no evidence of subsidence observed in the data.

4.4.2.2 April 2004 - Second Quarter

The April 2004 Baseline Difference graph is shown in Figure 6. No changes are observed in the air gap beneath the cement plug. Conditions are observed to be dry and stable, with no trends or indications of subsidence evident in the data.

The soil moisture content for the regulated interval, 73.2 to 82.3 m (240 to 270 ft), remains dry, stable, and is below the action level of 200 residual counts with no indications of subsidence.

4.4.2.3 July 2004 - Third Quarter

The July 2004 Baseline Difference graph is shown in Figure 7. The data indicate dry, stable conditions extending from 18.3 m (60 ft) to depth with no evidence of subsidence.

The soil moisture content for the regulated interval, 73.2 to 82.3 m (240 to 270 ft), remains dry and stable and is below the action level of 200 residual counts with no signs of subsidence.

4.4.2.4 October 2004 - Fourth Quarter

The October 2004 Baseline Difference graph is shown in Figure 8. This data also indicate dry and stable conditions extending from 18.3 m (60 ft) to depth with no indications of subsidence.

The soil moisture content for the regulated interval, 73.2 to 82.3 m (240 to 270 ft), remains dry and stable and is below the action level of 200 residual counts with no indications of subsidence.

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5.0 SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.1 SUMMARY

- Inspections of CAU 91 were performed in March and September to identify any significant changes that could impact the proper operation of the unit. No concerns were noted. The overall condition of the concrete pad, fence, and warning signs was good.
- A subsidence survey was completed in July 2004, and although there were some slight differences in elevations compared to the baseline survey of 1996, these are attributed to instrument error, and there is no clear evidence of any subsidence of the monument. Visual inspections also indicate that there is no subsidence of the unit.
- A directional borehole survey was conducted in October 2004 to determine if settling or subsidence within the U-3fi Injection Well is occurring. The data indicate stable conditions and show no evidence of subsidence within the U-3fi Injection Well.
- The total precipitation over the current monitoring period of November 2003 through October 2004 was 25.0 cm (9.86 in). The average precipitation over the same period from 1960 to 2004 is 16.3 cm (6.43 in).
- The soil moisture content data obtained in 2004 for the regulated interval, 73.2 to 82.3 m (240 to 270 ft), indicate dry and stable conditions and are below the action level of 200 residual counts.

5.2 CONCLUSIONS

- No issues or concerns were observed during the site inspections over the period November 2003 through October 2004.
- There has been no subsidence of the monument.
- The directional survey data indicate that the ER3-3 well borehole is stable, and there has been no evidence of subsidence within the U-3fi Injection Well.
- The total precipitation for the current monitoring period is above the average precipitation over the same period from 1960 to 2004.
- The moisture content of the regulated interval, 73.2 to 82.3 m (240 to 270 ft) remains dry and stable. The unit remains below the action level of 200 residual counts within the regulated interval.
- The closure is in compliance and performing as designed.

5.3 RECOMMENDATIONS

- Since monitoring began in 1995, the unit has been stable, well within compliance, and is performing as designed. Therefore, it is recommended to discontinue the soil moisture monitoring, subsidence surveys, and directional borehole surveys.

- Continue to perform visual site inspections and maintenance as scheduled to ensure the condition of the fence, warning signs, concrete pad, and use restrictions have been maintained.
- Report the results of the visual inspections and maintenance in an annual letter report submitted to the NDEP following the standardized Federal Facilities and Consent Order format. The inspection checklists and field notes will be included with this letter report.

6.0 REFERENCES

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Tattro, L. D., Los Alamos National Laboratory, August 4, 1989, Correspondence to Mr. Darrell M. Warren, Las Vegas, NV.

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Winograd, I. J., W. Thordarson, and R. A. Young, 1975. Hydrology of the Nevada Test Site and Vicinity, South Eastern Nevada, U.S. Department of the Interior, Geological Survey.

APPENDIX A

INSPECTION CHECKLISTS, FIELD NOTES, AND PHOTOGRAPHS

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CAU 91: AREA 3 U-3fi INJECTION WELL, POST-CLOSURE INSPECTION CHECKLIST

Inspection Date and Time: 3/22/2004, 12:00	Reason for Inspection: Semi-Annual
Date of Last Post-Closure Inspection: 9/29/2003	Reason for Last Post-Closure Inspection: Semi-Annual
Responsible Agency: Bechtel Nevada Environmental Restoration	
Address: Nevada Test Site, Mercury, Nevada	
Responsible Agency Official: Jeffrey L. Smith, Project Manager	

Chief Inspector: James Traynor	Title: Field Coordinator	Organization: Environmental Restoration
Assistant Inspector:	Title:	Organization: Environmental Restoration

A. GENERAL INSTRUCTIONS

1. All checklist items must be completed and detailed comments made to document the results of the site inspection. The completed checklist is part of the field record of the inspection. Additional pages should be used as necessary to ensure that a complete record is made. Attach the additional pages and number all pages upon completion of the inspection.
2. Any checklist line item marked by an inspector in a SHADED BOX must be fully explained or an appropriate reference to previous reports provided. The purpose of this requirement is to provide a written explanation of inspector observations and the inspector's rationale for conclusions and recommendations. Explanations are to be placed on additional attachments and cross-referenced appropriately. Explanations, in addition to narrative, will take the form of sketches, measurements, and annotated site maps.
3. The site inspection is a walking inspection of the entire site including the perimeter and sufficient transects to be able to inspect the entire surface and all features specifically described in this checklist.
4. A standard set of color photographs is required. In addition, all anomalous features or new features (such as changes in adjacent area land use) are to be photographed. A photograph log entry will be made for each photograph taken.
5. Field notes taken to assist in completion of this checklist will become part of the inspection record. No form is specified for field notes; however, they must be legible and in sufficient detail to enable review by succeeding inspectors and the responsible agency.
6. This unit will be inspected semi-annually with formal reporting to the Nevada Division of Environmental Protection to be done annually. The annual report will include an executive summary, this inspection checklist with field notes and photograph log attached, and recommendations and conclusions.

B. PREPARATION (To be competed prior to site visit)	YES	NO	EXPLANATION
1. Has the Post-Closure Permit been reviewed?	X		
2. Have the design basis documents been reviewed?	X		
3. Have the site as-built plans and site base map been reviewed?	X		
4. Have the previous inspection reports been reviewed?	X		
a. Were anomalies or trends detected on previous inspections?		X	
b. Was maintenance performed?		X	
5. Have the site maintenance and repair records been reviewed?		X	NO MAJOR REPAIRS PERFORMED.
a. Has site repair resulted in a change from as-built conditions?		X	
b. Are revised as-built plans available that reflect repair changes?		X	N/A

C. SITE INSPECTION PREPARATION

Assemble the following, as needed, to conduct inspections:

a. Camera, film, and batteries
b. Keys to locks
c. Clipboard
d. Tape measure
e. Radio, pager, etc.
f. Previous Post-Closure Report, Inspection Checklists, repair records, and as-built plans
g. Other miscellaneous support equipment

CAU 91: AREA 3 U-3fi INJECTION WELL, POST-CLOSURE INSPECTION CHECKLIST

D. SITE INSPECTION	YES	NO	EXPLANATION
1. Adjacent off-site features:			
a. Have there been any changes in the use of the adjacent area?		X	
b. Are there any new roads or trails?		X	
c. Has there been any change in the position of nearby washes?		X	
d. Has there been lateral excursion or erosion/deposition of nearby washes?		X	
e. Are there new drainage channels?		X	
f. Has there been a change in the surrounding vegetation?		X	
2. Access roads, fences, gates, and signs:			
a. Is there a break in the fence?		X	
b. Have any posts been damaged or their anchoring weakened?		X	
c. Does the gate show evidence of tampering or damage?		X	
d. Was the gate locked?	X		
e. Is there any evidence of human intrusion onto the cover?		X	
f. Is there any evidence of large animal intrusion onto the cover?		X	
g. Have any signs been damaged or removed? (Number of signs replaced: ___)		X	
h. Other?		X	
3. Monuments and other permanent features:			
a. Have survey markers, boundary monuments, or monitoring stations been disturbed?		X	
b. Do natural processes threaten the integrity of any survey marker, boundary monument or monitoring station?		X	
c. Is there excessive vegetation around the survey markers, boundary monuments, or monitoring stations?		X	
d. Other?		X	
4. Waste unit cover:			
a. Is there evidence of settling?		X	
b. Is there evidence of cracking?	X		LIGHT, HAIRLINE, RADIAL CRACKS IN PAD.
c. Is there evidence of erosion (wind or water)?		X	
d. Is there evidence of animal burrowing?	X		ANIMAL BURROWS. BACKFILLED DURING INSPECTION.
e. Is there vegetation growing on the cover?		X	HERBICIDE WAS APPLIED SINCE THE LAST INPSECTION.
g. Other (including trash, debris, etc within fenced area)?	X		MINOR. REMOVED DURING INPSECTION.

CAU 91: AREA 3 U-3fi INJECTION WELL, POST-CLOSURE INSPECTION CHECKLIST

5. Photograph Instructions:

A total of 10 photographs are required to be taken during each inspection of CAU 91. Additional photographs may also be taken. The required photographs shall be taken as follows:

- Four (4) from the center of the unit, one in each compass direction (i.e., N, S, E, W),
- Four (4) of the unit from outside the fence, one in each compass direction, and
- Two (2) of the ER3-3 monitoring well surface with compass directions (N and S) noted on the photograph log.

6. Photograph Documentation:	YES	NO	EXPLANATION
a. Have all photographs required by the photograph instructions been taken?		X	THE PHOTOGRAPH FROM INSIDE THE UNIT LOOKING EAST WAS NOT TAKEN BY MISTAKE.
b. Has a photograph log been prepared? (Number of photographs taken: 9)	X		
c. Other?		X	

E. FIELD CONCLUSIONS

1. Is there an imminent hazard to the integrity of the unit? (Immediate report required)		X	
Person/Agency to whom report was made:			
2. Are more frequent inspections required?		X	
3. Are existing maintenance/repair actions satisfactory?	X		
4. Is other maintenance/repair necessary?		X	

5. Field conclusions/recommendations: The unit is in good working condition. Radial cracks in the monument pad should be watched.

F. CERTIFICATION

I have conduction an inspection of CAU 91, Area 3 U-3fi Injection Well, in accordance with the procedures of the Post-Closure Permit (including the Post-Closure Plan) as recorded on this checklist, attached sheets, field notes, photographs, and photograph logs.

Chief Inspector's Signature:	Date: 3/22/2004
Printed Name: James Traynor	Title: Field Coordinator

CAV 91 Area 3 U-3fi Injection Well
CAS 03-20-03 U-3fi Waste Disposal Unit

12^00 Adjacent offsite: Good.

Access roads, fences, gates & signs: Good.
Minor animal burrows. Backfilled during inspection.
Minor debris. Removed during inspection.
Monuments & permanent structures: Good.
Cover: No change. Minor animal burrows.
Backfilled during inspection.
Photos: 1 Inside N
2 Inside E
3 Inside S
4 Inside W
5 Wellhead N
6 Wellhead S
7 Outside N
8 Outside E
9 Outside S
10 Outside W
Recommendations/Conclusions: Unit is in good condition. Continue inspections as scheduled.

SIGNATURE
DISCLOSED TO AND UNDERSTOOD BY
DATE
WITNESS
DATE 3/22/04
DATE

CAU 91: AREA 3 U-3fi INJECTION WELL, POST-CLOSURE INSPECTION CHECKLIST

Inspection Date and Time: 9/14/2004, 11:40 am	Reason for Inspection: Semi-Annual	
Date of Last Post-Closure Inspection: 6/23/2004	Reason for Last Post-Closure Inspection: Semi-Annual	
Responsible Agency: Bechtel Nevada Environmental Restoration		
Address: Nevada Test Site, Mercury, Nevada		
Responsible Agency Official: Jeffrey L. Smith, Project Manager		
Chief Inspector: Alissa Tibesar	Title: Technical Lead	Organization: Environmental Restoration
Assistant Inspector: Shaughn Burnison	Title: Task Manager	Organization: Environmental Restoration

A. GENERAL INSTRUCTIONS

1. All checklist items must be completed and detailed comments made to document the results of the site inspection. The completed checklist is part of the field record of the inspection. Additional pages should be used as necessary to ensure that a complete record is made. Attach the additional pages and number all pages upon completion of the inspection.
2. Any checklist line item marked by an inspector in a SHADED BOX must be fully explained or an appropriate reference to previous reports provided. The purpose of this requirement is to provide a written explanation of inspector observations and the inspector's rationale for conclusions and recommendations. Explanations are to be placed on additional attachments and cross-referenced appropriately. Explanations, in addition to narrative, will take the form of sketches, measurements, and annotated site maps.
3. The site inspection is a walking inspection of the entire site including the perimeter and sufficient transects to be able to inspect the entire surface and all features specifically described in this checklist.
4. A standard set of color photographs is required. In addition, all anomalous features or new features (such as changes in adjacent area land use) are to be photographed. A photograph log entry will be made for each photograph taken.
5. Field notes taken to assist in completion of this checklist will become part of the inspection record. No form is specified for field notes; however, they must be legible and in sufficient detail to enable review by succeeding inspectors and the responsible agency.
6. This unit will be inspected semi-annually with formal reporting to the Nevada Division of Environmental Protection to be done annually. The annual report will include an executive summary, this inspection checklist with field notes and photograph log attached, and recommendations and conclusions.

B. PREPARATION (To be competed prior to site visit)	YES	NO	EXPLANATION
1. Has the Post-Closure Permit been reviewed?	X		
2. Have the design basis documents been reviewed?	X		
3. Have the site as-built plans and site base map been reviewed?	X		
4. Have the previous inspection reports been reviewed?	X		
a. Were anomalies or trends detected on previous inspections?		X	
b. Was maintenance performed?		X	
5. Have the site maintenance and repair records been reviewed?	X		
a. Has site repair resulted in a change from as-built conditions?		X	
b. Are revised as-built plans available that reflect repair changes?		X	N/A

C. SITE INSPECTION PREPARATION

Assemble the following, as needed, to conduct inspections:

a. Camera, film, and batteries
b. Keys to locks
c. Clipboard
d. Tape measure
e. Radio, pager, etc.
f. Previous Post-Closure Report, Inspection Checklists, repair records, and as-built plans
g. Other miscellaneous support equipment

CAU 91: AREA 3 U-3fi INJECTION WELL, POST-CLOSURE INSPECTION CHECKLIST

D. SITE INSPECTION	YES	NO	EXPLANATION
1. Adjacent off-site features:			
a. Have there been any changes in the use of the adjacent area?		X	
b. Are there any new roads or trails?		X	
c. Has there been any change in the position of nearby washes?		X	
d. Has there been lateral excursion or erosion/deposition of nearby washes?		X	
e. Are there new drainage channels?		X	
f. Has there been a change in the surrounding vegetation?		X	
2. Access roads, fences, gates, and signs:			
a. Is there a break in the fence?		X	
b. Have any posts been damaged or their anchoring weakened?		X	
c. Does the gate show evidence of tampering or damage?		X	
d. Was the gate locked?	X		
e. Is there any evidence of human intrusion onto the cover?		X	
f. Is there any evidence of large animal intrusion onto the cover?		X	
g. Have any signs been damaged or removed? (Number of signs replaced: ___)		X	
h. Other?		X	
3. Monuments and other permanent features:			
a. Have survey markers, boundary monuments, or monitoring stations been disturbed?		X	
b. Do natural processes threaten the integrity of any survey marker, boundary monument or monitoring station?		X	
c. Is there excessive vegetation around the survey markers, boundary monuments, or monitoring stations?		X	
d. Other?		X	
4. Waste unit cover:			
a. Is there evidence of settling?		X	
b. Is there evidence of cracking?		X	
c. Is there evidence of erosion (wind or water)?		X	
d. Is there evidence of animal burrowing?	X		Small animal burrows were backfilled during the time of the inspection.
e. Is there vegetation growing on the cover?		X	
g. Other (including trash, debris, etc within fenced area)?		X	

CAU 91: AREA 3 U-3fi INJECTION WELL, POST-CLOSURE INSPECTION CHECKLIST

5. Photograph Instructions:

A total of 10 photographs are required to be taken during each inspection of CAU 91. Additional photographs may also be taken. The required photographs shall be taken as follows:

- Four (4) from the center of the unit, one in each compass direction (i.e., N, S, E, W),
- Four (4) of the unit from outside the fence, one in each compass direction, and
- Two (2) of the ER3-3 monitoring well surface with compass directions (N and S) noted on the photograph log.

6. Photograph Documentation:	YES	NO	EXPLANATION
a. Have all photographs required by the photograph instructions been taken?	X		
b. Has a photograph log been prepared? (Number of photographs taken: 12)	X		
c. Other?		X	

E. FIELD CONCLUSIONS

1. Is there an imminent hazard to the integrity of the unit? (Immediate report required)		X	
Person/Agency to whom report was made:			
2. Are more frequent inspections required?		X	
3. Are existing maintenance/repair actions satisfactory?	X		
4. Is other maintenance/repair necessary?		X	

5. Field conclusions/recommendations: No issues or concerns were noted. Continue inspections as scheduled.

F. CERTIFICATION

I have conduction an inspection of CAU 91, Area 3 U-3fi Injection Well, in accordance with the procedures of the Post-Closure Permit (including the Post-Closure Plan) as recorded on this checklist, attached sheets, field notes, photographs, and photograph logs.

Chief Inspector's Signature:	Date: 9/14/2004
Printed Name: Alissa Tibesar	Title: Technical Lead

- Both areas of subsidence continue to be at actionable levels. Soil around edges is tunneling, and animal burrows are prevalent in these areas.
- FIRE Ant hills and animal burrows were noted on cover
- No other issues or concerns noted.
- Recommend repairing subsidence and killing fire ants.

11:24 am - Signed out of Area 3 RUMS

11:40 am - arrived at U-3fi

CAU 91 - A3 U-3fi Injection Well

Photos:

1. Center looking N
2. Center looking E
3. Center looking S
4. Center looking W
5. Wellhead looking N
6. Wellhead looking S
7. Animal burrow
8. "
9. outside looking N
10. outside looking E
11. outside looking S
12. outside looking W

- Small animal burrows backfilled during inspection.
- NO issues or concerns.

12:05 pm - arrived at Decon Pond

CAU 92 - A6 Decon Pond Facility

Photos:
1. outside looking E
2. ~~outside~~ looking S
3. outside looking W
4. outside looking N
5. center looking N
6. center looking E
7. center looking S
8. center looking W

(last 4 taken w/disposable 35mm camera)

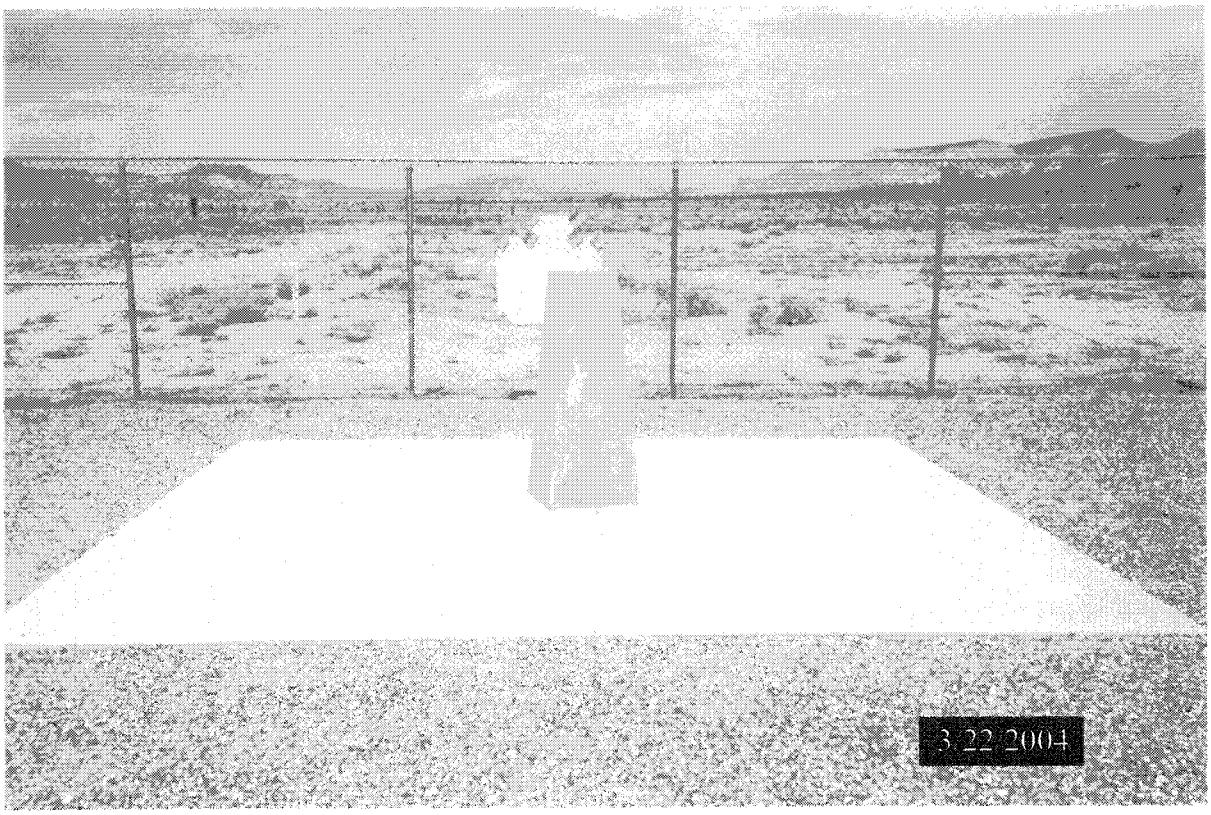
- Animal barricades on fence need repair
- Dead brush in corners
- no other issues or concerns

Work continued to Page ___

SIGNATURE			DATE 9/14/04
DISCLOSED TO AND UNDERSTOOD BY	DATE	WITNESS	DATE

PHOTOGRAPH LOG

PHOTOGRAPH NUMBER	DATE	DESCRIPTION
1	3/22/2004	Inside unit looking north
2	3/22/2004	Inside unit looking south
3	3/22/2004	Inside unit looking west
4	3/22/2004	Inside unit, wellhead looking north
5	3/22/2004	Inside unit, wellhead looking south
6	3/22/2004	Outside unit looking north
7	3/22/2004	Outside unit looking east
8	3/22/2004	Outside unit looking south
9	3/22/2004	Outside unit looking west
1	9/14/2004	Inside unit looking north
2	9/14/2004	Inside unit looking east
3	9/14/2004	Inside unit looking south
4	9/14/2004	Inside unit looking west
5	9/14/2004	Inside unit, wellhead looking north
6	9/14/2004	Inside unit, wellhead looking south
7	9/14/2004	Outside unit looking north
8	9/14/2004	Outside unit looking east
9	9/14/2004	Outside unit looking south
10	9/14/2004	Outside unit looking west



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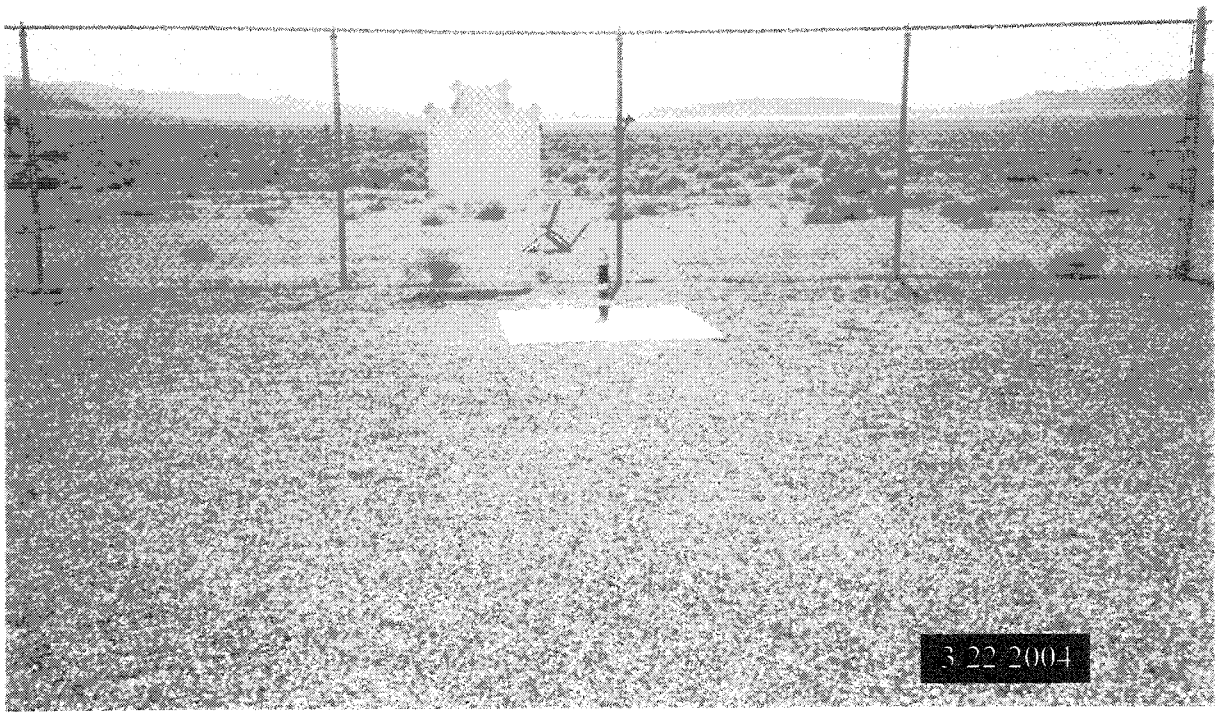

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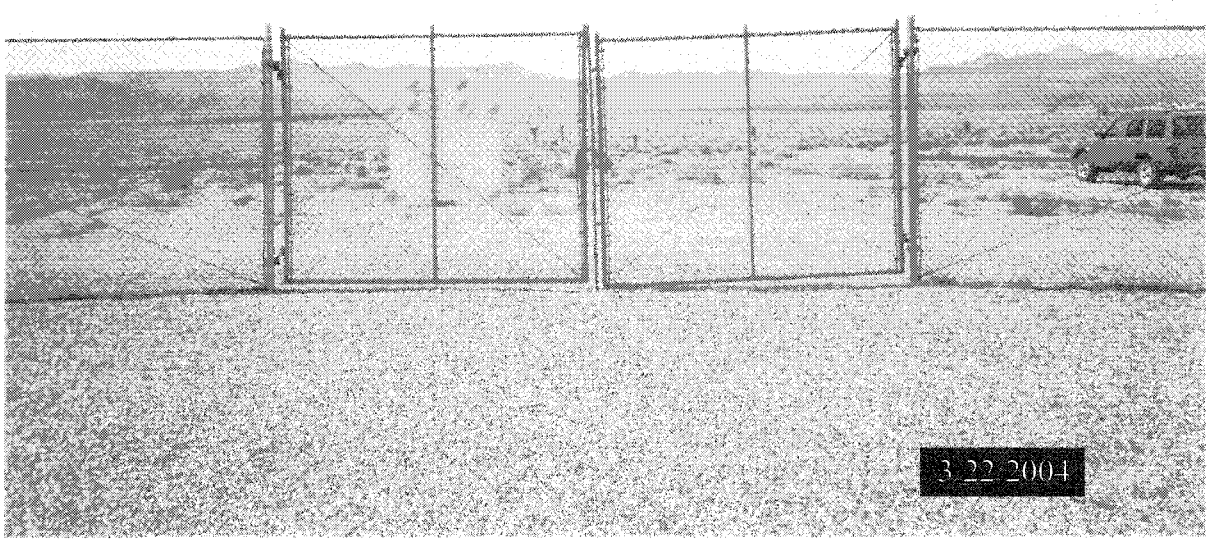

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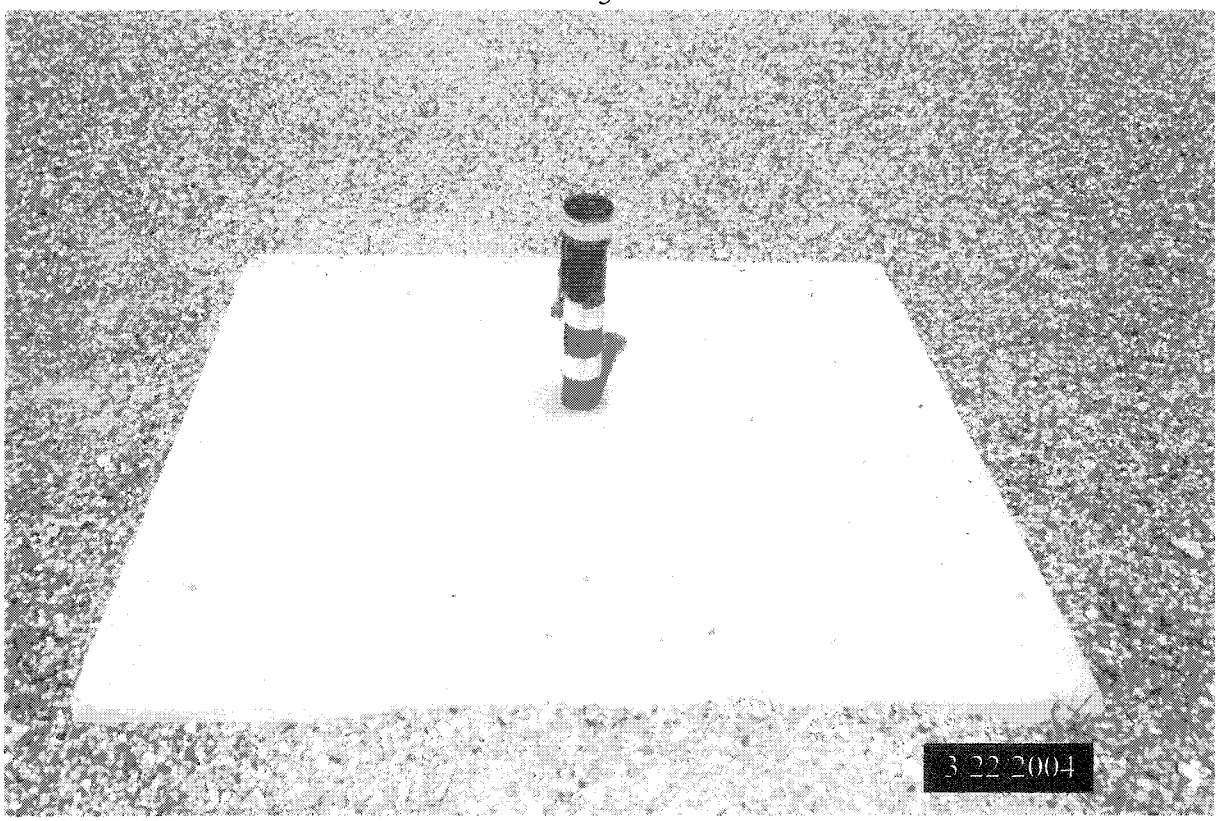

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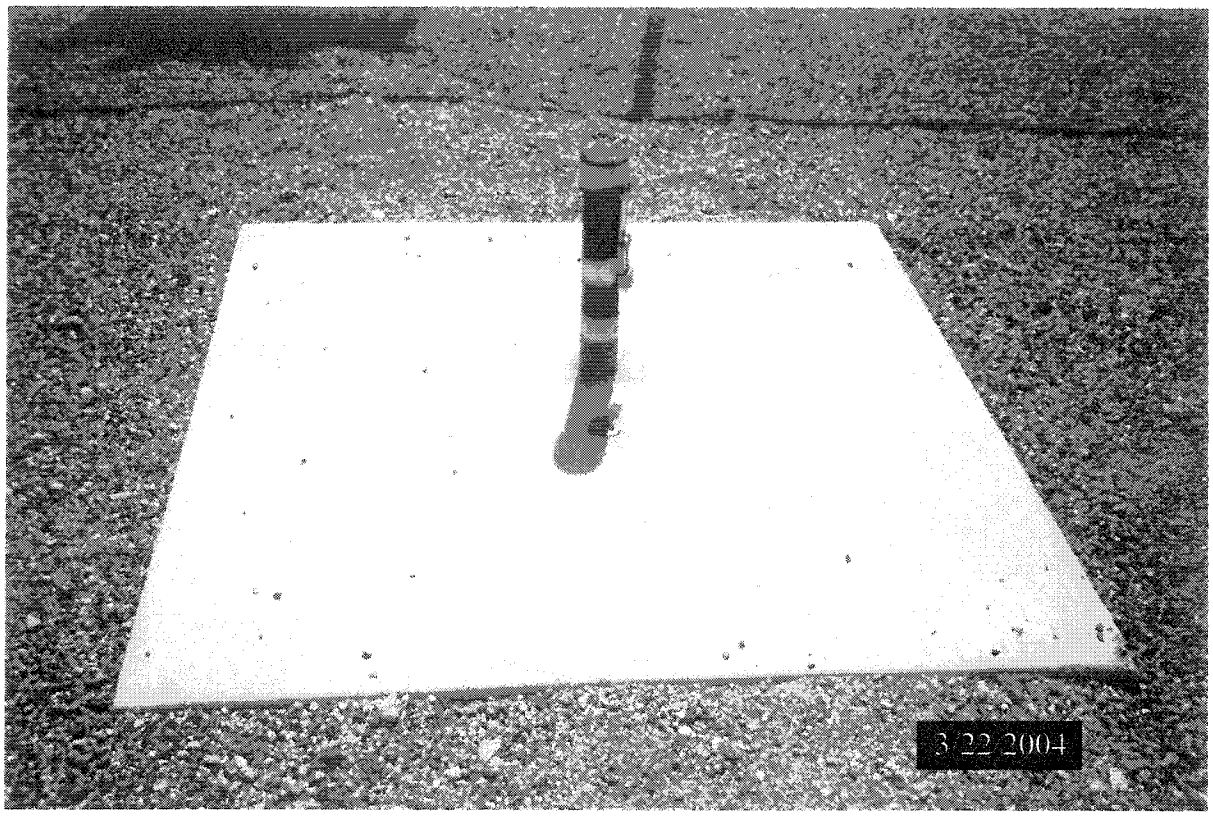

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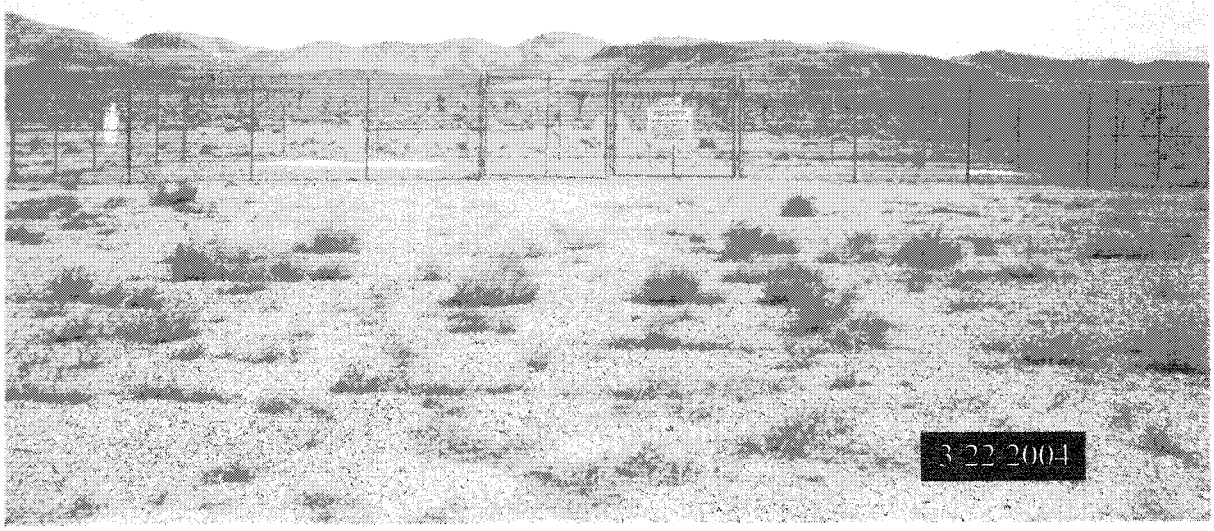

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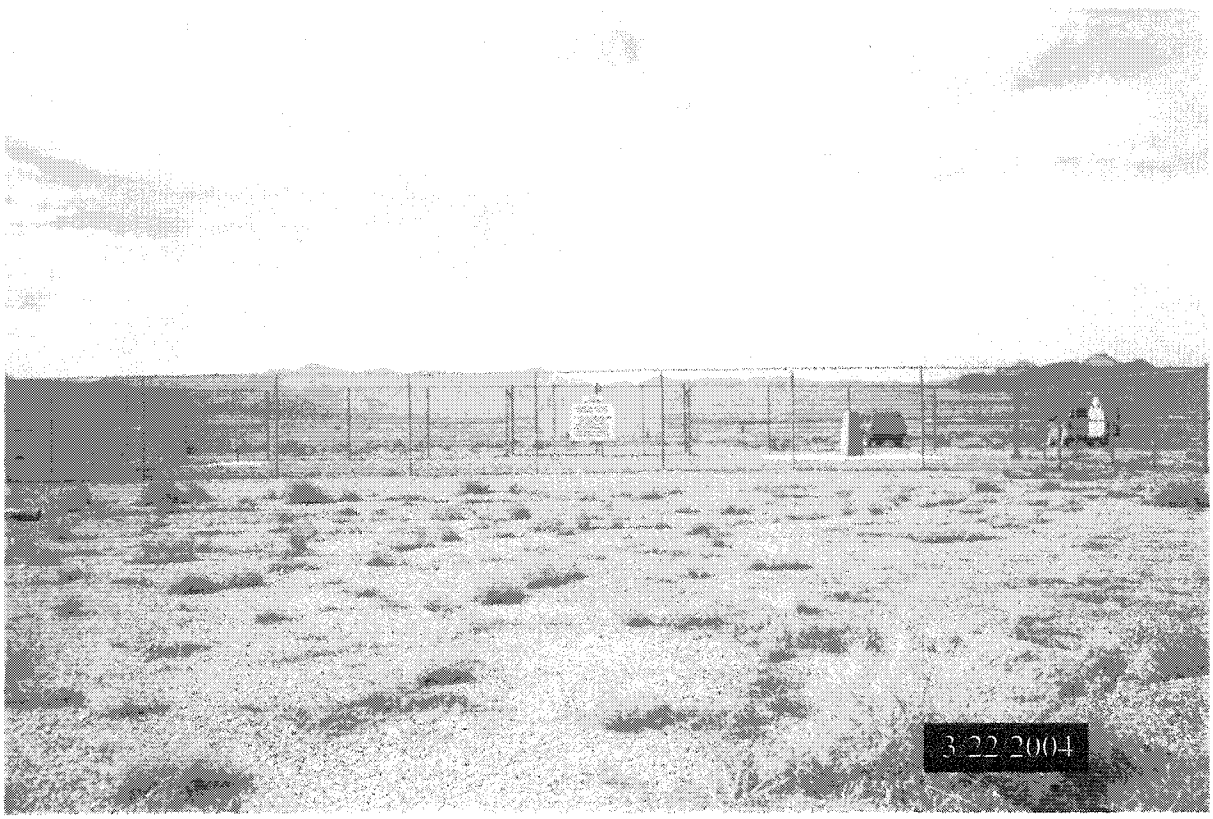

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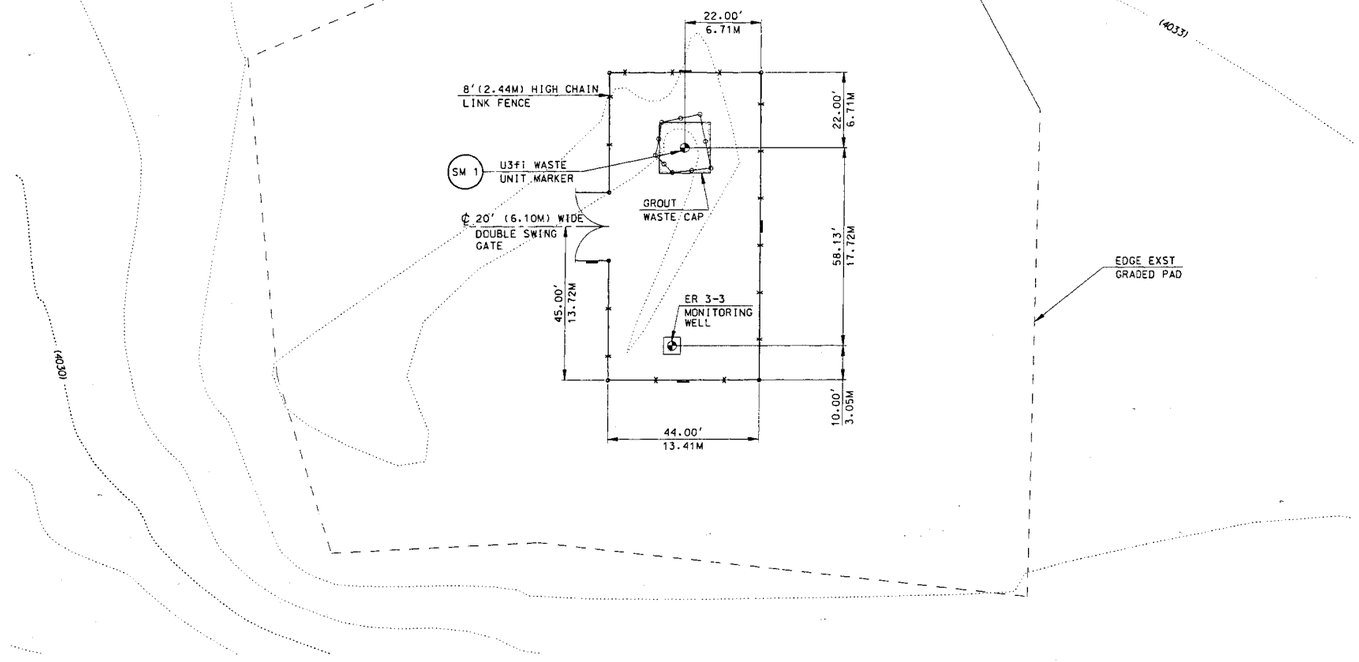

PLAN

SCALE: 1"= 20'

NOTES

1. THE OWNER OR OPERATOR OF THIS SITE MUST RESTRICT DISTURBANCE OF THIS HAZARDOUS WASTE DISPOSAL UNIT IN ACCORDANCE WITH ALL APPLICABLE REGULATIONS CONTAINED IN 40 CFR, PART 265, SUBPART 6.
2. ALL COORDINATES BASED ON THE NEVADA STATE PLANE GRID, CENTRAL ZONE, NORTH AMERICAN DATUM OF 1927, FEET
3. ALL ELEVATIONS BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1929, FEET

MONUMENT LOCATION TABLE

MON NO	COORDINATES N	COORDINATES E	ELEV TOP MON SEPTEMBER 1996
SM 1	834,004.00	692,900.35	4038.18

N

GRAPHIC SCALE

0 10 20 40 60 FEET

1" = 20'

NO	REVISIONS	DESIGN	DRAWN	CHECK	ENG MANG
0	ISSUED FOR INCLUSION IN ANNUAL SUBSIDENCE REPORT 1/16/04				

NATIONAL NUCLEAR SECURITY ADMINISTRATION

NEVADA SITE OFFICE — LAS VEGAS, NEVADA

NEVADA TEST SITE — AREA 3

U3fi WASTE UNIT RCRA CLOSURE

SUBSIDENCE MONUMENT

LOCATION PLAN

DESIGNED BJL — DRAWN EKJ — CHECKED LRE — ENG MANG JAS RPM

DRAWING PRINTED 1/16/2004 2:27:02 PM

Bechtel Nevada

P.O. BOX 98521 LAS VEGAS, NV 89193-8521

DRAWING NUMBER NLV SK-003-04051-C1

g:\dgn\04051a03\csd_data\SK00304051C1.dgn REVISION 0

PROJECT SKETCH - NOT FOR CONSTRUCTION

PROJECT SKETCH - NOT FOR CONSTRUCTION

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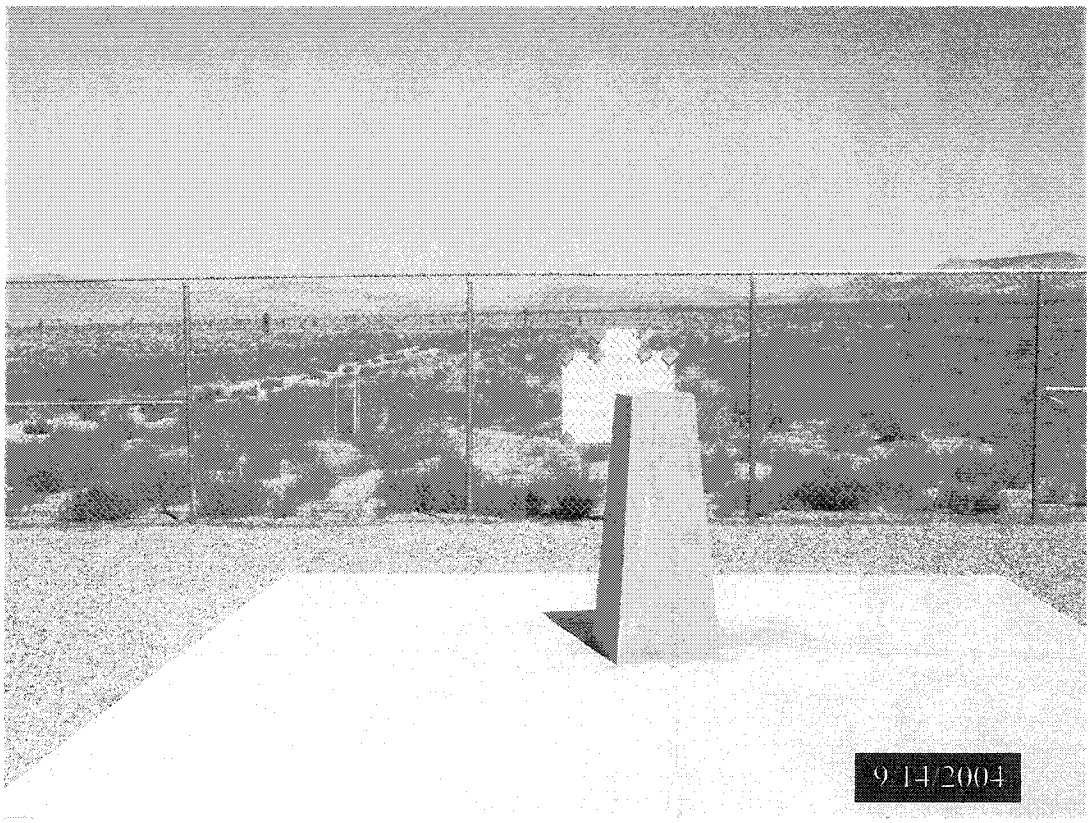

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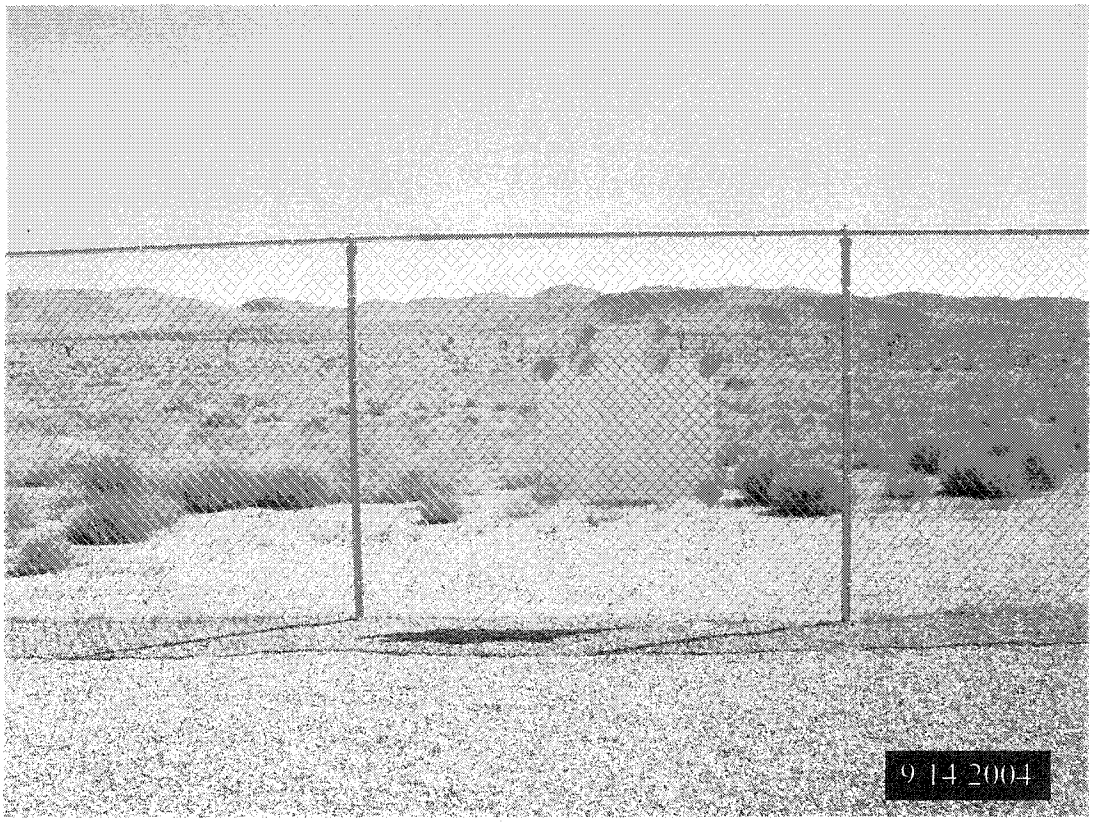

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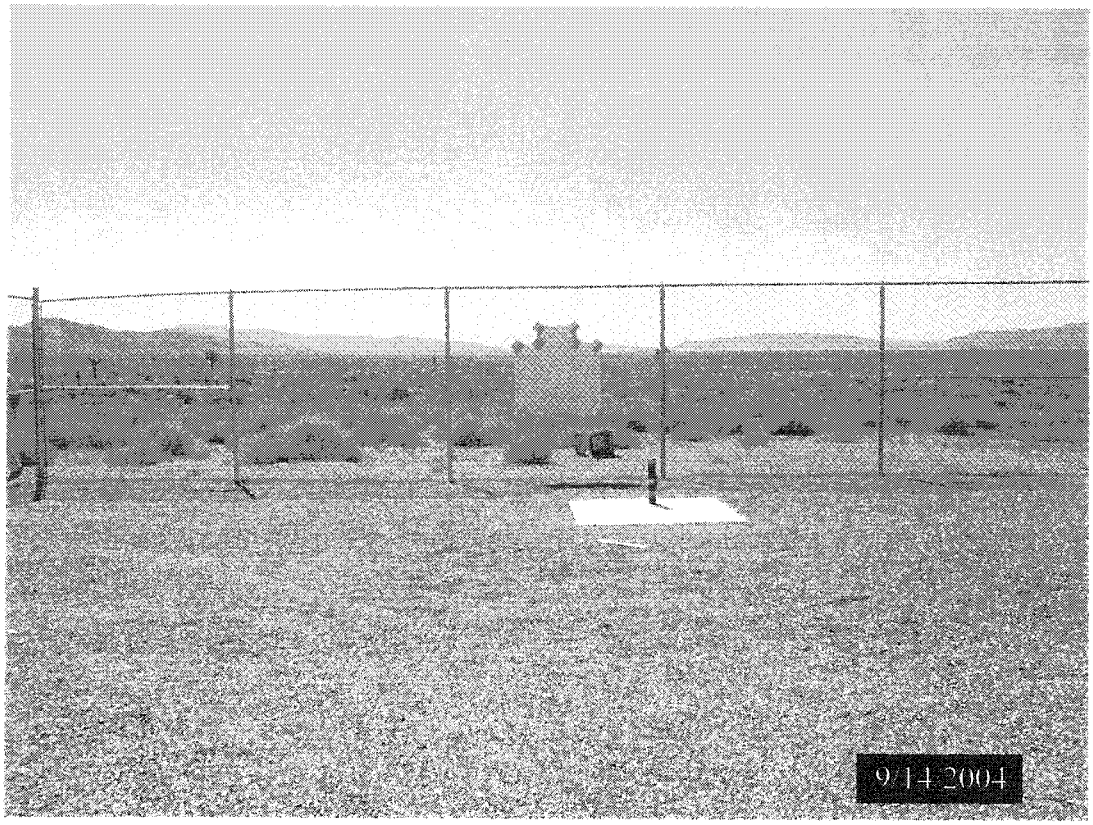

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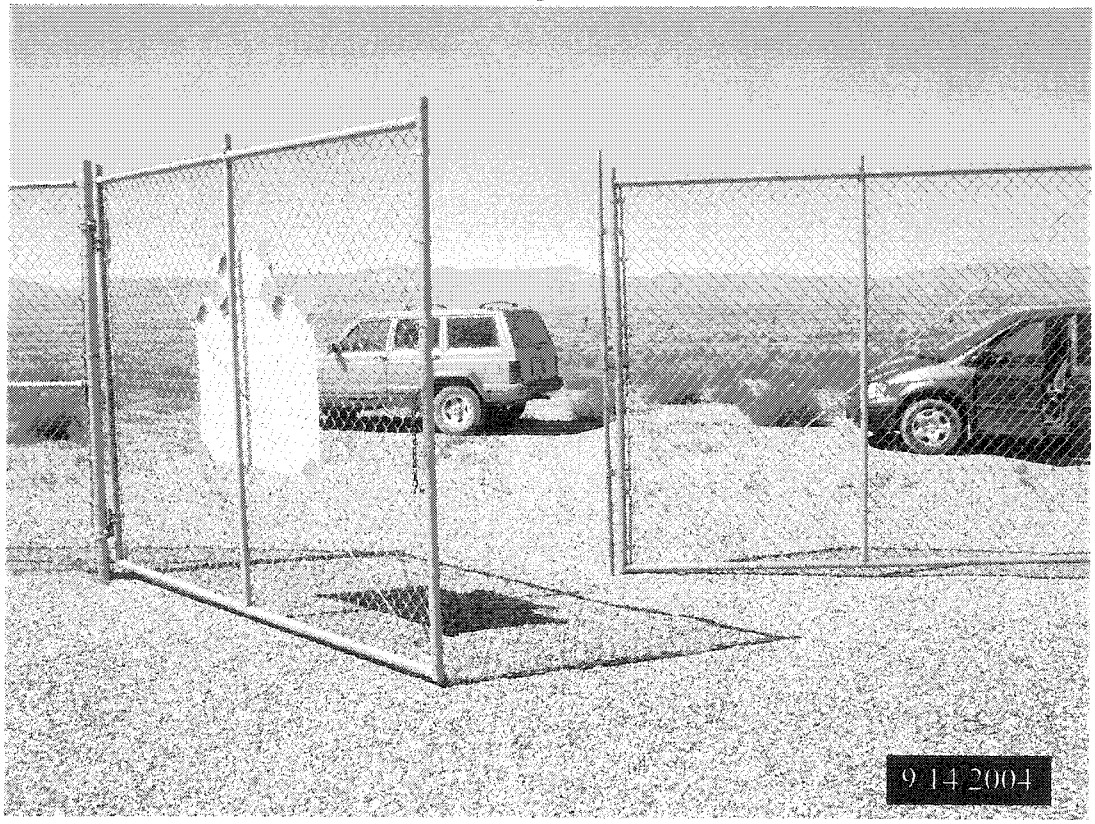

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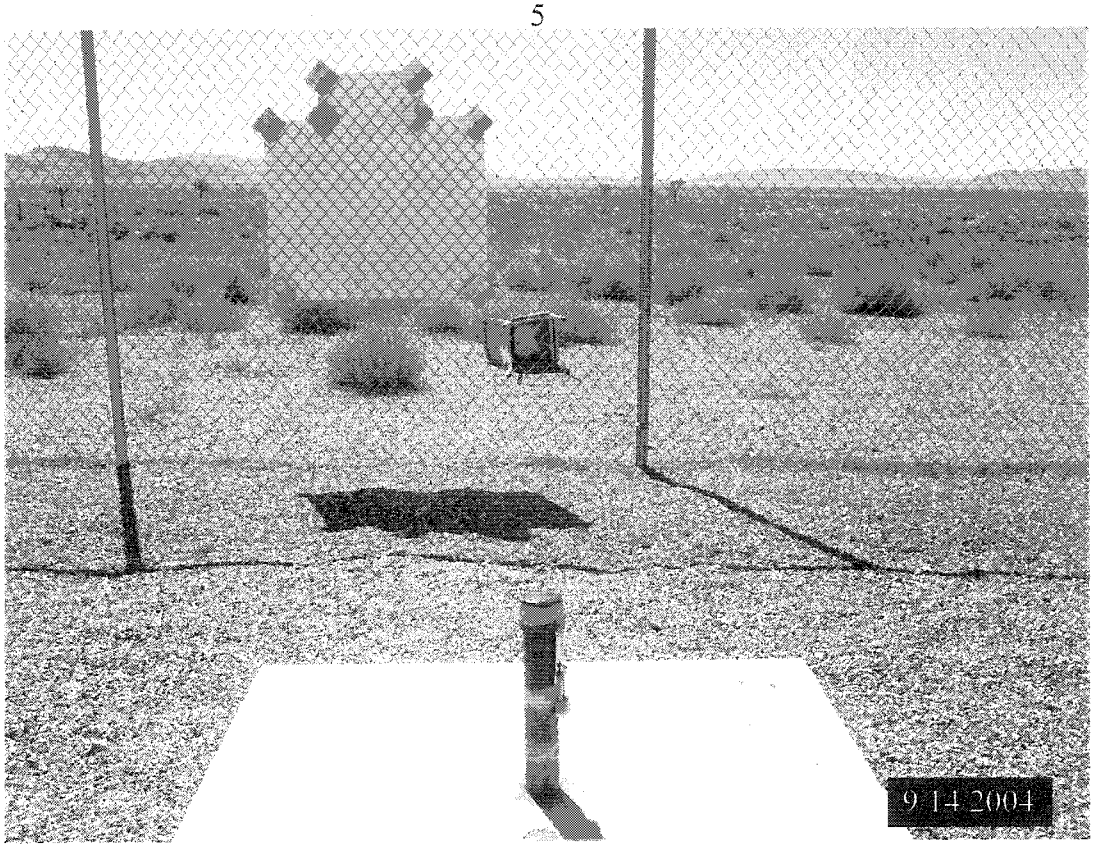

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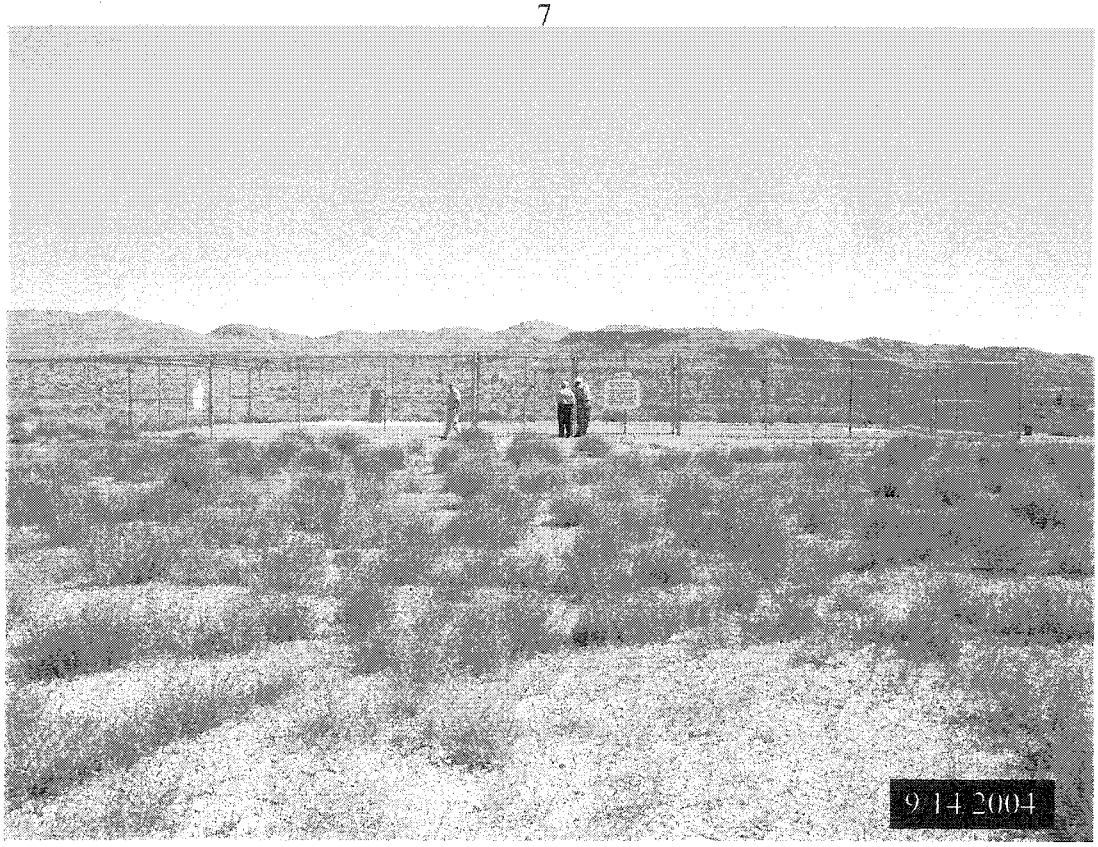

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APPENDIX B

SUBSIDENCE SURVEY PLAT

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APPENDIX C

PRECIPITATION RECORDS

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NTS PRECIPITATION

November 2003

	A12	BJY	CS	DRA	A06	E Tu	4JA	LF2	MER	MV	40 Mi	PM1	PHS	RV	TS2	W5B	UCC
1	0.10	0.04	0.14	0.02	0.12	0.07	0.08	0.03	0.03	0.03	0.08		0.02	0.08	0.01	0.01	0.07
2								0.02									
3																	
4																	
5																	
6																	
7																	
8							0.02			0.02		0.02					
9				0.01		0.02	0.05							0.04			0.02
10				0.02													
11																	
12	0.60	0.31	0.37	0.33	0.47	0.37	0.58	0.55	0.32	0.80	0.60	0.28	0.67	0.40	0.61	0.25	0.30
13	0.17	0.02				0.12	0.02	0.02		0.02	0.03		0.05		0.03		0.02
14								0.26									
15	0.25	0.27	0.15	0.06	0.25	0.24	0.37	0.02	0.18	0.30	0.31	0.24	0.31	0.27	0.27	0.13	0.10
16	0.13	0.02	0.09	0.25	0.02	0.05	0.07				0.02	0.05	0.01	0.12	0.01	0.09	0.15
17																	
18																	
19																	
20																	
21																	
22																	
23																	
24																	
25																	
26																	
27																	
28																	
29																	
30																	
TOTAL	1.25	0.66	0.75	0.69	0.86	0.87	1.19	0.90	0.53	1.17	1.04	0.59	1.06	0.91	0.93	0.48	0.66

Area 12 Dip Stick Rain Gage Reading: 0.20 inches of precipitation from 11/04/2003 to 12/01/2003

Data Tabulated By: Raymond D. Dennis 12/03/2003

Data Quality Control: Raymond D. Dennis 12/03/2003

Certified By: [signature] 12-03-2003

NTS PRECIPITATION

December 2003

	A12	BJY	CS	DRA	A06	E Tu	4JA	LF2	MER	MV	40 Mi	PM1	PHS	RV	TS2	W5B	UCC
1																	
2																	
3																	
4																	
5																	
6																	
7			0.02		0.20		0.03	0.02		0.09							0.10
8																	
9																	
10																	
11			0.05	0.02	0.02	0.10	0.07	0.02	0.06	0.03		0.12					
12																	
13																	
14			0.07	0.05	0.05	0.07	0.07		0.09	0.05	0.02	0.04		0.10	0.03	0.02	0.05
15																	
16																	
17																	
18																	
19																	
20	0.02				0.01	0.02	0.02	0.04	0.02			0.10	0.02	0.03	0.09		0.01
21		0.02			0.01	0.06	0.10	0.02					0.04				0.03
22																	
23	0.02	0.05	0.03	0.05	0.04	0.08		0.05	0.05	0.07	0.05	0.02	0.03	0.07	0.08		0.05
24	0.05	0.07	0.02	0.11	0.05	0.06		0.08		0.08	0.02	0.02	0.08		0.03		1.23
25	0.89	0.74	1.75	1.25	1.17	1.30	1.21	0.47	1.05	1.78	0.75	0.50	0.90	1.32	1.25	0.90	0.02
26	0.02		0.03	T	0.01	0.05		0.01		0.01	0.01	0.01			0.01		
27																	
28																	
29			0.02				0.01			0.03					0.03		
30							0.01			0.01				0.02			
31										0.02							
TOTAL	1.00	0.88	1.99	1.48	1.56	1.74	1.52	0.71	1.27	2.17	0.85	0.81	1.07	1.54	1.52	0.92	1.49

Area 12 Dip Stick Rain Gage Reading: 1.60 inches of precipitation from 12/01/2003 to 01/02/2004

Data Tabulated By: Raymond D. Dennis 01/05/2004

Data Quality Control: Raymond D. Dennis 01/05/2004

Certified By: [signature] 01-05-2004

NTS PRECIPITATION

January 2004

	A12	BJY	CS	A06	DRA	E Tu	4JA	40 Mi	LF2	MER	MV	PM1	PHS	RV	TS2	W5B	UCC
1																	
2																	
3	0.02				0.01	0.02						0.04					
4																	
5																	
6	0.02					0.01											
7																	
8																	
9																	
10																	
11																	
12																	
13																	
14																	
15																	
16																	
17																	
18																	
19																	
20					T												
21																	
22																	
23																	
24																	
25																	
26																	
27	0.12	0.02				0.01		0.06	0.03		0.12	0.12	0.07		0.08		
28	0.01	0.03		0.01		0.03		0.02	0.04		0.01		0.02		0.01		0.03
29																	
30	0.04									0.09							
31			0.01	0.02	0.02	0.02	0.02			0.02		0.02		0.02			
TOTAL	0.21	0.05	0.01	0.03	0.03	0.09	0.02	0.08	0.07	0.11	0.13	0.18	0.09	0.02	0.09	0.00	0.03

Area 12 Dip Stick Rain Gage Reading: 0.10 inches of precipitation from 01/02/2004 to 02/02/2004

Data Tabulated By: R [signature] 02/04/04

Data Quality Control: Raymond W. Lemmi 02/04/2004

Certified By: [signature] 02/04/2004

NTS PRECIPITATION

February 2004

	A12	BJY	CS	A06	DRA	E Tu	4JA	40 Mi	LF2	MER	MV	PM1	PHS	RV	TS2	W5B	UCC
1									0.02								
2	0.02	0.19	0.13	0.05		0.33	0.09	0.06	0.13		0.33	0.05	0.26	0.01	0.27	0.14	0.09
3	*	0.42	0.55	0.63	0.19	0.39	0.54	0.43	0.35	0.32	0.55	0.27	0.34	0.52	0.44	0.25	0.62
4	*																
5	*																
6	*																
7	*																
8	*																
9	*																
10	*																
11	*																
12	*																
13	*																
14	*																
15	*																
16	*																
17	*																
18	*	0.41	0.41	0.21	0.16	0.41	0.32	0.31	0.30	0.20	0.25	0.25	0.46	0.29	0.39	0.17	0.24
19	*	0.02							0.02		0.01						
20	*	0.11	0.15	0.10	0.05	0.45	0.15	0.02	0.02	0.12	0.19	0.05	0.06	0.14	0.21	0.10	0.08
21	*	0.09	0.03	0.04	0.02	0.24	0.04	0.05	0.04	0.03	0.07	0.03	0.18	0.05	0.10	0.03	0.06
22	*	0.45	0.85	0.69	0.30	1.02	0.65	0.52	0.32	0.25	1.03	0.12	0.80	0.56	0.87	0.17	0.57
23	*	0.12	0.05	0.04	0.26	0.40	0.08	0.13	0.08	0.11	0.19	0.22	0.30	0.06	0.53	0.03	0.21
24	*								0.02		0.02	0.01			0.01		
25	*	0.40	0.44	0.32	0.02	0.23	0.50	0.12	0.40	0.10	0.59	0.07	0.32	0.24	0.55	0.11	0.14
26	*	0.02	0.33	0.12	0.33	0.59	0.26	0.27	0.21	0.24	0.35	0.15	0.39	0.32	0.59	0.36	0.35
27	*	0.02				0.01	0.06	0.04			0.04	0.11	0.02	0.04	0.01		
28	*		0.01				0.01	0.01		0.03							
29	*		0.01				0.01			0.01							
	*																
	*																
	*																
TOTAL	0.02	2.25	2.96	2.20	1.33	4.07	2.71	1.96	1.91	1.41	3.62	1.33	3.13	2.23	3.97	1.36	2.36
	*																

* Area 12 missing, gauge inaccessible, due to snow. Data will be updated when site becomes accessible.

Area 12 Dip Stick Rain Gage Reading: 4.30 inches of precipitation from 02/02/2004 to 03/01/2004

Data Tabulated By: 3/3/04

Data Quality Control: Raymond J. Dennis 3/3/04

Certified By: 3-3-04

NTS PRECIPITATION

March 2004

	A12	BJY	CS	A06	DRA	E Tu	4JA	40 Mi	LF2	MER	MV	PM1	PHS	RV	TS2	W5B	UCC
1	1.15	0.10	0.46	0.53	0.27	0.02	0.40	0.03	0.08	0.26	0.17	0.01	0.07	0.15	0.16	0.17	0.08
2	0.10	0.35	0.12	0.02	0.23	1.16		0.39	0.23	0.10	0.58	0.22	0.16	0.50	0.60	0.15	0.50
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	
11																	
12																	
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22																	
23																	
24																	
25																	
26																	
27																	
28																	
29																	
30																	
31																	
TOTAL	1.25	0.45	0.58	0.55	0.50	1.18	0.40	0.42	0.31	0.36	0.75	0.23	0.23	0.65	0.76	0.32	0.58

Area 12 Dip Stick Rain Gage Reading: 1.00 inches of precipitation from 03/01/2004 to 04/02/2004

Data Tabulated By: Raymond O. Dennis 04/05/2004

Data Quality Control: Raymond O. Dennis 04/05/2004

Certified By: [signature] 04/05/2004

NTS PRECIPITATION

April 2004

	A12	BJY	CS	DRA	A06	E Tu	4JA	LF2	MER	MV	40 Mi	PM1	PHS	RV	TS2	W5B	UCC
1		0.07	0.05		0.10	0.05	0.07	0.01	0.08	0.01	0.04		0.10	0.04		0.10	0.02
2	0.89	0.50	0.36	0.37	0.45	0.85	0.15	0.48	0.29	0.63	0.52	0.59	0.65	0.15	0.63	0.27	0.39
3	0.35					0.15					0.19	0.08	0.04		0.06		
4	0.02																
5	0.06																
6	0.04	0.11				0.06		0.15		0.09	0.05	0.03	0.02		0.07		0.05
7	0.01																
8	0.09	0.30		T	0.17	0.06	0.04	0.03	0.04	0.04		0.01	0.02	0.12	0.02		0.07
9																	
10																	
11																	
12																	
13																	
14																	
15																	
16																	
17												0.13			0.02		
18	0.06							0.02	0.02		0.01					0.09	
19																	
20																	
21																	
22																	
23																	
24																	
25																	
26																	
27																	
28																	
29																	
30																	
TOTAL	1.52	0.98	0.41	0.37	0.72	1.17	0.26	0.69	0.43	0.77	0.81	0.84	0.83	0.31	0.80	0.46	0.53

Area 12 Dip Stick Rain Gage Reading: 1.40 inches of precipitation from 04/01/2004 to 05/04/2004

Data Tabulated By: [signature] 5/5/04

Data Quality Control: Raymond O. Dennis 5/5/04

Certified By: [signature] 05/05/04

NTS PRECIPITATION

May 2004

	A12	BJY	CS	DRA	A06	E Tu	4JA	LF2	MER	MV	40 Mi	PM1	PHS	RV	TS2	W5B	UCC
1																	
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10														0.01			
11	0.02	0.01				0.02			0.01			0.02		0.02		0.01	
12																	
13																	
14																	
15																	
16																	
17																	
18																	
19																	
20																	
21												0.08					
22																	
23																	
24																	
25																	
26																	
27																	
28	0.09	0.04				0.10		0.02				0.12	0.21			0.05	
29																	
30																	
31																	
TOTAL	0.11	0.05	0.00	0.00	0.00	0.12	0.00	0.02	0.01	0.00	0.00	0.22	0.21	0.03	0.00	0.06	0.00

Area 12 Dip Stick Rain Gage Reading: 0.10 inches of precipitation from 05/04/2004 to 06/01/2004

Data Tabulated By: [signature] 6/2/04

Data Quality Control:

Certified By: [signature] 6/2/04

NTS PRECIPITATION

June 2004

	A12	BJY	CS	DRA	A06	E Tu	4JA	LF2	MER	MV	40 Mi	PM1	PHS	RV	TS2	W5B	UCC
1																	
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	
11																	
12																	
13																	
14																	
15												0.01					0.02
16	0.30	0.32	0.20	0.01	0.24	0.28	0.28	0.29	0.03	0.34	0.22	0.77	0.19	0.37	0.19	0.47	0.32
17								0.01			0.03	0.02			0.01		
18																	
19																	
20																	
21																	
22																	
23																	
24																	
25																	
26																	
27																	
28																	
29																	
30																	
31																	
TOTAL	0.30	0.32	0.20	0.01	0.24	0.28	0.28	0.30	0.03	0.34	0.25	0.80	0.19	0.37	0.20	0.47	0.34

Area 12 Dip Stick Rain Gage Reading: 0.30 inches of precipitation from 06/01/2004 to 07/01/2004

Data Tabulated By: Raymond D. Dennis 07/07/04

Data Quality Control: Raymond D Dennis 07/07/04

Certified By: Douglas L Lewis 07-07-2004

NTS PRECIPITATION

July 2004

	A12	BJY	CS	DRA	A06	E Tu	4JA	LF2	MER	MV	40 Mi	PM1	PHS	RV	TS2	W5B	UCC
1																	
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	
11																	
12																	
13																	
14																	
15	0.37	0.26										0.48					
16	0.28	0.34	0.01		0.10	0.63									0.39		0.18
17	0.07		0.30			0.03	0.01	0.07		0.42	0.25		0.06		0.19	0.01	0.13
18																	
19																	
20																	
21																	
22																	
23																	
24																	
25																	
26																	
27																	
28																	
29																	
30																	
31																	
TOTAL	0.72	0.60	0.31	0.00	0.10	0.66	0.01	0.07	0.00	0.42	0.25	0.48	0.06	0.00	0.58	0.01	0.31

Area 12 Dip Stick Rain Gage Reading: 0.05 inches of precipitation from 07/01/2004 to 08/02/2004

Data Tabulated By: 8/3/04

Data Quality Control: 8/4/04

Certified By: 8/04/2004

ARL/SORD
232 Energy Way
N. Las Vegas, NV 89030
702-295-1263

NTS PRECIPITATION

August 2004

	A12	BJY	CS	DRA	A06	E Tu	4JA	LF2	MER	MV	40 Mi	PM1	PHS	RV	TS2	W5B	UCC
1	0.03	0.06	0.05	T	0.12	0.02	0.19	0.04	0.03	0.07		0.08	0.04	0.01	0.11	0.02	0.05
2	0.01	0.26	0.05		0.04	0.01	0.01	0.01	0.01	0.01	0.03		0.08	0.08	0.03	0.05	0.07
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	
11																	
12				T					0.01	0.01							
13				T					0.03	0.17		0.10					
14	0.32	0.25	0.06		0.05	0.12	0.44	0.18	0.32	0.25	0.16	0.05		0.16	0.01		0.05
15	0.43	0.37	0.79	1.80	0.93	0.36	0.28	0.22	0.88	0.47	0.21	1.38	0.30	0.93	0.21	0.58	0.33
16				0.08		0.01	0.02	0.01		0.01	0.01	0.01	0.08		0.06	0.02	0.02
17																	
18	0.41	0.36		T		0.39				0.09	0.43		0.08		0.05		0.17
19																	
20																	
21	0.08					0.05											
22																	
23																	
24																	
25																	
26																	
27																	
28																	
29																	
30																	
31																	
TOTAL	1.28	1.30	0.95	1.88	1.14	0.96	0.94	0.46	1.28	1.08	0.84	1.62	0.58	1.18	0.47	0.67	0.69

Area 12 Dip Stick Rain Gage Reading: 0.80 inches of precipitation from 08/02/2004 to 09/02/2004

Data Tabulated By: Raymond D. Dennis 09/03/2004

Data Quality Control: Raymond D. Dennis 09/03/2004

Certified By: [signature] 09-03-2004

NTS PRECIPITATION

September 2004

	A12	BJY	CS	DRA	A06	E Tu	4JA	LF2	MER	MV	40 Mi	PM1	PHS	RV	TS2	W5B	UCC
1																	
2																	
3				0.01													
4																	
5																	
6																	
7																	
8																	
9	0.15	0.02		0.21		0.09			0.02				0.31				
10																	
11	0.03			0.26	0.02	0.15	0.23				0.06		0.15	0.86			0.10
12			0.03		0.02		0.12		0.02					0.07		0.06	0.02
13																	
14																	
15																	
16																	
17																	
18																	
19																	
20																	
21																	
22																	
23																	
24																	
25																	
26																	
27																	
28																	
29	0.13					0.05				0.28	0.02						0.19
30	0.02			T	0.01	0.03		0.04		0.03	0.08		0.12		0.08		0.02
TOTAL	0.33	0.02	0.03	0.48	0.05	0.32	0.35	0.04	0.04	0.31	0.16	0.00	0.58	0.93	0.08	0.06	0.33

Area 12 Dip Stick Rain Gage Reading: 0.00 inches of precipitation from 09/02/2004 to 10/01/2004

Data Tabulated By: Raymond O. Dennis 10/04/04

Data Quality Control: Raymond O. Dennis 10/04/04

Certified By: [signature] 10/05/2004

NTS PRECIPITATION

October 2004

	A12	BJY	CS	DRA	A06	E Tu	4JA	LF2	MER	MV	40 Mi	PM1	PHS	RV	TS2	W5B	UCC
1	M							0.01			0.02		0.02				
2	M																
3	M																
4	M																
5	M																
6	M																
7	M																
8	M																
9	M																
10	M				0.03												
11	M			0.01													
12	M																
13	M																
14	M																
15	M																
16	M																
17	M														0.02		
18	M														0.01		
19	M	0.76	1.43	0.21	0.47	1.00	0.65	0.57	0.38	2.13	1.54	0.50	0.56	1.15	1.38	0.46	0.48
20	M	0.56	1.37	1.40	1.31	1.00	1.04	0.75	1.07	1.59	1.32	0.05	1.00	1.25	0.99	0.72	1.25
21	M	0.03	0.10	0.17		0.22	0.17	0.10	0.17	0.13	0.08	0.11	0.14	0.17	0.09	0.11	0.11
22	M		0.01			0.01		0.01			0.02				0.10		0.02
23	M																
24	M	0.01	0.19		0.27	0.07	0.01	0.09				0.20		0.26			
25	M	0.02	0.10	T		0.02	0.04	0.02				0.02	0.06			0.02	0.16
26	M	0.27	0.19		0.04		0.25	0.10			0.58	0.20	0.04	0.48	0.22	0.20	
27	M	0.63	0.74	0.68	0.62	1.19	0.42	1.13	0.54	0.68	0.75	0.37	0.96	0.42	0.66	0.34	0.82
28	M	0.02	0.12	0.02	0.01	0.19	0.01	0.22	0.03	0.07	0.15	0.05	0.22		0.04		0.03
29	M		0.01				0.01				0.03					0.01	
30	M		0.01				0.01										
31	M																
TOTAL	M	2.30	4.27	2.49	2.75	3.70	2.61	3.00	2.19	4.60	4.49	1.50	3.00	3.73	3.51	1.86	2.87

Area 12 Dip Stick Rain Gage Reading: 3.10 inches of precipitation from 10/01/2004 to 11/01/2004

Data Tabulated By: Raymond D. Dennis 11/02/04

Data Quality Control: Raymond D. Dennis 11/02/04

Certified By: [signature] 11-02-04

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