Nevada
Environmental
Restoration
Project

DOE/NV-735

Post-Closure Inspection Report for
Corrective Action Unit 404:
Roller Coaster Sewage Lagoons
And North Disposal Trench
Tonopah Test Range, Nevada
Calendar Year 2000

Controlled Copy No.: _____

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Revision: 0

June 2001

Environmental Restoration
Division

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

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LTC P. M. Loomis, DTRA, M/S 645,
Mercury, NV

DTRA Environmental, M/S 645, Mercury, NV

BN Technical Information Officer, M/S NLV048,
Las Vegas, NV

G. M. Romano, IT, Las Vegas, NV

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K. B. Campbell, BN, Mercury, NV

K. A. Hoar, ESHD, NNSA/NV, Las Vegas, NV

J. M. Ford, OPAI, NNSA/NV, Las Vegas, NV

P. L. Hall, EM, NNSA/NV, Las Vegas, NV

R. C. Wycoff, ERD, NNSA/NV, Las Vegas, NV

J. L. Appenzeller-Wing, ERD, NNSA/NV, Las Vegas, NV

K. J. Cabble, ERD, NNSA/NV, Las Vegas, NV

**POST-CLOSURE INSPECTION REPORT FOR
CORRECTIVE ACTION UNIT 404:
ROLLER COASTER SEWAGE LAGOONS
AND NORTH DISPOSAL TRENCH
TONOPAH TEST RANGE, NEVADA
CALENDAR YEAR 2000**

**Prepared for
U. S. Department of Energy
National Nuclear Security Administration
Nevada Operations Office
Work Performed Under Contract No.
DE-AC08-96NV11718**

Controlled Copy No.: _____

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Revision: 0

June 2001

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**POST-CLOSURE INSPECTION REPORT FOR
CORRECTIVE ACTION UNIT 404:
ROLLER COASTER SEWAGE LAGOONS
AND NORTH DISPOSAL TRENCH
TONOPAH TEST RANGE, NEVADA
CALENDAR YEAR 2000**

Approved by:

Janet L. Appenzeller-Wing, Project Manager
Industrial Sites Project

Date:

6/21/01

Approved by:

Runore C. Wycoff, Division Director

Date:

6/21/01

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LIST OF ACRONYMS AND ABBREVIATIONS

CAU	Corrective Action Unit
cm	centimeter
CR	Closure Report
in.	inch
ft	foot
ft ²	square foot
m	meter
m ²	square meter
NDEP	Nevada Division of Environmental Protections

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1.0 INTRODUCTION

Post-closure monitoring requirements for the Roller Coaster Sewage Lagoons and North Disposal Trench (Corrective Action Unit [CAU] 404) (Figure 1) are described in Closure Report for Corrective Action Unit 404, Roller Coaster Sewage Lagoons and North Disposal Trench, Tonopah Test Range, Nevada, report number DOE/NV--187. The Closure Report (CR) was submitted to the Nevada Division of Environmental Protection (NDEP) on September 11, 1998. Permeability results of soils adjacent to the engineered cover and a request for closure of CAU 404 were transmitted to the NDEP on April 29, 1999. The CR (containing the Post-Closure Monitoring Plan) was approved by the NDEP on May 18, 1999.

Post-closure monitoring at CAU 404 consists of the following:

- Site inspections done twice a year to evaluate the condition of the unit.
- Verification that the site is secure.
- Notice of any subsidence or deficiencies that may compromise the integrity of the unit.
- Remedy of any deficiencies within 90 days of discovery.
- Preparation and submittal of an annual report.

Site inspections were conducted on June 19, 2000, and November 21, 2000. The site inspections were conducted after completion of the revegetation activities (October 30, 1997) and NDEP approval of the CR (May 18, 1999). All site inspections were conducted in accordance with the Post-Closure Monitoring Plan in the NDEP-approved CR.

This report includes copies of inspection checklists, photographs, recommendations, and conclusions. The Post-Closure Inspection Checklists are found in Attachment A, a copy of the field notes is found in Attachment B, and copies of the inspection photographs are found in Attachment C.

2.0 INSPECTION RESULTS

2.1 June 19, 2000 Inspection

The first inspection was completed on June 19, 2000. Small mammal burrows were observed along the south and west cover side slopes. All observed burrows were less than 5 centimeters (cm) (2 inches [in.]) in diameter and were located along the toe of the cover side slopes. Small animal burrows/scratchings were also present along the fence line, both inside and outside the fence line. The burrows did not effect the integrity of the cover. The fence and the chicken wire mesh fence were in good repair with no apparent holes or breaches in the fencing. However, small mammals had burrowed under the mesh fence at several locations. Three warning signs that were originally attached to the fence using steel hog rings had fallen off at the time of inspection. The signs were reattached to the fence using the original hog rings. A small number of minor erosion features, surface channeling measuring less than 1 meter (m) (3.3 feet [ft]) long,

approximately 1-2 cm (0.4 - 0.8 in.) wide, and 1 cm (0.4 in.) in depth, were present on the cover side slopes. No erosion, subsidence, or cracking of the cover surface was observed. Overall, the cover, fencing, and the area inside the fence were observed to be stable and in good condition. No further maintenance or repairs are recommended.

2.2 November 21, 2000 Inspection

The second inspection was completed on November 21, 2000. Small shallow burrow/scratchings approximately 2.5 cm (1 in.) in width and depth were observed at the toe of the south and west cover side slopes. Small mammal burrows were also present in several areas along the perimeter of the fence. The burrows at the base of the fence were backfilled with soils taken adjacent to the fence. The wire fence, chicken wire mesh, and gates were all in excellent condition. Small erosion rills measuring approximately 1 m (3.3 ft) long, 1-2 cm (0.4 - 0.8 in.) wide, and 1 cm (0.4 in.) in depth were present on the cover side slopes. These erosional features do not effect the integrity of the cover. Three warning signs originally attached to the fence had become unattached. These signs were reattached to the fence using the original steel hog rings. Cover vegetation was well established and healthy. There was no evidence of erosion, settling, or cracking to the cover. The integrity of the cover unit was excellent. No further maintenance or repairs were recommended.

3.0 VEGETATIVE MONITORING

Vegetative monitoring is done in the first, third, and fifth year after revegetation was completed as stated in the Post-Closure Monitoring Plan (contained in the CR). The vegetative monitoring done is for the third year following revegetation. The vegetative monitoring was conducted on May 23, 2000 and November 14, 2000, by Bechtel Nevada biologist. Seed germination, wildlife usage, and erosion condition of the soil were accessed. The plant species present on the site were determined by placing a 1-square meter (m^2) (10.7-square ft [ft^2]) quadrat at 70 random locations within the fenced area. The number and type of plant species within each quadrat were counted and recorded on field data sheets. Twenty surveyed areas were located on the cover, and the other 50 surveyed areas were located off of the cover but inside the fenced area. Table 1 presents the summarized data for the May 23 site visit. Wildlife usage of the site was determined by recording the presence of animal scat within the quadrats. The erosion condition of the soil over the site in general was determined using an erosion condition classification.

Eight of the eight seeded species were observed at the site. Outside of the cover area (inside of the fence), approximately 21 seedlings of seeded plants were observed in a $1 m^2$ (10.7 ft^2). On the cover, there were approximately 37 seedlings of seeded plants in a $1 m^2$ (10.7 ft^2). In addition, approximately less than one non-seeded plant was observed in $1 m^2$ (10.7 ft^2) in the cover area, and three non-seeded plants were observed in a $1 m^2$ (10.7 ft^2) outside of the cover area. The straw mulch (from the revegetation activities) was still present at the site, but has decreased by approximately 50 percent from that observed in the inspection on June of 1998.

Grazing (herbivory) by rabbits was not observed during the vegetative monitoring. Some small burrows were found on the southern edge of the cover (approximately 2 cm [0.8 in] in width and depth) were observed on the southern edge of the cover. There were no signs of erosion on the site, even on the steep side slopes of the cover. The overall condition of the vegetative cover is very good with a good diversity of native shrubs and grasses established both on the cover and on the staging area within the fence.

4.0 CONCLUSIONS AND RECOMMENDATIONS

Minor grazing by rabbits has been observed; however, the plant population remains diverse. The overland runoff is being properly diverted around the site. There is no evidence of drainage or erosion through the site. Minor erosion of the cover has been observed; however, this is confined to the loose (non-compacted) vegetative horizon of the cover. A small amount of erosion was also noted outside of the cover area (within the fenced area). The minor erosion observed does not impact the cover integrity. Rabbits have burrowed under the fence in several areas; upon observation, the burrows were backfilled. The condition of the cover is very good and there is a good diversity of plant species growing on the cover and within the fenced area.

Monitoring of the vegetation is recommended for the fifth year (2002) after revegetation as proposed in the CR. Modifications/repairs to the cover or a change to inspection frequency are not recommended as a result of the observations conducted.

TABLE 1 - SUMMARY OF VEGETATIVE MONITORING RESULTS FOR MAY 2000

LIFE FORM	GENUS	SPECIES	COMMON NAME	PLANT DENSITY (Plants/m ²)	
				Cover	Inside Fence
Shrub	<i>Artemisia</i>	<i>spinescens</i>	Bud sagebrush	2.1	1.7
Shrub	<i>Atriplex</i>	<i>canescens</i> var. <i>Canescens</i>	Fourwing saltbrush	0.9	0.3
Shrub	<i>Atriplex</i>	<i>confertifolia</i>	Shadscale saltbrush	10.9	10.0
Shrub	<i>Kraschenin- nikovia</i> (<i>Ceratoides</i>)	<i>lanata</i>	Winterfat	0.3	0.04
Grass	<i>Achnatherum</i> (<i>Oryzopsis</i>)	<i>hymenoides</i>	Indian ricegrass	3.8	2.5
Grass	<i>Elymus</i> (<i>Sitanion</i>)	<i>elymoides</i> ssp. <i>elymoides</i>	Bottlebrush squirreltail	10.8	6.2
Grass	<i>Pleuraphis</i> (<i>Hilaria</i>)	<i>jamesii</i>	Galleta grass	8.6	0.8
Forb	<i>Sphaeralcea</i>	<i>ambigua</i> ssp. <i>ambigua</i>	Apricot globemallow	0.2	0.1
TOTAL SEEDED				37.6	21.6
Forb	<i>Halogeton</i>	<i>glomeratus</i>	Halogeton	0.3	3.3
TOTAL NON-SEEDED				0.3	3.3
TOTAL Plants/m ²				37.9	24.9
% MULCH				5.0%	11.0%
% PLOTS w/ SCAT				0%	0%

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ATTACHMENT A
INSPECTION CHECKLISTS

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ROLLER COASTER LAGOONS & N. DISPOSAL TRENCH, POST-CLOSURE MONITORING CHECKLIST

Date of Last Inspection: 11/30/99	Reason for Last Inspection: Bi - Annual
Responsible Agency: DCE/NV	Project Manager: Wayne Johnson BSI/ER
Inspection Date: 6/19/00	
Inspector (name, title, organization): Kevin Campbell Geologist/Hydrologist BSI/ER	
Assistant Inspector (name, title, organization): N/A	

A. GENERAL INSTRUCTIONS

- 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.
- 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, annotated site maps.
- 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.
- A standard set of color 35mm photographs is required. In addition, all anomalous features or new features (such as changes in adjacent area land use) are to be photographed. A photo log entry will be made for each photograph taken.
- This unit will be inspected biannually 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 photo log attached, and recommendations and conclusions.

B. PREPARATION (To be completed prior to site visit)	YES	NO	EXPLANATION
1. Site as-built plans and site base map reviewed.	✓		
2. Previous inspection reports reviewed.	✓		
a. Were anomalies or trends detected on previous inspections?		✓	
b. Was maintenance performed?		✓	
3. Site maintenance and repair records reviewed.		✓	N/A
a. Has site repair resulted in a change from as-built conditions?		✓	
b. Are revised as-builts available that reflect repair changes?		✓	

C. SITE INSPECTION (To be completed during inspection)	YES	NO	EXPLANATION
1. Adjacent off-site features within watershed areas.			
a. Have there been any changes in use of adjacent area?		✓	
b. Are there any new roads or trails?		✓	
c. Has there been a change in the position of nearby washes?		✓	
d. Has there been lateral excursion or erosion/deposition of nearby washes?		✓	
e. Are there new drainage channels?		✓	
f. Change in surrounding vegetation?		✓	
2. Security fence, signs.			
a. Displacement of fences, site markers, boundary markers, or monuments?		✓	
b. Have any signs been damaged or removed? (Number of signs replaced: 0)	✓		3 signs were not attached to fence
c. Were gates locked?		✓	No locks present

ROLLER COASTER LAGOONS & N. DISPOSAL TRENCH, POST-CLOSURE MONITORING CHECKLIST

3. Waste Unit cover.

- a. Is there evidence of settling?
- b. Is there cracking?
- c. Is there evidence of erosion around the cap (wind or water)?
- d. Is there evidence of animal burrowing?
- e. Have the site markers been disturbed by man or natural processes?
- f. Do natural processes threaten to integrity of any cover or site marker?
- g. Other?

YES NO EXPLANATION

	☒	
	☒	
	☒	
☒		Burrows on SW portion of Cap. Also all along fence line
	☒	
	☒	
	☒	

4. Vegetative cover.

- a. Is perimeter fence or mesh fencing damaged?
- b. Is there evidence of horses or rabbits on site?
- c. Is organic mulch adequate to prevent erosion?
- d. Are weedy annual plants present? If yes, are they a problem?
- e. Are seeded plant species found on site?
- f. Is there evidence of plant mortality?

	☒	
☒		Evidence of rabbits scratching under mesh
		N/A mulch gone
☒		
	☒	

5. Photo Documentation

- a. Has a photo log been prepared?

☒		
-------------------------------------	--	--

- c. Number of photos exposed (8)

D. FIELD CONCLUSIONS

- 1. Is there an imminent hazard to the integrity of the unit? (Immediate report required)

	☒	
--	-------------------------------------	--

Person/Agency to whom report made:

- 2. Are more frequent inspections required?

	☒	
--	-------------------------------------	--

- 3. Are existing maintenance/repair actions satisfactory?

☒		
-------------------------------------	--	--

- 4. Is other maintenance/repair necessary?

	☒	
--	-------------------------------------	--

- 5. Is current status/condition of vegetative cover satisfactory?

☒		
-------------------------------------	--	--

- 6. Rationale for field conclusions: Unit appears intact and in good condition. No obvious damage to cap or fence.

E. CERTIFICATION

I have conducted an inspection of the Roller Coaster Sewage Lagoons & North Disposal Trench, CAU 404, at the TTR in accordance with the Post-Closure Monitoring Plan (see Closure Report) as recorded on this checklist, attached sheets, field notes, photo logs, and photographs.

Chief Inspector's Signature:

[Signature]

Printed Name:

Daniel S. Tobrason

Title:

Scientist

Date:

11/21/00

ROLLER COASTER LAGOONS & N. DISPOSAL TRENCH, POST-CLOSURE MONITORING CHECKLIST

Date of Last Inspection: 6/19/00

Reason for Last Inspection: Bi-Annual

Responsible Agency: DOE/NV

Project Manager: W. Johnson, BN/ER

Inspection Date: 11/21/00

Inspector (name, title, organization): Don Tobiasson, Scientist, BN/ER

Assistant Inspector (name, title, organization):

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.
3. 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, annotated site maps.
4. 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.
5. A standard set of color 35mm photographs is required. In addition, all anomalous features or new features (such as changes in adjacent area land use) are to be photographed. A photo log entry will be made for each photograph taken.
6. This unit will be inspected biannually 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 photo log attached, and recommendations and conclusions.

B. PREPARATION (To be completed prior to site visit)		YES	NO	EXPLANATION
1. Site as-built plans and site base map reviewed.		☒		
2. Previous inspection reports reviewed.		☒		
a. Were anomalies or trends detected on previous inspections?			☒	
b. Was maintenance performed?			☒	
3. Site maintenance and repair records reviewed.				N/A
a. Has site repair resulted in a change from as-built conditions?				N/A
b. Are revised as-builts available that reflect repair changes?				N/A

C. SITE INSPECTION (To be completed during inspection)		YES	NO	EXPLANATION
1. Adjacent off-site features within watershed areas.				
a. Have there been any changes in use of adjacent area?			☒	
b. Are there any new roads or trails?			☒	
c. Has there been a change in the position of nearby washes?			☒	
d. Has there been lateral excursion or erosion/deposition of nearby washes?			☒	
e. Are there new drainage channels?			☒	
f. Change in surrounding vegetation?			☒	
2. Security fence, signs.				
a. Displacement of fences, site markers, boundary markers, or monuments?			☒	
b. Have any signs been damaged or removed? (Number of signs replaced: <u>0</u>)		☒		3 Sign down on N, NW, and E sites
c. Were gates locked?			☒	No Lock Present

ROLLER COASTER LAGOONS & N. DISPOSAL TRENCH, POST-CLOSURE MONITORING CHECKLIST

3. Waste Unit cover.

- a. Is there evidence of settling?
- b. Is there cracking?
- c. Is there evidence of erosion around the cap (wind or water)?
- d. Is there evidence of animal burrowing?
- e. Have the site markers been disturbed by man or natural processes?
- f. Do natural processes threaten to integrity of any cover or site marker?
- g. Other?

YES NO EXPLANATION

	✓	
	✓	
	✓	
✓		small burrows at South east toe of cap.
	✓	
	✓	
	✓	

4. Vegetative cover.

- a. Is perimeter fence or mesh fencing damaged?
- b. Is there evidence of horses or rabbits on site?
- c. Is organic mulch adequate to prevent erosion?
- d. Are weedy annual plants present? If yes, are they a problem?
- e. Are seeded plant species found on site?
- f. Is there evidence of plant mortality?

✓		Bumpy terrain, breached/burrowed at science locations
✓		Burrows inside fence
	✓	Plants well established much for
	✓	
✓		
	✓	

5. Photo Documentation

- a. Has a photo log been prepared?

✓		
---	--	--

- c. Number of photos exposed (8)

D. FIELD CONCLUSIONS

- 1. Is there an imminent hazard to the integrity of the unit? (Immediate report required)

	✓	
--	---	--

Person/Agency to whom report made:

- 2. Are more frequent inspections required?
- 3. Are existing maintenance/repair actions satisfactory?
- 4. Is other maintenance/repair necessary?
- 5. Is current status/condition of vegetative cover satisfactory?

	✓	
✓		
	✓	
✓		

- 6. Rationale for field conclusions:

Cover appears in good condition - with healthy vegetation established and fence in good condition. Small burrows present along ^{SW} cover edges and at base of side slopes. No obvious erosion features.

E. CERTIFICATION

I have conducted an inspection of the Roller Coaster Sewage Lagoons & North Disposal Trench, CAU 404, at the TTR in accordance with the Post-Closure Monitoring Plan (see Closure Report) as recorded on this checklist, attached sheets, field notes, photo logs, and photographs.

Chief Inspector's Signature:

Kevin B. Campbell

Printed Name:

Kevin B. Campbell

Title:

EN Geologist/Hydrologist

Date:

6/19/00

ATTACHMENT B

FIELD NOTES

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continued from Page U/A

BOOK NO.

TTR Post-Closure Inspections - Roller Coaster Sewage Lagoons CAU 404

Monday June 19, 2000

check, warm sunny.

30 Met up with Clair Blackburn - TTR Westinghouse photographer.

45 Arrive at Roller Coaster Sewage Lagoons CAU 404 to conduct inspection.

- Fence in good shape/repair
- Gate in good shape no lock present on gate
- Signs on the north, west and east fence line are down/partially attached.
- Reattached signs to fence line with existing bulldozers. Need to bring pliers and new rings next time.
- Evidence of animals present inside and along fence line. Many small burrow holes along fence line.
- "Bunny" fencing breached by burrowing animals at several locations but mesh fencing in good shape. Buried bottom of fence when it was little.
- Burrows present along the toe of the cover slope and along fence line. Burrows don't seem to present any have compromised cover integrity or effectiveness.
- Vegetation on cover and on staging area inside fence line looks very healthy.
- straw mulch accumulated along fence line.
- 9 photographs taken.
- 2 Completed filling out inspection checklist and depart site

KAC

IDERY PRODUCTIONS CHICAGO 60606 Made in USA

Work continued to Page 4

RE

DATE

6/19/00

D TO AND UNDERSTOOD BY

DATE

WITNESS

DATE

TTR POST-CLOSURE INSPECTIONS - CONTINUED

TUESDAY, NOVEMBER 21, 2000.

HIGH CLOUDS, CALM, 12:10 (40%)

1030 INSPECTION OF ROLLER COASTER SEWAGE LAGOONS

GATE AND FENCE IN EXCELLENT SHAPE. NO LOCK ON GATE.
SIGNS ON THE N, E, NW SIDES ARE DOWN.

EVIDENCE OF BURROWING ON THE SW PART OF CAP AND
ALONG THE FENCELINE THROUGHOUT. ALSO EVIDENCE OF
SMALL ANIMALS SCRATCHING UNDER MARSH FENCE. MESH
IS IN GOOD SHAPE.

VEGETATION IS HEALTHY THROUGHOUT ENTIRE FENCED AREA
AND ON CAP. MAINLY CONSISTS OF VARIOUS GRASSES WITH
FEW SHRUBS.

1050 COMPLETED ROLLER COASTER INSPECTION.

Work continued to Page 33

D. J. S. R.

11/21/00

ATTACHMENT C
PHOTOGRAPH LOG AND PHOTOGRAPHS

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PHOTOGRAPH LOG

PHOTO NUMBER	DATE	DESCRIPTION
1	5/23/2000	View to northeast of cover surface.
2	5/23/2000	View to northeast of the area off the cover.
3	6/19/2000	View to east from entrance of site.
4	6/19/2000	View of the southern edge of cover. Note the burrow holes along the base of slope and just inside the fence line.
5	6/19/2000	View looking northeast from entrance to site.
6	6/19/2000	View of southwest corner of cover looking west.
7	11/14/2000	View to northeast of the staging area.
8	11/14/2000	View to southwest of cover surface.
9	11/21/2000	View to east from entrance gate.
10	11/21/2000	View to northeast from entrance gate.
11	11/21/2000	Animal burrows along the southwest cover edge.
12	11/21/2000	View of southwest corner of cover looking to the west.

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05/23/2000

1

05/23/2000

2

3

4

5

6

11/14/2000

7

11/14/2000

8

11/21/2000 10:29

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