MACTEC

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December 5, 2006

Mr. Wayne Svejnoha, Contracting Officer's Representative
U.S. Department of the Interior
BUREAU OF LAND MANAGEMENT
Alaska State Office
222 West 7th Avenue
Anchorage, Alaska 99513

Transmittal Letter
Shoreline Erosion Project, Reserve Pit Characterization
North Kalikpik Disposal Plan
National Petroleum Reserve – Alaska
MACTEC Project 4034050005

Dear Mr. Svejnoha:

The Bureau of Land Management (BLM) retained MACTEC Engineering and Consulting (MACTEC) and our subcontractor, Marsh Creek, to prepare a design for placement of additional drilling waste into an inactive reserve pit at North Kalikpik in the National Petroleum Reserve-Alaska (NPRA). This work was performed under the BLM's contract NAC040273 with MACTEC.

North Kalikpik was chosen as a repository for waste from two of the BLM's current priority sites that may become threatened by coastline erosion: East Teshekpuk Test Well No. 1 (East Teshekpuk) and Atigaru Test Well No. 1 (Atigaru). Corrective action strategies for a third priority site, Drew Point Test Well No. 1, are still being developed, but are not anticipated to use North Kalikpik because of travel distances.

The benefits of using the North Kalikpik site as a central drilling waste repository include the following:

- Eliminating construction of additional/new disposal units within the NPRA
- Reducing the area of ponded water within the North Kalikpik reserve pit
- Making use of an existing local disposal location, allowing project milestones to be completed as funding allows

A template letter to the Alaska Department of Environmental Conservation (ADEC) is attached (hard copy and Microsoft Word document) for your use in transmitting this final preliminary design and to obtain input from the ADEC. The final preliminary design for the North Kalikpik disposal plan is also attached (hard copy and PDF). The ADEC may request that a complete permit package be submitted and that their comments be incorporated into a final design package. However, information gathered during previous discussions between the BLM and ADEC indicates that a full permit package for a solid waste disposal unit as normally required under Title 18, Alaska Administrative Code, Chapter 60, Solid Waste Disposal Regulations may not be necessary because the site is already a designated solid waste disposal area under the reserve pit solid waste disposal regulations.

The final preliminary design was based on MACTEC's and Marsh Creek's experience at other similar sites and the following assumptions:

1) The volume estimates for placement of drilling waste from both East Teshekpuk and Atigaru are based on estimates of measured-in-place volumes and application of a swell factor of 1.35 to produce the total volume of drilling waste that will be disposed of at the North Kalikpik reserve pit. This volume will be placed in the drilling waste disposal area indicated on the Disposal Plan at depths ranging from elevation 6.4 feet above mean sea level (MSL) to 17.4 feet above MSL. Placing drilling waste at these elevations will optimize efficiency for excavation equipment and place the top of the waste below the anticipated active layer to keep the waste frozen.

2) The native material that will be excavated out of the North Kalikpik reserve pit boundary area is not expected to contain drilling waste. This excavated area that will provide space for the drilling waste from East Teshekpuk and Atigaru is represented as "cover material" on the Disposal Plan. The cover material will provide a soil cover for the drilling waste.

3) Cover material is expected to swell by a factor of 1.3, on the basis of information from personal communications with Duane Miller Associates LLC; however, for this estimate a more conservative swell factor of 1.4 was used.

4) Thaw settlement of the cover material was estimated to average 2.6 feet, based on mound settlement data for ice-rich permafrost consisting of alluvial marine deposits and organics with ice volumes ranging from 60 to 70 percent, as presented in the report *Geomorphology of the Northeast Planning Area of the NPRA, 2001,* by Jorgensen, Pullman, and Shur, prepared for Phillips Alaska, Inc., in 2001. Frozen cover material will initially be placed at elevations approximately 5.5 to 6.5 feet above the surrounding grade and is estimated to settle to elevations of 3 to 4 feet above the surrounding grade.

5) The overall plan assumes a cover that is 3 feet above the surrounding grade at the perimeter and 4 feet above the surrounding grade in the center to minimize ponding.

Thank you for the opportunity to be of continued service. Please call Jason Ditsworth at 907-261-7407 if you have questions.

Sincerely,

MACTEC Engineering and Consulting

Jason E. Ditsworth, P.E.
Program/Project Manager

Wade M. Ellis, P.E.
Senior Engineer

cwc
QC/TE/cc/A0451RF

Attachments: ADEC Draft Letter Template
North Kalikpik Disposal Plan (5 full-size copies and five 11x17-inch copies)
Marsh Creek, North Kalikpik Test Well No. 1, Topographic Survey (5 copies, full size)
Compact Disk with above documents (3 copies)

ADEC DRAFT LETTER TEMPLATE

December 5, 2006

Ms. Lori Aldrich, Reserve Pit Coordinator
Alaska Department of Environmental Conservation
555 Cordova Street
Anchorage, Alaska 99508

North Kalikpik #1 Preliminary Design Drawing
Legacy Drill Sites, National Petroleum Reserve Alaska

Dear Ms. Aldrich:

Attached is the Bureau of Land Management's (BLM's) preliminary design for placement of additional drilling waste into the inactive reserve pit at North Kalikpik in the National Petroleum Reserve–Alaska (NPRA).

The BLM is currently developing approaches to address previously closed NPRA exploratory drill sites that may become subject to coastline erosion. Currently, the three priority sites are East Teshekpuk Test Well No. 1 (East Teshekpuk), Atigaru Test Well No. 1 (Atigaru), and Drew Point Test Well No. 1 (Drew Point).

Our current corrective action strategy for the East Teshekpuk and Atigaru sites uses the North Kalikpik reserve pit area as a drilling waste repository because of its central location and relatively straightforward winter access along the Kogru River with minimal travel on the tundra. The benefits of using the North Kalikpik site as a central drilling waste repository include the following:

- Eliminating construction of additional/new disposal units within the NPRA
- Reducing the area of ponded water within the North Kalikpik reserve pit
- Making use of an existing local disposal location, allowing project milestones to be completed as funding allows

Corrective action strategies for Drew Point are currently being developed and are not anticipated to use North Kalikpik because of travel distances.

We request that the Alaska Department of Environmental Conservation (ADEC) review the attached preliminary design then contact me to coordinate a meeting to discuss the BLM's approach and receive the ADEC's input early during this planning stage. When you are ready to schedule a meeting, please contact me at 907-271-3807 or Wayne_Svejnoha@ak.blm.gov.

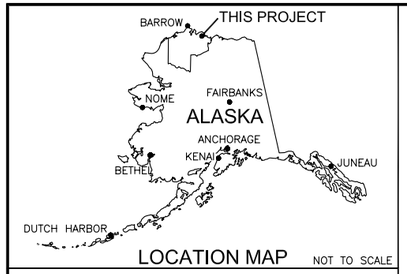
Sincerely,

Bureau of Land Management

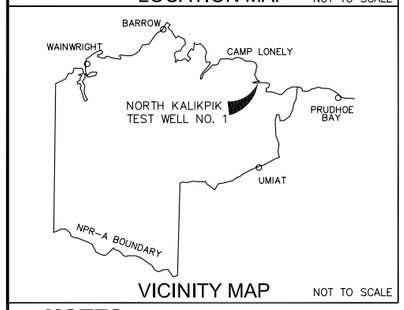
Wayne Svejnoha

Attachment: North Kalikpik Disposal Plan

NORTH KALIKPIK DISPOSAL PLAN



LOCATION MAP NOT TO SCALE



VICINITY MAP NOT TO SCALE

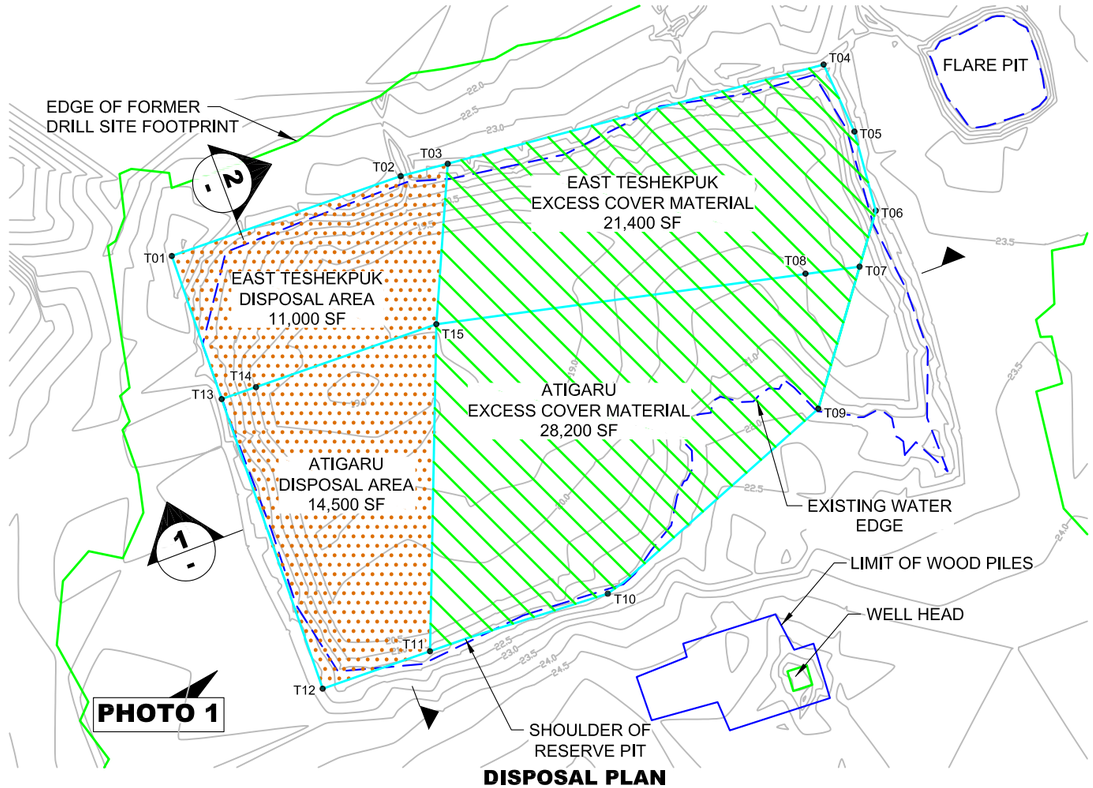
NOTES

1. Survey information based on physical survey performed by F.R. Bell and Assoc., August 2005. See attached North Kalikpik Topographic Survey.
2. Elevations shown are in feet. Contour interval is 0.5 Ft. Coordinates are Alaska State Plane, Zone 5, NAD 27.
3. Coordinates based on control points:
   M1050221A N 6038046.74 E 699377.63 Elev. 26.48 (MSL)
   M1050221B N 6038958.43 E 699575.20 Elev. 22.94 (MSL)
   M1050221C N 6038730.61 E 699047.10 Elev. 25.27 (MSL)
4. Atigaru (4350 CY) and East Teshekpuk (3300 CY) drilling waste quantities provided by Marsh Creek are approximate. As such, actual disposal area extents and cover material placement area will vary at time of construction. Positive drainage shall be maintained.
5. Volumes and areas are based on the following:
   Drilling waste swell factor of 1.35
   Kalikpik soil and ice excavation swell factor of 1.4
   Thaw settlement of graded surface is expected to be 2.6' based on ~ 65% ice content of cover material.
   This plan assumes that compaction is negligible.
6. Place excess excavation (cover material) over the ponded water as shown.
7. Areas outside the former drill site footprint and well marker to remain undisturbed.
8. Grey contours represent existing ground including pond bottom.
9. Top of drilling waste burial depth shall not be above elevation 17.4.

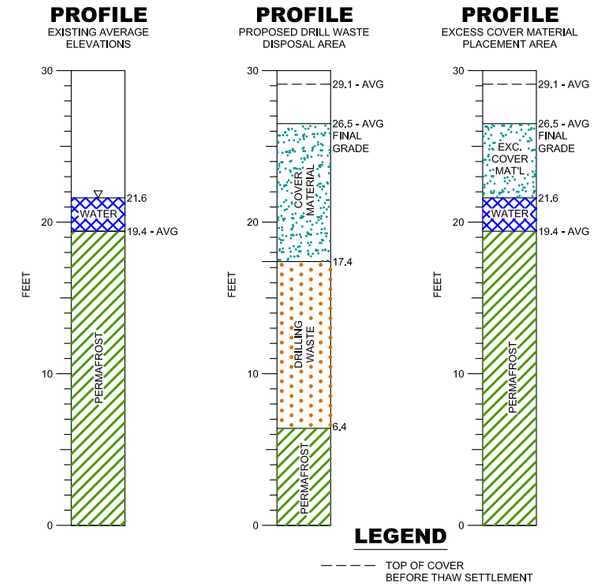
PHOTO 1 - AERIAL VIEW OF SITE

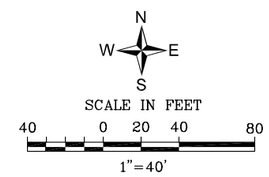
Spot Elev.	Northing	Easting	Bottom of Drilling Waste	Top of Drilling Waste	Top of Cover * (Before Thaw)
T01	6038748.05	699124.07	6.4	17.4	28.6
T02	6038790.18	699244.89	6.4	17.4	28.6
T03	6038796.74	699269.73	6.4	17.4	28.6
T04	6038849.07	699468.15			28.6
T05	6038813.71	699484.38			28.6
T06	6038771.95	699495.73			28.6
T07	6038742.41	699487.14			28.6
T08	6038738.71	699458.57			29.6
T09	6038667.42	699465.34			28.6
T10	6038569.80	699354.23			28.6
T11	6038539.41	699260.38	6.4	17.4	28.6
T12	6038519.65	699203.72	6.4	17.4	28.6
T13	6038672.51	699150.42	6.4	17.4	28.6
T14	6038678.82	699168.49	6.4	17.4	29.6
T15	6038712.03	699263.72	6.4	17.4	29.6

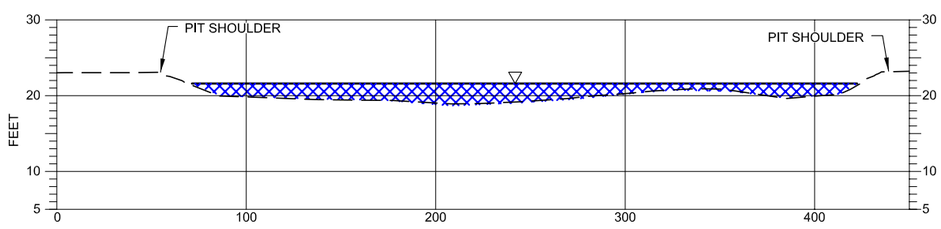
* Cover shoulder and grade break typical.



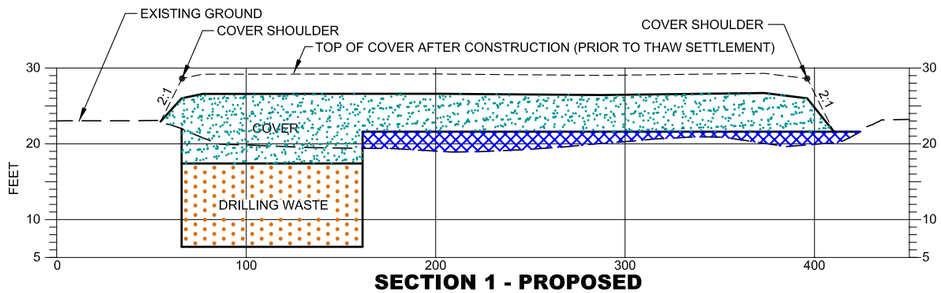
DISPOSAL PLAN



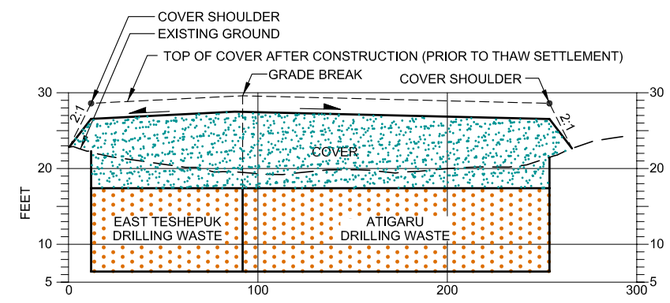




SECTION 1 - EXISTING



SECTION 1 - PROPOSED



SECTION 2 - PROPOSED

SCALE: 1" = 40'	DRAWN: CDB	MACTEC	601 East 57th Place Anchorage, AK 99518 Phone: (907) 563-8102 Fax: (907) 561-4754 www.mactec.com
THIS BAR IS 1" AT FULL SIZE:	DESIGNED: WME		
PROJECT NO.: 4034050004	CHECKED: WTH		

DISPOSAL PLAN

NORTH KALIKPIK TEST WELL NO. 1

BUREAU OF LAND MANAGEMENT

NPRA, ALASKA

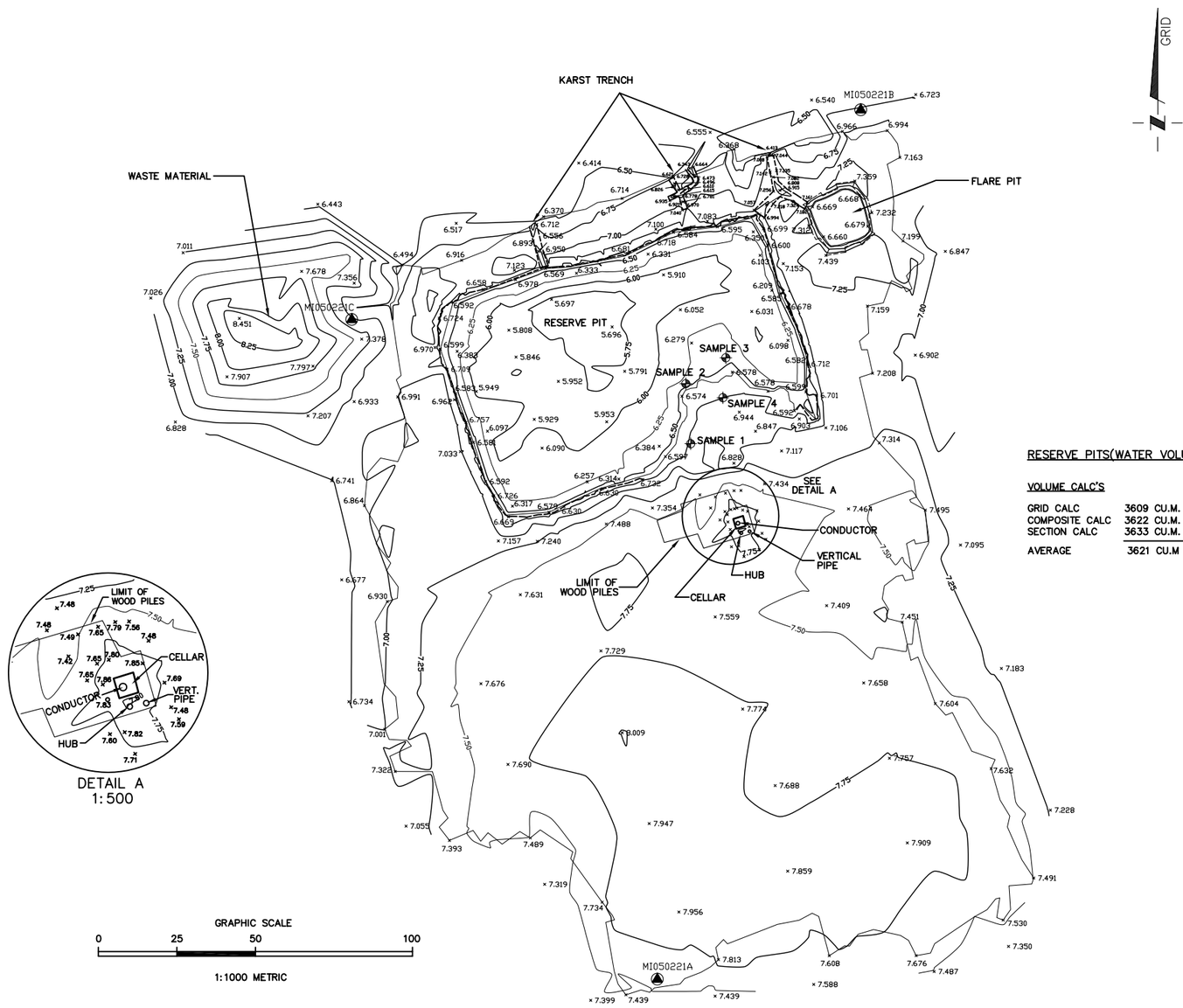
DRAWING: 1 OF 1

SHEET: 1 OF 1

DATE: 12-04-2006

P:\Group\BLM2004_Delivery Orders\T004_Shoreline Reserve Pits\North Kalikpik Disposal Plan\CAD_Acad\disposal_plan-english, 1=40, 12/05/06 at 10:29 by cdb
LAYOUT: Layout1

MARSH CREEK, NORTH KALIKPIK TEST WELL NO. 1, TOPOGRAPHIC SURVEY

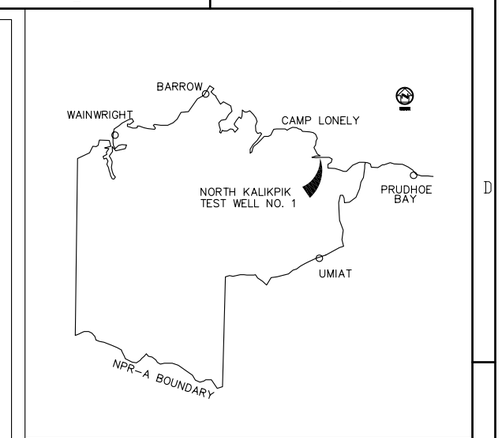


DETAIL A
1:500

RESERVE PITS(WATER VOLUME)

VOLUME CALC'S

GRID CALC	3609 CU.M.
COMPOSITE CALC	3622 CU.M.
SECTION CALC	3633 CU.M.
AVERAGE	3621 CU.M



VICINITY MAP
NTS

POINT	NORTH	EAST	ELEV
MI050221A	7822591.852	523395.245	8.070
MI050221B	7822868.613	523460.000	6.991
MI050221C	7822801.852	523297.969	7.703
HUB	7822733.869	523421.989	8.271
ALUM. CAP	7822713.417	523428.543	7.808
WELL	7822736.969	523420.91	8.158
SAMPLE 1	7822762.298	523405.877	6.779
SAMPLE 2	7822781.384	523404.308	6.322
SAMPLE 3	7822789.647	523417.056	6.421
SAMPLE 4	7822776.928	523416.123	6.750

NOTES

1. COORDINATES ARE UTM ZONE 5 NAD83
2. ELEVATIONS WERE DERIVED FROM PUBLISHED CORS ELLIPSOIDAL VALUES AND APPLYING GEOID99 UNDULATIONS TO ALL OBSERVED ELLIPSOID HEIGHTS
3. REF. FIELDBOOK MI0502 P. 21–25
4. CONTOUR INTERVAL IS 0.25 METERS
5. CONTOURS WITHIN RESERVE PIT ARE BATHYMETRIC
6. WELL POSITION ABOVE WAS TAKEN AT TOP OF CONDUCTOR CASING

LEGEND

- CONTROL POINT
- SAMPLE POINT
- GRAVEL SHOULDER
- RESERVE PIT

REFERENCE DRAWINGS	NO.	DATE	REVISION	BY	CHK	APPD	NO.	DATE	REVISION	BY	CHK	APPD
	0	10-13-05	ISSUED FOR INFORMATION	SPM								

F. Robert bell assoc.

ENGINEERING RECORD		DATE
DRN:	SPM	10-13-05
DSGN:		
CHK:		
APP:		
APP:		
SCALE:	1:1000	

MARSHCREEK

TITLE OF DRAWING: MARSH CREEK GOV'T SERVICES
NORTH KALIKPIK TEST WELL NO.1
TOPOGRAPHIC

WORK PACKAGE	DRAWING NUMBER	REV	SHEET
	FRB05 MC 04–00	0	1
MODULE:			OF 1

COMPACT DISCS