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LEWIS PROPERTY RESTORATION PLAN

EMERY DEEP MINE
CONSOLIDATION COAL COMPANY
OCTOBER 1986

Submitted To:

State of Utah - Division of Oil, Gas & Mining

Prepared By:

Gary Goodrich, Manager - Environmental Permits
Consol Plaza

Nic Neumann, Group Leader - Permits
Mid-Continent Region

LEWIS PROPERTY RESTORATION PLAN

INTRODUCTION

The following restoration plan is submitted to the Division of Oil, Gas and Mining as per the Section 3.4.8 (Subsidence Control Plan) and Section 12.4.3 (Subsidence Control and Mitigation Methods) of Consol's Permanent Program Permit (ACT/015/015) for the Emery Deep Mine. The area of subsidence located on the J. Lewis property has been identified on the enclosed Location Map. The subsidence was the result of underground coal mining operations in the Third Right and Fourth Right Sections of Second Main West. This area was included in Consol's subsidence monitoring plan with all monitoring locations indicating that subsidence has currently stopped. Included also in this package are the Pre-Subsidence Topography and Post-Subsidence Topography Maps for your review.

TERRACE CONCEPT RESTORATION

The area affected by subsidence on the J. Lewis Property was confined to approximately 45 acres of alfalfa fields. These fields for restoration purposes have been identified as the North, Middle and South Fields. The majority of the subsidence occurred in the South Field, with minor subsidence in Middle Field. The alfalfa fields are presently being managed by flood irrigation methods. As a result of the subsidence, crop damage was experienced in all three fields with the majority of damage in the South and Middle Fields.

After evaluating several mitigation plans, Consol is presenting a Terrace Concept for restoration of the alfalfa fields on the J. Lewis Property. Cross sections representing this restoration plan are enclosed for all three fields. This plan simply calls for creation of a sloped terrace through the middle and south fields starting at Station 600. The maximum East to West slope on the affected areas would be 0.6% and for the North to South slope on the affected areas would be 0.25%. The terrace would be created by land leveling in both the Middle and South Fields. This plan calls for no change to North Field since no adverse effects were incurred and the existing slopes are compatible with the proposed restoration slopes. Enclosed is the Proposed Post-Restoration Topography Map showing contours and elevations as a result of the terrace concept restoration.

New drainage laterals would be established in both the Middle and South Fields. These can be reviewed on the Post-Restoration Topography Map with an overlay of all the drainage flowpaths.

SOIL SUITABILITY

The attached report and soils analysis indicate that the terrace concept of restoration can be accomplished with no impact on the land leveled soil's capability to provide excellent plant growth medium with normal fertilizer applications.

LAND LEVELING CALCULATIONS

North Field: No yardage moved.

Middle Field:

Total Volume of Cuts	=	2296 yards
Total Volume of Fills	=	2556 yards

South Field:

Total Volume of Cuts	=	7333 yards
Total Volume of Fills	=	3963 yards

In trying to maintain a cut/fill ratio of 1.4 to 1.6, there exists an adequate amount of surplus yardage in the South Field to meet the shortage of yardage in the Middle Field. At a 1.4 cut/fill ratio, 1785 yards are available in the South Field. Consequently, a cut/fill ratio of 1.6 is achieved in the Middle Field from this surplus to adequately meet the yardage needed.

COPIES TO: K. Beardall - SCS
D. W. Kirtz
R. Thompson
Emery File
"A" File

CONSOLIDATION COAL COMPANY

ENVIRONMENTAL QUALITY CONTROL DEPARTMENT

INTER-OFFICE CORRESPONDENCE

To : N. Neumann

Date : August 19, 1986

From : G. W. Goodrich

At (Office) : Consol Plaza

Subject : Soil Suitability at Emery Hayfields

Please find enclosed a copy of the Emery soil tests and a small map (approximate scale 1"-300') which illustrates the sample locations in relation to the irrigated hayfields. Note that all soil materials tested within the hayfields to a minimum depth of 36" will provide excellent plant growth medium with normal fertilizer applications. This would strongly indicate that cut and fill operations to a depth of 36" will yield excellent materials at both the cut site and the fill site. The only notable parameter which deteriorated with depth was phosphorus, which is expected and is easily corrected with fertilizer.

The textures are excellent and indicate very little clay content and high sand content, indicating that compaction from equipment would be less of a concern that I initially thought.

Borrow sites #1 and #2 will provide excellent plant growth medium to at least a 24" depth. Both of these sites are ideal borrow areas in that the borrow site can be easily shaped to drain to the stream following removal of the topsoil. These sites currently support a sparse population of greasewood and are agrinomically useless to and isolated from the current ranch operation. Borrow sites #3 and #4 are unsuitable because the salt and sodium content of the soil would be damaging to alfalfa. This condition may be inherent in the soil or could be caused by decades of irrigation return flow percolating through the soil. I would definitely stay away from materials to the south of the currently irrigated fields.

This soil data indicates that there are very few physical constraints to your selection of a mitigation strategy and that a decision can be based on economic and technical factors. As I mentioned previously, I would favor a combined improved drainage - land leveling option so that construction damage to the fields can be minimized. Please call with any comments or questions.

Gary W. Goodrich

Gary W. Goodrich

GWG:jd
Enc.

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Topsoil Handling Plan

Based upon the site specific lab data presented in the "Lewis Property Restoration Plan, October 1986", favorable chemical and physical soil properties occur to a minimum depth of 36" within the affected fields which will provide favorable topsoiling medium for both the cut and fill area. Textures and potassium values are consistent with depth, and decreasing phosphorous availability with depth can be easily amended with fertilizers. Commitments to high-level refertility program, as described in the following section, will assure that the post reconstruction surface material will be equal to or better than the previous surface for supporting alfalfa growth.

Mr. G. Cook and Mr. R. Jewkes of the Soil Conservation Service in Price, Utah were consulted concerning the need to separately handle A horizon material during a land leveling project. Both men are experienced with land leveling projects in Emery County and are familiar with our proposal. We were advised that special topsoil handling is not a standard practice for agricultural land leveling and that no problems related to poor yields or excessive requirements for management have occurred. They suggested that, based upon their experience, special topsoil handling is not necessary to produce maximum hay production from this land leveling project.

Accordingly, Consol is not proposing to separately handle A horizon material, but to provide an alternate topsoil material of mixed A and B horizons as placed during the construction project.

Fertility Commitments

Consol is proposing to establish a high-level fertility on those areas of the irrigated fields to be affected by the land leveling project. This high-level fertility will be a substantial improvement over current fertility and will result in improved yields for the landowner. Following the two-year fertility program proposed by Consol, management of fertilizer applications will revert to the landowner.

Nitrogen

In the spring of 1987, a small grain (wheat, barley, oats) will be planted. Nitrogen requirements for the grain and straw will total approximately 80 lbs N/acre. Assuming a 50% loss due to volatilization and irrigation leaching, 120 lbs N/acre will be applied.

When the alfalfa is seeded (either August 1987 or May 1988 depending on water availability) a second nitrogen application will be made.

A 4-5 ton alfalfa crop will require approximately 250 lbs N/acre, with about ½ provided by nitrogen fixing bacteria. Assuming less than 1% organic matter in the newly constructed plow layer, the soil will provide approximately 50 lbs N/acre. Accordingly, 75 lbs/acre of supplemental nitrogen will be needed for maximum hay yields. Assuming a 50% loss due to volatilization and irrigation leaching, 110 lbs N/acre will be applied when the alfalfa is seeded.

Phosphorous

Application of phosphorous fertilizers will be based upon soil test results. Following the land leveling operation and prior to any seeding, composite samples from the plow layer of the disturbed areas will be collected and forwarded to the Utah State Agricultural Extension Service office in Castle Dale for fertility analyses.

Based upon the Weak Bray (P_1) or Sodium Bicarbonate test, fertilizer will be added based upon the following table:

Soil Test Results (ppm)	Actual P_2O_5 Added
<5	250 lbs/acre
6-13	175 lbs/acre
14-19	120 lbs/acre
20-28	50 lbs/acre
Over 28	No Additions

Soil fertility will be checked again prior to seeding the alfalfa crop. Fertilizer additions will again be based upon the previous table.

Potassium

Current potassium levels are extremely low and suggest that a serious deficiency currently exist on the fields. Applications of potassium fertilizers will be based upon the soil testing program previously described for phosphorous. Our goal will be to raise potassium levels in the soil to approximately 150 ppm. The following formula will be used to determine quantities of potassium fertilizer:

150 ppm - actual K values (ppm) x 2 = x lbs/acre K

150 lbs removed with 5 ton alfalfa + 60 lbs removed with small grain crop = 210 lbs/acre K

Amount of K_2O fertilizer to be applied:

Conversion from K to K_2O $\longrightarrow$ 1.2 (x + 210 lbs K/acre)

It is anticipated that this value will exceed 400 lbs/acre K_2O, in which case the application rate will be halved, with ½ being applied prior to any seeding and the other ½ applied when the alfalfa is seeded.

Seeding Plan

It is anticipated that all land leveling will be completed prior to the spring, 1987 planting season. The affected portions of the field will be disced, fertilized, seedbed prepared, and seeded with a drill to a small grain crop during the 1987 spring planting season. We anticipate that the landowner will choose wheat, oats, or barley seeded at an approximate rate of 100 lbs/acre.

Following harvest of the small grain crop in August, 1987, additional farm machinery will be used as needed, to level any differential settling which may have occurred and to otherwise prepare the field for permanent alfalfa production. If adequate irrigation water is available (based upon landowner judgement), the fields will be refertilized in August and a locally adapted variety of alfalfa (Ranger or other choice made by landowner) will be immediately drill seeded at an approximate rate of 12 lbs/acre. Normal alfalfa production and harvest will then resume during the 1988 season.

If adequate irrigation water is not available in August, the field will be left in grain stubble until early May, 1988, when agricultural implements will be used, as needed, to eliminate differential settling and otherwise prepare the field for permanent alfalfa production. Following the second fertilizer application, locally- adapted alfalfa will be drill seeded at a rate of 10-12 lbs/acre and oats will be overseeded at a rate of 60 lbs/acre. Oat hay will be cut in early July, 1988, and oat/ alfalfa hay will be cut in September, 1988. Normal alfalfa production and harvest will then resume during the 1988 season.

Climatic factors or unforeseen delays in the land leveling project may dictate revisions to this planned approach. Prior approval of the landowner and the DOGM will be obtained prior to making any substantive changes. Consol and the landowner may agree to other modifications or amendments to other portions of the alfalfa fields which are not directly involved in the land-leveling disturbances. Activities in these areas will be at the discretion of Consol and the landowner and will not necessarily comply with the commitments described in this plan.

Inter-Mountain Laboratories, Inc.

2506 West Main Street Farmington, New Mexico 87401 Tel. (505) 326-4737

CONSOLIDATION COAL COMPANY
EMERY MINE, UTAH

August 14, 1986

Topsoil Analysis

Lab No.	Sample ID	Depth In.	pH	Cond. mmhos/ cm @ 25 C	Soluble Cations Ca meq/l	Mg meq/l	Na meq/l	SAR (1)	P ppm	K ppm	Sand %	Silt %	Clay %	Texture
F3120	1	0-12	7.8	1.17	5.29	3.84	3.15	1.47	28.5	6.10	50.4	37.1	12.5	LOAM
F3121		12-24	8.1	0.81	3.88	2.46	2.89	1.62	2.52	2.80	42.2	48.9	8.9	LOAM
F3122		24-36	7.9	1.28	6.01	4.06	3.38	1.51	10.8	2.80	47.6	42.6	9.8	LOAM
F3123	2	0-12	7.6	0.93	4.45	3.49	2.61	1.31	26.9	7.50	45.8	45.3	8.9	LOAM
F3124		12-24	8.1	0.87	3.42	3.34	2.99	1.63	6.55	17.3	32.2	43.4	24.4	LOAM
F3125		24-36	8.0	1.02	4.45	3.65	3.66	1.82	3.02	7.10	50.4	37.1	12.5	LOAM
F3126	3	0-12	8.1	0.87	3.33	2.31	3.33	1.98	13.9	7.40	52.2	39.8	8.0	SANDY LOAM
F3127		12-24	8.0	2.99	19.0	10.4	8.22	2.14	4.40	11.1	33.1	57.1	9.8	SILT LOAM
F3128		24-36	8.1	4.99	25.2	20.6	21.0	4.38	6.11	12.7	38.5	46.2	15.3	LOAM
F3129	4	0-12	7.9	0.74	3.55	2.53	2.46	1.41	16.4	7.10	44.9	40.7	14.4	LOAM
F3130		12-24	8.2	0.97	4.39	2.73	3.51	1.86	4.33	7.40	36.7	48.9	14.4	LOAM
F3131		24-36	7.8	0.76	3.44	2.10	3.04	1.83	2.28	13.4	24.9	55.3	19.8	SILT LOAM
F3132	B. SITE 1	0-6	8.2	0.68	3.98	1.27	1.03	0.64	13.3	12.4	66.7	25.3	8.0	SANDY LOAM
F3133		6-18	8.2	0.47	2.92	1.07	1.00	0.71	4.63	7.50	66.7	28.9	4.4	SANDY LOAM
F3134		18-24	8.1	0.58	3.48	1.58	1.13	0.71	8.56	3.50	68.5	25.3	6.2	SANDY LOAM
F3135	B. SITE 2	0-6	8.2	0.67	2.79	1.36	3.81	2.64	4.53	7.60	58.5	31.7	9.8	SANDY LOAM
F3136		6-18	8.3	0.75	3.83	2.76	3.60	1.98	2.69	1.80	61.3	32.5	6.2	SANDY LOAM
F3137		18-24	8.0	2.65	17.5	13.9	4.77	1.20	2.52	2.40	38.5	54.4	7.1	SILT LOAM

(1) Sodium Adsorption Ratio.

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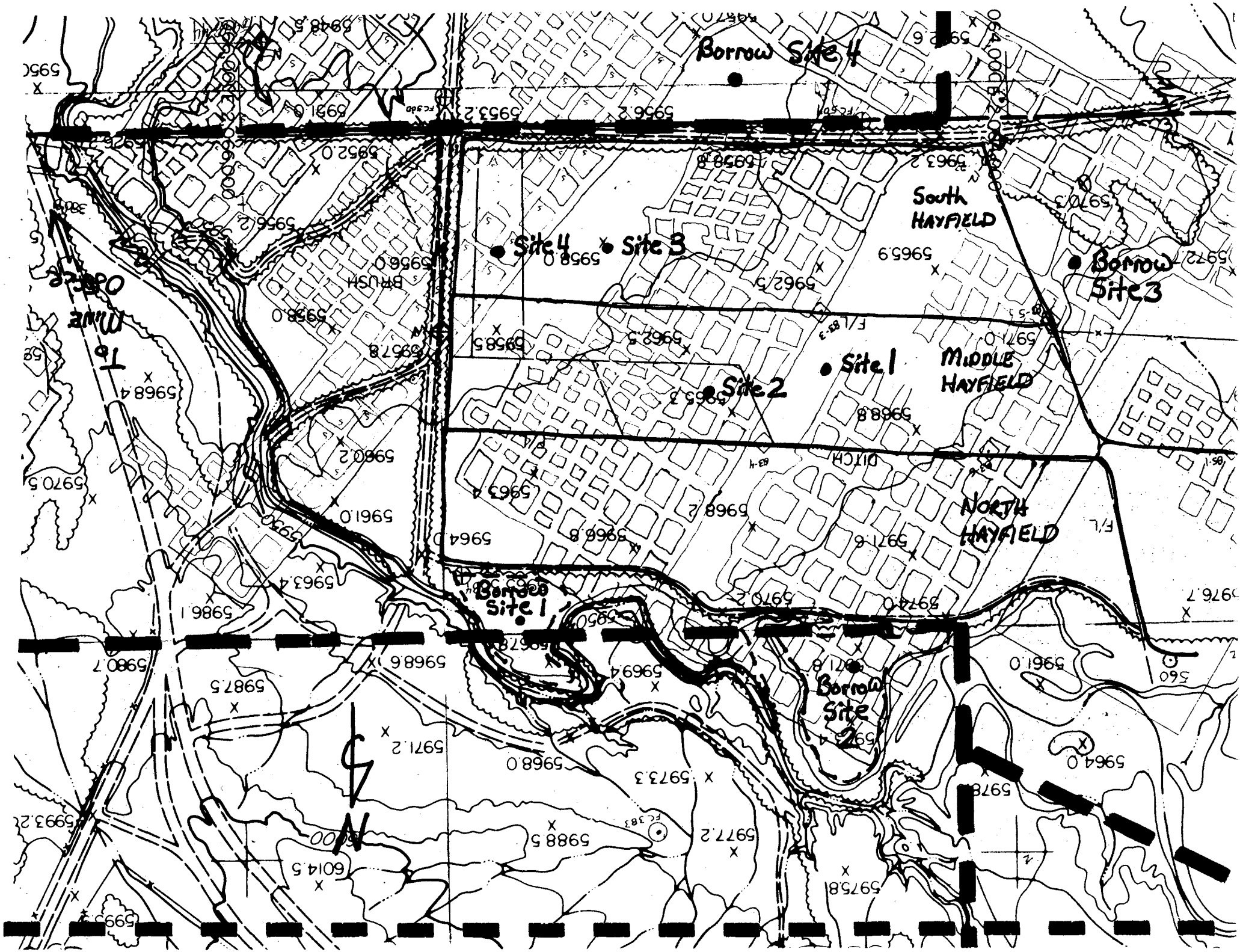
F3138	B. SITE 3	0-6	8.2	5.18	7.97	4.26	41.7	16.9	5.17	20.7	45.8	38.0	16.2	LOAM
F3139		6-18	7.7	6.61	35.1	28.1	14.7	2.62	2.62	7.70	47.6	37.1	15.3	LOAM
F3140	B. SITE 4	0-6	8.7	34.4	13.2	42.7	406.	76.8	7.56	37.3	40.4	43.4	16.2	LOAM
F3141		6-18	8.6	39.1	50.0	82.7	475.	58.3	4.77	40.3	27.3	53.2	19.5	SILT LOAM
F3142		18-24	8.7	38.8	43.3	102.	480.	56.3	3.19	25.4	40.9	35.1	24.0	LOAM

(1) Sodium Adsorption Ratio.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