

Fansteel
Metals

number ten tantalum place muskogee, oklahoma 74401

March 23, 1979

RECEIVED

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U.S. NUCLEAR REG.
E
NEW SECTION

40-7580

12344

Mr. Earl G. Wright
Radioisotopes Licensing Branch
Division of Fuel Cycle and Material Safety
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Reference: SMB 911

Dear Mr. Wright:

Enclosed are two copies of up-dated reports by Muskogee Testing giving more specific data about the construction of the waste disposal pond. Also attached is an additional statement dated March 21, 1979, by Mr. Carl D. Gales, P.E., testifying that the workmanship and construction of the pond did follow sound engineering practices.

I can also state that the construction contractor took great pains to remove all silty material from the entire old pond four. This material was removed down to the shale layer at the 500-505 elevation. This material was transferred to an area north of the pond to vacant property. Likewise, the dike on the north side of pond four was removed to the shale layer to aid the water drainage prior to construction.

Also in the process of constructing the trench for the exterior drain and excavating the new pond the entire original dike of pond three was completely removed. Most of this dike material was used in the construction of the new dikes since it was of suitable quality to meet the compaction test. Rock and stones from the surface were removed and utilized in the outfall.

Also at the start of the project an inspection ditch at the northeast corner was dug to evaluate the seepage and drainage. I personally observed the digging out of loose dirt and widening of the ditch such that compaction equipment could be utilized in the preparation of subgrade for the dike. Compaction tests were performed before construction proceeded.

I can also state that all silt removal was handled on a contract separate from the construction contract for the pond. That is, since an estimate of quantity of material that had to be removed before pond construction

SEE REPORT
all up

100000

A-17

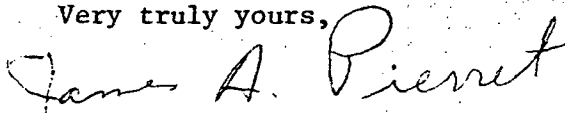
Mr. Earl G. Wright
March 23, 1979
Page 2

was most difficult, this removal was handled on an open-ended contract. This had the effect of more clearly defining the end point of silt removal because work was handled as two projects.

Hopefully this data helps to resolve any unanswered questions the reviewer may have.

Weather to date has not permitted the installation of the liner, but hopefully a change of weather will come soon so that the project can be completed. We do need the pond.

Very truly yours,

A handwritten signature in cursive script that reads "James A. Pierret". The signature is written in dark ink and is positioned to the left of the typed name.

JAMES A. PIERRET
Plant Manager - Muskogee

JAP:nj

Enclosures

MUSKOGEE ENGINEERING CO.

208 Eastside Blvd.

MUSKOGEE, OKLAHOMA 74401

Gas Systems; Design, Testing and Cathodic Protection Systems
Water, Sewer & Drainage Systems
Land Surveying, Construction Management

CARL D. GALES, P.E.

DALLAS COLLINS

LAWRENCE RAMEY

PHONES:

918-682-7855

682-7854

682-7853

March 21, 1979

Mr. James Pierret
Project Manager
Fansteel, Inc.
Ten Tantalum Place
Muskogee, Oklahoma 74401

Re: Waste Disposal Pond

Dear Mr. Pierret:

In reply to our conversation with Mr. Owen Thompson concerning the method of inspection. Mr. Dallas Collins has performed all of the inspection under my supervision and with my authority as professional engineer.

Mr. Thompson expressed concern regarding the subgrade and the removal of unsuitable material. We have reviewed Mr. Collins daily reports and we have revised my summaries to reflect the inspection made regarding the undercutting subgrade, and including the elevations that fill material was tested by the Standard Field Compaction Tests for proper location.

It is my opinion that the entire area has been adequately tested to obtain the desired finished product.

We are including a copy of my January 11, 1979 letter and we are considering this report as a complete documentation of the inspection of the earthwork for the waste disposal pond.

If any additional information is required concerning the matter, please contact us immediately. We wish to express our appreciation for the opportunity to perform these services.

Yours truly,

MUSKOGEE ENGINEERING COMPANY



Carl D. Gales, P. E.

Enclosure

MUSKOGEE ENGINEERING CO.

208 Eastside Blvd.

MUSKOGEE, OKLAHOMA 74401

Gas Systems; Design, Testing and Cathodic Protection Systems

Water, Sewer & Drainage Systems

Land Surveying, Construction Management

CARL D. GALES, P.E.

DALLAS COLLINS

LAWRENCE RAMEY

January 11, 1979

PHONES:

918-682-7855

682-7854

682-7853

Mr. James Pierret
Project Manager
Fansteel, Inc.
Ten Tantalum Place
Muskogee, OK 74401

Re: Waste Disposal Pond

Dear Mr. Pierret:

As per your request, this report will document the inspection of the earthwork for the referred project.

The inspection began September 25, 1978, with the operation of backfilling the French Drain. Eleven (11) field compaction tests were performed with all results above the 95% Standard Proctor Density, ASTM D-698 requirement. The contractor began the dike embankment on October 11, 1978. Forty-three standard compaction tests have been performed upon the dike fill. All of these tests have exceeded the minimum requirement of 95% Standard Proctor Density.

Inspection reports and test results are included for your information. The subgrade was undercut from embankment areas to insure impermeable of the dikes.

An as-built drawing of the facility is also included to indicate that the project is constructed as designed.

If any additional information is required concerning this matter, please contact us immediately.

Yours truly,

MUSKOGEE ENGINEERING COMPANY



Carl D. Gales, P.E.

MUSKOGEE TESTING LABORATORY, INC.

108 PEAK BLVD
PHONE 918/682-7853
MUSKOGEE, OKLAHOMA 74401

2635 E. 36th ST. NORTH
PHONE / 918/428-1986
TULSA, OKLAHOMA 74010

Soils & Concrete Testing - Concrete Coring - Foundation Investigation Drilling

REPORT OF FIELD DENSITY TESTS

DATE RECEIVED: 9-22-78 AUTHORIZED BY: LABORATORY NO: 97859

REPORT TO: Fansteel Metals

PROJECT: Waste Disposal Pond

CONTRACTOR: Berry Equipment

SOURCE: Jobsite

PROCTOR SPECIFICATIONS: ASTM D-698

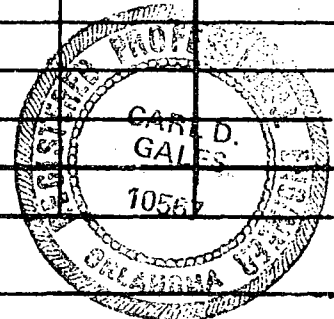
TESTS BY: D. Collins

2359

TEST NO.	DESCRIPTION OF LOCATIONS
1	Backfill Over French Drain East End Elevation 512.0
2	Backfill Over French Drain West End Elevation 512.0

TEST RESULTS

TEST NO.	1	2					
WET DENSITY IN LBS /CU. FT.	122.3	124.4					
DRY DENSITY IN LBS /CU. FT.	110.7	112.2					
IN-PLACE MOISTURE CONTENT %	10.5	10.9					
OPTIMUM MOISTURE %	11.0	11.0					
MAXIMUM DRY DENSITY IN LBS./CU. FT.	115.2	115.2					
PERCENT OF MAXIMUM DRY DENSITY	96.1	97.4					
MATERIAL DESCRIPTION	*	*					



REMARKS: * ORANGE CLAYEY SAND TESTS MEET SPECIFICATIONS

COPIES:

2 - Fansteel Metals

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Carl D. Gales

MUSKOGEE TESTING LABORATORY, INC.

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Soils & Concrete Testing - Concrete Coring - Foundation Investigation Drilling

REPORT OF FIELD DENSITY TESTS

DATE RECEIVED: 9-25-78 AUTHORIZED BY: LABORATORY NO: 97860

REPORT TO: Fansteel Metals

PROJECT: Waste Disposal Pond

CONTRACTOR: Berry Equipment Company

SOURCE: Jobsite

PROCTOR SPECIFICATIONS: ASTM D-698

TESTS BY: D. Collins

2360

TEST NO.	DESCRIPTION OF LOCATIONS
1	Backfill French Drain East End Elevation 514.0
2	Backfill French Drain West End Elevation 514.0

TEST RESULTS

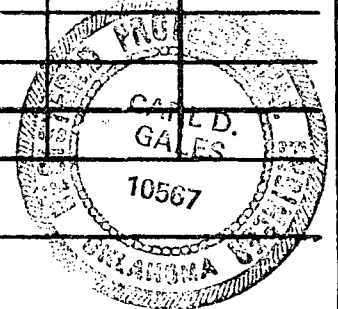
TEST NO.	1	2					
WET DENSITY IN LBS /CU. FT.	125.5	125.2					
DRY DENSITY IN LBS /CU. FT.	113.4	112.7					
IN-PLACE MOISTURE CONTENT %	10.7	11.1					
OPTIMUM MOISTURE %	11.0	11.0					
MAXIMUM DRY DENSITY IN LBS./CU. FT.	115.2	115.2					
PERCENT OF MAXIMUM DRY DENSITY	98.4	97.8					
MATERIAL DESCRIPTION	*	*					

REMARKS: * ORANGE CLAYEY SAND TESTS MEET SPECIFICATIONS

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Carl D. Gales

MUSKOGEE TESTING LABORATORY, INC.

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Soils & Concrete Testing - Concrete Coring - Foundation Investigation Drilling

INSPECTORS REPORT

10-2-78 to 10-6-78

FANSTEEL METALS

Waste Disposal Pond

10-2-78

Checked job site in A.M. Contractor backfilling French Drain, Leveling work area and Removing soft area that is inside of Dike.

10-3-78

Checked job site in A.M. Contractor backfilling French Drain and Leveling work area.

10-4-78

Checked job site in A.M. Contractor backfilling French Drain and Leveling work area.

10-5-78

Checked job site in A.M. Contractor backfilling French Drain and leveling work area.

10-6-78

Checked job site in A.M. Contractor backfilling French Drain and Leveling work area.

Yours Truly,
Muskogee Testing Lab.


Dallas Collins

MUSKOGEE TESTING LABORATORY, INC.

108 PEAK BLVD
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TULSA, OKLAHOMA 74010

Soils & Concrete Testing - Concrete Coring - Foundation Investigation Drilling

REPORT OF FIELD DENSITY TESTS

DATE RECEIVED: 10-2-78 AUTHORIZED BY: LABORATORY NO: 107895
REPORT TO: Fansteel Metals, Inc.
PROJECT: Waste Disposal Pond
CONTRACTOR: Berry Equipment
SOURCE: Jobsite
PROCTOR SPECIFICATIONS: ASTM D-698 TESTS BY: D. Collins

2395

TEST NO.	DESCRIPTION OF LOCATIONS
1	Backfill Over French Drain - East End Elevation 516.0
2	Backfill Over French Drain - West End Elevation 516.0

TEST RESULTS

TEST NO.	1	2					
WET DENSITY IN LBS /CU. FT.	125.0	124.1					
DRY DENSITY IN LBS /CU. FT.	111.5	110.9					
IN-PLACE MOISTURE CONTENT %	12.1	11.9					
OPTIMUM MOISTURE %	11.0	11.0					
MAXIMUM DRY DENSITY IN LBS /CU. FT.	115.2	115.2					
PERCENT OF MAXIMUM DRY DENSITY	96.8	96.3					
MATERIAL DESCRIPTION	*	*					

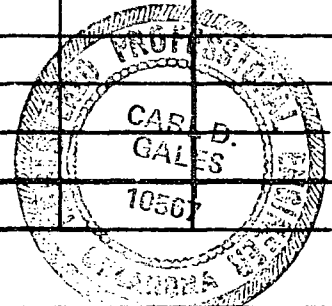
REMARKS: * ORANGE CLAYEY SAND

TEST MEETS SPECIFICATIONS

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Carl D. Gales

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TULSA, OKLAHOMA 74010

Soils & Concrete Testing - Concrete Coring - Foundation Investigation Drilling

REPORT OF FIELD DENSITY TESTS

DATE RECEIVED: 10-3-78 AUTHORIZED BY: LABORATORY NO: 107896

REPORT TO: Fansteel Metals, Inc.

PROJECT: Waste Disposal Pond

CONTRACTOR: Barry Equipment

SOURCE: Jobsite

PROCTOR SPECIFICATIONS: ASTM D-698

TESTS BY: D. Collins

2396

TEST NO.	DESCRIPTION OF LOCATIONS
1	Backfill Over French Drain - East End Elevation 518.0
2	Backfill Over French Drain - West End Elevation 518.0

TEST RESULTS

TEST NO.	1	2					
WET DENSITY IN LBS /CU. FT.	126.3	126.1					
DRY DENSITY IN LBS./CU. FT.	113.2	112.8					
IN-PLACE MOISTURE CONTENT %	11.5	11.8					
OPTIMUM MOISTURE %	11.0	11.0					
MAXIMUM DRY DENSITY IN LBS./CU. FT.	115.2	115.2					
PERCENT OF MAXIMUM DRY DENSITY	98.3	97.9					
MATERIAL DESCRIPTION	*	*					

REMARKS: * ORANGE CLAYEY SAND TESTS MEET SPECIFICATIONS

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Carl Collins

MUSKOGEE TESTING LABORATORY, INC.

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PHONE 918-682-7853
MUSKOGEE, OKLAHOMA 74401

Soils & Concrete Testing - Concrete Coring - Foundation Investigation Drilling

INSPECTORS REPORT

10-9-78 to 10-13-78

FANSTEEL METALS

Waste Disposal Pond

10-9-78

Checked jobsite in A.M., leveling work area and removing material in existing pond and wasting it.

10-10-78

Checked jobsite in A.M., leveling work area and removing material in existing pond and wasting it.

10-11-78

Checked jobsite in A.M., leveling work area and removing material in existing pond and wasting it. Subgrade was checked on north and south dike and permission was given to Contractor to commence hauling fill material. Contractor began hauling material on north and south dike.

10-12-78


Checked jobsite in A.M., leveling work area and removing material in existing pond and wasting it. Contractor began hauling material on north and south dike.

10-13-78

Checked jobsite in A.M., leveling work area and removing material in existing pond and wasting it. Contractor began hauling material on north and south dike.

Yours truly,

MUSKOGEE TESTING LABORATORY, INC.



Dallas Collins

MUSKOGEE TESTING LABORATORY, INC.

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Soils & Concrete Testing - Concrete Coring - Foundation Investigation Drilling

REPORT OF FIELD DENSITY TESTS

DATE RECEIVED: 10-12-78 AUTHORIZED BY: LABORATORY NO: 107838

REPORT TO: Fansteel Metals, Inc.

PROJECT: Waste Disposal Pond

CONTRACTOR: Berry Equipment

SOURCE: Jobsite

PROCTOR SPECIFICATIONS: ASTM D-698

TESTS BY: Collins

2438

TEST NO.	DESCRIPTION OF LOCATIONS	
1.	Backfill over French Drain - East End	Elevation 520.0
2.	Backfill over French Drain - Center	Elevation 520.0
3.	Backfill over French Drain - West End	Elevation 520.0
4.	North Dike @ 1st Lift	Elevation 510.0
5.	North Dike @ 1st Lift	Elevation 510.0

TEST RESULTS

TEST NO.	1	2	3	4	5		
WET DENSITY IN LBS /CU. FT.	124.8	124.1	126.2	125.4	125.9		
DRY DENSITY IN LBS./CU. FT.	111.1	110.2	112.7	111.6	112.3		
IN-PLACE MOISTURE CONTENT %	12.4	12.6	12.0	12.3	12.1		
OPTIMUM MOISTURE %	11.0	11.0	11.0	11.0	11.0		
MAXIMUM DRY DENSITY IN LBS./CU. FT.	115.2	115.2	115.2	115.2	115.2		
PERCENT OF MAXIMUM DRY DENSITY	96.4	95.7	97.8	96.9	97.5		
MATERIAL DESCRIPTION	*	*	*	*	*		

REMARKS: * ORANGE CLAYEY SAND ALL TESTS MEET SPECIFICATIONS

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Collins

MUSKOGEE TESTING LABORATORY, INC.

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TULSA, OKLAHOMA 74010

Soils & Concrete Testing - Concrete Coring - Foundation Investigation Drilling

REPORT OF FIELD DENSITY TESTS

DATE RECEIVED: 10-13-78 AUTHORIZED BY: LABORATORY NO: 107848

REPORT TO: Fansteel Metals, Inc.

PROJECT: Waste Disposal Pond

CONTRACTOR: Berry Equipment Company

SOURCE: Jobsite

PROCTOR SPECIFICATIONS: ASTM D-698

TESTS BY: Collins

2448

TEST NO.	DESCRIPTION OF LOCATIONS	
1	South Dike	Elevation 514.0
2	South Dike	Elevation 514.0
3	South Dike	Elevation 514.0

TEST RESULTS

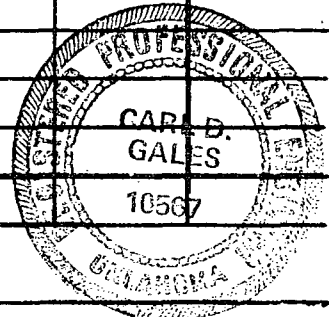
TEST NO.	1	2	3				
WET DENSITY IN LBS /CU. FT.	125.8	125.6	126.5				
DRY DENSITY IN LBS./CU. FT.	112.2	111.5	113.0				
IN-PLACE MOISTURE CONTENT %	12.1	12.6	11.9				
OPTIMUM MOISTURE %	11.0	11.0	11.0				
MAXIMUM DRY DENSITY IN LBS./CU. FT.	115.2	115.2	115.2				
PERCENT OF MAXIMUM DRY DENSITY	97.4	96.8	98.1				
MATERIAL DESCRIPTION	*	*	*				

REMARKS: * ORANGE CLAYEY SAND

TESTS MEET SPECIFICATIONS

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Carl B. Gales

MUSKOGEE TESTING LABORATORY, INC.

208 EASTSIDE BLVD.
PHONE 918-682-7853
MUSKOGEE, OKLAHOMA 74401

Soils & Concrete Testing - Concrete Coring - Foundation Investigation Drilling

INSPECTORS REPORT

10-16-78 to 10-20-78

FANSTEEL METALS

Waste Disposal Pond

10-16-78

Checked job site. Contractor hauling fill material on pond dikes. Removing material from existing pond area.

10-17-78

Checked job site. Contractor hauling fill material on pond dikes. Removing material from existing pond area.

10-18-78

Checked job site. Contractor hauling fill material on pond dikes. Removing material from existing pond area.

10-19-78

Checked job site. Contractor hauling fill material on pond dikes. Removing material from existing pond area.

10-20-78

Checked job site. Contractor hauling fill material on pond dikes. Removing material from existing pond area. The subgrade for east and west dike was checked and Contractor was given permission to begin hauling fill. All unsuitable material has been removed from pond area.

Yours truly,

MUSKOGEE TESTING LABORATORY, INC.



Dallas Collins

MUSKOGEE TESTING LABORATORY, INC.

108 PEAK BLVD.
PHONE 918/682-7853
MUSKOGEE, OKLAHOMA 74401

2635 E. 36th ST. NORTH
PHONE / 918/428-1986
TULSA, OKLAHOMA 74010

Soils & Concrete Testing - Concrete Coring - Foundation Investigation Drilling

REPORT OF FIELD DENSITY TESTS

DATE RECEIVED: 10-17-78 AUTHORIZED BY: LABORATORY NO: 107859

REPORT TO: Fansteel Metals, Inc.

PROJECT: Waste Disposal Pond

CONTRACTOR: Berry Equipment Co.

SOURCE: Jobsite

PROCTOR SPECIFICATIONS: ASTM D-698

TESTS BY: Collins

2459

TEST NO.	DESCRIPTION OF LOCATIONS	
1	South Dike	Elevation 516.0
2	South Dike	Elevation 516.0
3	North Dike	Elevation 516.0
4	North Dike	Elevation 516.0

TEST RESULTS

TEST NO.	1	2	3	4			
WET DENSITY IN LBS /CU. FT.	124.8	124.4	124.0	125.0			
DRY DENSITY IN LBS /CU. FT.	110.5	110.2	110.1	110.7			
IN-PLACE MOISTURE CONTENT %	13.0	12.8	12.5	12.9			
OPTIMUM MOISTURE %	11.0	11.0	11.0	11.0			
MAXIMUM DRY DENSITY IN LBS /CU. FT.	115.2	115.2	115.2	115.2			
PERCENT OF MAXIMUM DRY DENSITY	95.9	95.7	95.7	96.1			
MATERIAL DESCRIPTION	*	*	*	*			

REMARKS: * Orange Clayey Sand All Test Meet Specifications

COPIES:

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REGISTERED PROFESSIONAL
CARL D. GALES
10567
Carl D. Gales

MUSKOGEE TESTING LABORATORY, INC.

108 PEAK BLVD.
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MUSKOGEE, OKLAHOMA 74401

2635 E. 36th ST. NORTH
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TULSA, OKLAHOMA 74010

Soils & Concrete Testing - Concrete Coring - Foundation Investigation Drilling

REPORT OF FIELD DENSITY TESTS

DATE RECEIVED: 10-20-78 AUTHORIZED BY: LABORATORY NO: 107887

REPORT TO: Fansteel Metals, Inc.

PROJECT: Waste Disposal Pond

CONTRACTOR: Berry Equipment Company

SOURCE: Job Site

PROCTOR SPECIFICATIONS: ASTM D-698

TESTS BY: Collins

2487

TEST NO.	DESCRIPTION OF LOCATIONS	
1	North Dike East End	Elevation 520.0
2	North Dike West End	Elevation 520.0
3	East Dike North End	Elevation 520.0
4	East Dike South End	Elevation 520.0
5	South Dike East End	Elevation 520.0
6	South Dike West End	Elevation 520.0

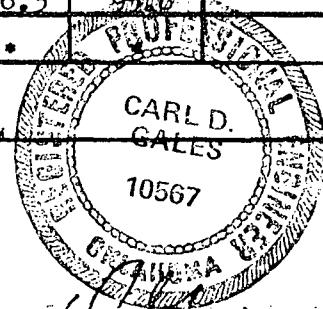
TEST RESULTS

TEST NO.	1	2	3	4	5	6
WET DENSITY IN LBS./CU. FT.	124.0	124.7	124.4	123.8	124.8	124.5
DRY DENSITY IN LBS./CU. FT.	110.5	110.8	110.7	109.6	110.9	110.4
IN-PLACE MOISTURE CONTENT %	12.2	12.5	12.4	13.0	12.5	12.8
OPTIMUM MOISTURE %	11.0	11.0	11.0	11.0	11.0	11.0
MAXIMUM DRY DENSITY IN LBS./CU. FT.	115.2	115.2	115.2	115.2	115.2	115.2
PERCENT OF MAXIMUM DRY DENSITY	95.9	96.2	96.1	95.1	96.3	95.8
MATERIAL DESCRIPTION	*	*	*	*	*	*

REMARKS: * ORANGE CLAYEY SAND

MEETS ALL SPECIFICATIONS

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MUSKOGEE TESTING LABORATORY, INC.

208 EASTSIDE BLVD.
PHONE 918-682-7853
MUSKOGEE, OKLAHOMA 74401

Soils & Concrete Testing - Concrete Coring - Foundation Investigation Drilling

INSPECTORS REPORT

10-23-78 to 10-28-78

FANSTEEL METALS, INC.

Waste Disposal Pond

10-23-78

Job site checked and due to overnight rain no work was in progress.

10-24-78

Job site checked and contractor placing fill material and cleaning area.

10-25-78

Job site checked and contractor dressing pond area and hauling fill material.

10-26-78

Job site checked and contractor hauling fill material and dressing area and pond area.

10-27-78

Job site checked and contractor dressing work area and pond area and hauling fill.

10-28-78

Job site checked , contractor hauling fill material and dressing work area.

Yours truly,

Muskogee Testing Laboratory, Inc.



Dallas Collins

DC:dc

MUSKOGEE TESTING LABORATORY, INC.

108 PEAK BLVD.
PHONE 918/682-7853
MUSKOGEE, OKLAHOMA 74401

2635 E. 36th ST. NORTH
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TULSA, OKLAHOMA 74010

Soils & Concrete Testing - Concrete Coring - Foundation Investigation Drilling

REPORT OF FIELD DENSITY TESTS

DATE RECEIVED: 10-26-78 AUTHORIZED BY: LABORATORY NO: 107816

REPORT TO: Fansteel Metals, Inc.

PROJECT: Waste Disposal Pond

CONTRACTOR: Berry Equipment Company

SOURCE: Job Site

PROCTOR SPECIFICATIONS: ASTM D-698

TESTS BY: Collins

16

TEST NO.	DESCRIPTION OF LOCATIONS	
1	North Dike, West End	Elevation 523.0
2	North Dike, East End	Elevation 523.0
3	East Dike, North End	Elevation 523.0
4	East Dike, South End	Elevation 523.0

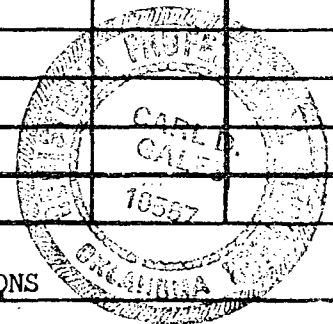
TEST RESULTS

TEST NO.	1	2	3	4			
WET DENSITY IN LBS /CU. FT.	125.5	126.2	124.8	124.0			
DRY DENSITY IN LBS /CU. FT.	112.3	113.2	111.6	110.4			
IN-PLACE MOISTURE CONTENT %	11.7	11.4	11.8	12.4			
OPTIMUM MOISTURE %	11.0	11.0	11.0	11.0			
MAXIMUM DRY DENSITY IN LBS /CU. FT.	115.2	115.2	115.2	115.2			
PERCENT OF MAXIMUM DRY DENSITY	97.5	98.3	96.9	95.8			
MATERIAL DESCRIPTION	*	*	*	*			

REMARKS: * ORANGE CLAYEY SAND

ALL TESTS MEET SPECIFICATIONS

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Collins

MUSKOGEE TESTING LABORATORY, INC.

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2635 E. 36th ST. NORTH
PHONE / 918/428-1986
TULSA, OKLAHOMA 74010

Soils & Concrete Testing - Concrete Coring - Foundation Investigation Drilling

REPORT OF FIELD DENSITY TESTS

DATE RECEIVED: 10-26-78 AUTHORIZED BY: LABORATORY NO: 107816

REPORT TO: Fansteel Metals, Inc.

PROJECT: Waste Disposal Pond

CONTRACTOR: Berry Equipment Company

SOURCE: Job Site

PROCTOR SPECIFICATIONS: ASTM D-698

TESTS BY: Collins

16

TEST NO.	DESCRIPTION OF LOCATIONS	
5	South Dike, East End	Elevation 523.0
6	South Dike, West End	Elevation 523.0
7	West Dike, South End	Elevation 523.0
8	West Dike, North End	Elevation 523.0

TEST RESULTS

TEST NO.	5	6	7	8			
WET DENSITY IN LBS /CU. FT.	124.8	126.3	126.0	124.4			
DRY DENSITY IN LBS./CU. FT.	110.9	112.7	111.6	110.2			
IN-PLACE MOISTURE CONTENT %	12.5	12.1	12.9	12.8			
OPTIMUM MOISTURE %	11.0	11.0	11.0	11.0			
MAXIMUM DRY DENSITY IN LBS./CU. FT.	115.2	115.2	115.2	115.2			
PERCENT OF MAXIMUM DRY DENSITY	96.3	97.8	96.9	95.7			
MATERIAL DESCRIPTION	*	*	*	*			

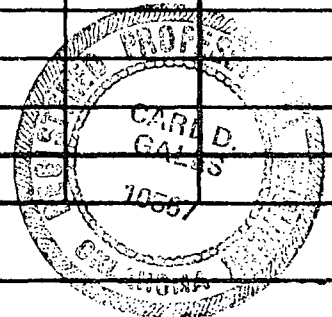
REMARKS: * ORANGE CLAYEY SAND

ALL TESTS MEET SPECIFICATIONS

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Carl D. Giles

MUSKOGEE TESTING LABORATORY, INC.

208 EASTSIDE BLVD.
PHONE 918-682-7853
MUSKOGEE, OKLAHOMA 74401

Soils & Concrete Testing - Concrete Coring - Foundation Investigation Drilling

INSPECTORS REPORT

10-30-78 to 11-3-78

FANSTEEL METALS, INC.

Waste Disposal Pond

10-30-78

Job site checked and contractor hauling fill material and dressing bottom of pond.

10-31-78

Contractor hauling fill, dressing slopes and dressing bottom of pond.

11-1-78

Job site checked, contractor hauling fill, dressing slopes and bottom of pond.

11-2-78

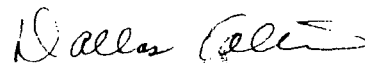
Contractor hauling fill material, dressing slopes and dressing the bottom of pond.

11-3-78

Job site checked and contractor hauling fill material, dressing slopes and bottom of pond.

Yours truly,

MUSKOGEE TESTING LABORATORY, INC.



Dallas Collins

MUSKOGEE TESTING LABORATORY, INC.

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Soils & Concrete Testing - Concrete Coring - Foundation Investigation Drilling

REPORT OF FIELD DENSITY TESTS

DATE RECEIVED: 10-30-78 AUTHORIZED BY: LABORATORY NO: 107828

REPORT TO: Fansteel Metals, Inc.

PROJECT: Waste Disposal Pond

CONTRACTOR: Berry Equipment Company

SOURCE: Job Site

PROCTOR SPECIFICATIONS: ASTM D-698

TESTS BY: Collins

28

TEST NO.	DESCRIPTION OF LOCATIONS	
1	South Dike - East End	Elevation 526.0
2	South Dike - West End	Elevation 526.0
3	West Dike - South End	Elevation 526.0
4	West Dike - North End	Elevation 526.0

TEST RESULTS

TEST NO.	1	2	3	4			
WET DENSITY IN LBS /CU. FT.	119.2	119.4	119.3	118.4			
DRY DENSITY IN LBS./CU. FT.	107.4	108.1	107.5	106.7			
IN-PLACE MOISTURE CONTENT %	11.0	10.4	10.9	11.1			
OPTIMUM MOISTURE %	9.8	9.8	9.8	9.8			
MAXIMUM DRY DENSITY IN LBS./CU. FT.	110.8	110.8	110.8	110.8			
PERCENT OF MAXIMUM DRY DENSITY	96.9	97.6	97.0	96.3			
MATERIAL DESCRIPTION	*	*	*	*			

REMARKS: * TAN CLAYEY SAND

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Soils & Concrete Testing - Concrete Coring - Foundation Investigation Drilling

REPORT OF FIELD DENSITY TESTS

DATE RECEIVED: 10-30-78 AUTHORIZED BY: LABORATORY NO: 107828

REPORT TO: Fansteel Metals, Inc.

PROJECT: Waste Disposal Pond

CONTRACTOR: Berry Equipment Company

SOURCE: Job Site

PROCTOR SPECIFICATIONS: ASTM D-698

TESTS BY: Collins

28

TEST NO.	DESCRIPTION OF LOCATIONS	
5	East Dike, North End	Elevation 526.0
6	East Dike, South End	Elevation 526.0
7	North Dike, East End	Elevation 526.0
8	North Dike, West End	Elevation 526.0

TEST RESULTS

TEST NO.	5	6	7	8			
WET DENSITY IN LBS./CU. FT.	118.7	118.6	119.6	119.0			
DRY DENSITY IN LBS./CU. FT.	107.8	107.4	108.8	107.9			
IN-PLACE MOISTURE CONTENT %	10.1	10.5	9.9	10.3			
OPTIMUM MOISTURE %	9.8	9.8	9.8	9.8			
MAXIMUM DRY DENSITY IN LBS./CU. FT.	110.8	110.8	110.8	110.8			
PERCENT OF MAXIMUM DRY DENSITY	97.3	96.9	98.2	97.4			
MATERIAL DESCRIPTION	*	*	*	*			

REMARKS: * TAN CLAYEY SAND

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Soils & Concrete Testing - Concrete Coring - Foundation Investigation Drilling

MOISTURE - DENSITY CURVE

DATE: 10-30-78
CLIENT: Fansteel Metals, Inc.
PROJECT: Waste Disposal Pond

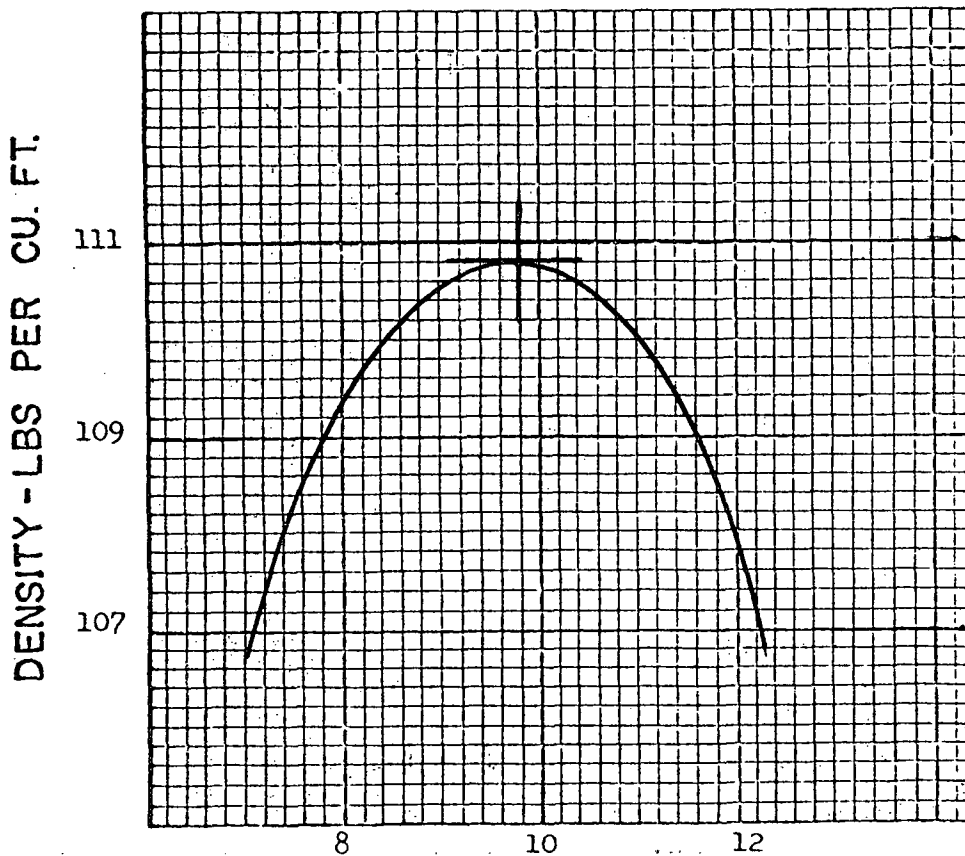
LAB. NO. 107828

MATERIAL: Tan Clayey Sand
MATERIAL SOURCE: Job Site
METHOD OF TEST: ASTM D-698

TEST RESULTS

MAXIMUM DRY DENSITY = 110.8 LBS PER CU. FT.

OPTIMUM MOISTURE CONTENT = 9.8 %



PHYSICAL PROPERTIES

LIQUID LIMIT = _____ %
PLASTIC LIMIT = _____ %
PLASTICITY INDEX = _____ %
SHRINKAGE LIMIT = _____ %

MOISTURE - PERCENT OF DRY WEIGHT

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Soils & Concrete Testing - Concrete Coring - Foundation Investigation Drilling

REPORT OF FIELD DENSITY TESTS

DATE RECEIVED: 11-2-78 AUTHORIZED BY: LABORATORY NO: 117858

REPORT TO: Fansteel Metals, Inc.

PROJECT: Waste Disposal Pond

CONTRACTOR: Berry Equipment Company

SOURCE: Job Site

PROCTOR SPECIFICATIONS: ASTM D-698

TESTS BY: Collins

58

TEST NO.	DESCRIPTION OF LOCATIONS	
1	North Dike - East End	Elevation 528.0
2	North Dike - West End	Elevation 528.0
3	West Dike - North End	Elevation 528.0
4	West Dike - South End	Elevation 528.0

TEST RESULTS

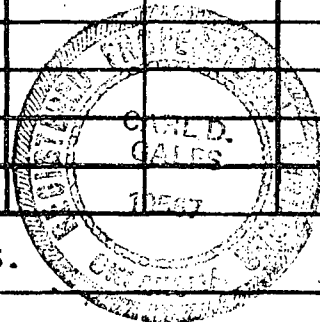
TEST NO.	1	2	3	4			
WET DENSITY IN LBS./CU. FT.	119.3	119.2	118.9	117.3			
DRY DENSITY IN LBS./CU. FT.	108.3	107.3	107.7	106.3			
IN-PLACE MOISTURE CONTENT %	10.2	11.1	10.4	10.4			
OPTIMUM MOISTURE %	9.8	9.8	9.8	9.8			
MAXIMUM DRY DENSITY IN LBS./CU. FT.	110.8	110.8	110.8	110.8			
PERCENT OF MAXIMUM DRY DENSITY	97.7	96.8	97.2	95.9			
MATERIAL DESCRIPTION	*	*	*	*			

REMARKS: * TAN CLAYEY SAND ALL TESTS MEET SPECIFICATIONS.

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Soils & Concrete Testing - Concrete Coring - Foundation Investigation Drilling

REPORT OF FIELD DENSITY TESTS

DATE RECEIVED: 11-2-78 AUTHORIZED BY: LABORATORY NO: 117858

REPORT TO: Fansteel Metals, Inc.

PROJECT: Waste Disposal Pond

CONTRACTOR: Berry Equipment Company

SOURCE: Job Site

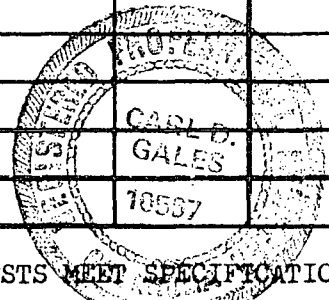
PROCTOR SPECIFICATIONS: ASTM D-698

TESTS BY: Collins

TEST NO.	DESCRIPTION OF LOCATIONS	
5	South Dike, West End	Elevation 528.0
6	South Dike, East End	Elevation 528.0
7	East Dike, South End	Elevation 528.0
8	East Dike, North End	Elevation 528.0

TEST RESULTS

TEST NO.	5	6	7	8			
WET DENSITY IN LBS./CU. FT.	124.1	124.3	117.6	118.8			
DRY DENSITY IN LBS./CU. FT.	109.7	109.6	106.7	107.3			
IN-PLACE MOISTURE CONTENT %	13.2	13.5	10.2	10.8			
OPTIMUM MOISTURE %	11.0	11.0	9.8	9.8			
MAXIMUM DRY DENSITY IN LBS./CU. FT.	115.2	115.2	110.8	110.8			
PERCENT OF MAXIMUM DRY DENSITY	95.2	95.1	96.3	96.8			
MATERIAL DESCRIPTION	*	*	**	**			



REMARKS: * ORANGE CLAYEY SAND * * TAN CLAYEY SAND ALL TESTS MEET SPECIFICATIONS

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Soils & Concrete Testing - Concrete Coring - Foundation Investigation Drilling

INSPECTORS REPORT

11-6-78 to 11-10-78

FANSTEEL METALS, INC.

Waste Disposal Pond

11-6-78

Job site checked and Contractor hauling Fill material and dressing slopes.

11-7-78

Job checked, Contractor hauling Fill and dressing Bottom of Pond.

11-8-78

Contractor continued hauling fill and dressing slopes.

11-9-78

Job checked and Contractor hauling fill material.

11-10-78

Job site checked and Contractor hauling fill material.

Yours truly,

MUSKOGEE TESTING LABORATORY, INC.


Dallas Collins

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INSPECTORS REPORT

11-13-78 to 11-17-78

FANSTEEL METALS, INC.

Waste Disposal Pond

11-13-78

Job site checked and Contractor hauling fill.

11-14-78

Job site checked and due to rain Contractor was not working.

Yours truly,

MUSKOGEE TESTING LABORATORY, INC.



Dallas Collins

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Soils & Concrete Testing - Concrete Coring - Foundation Investigation Drilling

INSPECTORS REPORT

12-4-78 to 12-8-78

FANSTEEL METALS, INC.

Waste Disposal Pond

12-4-78

Job site checked and Contractor hauling fill material.

12-5-78

Contractor continued hauling fill material this date.

12-6-78

Contractor hauling fill material this date.

Yours truly,
MUSKOGEE TESTING LABORATORY, INC.



Dallas Collins

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Soils & Concrete Testing - Concrete Coring - Foundation Investigation Drilling

INSPECTORS REPORT

12-18-78 to 12-22-78

FANSTEEL METALS, INC.

Waste Disposal Pond

12-18-78

Job site checked and Contractor was working on Equipment.
Dressing slopes on dike.

12-19-78

Job site checked and Contractor dressing slopes on Dike.

12-20-78

Job site checked and Contractor started hauling fill material.

12-21-78


Job site checked and Contractor hauling fill material.

12-22-78

Contractor continued hauling fill material.

Yours truly,

MUSKOGEE TESTING LABORATORY, INC.



Dallas Collins

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INSPECTORS REPORT

12-25-78 to 12-29-78

FANSTEEL METALS, INC.

Waste Disposal Pond

12-26-78

Job site checked and Contractor hauling fill material.

12-27-78

Contractor hauling fill on this date.

12-28-78

Job site checked and Contractor hauling fill.

12-29-78

Job site checked and due to rain Contractor was not working.

Yours truly,

MUSKOGEE TESTING LABORATORY, INC.


Dallas Collins

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Soils & Concrete Testing - Concrete Coring - Foundation Investigation Drilling

REPORT OF FIELD DENSITY TESTS

DATE RECEIVED: 12-27-78 AUTHORIZED BY: LABORATORY NO: 127807

REPORT TO: Fansteel Metals, Inc.

PROJECT: Waste Disposal Pond

CONTRACTOR: Barry Equipment Company

SOURCE: Job Site

PROCTOR SPECIFICATIONS: ASTM D-698

TESTS BY: Collins

307

TEST NO.	DESCRIPTION OF LOCATIONS	
1	West Dike South End	Elevation 531.0
2	West Dike North End	Elevation 531.0
3	South Dike West End	Elevation 531.0
4	South Dike East End	Elevation 531.0

TEST RESULTS

TEST NO.	1	2	3	4			
WET DENSITY IN LBS /CU. FT.	114.6	114.5	114.9	117.5			
DRY DENSITY IN LBS./CU. FT.	107.1	106.7	106.3	107.9			
IN-PLACE MOISTURE CONTENT %	7.0	7.4	8.1	8.9			
OPTIMUM MOISTURE %	9.8	9.8	9.8	9.8			
MAXIMUM DRY DENSITY IN LBS./CU. FT.	110.8	110.8	110.8	110.8			
PERCENT OF MAXIMUM DRY DENSITY	96.7	96.3	95.9	97.4			
MATERIAL DESCRIPTION	*	*	*	*			

REMARKS: * TAN CLAYEY SAND

TESTS MEET SPECIFICATIONS.

COPIES: 2 - Fansteel Metals
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Collins

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TULSA, OKLAHOMA 74010

Soils & Concrete Testing - Concrete Coring - Foundation Investigation Drilling

REPORT OF FIELD DENSITY TESTS

DATE RECEIVED: 12-27-78 AUTHORIZED BY: _____ LABORATORY NO: 127807

REPORT TO: Fansteel Metals, Inc.

PROJECT: Waste Disposal Pond

CONTRACTOR: Berry Equipment Company

SOURCE: Job Site

PROCTOR SPECIFICATIONS: ASTM D-698

TESTS BY: Collins

307

TEST NO.	DESCRIPTION OF LOCATIONS	
5	East Dike South End	Elevation 531.0
6	East Dike North End	Elevation 531.0
7	North Dike West End	Elevation 531.0
8	North Dike East End	Elevation 531.0

TEST RESULTS

TEST NO.	5	6	7	8			
WET DENSITY IN LBS./CU. FT.	115.5	115.8	117.5	114.8			
DRY DENSITY IN LBS./CU. FT.	106.4	107.3	108.5	106.6			
IN-PLACE MOISTURE CONTENT %	8.6	8.0	8.3	7.7			
OPTIMUM MOISTURE %	9.8	9.8	9.8	9.8			
MAXIMUM DRY DENSITY IN LBS./CU. FT.	110.8	110.8	110.8	110.8			
PERCENT OF MAXIMUM DRY DENSITY	96.0	96.8	97.9	96.2			
MATERIAL DESCRIPTION	*	*	*	*			

REMARKS: * TAN CLAYEY SAND TESTS MEET SPECIFICATIONS.

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Soils & Concrete Testing - Concrete Coring - Foundation Investigation Drilling

FANSTEEL METALS, INC.

FILTER DRAIN

AASSHTO - T -27

<u>SIEVE SIZE</u>	<u>PER CENT PASSING</u>	<u>REQUIRED</u>
3/4	100	100
No. 4	3.0	5% or less