40-7580 12344



number ten tantalum place muskogee, oklahoma 74401

March 23, 1979

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:

 $p_{i} \in \{1, 2, 3\}$ 

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.

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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 locse 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



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, Viene

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

DALLAS COLLINS

LAWRENCE RAMEY

CARL D. GALES, P.E.

March 21, 1979

PHONES: 918-682-7855 682-7854 682-7853

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.

CARL D. GALES, P.E.

DALLAS COLLINS

LAWRENCE RAMEY

208 Eastside Blvd.

MUSKOGEE, OKLAHOMA 74401 Gas Systems; Design, Testing and Cathodic Protection Systems Water, Sewer & Drainage Systems Land Surveying, Construction Management

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.

108 PEAK BLVD: PHONE 918/682-7853 MUSKOGEE, OKLAHOMA 74401. 2635 E. 36th ST. NORTH PHONE / 918/428-1986 TULSA, OKLAHOMA 74010

Solis & Concrete Testing - Concrete Coring - Foundation Investigation Drilling

				NSITY TESTS	<u> </u>	<u></u>	
					,		
DATE RECEN	VED 9-22-78 AUTHO	ORIZED BY		LABORA	ATORY NO : 5	97859	
REPORT TO:	Fansteel Metals	7	· · · · · · · · · · · · · · · · · · ·			· · · · · · · · · · · · · · · · · · ·	
PROJECT:	Waste Disposal	Pond					
CONTRACTO	R: Berry Equipment	L					
SOURCE:	Jobsite						
PROCTOR SP	ECIFICATIONS ASTM	D-698	·····	TESTS BY:	D. Collins	;	
235	59		:				
TEST NO.		DESC	RIPTION (	OF LOCATION	NS		
	Backfill Over Fro	mah Dra	in Foot Fud		Fleveti	on 512.0	
2	Backfill Over Fro			<u></u>		on 512.0	*******
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		Т	EST RESUL	TS			
TEST NO.	`	1	2				,
WET DENSIT	Y IN LBS /CU. FT.	122.3	124.4				
DRY DENSIT	Y IN LBS./CU. FT.	110.7	112.2			·····	د د د ار د د د د
IN-PLACE MO	DISTURE CONTENT %	10.5	10.9			ANTINO	
		11.0	11.0			VIUL	5 15 - 5
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PERCENT OF	MAXIMUM DRY DENSITY	96.1	97.4		See.	GALES	<b>1</b> 771日
MATERIAL D	ESCRIPTION	*	*			1056	E S
REMARKS:	* ORANGE CLAYEY S	AND (	rests meet s	PECIFICATIONS		APRIL	
COPIES:						Carrie Carrier	
2 -	Fansteel Metals		·				
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108 PEAK BLVD PHONE 918/682-7853 MUSKOGEE OKIAHO

MUSKOGEE, OKLAHOMA 74401

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

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	REPORT OF FIELD DENSITY TESTS											
DATE RECEI	NED 9-25-78 AUTH	ORIZED BY	:		LABORAT	ORY NO :	97860					
REPORT TO	Fansteel Met	tals										
PROJECT	Waste Dispos	sal Pond										
	DR: Berry Equip	ment Comp	any									
SOURCE	Jobsite				·							
PROCTOR S	PECIFICATIONS: ASTM D	-698	·····		ESTS BY:	D. Col	lins					
236	0											
TEST NO.	· · · · · · · · · · · · · · · · · · ·	DESC	RIPTION	OF LO	CATION	S		an ga an				
<u> </u>	Backfill French D	rain East	: End			Elevatio	on 514.0					
2	Backfill French D	rain West	: End		· · · · · · · · · · · · · · · · · · ·	Elevatio	on 514.0					
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		 ТI	EST RES	ULTS		<u> </u>						
TEST NO.		1	2	T								
	TY IN LBS /CU. FT.	.125.5	125,2	· · · ·			<u> </u>					
DRY DENSI	TY IN LBS./CU. FT.	113.4	112.7		t		·······					
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REMARKS	* ORANGE CLAYEY SAN	d tesi	rs meet si	PECIFICAT	IONS		<u>الم</u> 105	57				
COPIES: 2	- Fansteel Metals						4130 2010					
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208 EASTSIDE BLVD. PHONE 918-682-7853 MUSKOGEE, OKLAHOMA 74401

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

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

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

Solls & Concrete Testing + Concrete Coring - Foundation Investigation Drilling

ونصحاك منصبون بدبيبهم	ومتماهد وبالجاشي والمجار المتعاد والمحاصل ومستوان المستجد فللمور المعرب	الأعيبين ومستكنة كالشاط فترجي			فتشاكل بيشبون ومعافلا فبب		المتناك فستكر فأشتك ومستجهزته						
	REPORT OF FIELD DENSITY TESTS												
DATE RECEI	NED 10-2-78 AUTH	ORIZED BY	:		LABORAT	ORY NO :	107895						
REPORT TO:	Fansteel Meta	als, Inc.	•					التحديق المرجع المرجع المرجع					
PROJECT:	Waste Dispose	al Pond											
	Berry Equipme	ent					····						
SOURCE	Jobsite												
PROCTOR SP	PECIFICATIONS: ASTM ]	D-698			TESTS BY:	D. Col	lins						
	2395						a.						
TEST NO.		DESC	RIPTIO	N OF LO	OCATION	5							
Backfill Over French Drain - East End    Elevation 516.0													
2	Backfill Over Fre	nch Drain	1 - West	End		Elevat	ion 516.0	)					
- <b>Balling Constant</b> State State													
<b>6</b>	· · · · · · · · · · · · · · · · · · ·	TI	EST RES	SULTS									
TEST NO.		1	2										
WET DENSIT	Y IN LBS /CU. FT.	125.0	124.1										
DRY DENSIT	Y IN LBS./CU. FT.	111.5	110.9										
IN-PLACE MO	DISTURE CONTENT %	12.1	11.9					alen.					
		11.0	11.0				NHUI						
MAXIMUM DI IN LBS./CU.		115.2	115.2				CAR						
PERCENT OF	F MAXIMUM DRY DENSITY	96.8	96.3				GAL	S S					
MATERIAL D	DESCRIPTION	\$	•				1056						
REMARKS:	* ORANGE CLAYEY SAN	D	test mee	TS SPECI	FICATIONS								
COPIES: 2	2 - Fansteel Metals, Inc.												
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108 PEAK BLVD PHONE 918/682-7853 MUSKOGEE, OKLAHOMA 74401

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

Solis & Concrete Testing - Concrete Coring - Foundation Investigation Drilling

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REPORT OF FIELD DENSITY TESTS										
ORIZED BY				ORY NO : 10789	6					
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D-698			TESTS BY:	D. Collins						
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ench Drai	n - West	End		Elevation	n 518.0					
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Inc.										
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			Care	CHA O	elis					
	DESC DESC DESC DESC DESC Panch Drain Panch Panch	IORIZED BY    118, Inc.    11 Pond    Int    I D-698    DESCRIPTION    ench Drain - East    ench Drain - West    Ench Drain - West    I    2    126.3    126.3    11.5    12.2    98.3    97.9    •	IORIZED BY:    11s, Inc.    11 Pond    Int    Int	IORIZED BY:  LABORAT    11s, Inc.	IORIZED BY:  LABORATORY NO: 107894    Ils, Inc.     Il Pond     Int     A D-698  TESTS BY  D. Collins    DESCRIPTION OF LOCATIONS     ench Drain - East End  Elevation    ench Drain - West End  Elevation    Ench Drain - West End  Elevation    Il 2     1  2     126.3  126.1     11.5  11.8     11.5  11.8     11.5  11.6     11.5  11.6     11.5  11.8     11.5  11.8     11.5  11.5     115.2  115.2     98.3  97.9     ND  TESTS MEET SPECIFICATIONS					

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

Solls & 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

108 PEAK BLVD. PHONE 918/682-7853

MUSKOGEE, OKLAHOMA 74401

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

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Soils & Concrete Testing - Concrete Coring - Foundation Investigation Drilling in the Westman State No. 7 18 1 190. 19

	REPO	ORT OF	FIELD I	DENSIT	Y TESTS			· ·					
DATE RECEI	VED 10-12-78 AUTH	ORIZED BY:			LABORA	TORY NO :	107838	}					
REPORT TO:	Fansteel Met	als, Inc.											
PROJECT	Waste Dispos	al Pond											
CONTRACTO	DR: Berry Equipm	ent											
SOURCE	Jobsite												
PROCTOR S	PECIFICATIONS: ASTM	D-698			TESTS BY:	Collins	5						
24	38	•				•							
TEST NO		DESC	RIPTIO	N OF LO	OCATION	1S		an a					
1.	Backfill over Fren	ch Drain	- East E	nd	Elevatio	n 520.0							
2	Backfill over Fren	<u>ch Drain</u>	- Center	•	Elevatio	n 520.0	and the second second	5					
3.	Backfill over Fren	ch Drain	- West E	nd	Elevatio	n 520.0		and the second sec					
4.	North Dike @ 1st Lift Elevation 510.0												
	North Dike @ 1st L	ift		Elevatio	n 510.0		eq.						
							1	· · ·					
			1				and the second						
1		TE	EST RES	SULTS									
TEST NO.		1	2	3	4	5							
WET DENSI	TY IN LBS /CU. FT.	124,8	124.1	126.2	125.4	125.9							
DRY DENSIT	TY IN LBS./CU. FT.	111.1	110.2	112.7	111.6	112.3							
IN-PLACE M	CISTURE CONTENT %	12.4	12.6	12.0	12.3	12.1							
OPTIMUM M	- 11/	11.0	11.0	11.0	11.0	11.0							
MAXIMUM D	RY DENSITY FT		115.2	115.2	115.2	115.2							
PERCENT O	F MAXIMUM DRY DENSITY	96.4	95.7	97.8	96.9	97.5							
	DESCRIPTION	*	\$	*	+	*							
REMARKS	* ORANGE CLAYEY SAN	ID ALL	TESTS M	CET SPECI	FICATION	S ,							
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2 - Fansteel Metals

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108 PEAK BLVD. PHONE 918/682-7853

MUSKOGEE. OKLAHOMA 74401

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

Solls & Concrete Testing - Concrete Coring - Foundation Investigation Drilling

	REP	ORT OF	FIELD	DENSITY	/ TESTS			
DATE RECEI	VED 10-13-78 AUTH	ORIZED BY		<u>.</u>	LABORAT	ORY NO : 1	07848	
REPORT TO:	Fansteel Meta	ls, Inc.						
PROJECT	Waste Disposa	1 Pond						
		nt Compan	<u>17</u>					
SOURCE:	Jobsite							
PROCTOR S	PECIFICATIONS: ASTM D	-698			TESTS BY:	Collins		
• .	2448							
TEST NO.		DESC	RIPTION	OF LC	CATION	5		<u> </u>
1	South Dike					Elevatio	n 514.0	
2	South Dike		·			Elevatio	n 514.0	
3	South Dike					Elevatio	n 514.0	
			•					
2						· · · · · · · · · · · · · · · · · · ·		
	· · · · · · · · · · · · · · · · · · ·							
يز حمد فلا بالبلية الألفاني عن و		Т	EST RES	ULTS				
TEST NO.		1	2	3				
WET DENSI	TY IN LBS /CU. FT.	125.8	125,6	126.5				
DRY DENSIT	TY IN LBS./CU. FT.	112.2	111.5	113.0				
IN-PLACE M	OISTURE CONTENT %	12.1	12.6	11.9				
OPTIMUM M		11.0	11.0	11.0		and the second se	PRUTED.	103
MAXIMUM D	RY DENSITY FT.	115.2	115.2	115.2			CAD	A series
PERCENT O	F MAXIMUM DRY DENSITY	97.4	96.8	98.1			GALE	S HER
MATERIAL	DESCRIPTION	*	+	*		N. S.	10567	
REMARKS	• ORANGE CLAYEY SANI	)	TESTS	MEET SP	ECIFICATI		AHOM	
COPIES						<del></del>	- testelle	In the second
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208 EASTSIDE BLVD. PHONE 918-682-7853 MUSKOGEE, OKLAHOMA 74401

Solls & 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.

alles (

Dallas Collins

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

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

Solis & Concrete Testing - Concrete Coring - Foundation Investigation Drilling

REPORT OF FIELD DENSITY TESTS												
DATE RECEI	VED 10-17-78 AUTHO	DRIZED BY:			LABORA	TORY NO	107859					
REPORT TO	Fansteel Metals,	Inc.										
PROJECT	Waste Disposal P	ond										
CONTRACTO	DR Berry Equipment	Co.										
SOURCE	Jobsite											
PROCTOR S	PECIFICATIONS: ASTM I	-698			TESTS BY:	Collins	5					
2459												
TEST NO.		DESC	RIPTIO	N OF LO	CATION	15		and a second				
1	South Dike		,		Eleva	tion 516.	.0					
2	South Dike				Eleva	tion 516	.0					
3 North Dike Elevation 516.0												
4 North Dike Elevation 516.0												
L												
		TE	EST RES	SULTS	/							
TEST NO.		1	2	3	4							
WET DENSI	TY IN LBS /CU. FT.	124.8	124.4	124.0	125.0							
DRY DENSI	TY IN LBS./CU. FT	110.5	110.2	110.1	110.7							
IN-PLACE M	CISTURE CONTENT %	13.0	12.8	12.5	12.9							
ОРТІМИМ М		11.0	11.0	11.0	11.0							
IN LBS./CU.	RY DENSITY FT.	115.2	115.2	115.2	115.2							
PERCENT O	F MAXIMUM DRY DENSITY	95.9	95•7	95.7	96.1							
MATERIAL	MATERIAL DESCRIPTION * * * *											
REMARKS * Orange Clayey Sand All Test Meet Specifications												
COPIES: 2	- Fansteel Metals, 2	Inc.					CARL GALE	D. 11 V.				
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108 PEAK BLVD PHONE 918/682-7853 MUSKOGEE, OKLAHOMA 74401

2635 E 36th ST NORTH PHONE 7 918/428-1986 TULSA, OKLAHOMA 74010

Solls & Concrete Testing, Concrete Coring - Foundation Investigation Drilling

	REPORT OF FIELD DENSITY TESTS											
DATE RECEI	VED 10-20-78 AUTHO	ORIZED BY:			LABORA	TORY NO :	107887					
REPORT TO:	Fansteel Metal	ls, Inc.										
PROJECT	Waste Disposal	l Pond										
CONTRACTO	DR: Berry Equipmen	nt Compan	<b>y</b>									
SOURCE	Job Site	1 										
PROCTOR S	PECIFICATIONS: ASTM 1	D-698			TESTS BY:	Collins	3					
"WARDEN DE LE COMPANY OF THE OWNER OF THE OWNE	2487	DESC	PIPTION	I OF LO			· · · · · · · · · · · · · · · · · · ·					
TEST NO.												
	North Dike East End					levation		•				
_2	North Dike West End	والمرتبع المرتب المحادث المرتب ال				levation						
3												
	East Dike South End		•		E	levation	520.0					
_5	South Dike East End Elevation 520.0											
<u> </u>	6 South Dike West End Elevation 520.0											
		TE	EST RES	ULTS			<u> </u>					
TEST NO.		1	2	3	4	5	6	<u> </u>				
WET DENSI	TY IN LBS /CU. FT.	124.0	124.7	124.4	123.8	124.8	124.5					
DRY DENSIT	Y IN LBS./CU. FT.	110.5	110.8	110.7	109.6	110-9	110.4					
IN-PLACE M	OISTURE CONTENT %	12.2	12.5	12.4	13.0	12.5	12.8					
ОРТІМИМ М		11.0	11.0	11.0	11.0	11.0	11.0					
MAXIMUM D IN LBS./CU.	RY DENSITY FT.	115.2	115.2	115.2	115.2	115.2	115,2					
PERCENT O	F MAXIMUM DRY DENSITY	95.9	96.2	96.1	95.1	96.3	9518	~.,				
MATERIAL	DESCRIPTION	*	*	*	#	•	PRUFE					
REMARKS	REMARKS * ORANGE CLAYEY SAND MEETS ALL SPECIFICATIONS											
COPIES:	2 - Fansteel Metals 1 - File						6ALE 10567	S BEER				
	Carthala											

### 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

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 C. Carner

فنبد الاستوالار فزائلك ركيتها والتسن	فسيهي إجادها فتخب فانتجاك يعتنا			-	المحيد بالمتناف الخاطعات فيستعد	Network and a little in the second						
REPORT OF FIELD DENSITY TESTS												
				TORY NO	107816							
		······	LABORA	TURY NU :								
		·····										
ment Com	pany											
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-698		· · · · · · · · · · · · · · · · · · ·	TESTS BY:		·							
DESC	RIPTIO	NOFIC	CATION	IS								
					523.0							
	· · ·											
······			، مقارو برج و بونستان النسل 20 الد برسم			•						
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4 East Dike, South End . Elevation 523.0												
TI	EST RES	SULTS										
1	2	3	4			[						
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<b>1</b> 2			1	- Met	44	elis !						
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	ORIZED BY tals, Ind sal Pond ment Com -698 DESC nd nd nd nd nd 1 125.5 112.3 11.7 11.0 115.2 97.5 *	ORIZED BY: tals, Inc. sal Pond ment Company -698 DESCRIPTION nd nd nd nd nd nd nd 1 2 125.5 126.2 112.3 113.2 11.7 11.4 11.0 11.0 115.2 115.2 97.5 98.3 * *	ORIZED BY tals, Inc. sal Pond ment Company -698 DESCRIPTION OF LC nd nd nd nd nd nd 	ORIZED BY:  LABORA    tals, Inc.  sal Pond    ment Company  -698    -698  TESTS BY:    DESCRIPTION OF LOCATION    nd  E    1  2  3    125.5  126.2  124.8  124.0    112.3  113.2  111.6  110.4    11.7  11.4  11.8  12.4    11.0  11.0  11.0  11.0    115.2  115.2  115.2  97.5  98.3  96.9  95.8    *  *  *  *  *  *  *	ORIZED BY:  LABORATORY NO:    tals, Inc.  sal Pond    ment Company	DABORATORY NO. 107816    taboratory NO.    taboratory NO.    sal Pond    ment Company    -698    TESTS BY. Collins    DESCRIPTION OF LOCATIONS    nd  Elevation 523.0    Idea to the state of the state						

108 PEAK BLVD. PHONE 918/682-7853 MUSKOGEE, OKLAHOMA 74401 2635 E 36th ST NORTH PHONE / 918/428-1986 TULSA, OKLAHOMA 74010

Solis & Concrete Testing - Concrete Coring - Foundation Investigation Drilling

·	·							-						
	REPORT OF FIELD DENSITY TESTS													
		· .												
DATE RECE	IVED 10-26-78 AUTH	ORIZED BY			LABORA	TORY NO :	107816							
REPORT TO	Fansteel Me	tals, Inc	•											
PROJECT:	Waste Dispo	sal Pond						<u> </u>						
CONTRACTO	OR: Berry Equip	ment Comp	any		······································		<u></u>							
SOURCE:	Job Site													
PROCTOR S	PECIFICATIONS: ASTM	D-698			TESTS BY:	Collina	5							
,	16													
TEST NO.		DESC	RIPTIO	N OF LO	OCATION	15	·							
5	South Dike, East E	nd		·		Elevatio	523 0							
6	South Dike, West E					Elevation								
7	West Dike, South E		<u> </u>			Elevatio		· .						
8														
		Т	EST RES	SULTS										
TEST NO.		5	6	7	8			<u>^</u>						
WET DENSI	TY IN LBS /CU. FT.	124.8	126.3	126.0	124.4									
DRY DENSI	TY IN LIBS./CU. FT.	110.9	112.7	111.6	110.2									
IN-PLACE M	OISTURE CONTENT %	12.5	12.1	12.9	12.8									
	OISTURE %	11.0	11.0	11.0	11.0		PROF							
IN LBS./CU.		115.2	115.2	115.2	115.2		CA S							
PERCENT O	PERCENT OF MAXIMUM DRY DENSITY 96.3 97.8 96.9 95.7													
MATERIAL	MATERIAL DESCRIPTION													
REMARKS	• ORANGE CLAYEY SAN	D .	ALL TESTS	5 MEET SP	ECIFICAT	IONS	C. Same	EF S						
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	- Fansteel Metals - File													
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### 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 METAIS, 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.

Wallos (eli)

Dallas Collins

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

REP	REPORT OF FIELD DENSITY TESTS											
DATE RECEIVED 10-30-78 AUTH	ORIZED BY			LABORA	TORY NO :	107828						
REPORT TO: Fansteel Metals	s. Inc.											
PROJECT: Waste Disposal	Pond			· · ·	·····		·····					
CONTRACTOR Berry Equipment	Company	<u></u>		······								
SOURCE Job Site	-											
PROCTOR SPECIFICATIONS ASTM ]	0-698			TESTS BY:	Collins		·					
	, °				·							
28	<u>.</u>											
TEST NO.	DESC	RIPTIO	N OF LO	OCATION	NS							
1 South Dike - East	t End			•	Elevation	n <u>526.0</u>						
2 South Dike - West	t End	· · · · · · · · · · · · · · · · · · ·			Elevation	n <u>526.0</u>						
3 West Dike - South	n End				Elevation	<u>n 526.0</u>	· .					
4 West Dike - North	n_End	•			Elevatio	n 526.0						
	TEST RESULTS											
TEST NO.	1	2	3	<u>    4                                </u>								
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		$= -\frac{2}{2\pi} \frac{2}{2} $	2					
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		Cara						
MATERIAL DESCRIPTION	*	*	*	*		CALE						
						10537	·					
REMARKS: * TAN CLAYEY SANI	)				<u> </u>		د بر میں من اور					
COPIES 2 - Fansteel Metals 1 - File												
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				and the second	1							

108 PEAK BLVD.

PHONE 918/682-7853

MUSKOGEE, OKLAHOMA 74401

2635 E. 361h ST. NORTH PHONE / 918/428-1986 TULSA, OKLAHOMA 74010

Solis & Concrete Testing - Concrete Coring - Foundation Investigation Drilling

REPORT OF FIELD DENSITY TESTS												
DATE RECEI	DATE RECEIVED 10-30-78 AUTHORIZED BY LABORATORY NO. 107828											
REPORT TO: Fansteel Metals, Inc.												
PROJECT: Waste Disposal Pond												
CONTRACTO	CONTRACTOR Berry Equipment Company											
SOURCE:	OURCE Job Site											
PROCTOR SPECIFICATIONS: ASTM D-698 TESTS BY: Collins												
28												
TEST NO.												
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	•	<u>.</u>		Elevation 526.0						
	<u></u>				,							
<u></u>		TI	EST RES	SULTS								
TEST NO.		5	6	7	8							
WET DENSI	TY IN LBS./CU. FT.	. 118.7	118.6	119.6	119.0							
DRY DENSIT	TY IN LBS./CU. FT.	107.8	107.4	108.8	107.9							
IN-PLACE M	OISTURE CONTENT %	10,1	10.5	9,9	10.3							
ОРТІМИМ М		9.8	9.8	9,8	9.8	$= \frac{1}{2} \sum_{i=1}^{n} \frac{2ig_{ij}^{2}}{2}$						
IN LBS./CU.	RY DENSITY FT.	110,8	110.8	110,8	110.8							
PERCENT O	F MAXIMUM DRY DENSITY	97.3	96.9	98.2	97.4	Marca Nag						
MATERIAL	DESCRIPTION	*	*	*	¥							
REMARKS	REMARKS: * TAN CLAVEY SAND											
COPIES:	tai claigi sanz											
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108 PEAK BLVD. PHONE 918/682-7853 MUSKOGEE, OKLAHOMA 74401 2635 E. 361h ST. NORTH PHONE / 918/428-1986 TULSA, OKLAHOMA 74010

LAB. NO. 107828

Soils & Concrete Testing - Concrete Coring - Foundation Investigation Drilling

## MOISTURE - DENSITY CURVE

DATE: 10-30-78

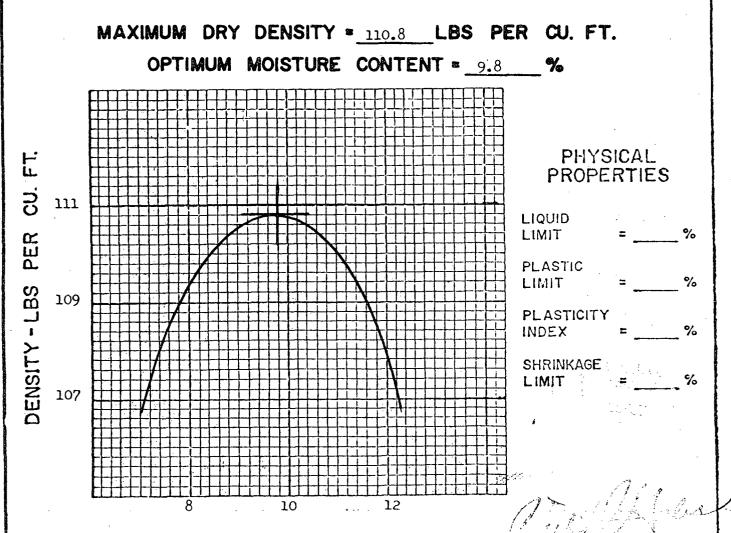
CLIENT: Fansteel Metals, Inc.

- **PROJECT:** Waste Disposal Pond
- MATERIAL: Tan Clayey Sand

MATERIAL SOURCE: Job Site

METHOD OF TEST: ASTM D-698

## TEST RESULTS



MOISTURE - PERCENT OF DRY WEIGHT

# MUSKOGEE TESTIN<del>G L</del>ABORATORY, INC.

108 PEAK BLVD.

PHONE 918/682-7853

MUSKOGEE, OKLAHOMA 74401

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

Solis & 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.											
1											
2	North Dike - Wes					Elevation 528.0 Elevation 528.0					
3		West Dike - North End Elevation 528.0									
4	West Dike - Sout					Elevation 528.0					
				<u> </u>							
,											
				·····							
<u></u>											
		Τŧ	EST RES	ULTS							
TEST NO.		1	2	3	4						
WET DENSI	TY IN LBS /CU. FT	119.3	119.2	118.9	117.3						
DRY DENSI	TY IN LBS./CU. FT.	108.3	107.3	107.7	106.3						
IN-PLACE M	CISTURE CONTENT %	10.2	11.1	10.4	10.4	- 707 N.S. 910-					
ОРТІМИМ М		9.8	9.8	9.8	9.8						
MAXIMUM D IN LBS./CU.	RY DENSITY FT.	110.8	110.8	110.8	110.8						
PERCENT O	F MAXIMUM DRY DENSITY	97.7	96.8	97.2	95.9	CALES					
MATERIAL	DESCRIPTION	*	*	*	*	I Thear Mail					
REMARKS: * TAN CLAYEY SAND ALL TESTS MEET SPECIFICATIONS.											
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	2 - Fansteel Metals,	Inc.									
	1 - File										
Calthalis											

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

	REPO	ORT OF		DENSITY	TESTS						
DATE RECEI	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 S	PECIFICATIONS ASTM	D-698			TESTS BY:	Collin	<u>s</u>	<u> </u>			
				•			· ·				
			<u> </u>			,					
TEST NO.		DESC	RIPTION	N OF LC	CATION	15					
5	South Dike, West	End				Elevati	on 528.0				
6	South Dike, East	End				Elevati	on 528.0				
7	East Dike, South End Elevation 528.0										
	East Dike, North	End	· •				on 528.0				
	······································										
		······································			· · · · ·			<u></u>			
		TE	ST RES	ULTS							
TEST NO.		5	6	7	8						
WET DENSI	TY IN LBS./CU. FT.	124.1	124.3	117.6	118.8						
DRY DENSI	TY IN LBS./CU. FT.	109.7	109.6	106.7	107.3						
IN-PLACE M	CISTURE CONTENT %	13.2	13.5	10.2	10.8		MARKER ST				
		11.0	11.0	9.8	9.8	THE REAL					
MAXIMUM D	RY DENSITY FT.	115.2	115.2	110,8	110.8	NSI	CARLO				
PERCENT O	F MAXIMUM DRY DENSITY	95.2	95.1	96.3	96.8	S SA	GALES				
MATERIAL	DESCRIPTION	*	+ .	* *	* *	11-3-4	10537				
REMARKS * ORANGE CLAYEY SAND * * TAN CLAYEY SAND ALL TESTS WEET SPECIFICATIONS											
	A second state of the seco										
	2 - Fansteel Metals,	Inc									
1 - File											

### 208 EASTSIDE BLVD. PHONE 918-682-7853 MUSKOGEE, OKLAHOMA 74401 Soils & Concrete Testing - Concrete Coring - Foundation Investigation Drilling

MUSKOGEE TESTING LABORATORY, INC.

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

## MUSKOGEE TESTING LABORATORY, INC. 208 EASTSIDE BLVD PHONE 918-682-7853

MUSKOGEE, OKLAHOMA 74401 Soils & Concrete Testing - Concrete Coring - Foundation Investigation Drilling

> 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

## MUSKOGEE TESTING LABORATORY, INC. 208 EASTSIDE BLVD. PHONE 918-682-7853 MUSKOGEE, OKLAHOMA 74401 Solls & 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

## MUSKOGEE TESTING LABORATORY, INC. 208 EASTSIDE BLVD. PHONE 918-682-7853 MUSKOGEE: OKLAHOMA 74401 Soils & Concrete Testing - Concrete Coring - Foundation Investigation Drilling

Sours & Concrete resting - Concrete Coring - Poundation investigation Draining

### 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

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

Soils & Concrete Testing - Concrete Coring - Foundation Investigation Drilling

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.

110

Dallas Collins

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

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

Solls & Concrete Testing - Concrete Coring - Foundation Investigation Drilling

ang ng sang ng sang ng sang dan sang	REP	ORT OF	FIELD	DENSIT	Y TEST	5	· · ·	un an			
DATE RECEIVED 12-27-78 AUTHORIZED BY: LABORATORY NO 127807											
REPORT TO: Fansteel Metals, Inc.											
PROJECT: Waste Disposal Pond											
CONTRACTO	OR: Berry Equip	ment Com	pany								
SOURCE:	Job Site		·		•						
PROCTOR S	PECIFICATIONS: ASTM	D-698			TESTS BY	Collins					
307 TEST NO.		DESC	RIPTIO	N OF LO	OCATIO	NS		مى يەرىپىلىرىكى تەرىپىلىرىكى تەرىپىلىرىكى تەرىپىلىرىكى تەرىپىلىرىكى تەرىپىلىرىكى تەرىپىلىرىكى تەرىپىلىرىكى تەر تەرىپىلىرىكى تەرىپىلىرىكى تەرىپىلىرىكى تەرىپىلىرىكى تەرىپىلىرىكى تەرىپىلىرىكى تەرىپىلىرىكى تەرىپىلىرىكى تەرىپىلى			
<u> </u>	West Dike South End Elevation 531.0										
2	West Dike North Er	<u>nd</u>				Elevatio	n 531.0				
	South Dike West Er	nd				Elevatio	n 531.0	· .			
4	South Dike East Er	<u>1d</u>	•			Elevatio	on 531.0				
				······				199 199 199			
<u></u>		[ ]	EST RES		r		المربية المربية المربية المربية المربية مربية المربية ال	T			
TEST NO.		1	2	3	4 ·		Caper				
WET DENSI	TY IN LBS /CU. FT.	114.6	114.5	114.9	117.5		CALL				
DRY DENSI	TY IN LBS./CU. FT.	107.1	106.7	106.3	107.9		16307				
	OISTURE CONTENT %	7.0	7.4	8.1	8.9						
OPTIMUM M	OISTURE %	9.8	9.8	9.8	9.8			Constant And Constant			
IN LBS./CU.		110.8	110.8	110.8	110.8			Į			
PERCENT O	F MAXIMUM DRY DENSITY	96.7	96.3	95.9	97.4	+	tine Marine Marine Arrighted and				
	DESCRIPTION	+	<b></b> *	*	*	l	*****	L			
REMARKS	* TAN CLAYEY SAND	TESI	's meet s	PECIFICA	rions.		-	and and an an an and an an and an an and an			
	- Fansteel Metals - File				(	Carl	<u>A</u>	1. a.			

108 PEAK BLVD PHONE 918/682-7853 MUSKOGEE, OKLAHOMA 74401 Solls & Concrete Testing - Concrete Coring - Founde

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

													1.		

	REPO	ORT OF	FIELD	DENSIT	Y 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											
	7										
TEST NO.											
_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 Er	nd	•			Elevation	n 531.0				
				•							
		Т	EST RES	SULTS							
TEST NO.		5	6	7	8						
WET DENSI	TY IN LBS./CU. FT.	115.5	115.8	117.5	114.8		C.A.				
DRY DENSI	TY IN LBS./CU. FT.	106-4	107.3	108-5	106.6						
IN-PLACE M	CISTURE CONTENT %	8.6	8.0	8.3	7.7		<u>ann</u> 103	12 11			
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	TESI	S MEET S	PECIFICAT	TIONS.	<del></del>	111	and a second			
COPIES:						1 Actor	101	A 1			

2 - Fansteel Metals, Inc. 1 - File

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

Soils & Concrete Testing - Concrete Coring - Foundation Investigation Drilling

FANSTEEL METALS, INC.

### FILTER DRAIN

AASSHTO - T - 27

SIEVE SIZE	PER CENT PASSING	REQUIRED
3/4	100	100
No. $l_{+}$	3.0	5% or less