



Reservoir 1 *North Tank*

Water District

Report of Findings

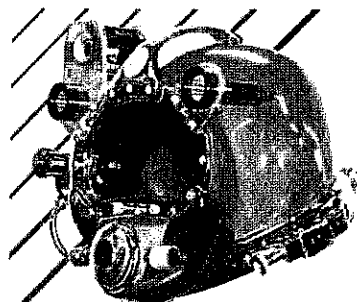
From the

Diving Operations

Conducted on

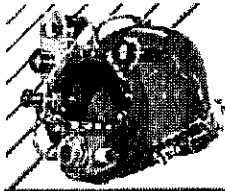
November 6, 2015

By



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TECHNOLOGY
DIVING SERVICES**

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TECHNOLOGY
S E R V I C E S

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Underwater Inspection of Reservoir 1

November 6, 2015

Following is the report of findings during the underwater work conducted on your storage tank.

It will focus on issues of concern or areas that need attention. In order to see a complete and detailed inspection, please view each video.

Color images of all plumbing fixtures, components and areas of concern were taken via underwater digital camera. The images should give you a clear view of the conditions described. The video may give you another view and a clearer understanding of any area that you may wish to look at more closely.

METHODOLOGY:

Disinfection of All Equipment With 200ppm+ Chlorine Solution Immediately Prior to Entering System: This process prevents contamination of the water supply. All LVT equipment was properly disinfected prior to entering the potable water system.

Full-Time Voice Communication between surface and Diver: The system allowed for constant communication between the diver, and all surface personnel. In addition, customers were able to communicate with the diver at any time. For purposes of a more efficient inspection, cleaning, and repair program, that enabled the diver to immediately discuss any observations he made inside the storage tank.

Full-Time Live High Resolution Color Video: Allowed for constant viewing of the diver's work and observations. This also enabled the district personnel to view what the diver in the storage tank was witnessing.

Reservoir 1

TERMINOLOGY:

When describing the features or areas of interest inside the storage tank, an image number is placed next to the description that corresponds with the inspection findings. The diagram is shown in a view looking from the top down. The entry hatch is referred to as the 12:00 o'clock position.

Following the diagram are pictures of the pertinent areas of the storage tank and the locations where the pictures were taken. Each picture is described and numbered.

The standards used to evaluate the condition of the storage tank include: Standard Method of Evaluating Degree of Rusting on Painted Steel Surfaces – SSPC-Vis 2-82 & ASTM D 610-85
NACE Standard RP0196-96 & RP0388-2001 or Condition of Concrete In-service – ACI 201.1R-92.

Reservoir 1

OVERVIEW OF STORAGE TANK INSPECTED:

Customer Name:	Water District	Tank Name:	Reservoir 1
Manager:		Construction:	OG Concrete
Job Number:	WA2044015R1T4	Capacity (gal.):	150,000
Date of Inspection:	November 6, 2015	Diameter or L x W:	25'
Report Writer:	Colton Leatherwood	Height:	40'
Diver:	David Aufai	Floor Square FT:	490.9
Tender:	Alec Althuisius	Date Built:	1975

N/A –not applicable **Excellent** (Ex.) –like new condition, no repairs needed. **Good** – Cosmetic only problems, repairs if wanted. **Fair**-Minor problems, repairs needed, not immediate. **Poor** –Major problems, structural or like, immediate repairs needed.

original cost: \$120,000

est. replacement cost - \$300,000

1. Rust Grades

Grades	% of Surface Rusted	Description
10	0% - 0.01%	No rusting or less than 0.01% of surface rusted
9	0.01% - 0.03%	Minute rusting, less than 0.03% of surface rusted
8	0.03% - 0.1%	Few isolated rust spots, less than 0.1% of surface rusted
7	0.1% - 0.3%	Less than 0.3% of surface rusted
6	0.3% - 1%	Extensive rust spots, but less than 1% of surface rusted
5	1% - 3%	Rusting to the extent of 3% of surface rusted
4	3% - 10%	Rusting to the extent of 10% of surface rusted
3	10% - 16%	Approximately one sixth of the surface rusted (16%)
2	16% - 33%	Approximately one third of the surface rusted (33%)
1	33% - 50%	Approximately one half of the surface rusted (50%)
0	50% - 100%	Approximately 100% of the surface rusted

2. Concrete Deformities

Unable to Evaluate	Good Condition	Cracks	Blistering	Chalking	De-Lamination	Pitting	Popouts	Scaling	Spalling	Warping
UE	GC	CK	BL	CH	DL	PT	PO	SC	SP	WA

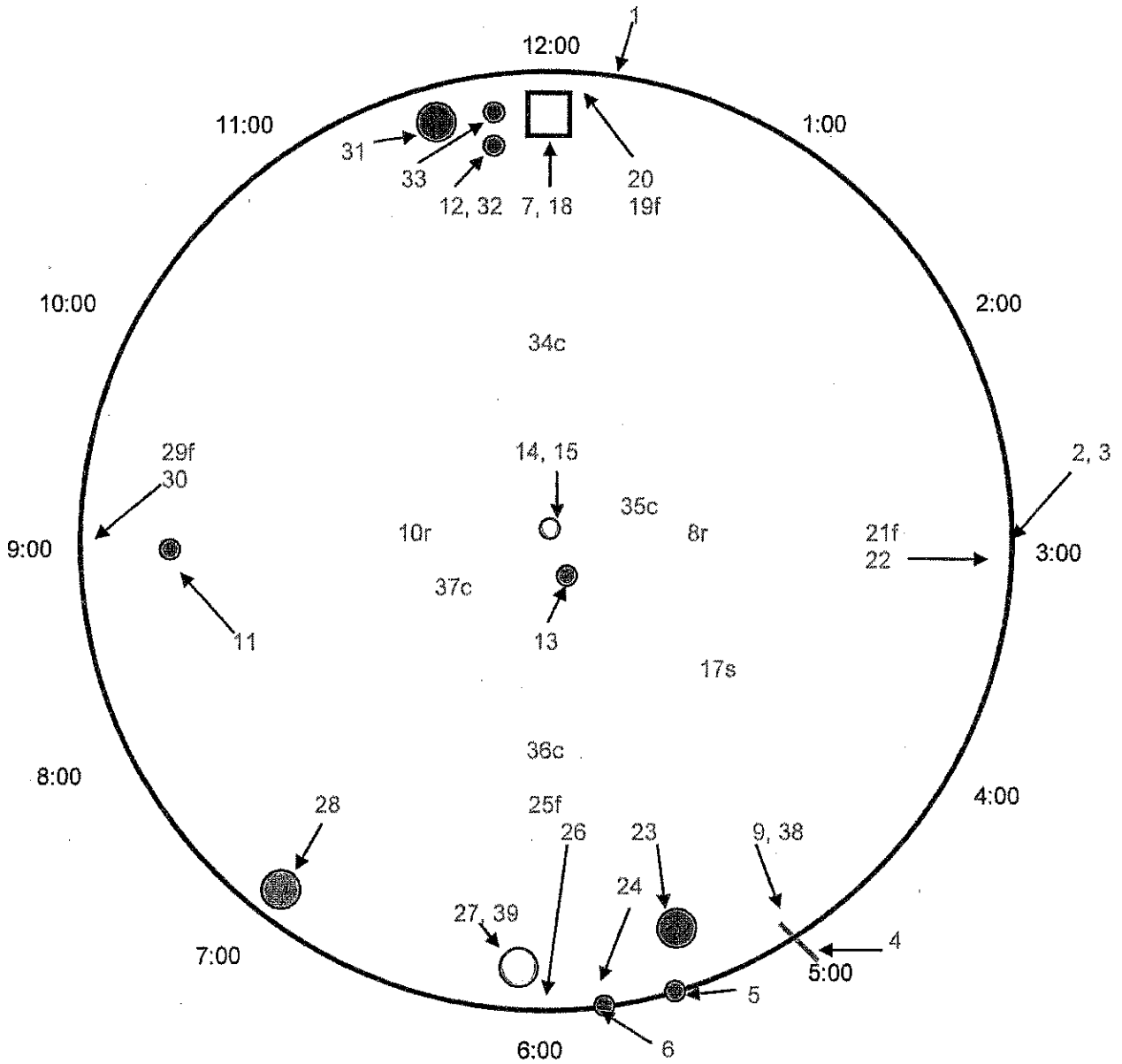
Reservoir 1

RECOMMENDATIONS:

Recommendation	Estimated Time - Hrs.
Repair and/or install fine mesh screens on exterior vents to limit the risk of bugs and other matter from entering the storage tank.	1.0
Install weather stripping on entry hatch to limit the risk of bugs and other matter from entering the storage tank.	1.0
Install new entry hatch lid.	Please contact our sales office for an estimate.
Perform a regular cleaning, inspection and repair cycle every 2-3 years in order to ensure superior water quality and proper maintenance of coating condition and appurtenances is performed.	Please contact our sales office for an estimate.

Reservoir 1

Tank Diagram



Drawing Not To Scale

	Entry Hatch		Overflow		Drain/Scour
	Inlet		Capped Off Penetration		Telemetry
	Outlet		Liquid Level Indicator		Air Vent

Reservoir 1

Image #1

Exterior Ladder 12:05

Condition:
Rust Grade 8.

Description:
Exterior Ladder
appeared to be in good
condition with a minor
amount of corrosion.

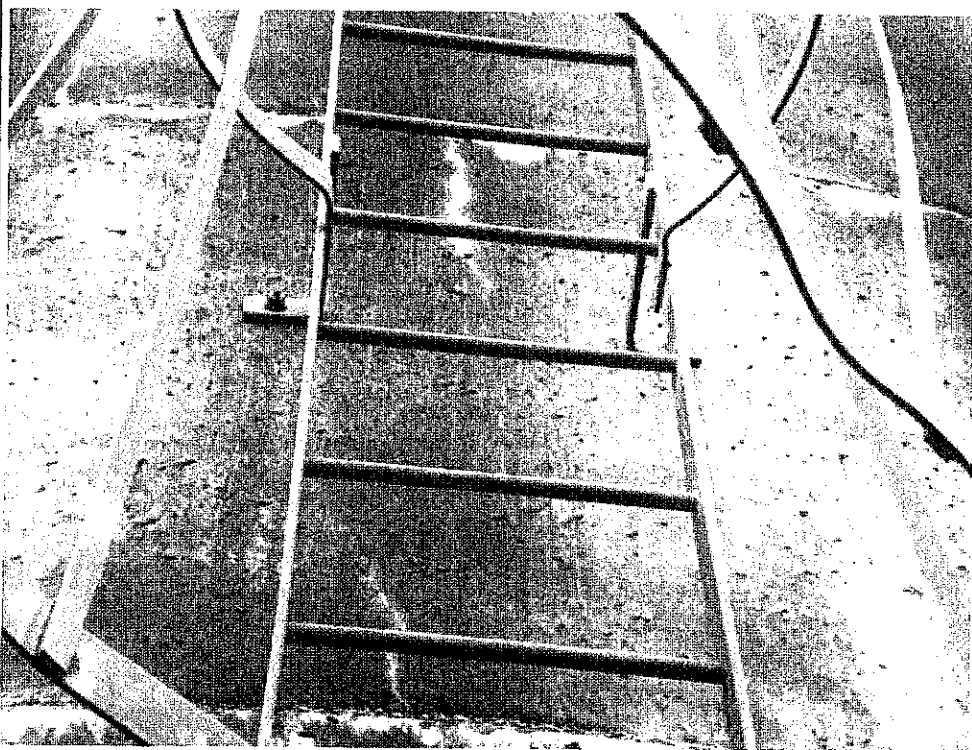


Image #2

*Exterior Earthen Base
3:00*

Description:
Exterior Earthen Base
appeared to be in good
condition with no
problems.



Reservoir 1

Image #3

Exterior Wall 3:00

Condition:
Concrete Deform³ CK

Description:
Exterior Wall
appeared to be in fair
condition with a
moderate amount of
cracking.

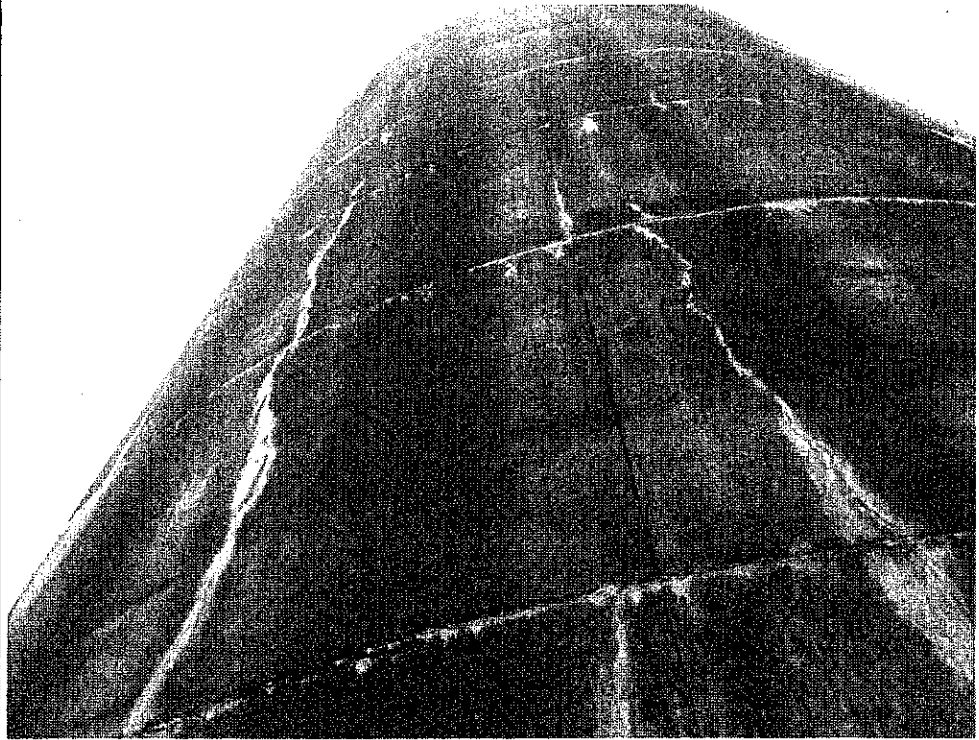


Image #4

*Liquid Level Indicator
Reader Board 5:00*

Condition:
Rust Grade¹ 4

Description:
Liquid Level Indicator
Reader Board appeared
to be in fair condition
with a moderate
amount of corrosion
and a heavy amount of
rot.



Reservoir 1

Image #5

Telemetry 5:30

Condition:
Rust Grade¹ 9.

Description:
1 1/2" Telemetry
appeared to be in good
condition with a minor
amount of corrosion.

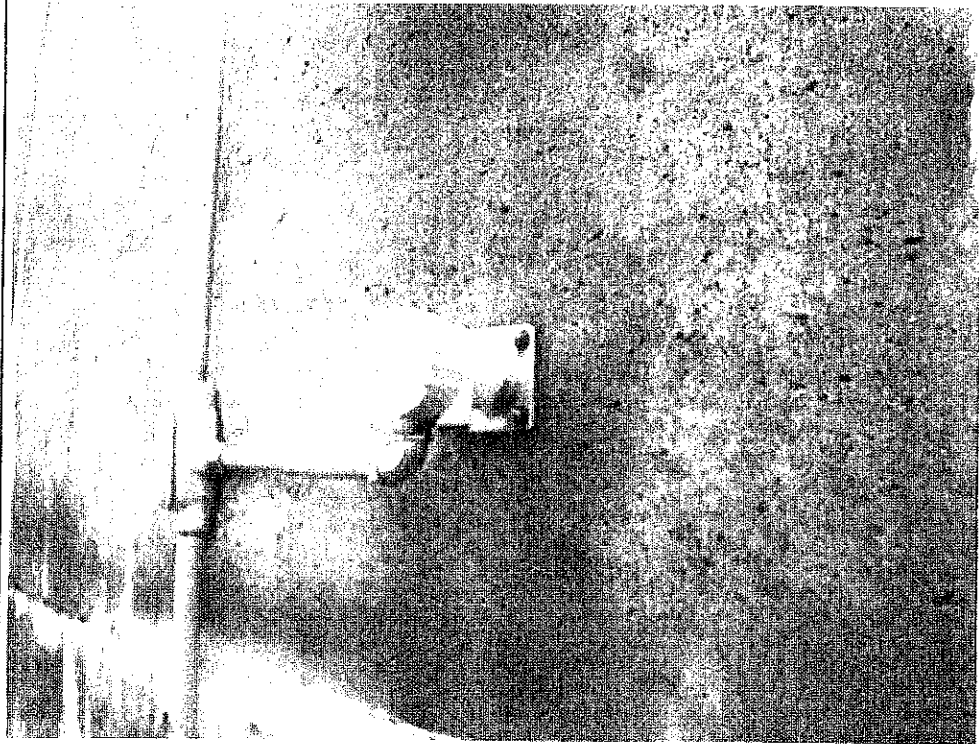


Image #6

Capped Off Penetration
5:45

Condition:
Rust Grade¹ 7.

Description:
3" Capped Off
Penetration appeared to
be in fair condition
with a minor amount of
corrosion.



Reservoir 1

Image #7

Entry Hatch 12:00

Condition:
Rust Grade¹ 6.

Description:
24"x48" Entry Hatch appeared to be in fair condition with a moderate amount of corrosion.

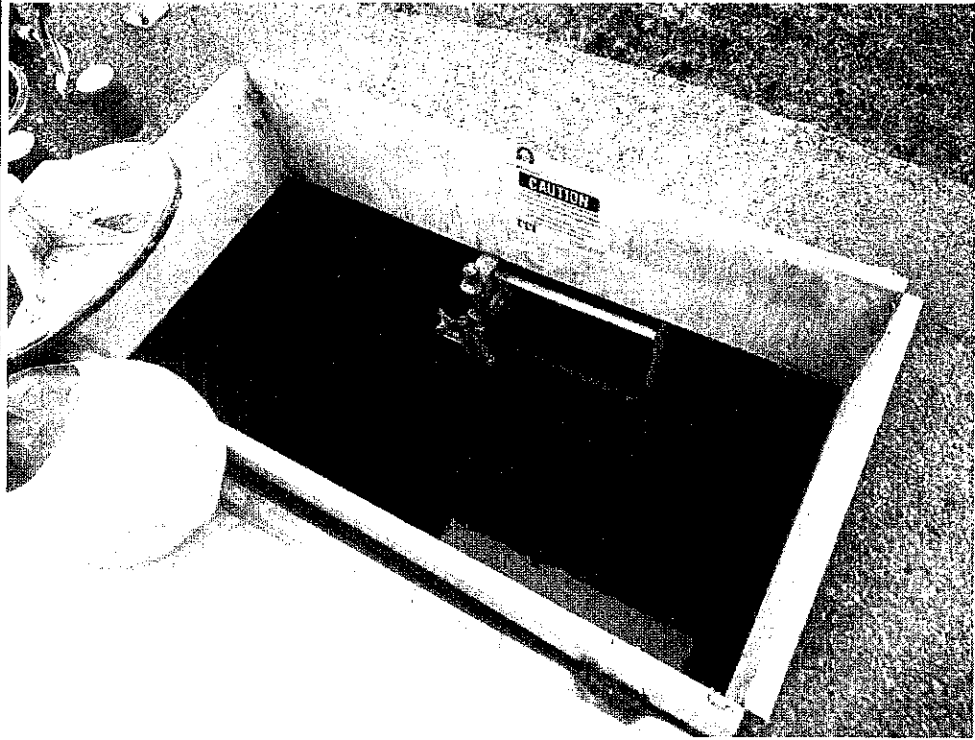


Image #8

Roof 3:00

Condition:
Concrete Deform³ GC.

Description:
Roof appeared to be in good condition with no concrete problems.



Reservoir 1

Image #9

*Liquid Level Indicator
Penetration 5:00*

Condition:
Rust Grade¹ 2.

Description:
1 1/2" Liquid Level
Indicator Penetration
appeared to be in fair
condition with a
moderate amount of
corrosion.

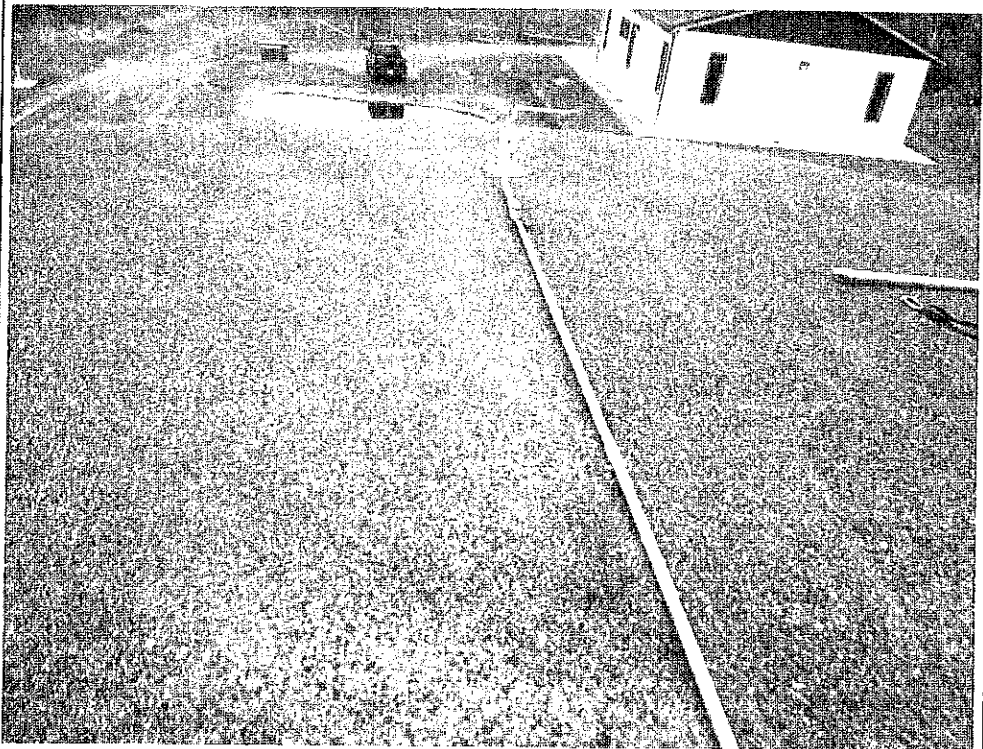


Image #10

Roof 9:00

Condition:
Concrete Deform³ GC.

Description:
Roof appeared to be in
good condition with no
concrete problems.



Reservoir 1

Image #11

Telemetry Penetration
9:00

Condition:
Rust Grade¹ 9.

Description:
1" Telemetry
Penetration appeared to
be in good condition
with a minor amount of
corrosion.

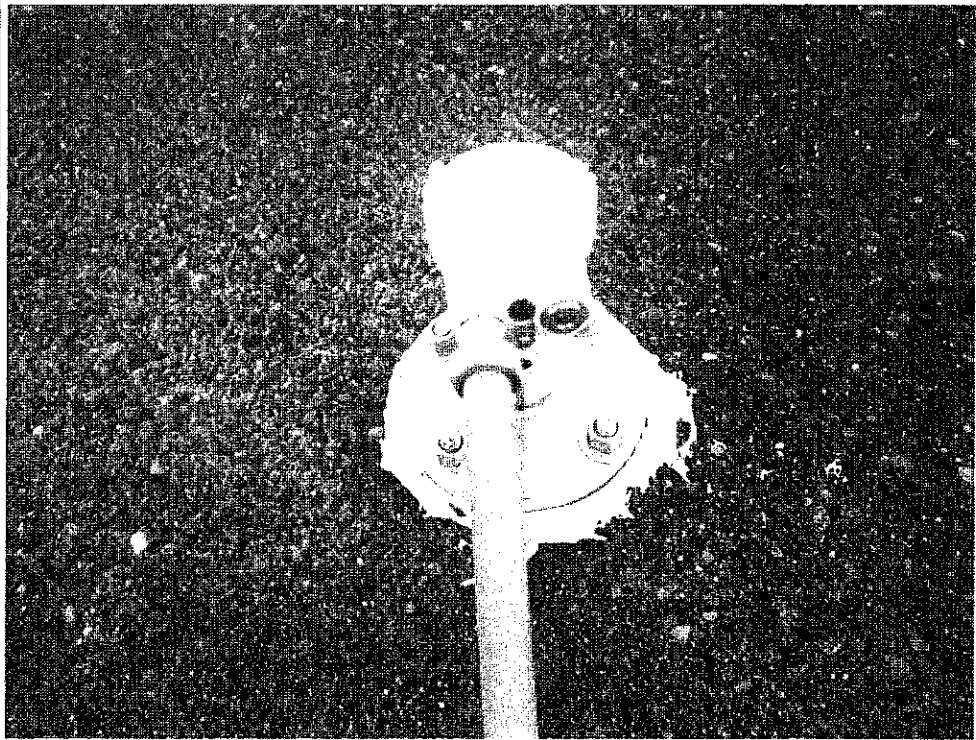


Image #12

Telemetry Penetrations
11:55

Condition:
Rust Grade¹ 1.

Description:
2" Telemetry
Penetrations appeared
to be in fair condition
with a moderate
amount of corrosion.



Reservoir 1

Image #13

*Capped Off Penetration
Center*

Condition:
Rust Grade¹ 2.

Description:
2" Capped Off
Penetration appeared to
be in fair condition
with a moderate
amount of corrosion.

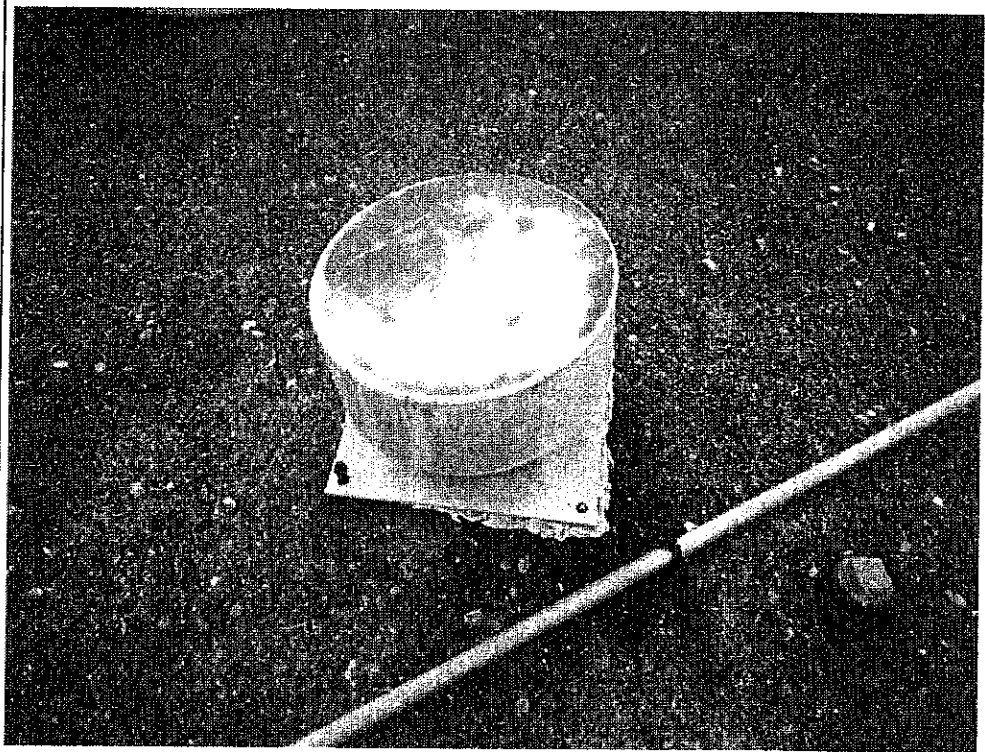


Image #14

Vent Center

Condition:
Rust Grade¹ 3.

Description:
8" Vent appeared to be
in good condition with
a minor amount of
corrosion.



Reservoir 1

Image #15

Vent Screen Center

Condition:
Rust Grade¹ 8.

Description:
Medium Mesh Vent
Screen appeared to be
in good condition with
a minor amount of
corrosion.

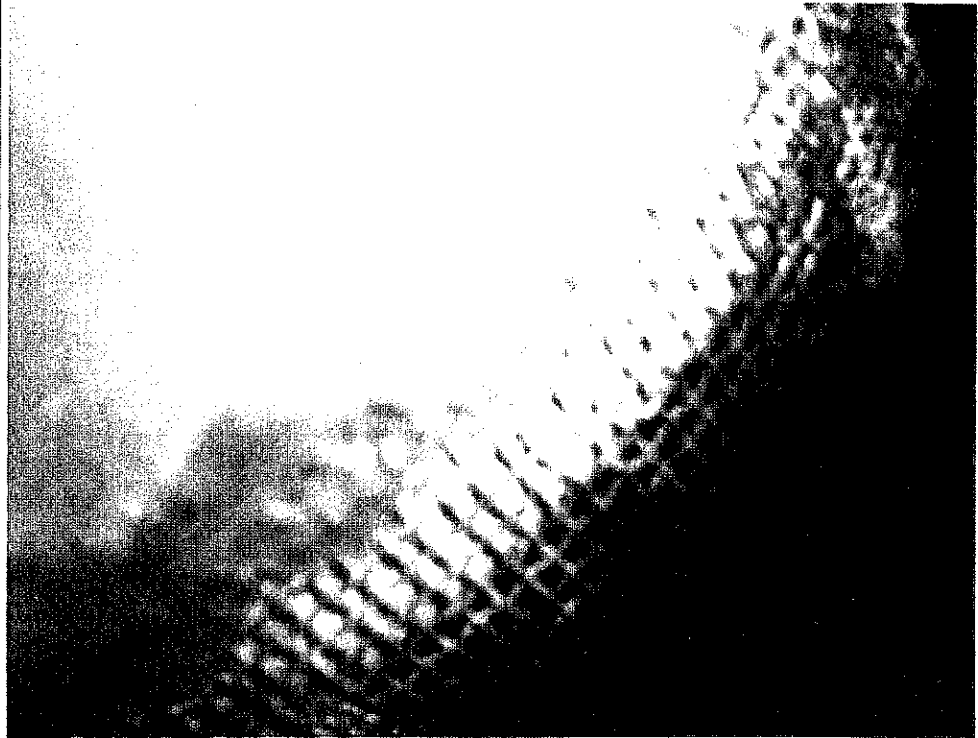
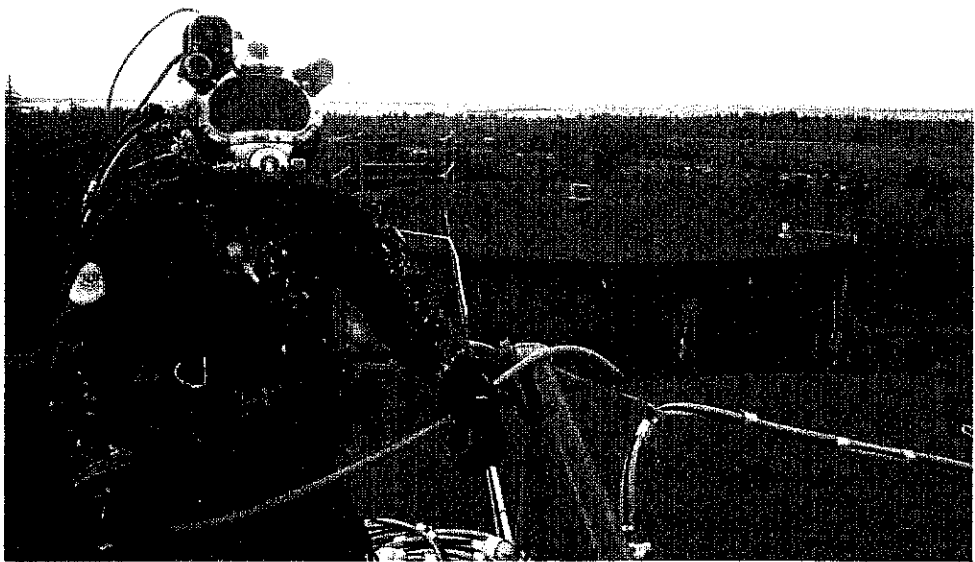


Image #16

Diver



Reservoir 1

Image #17

Sediment

Description:
3/4" of sediment was
removed from
reservoir floor.

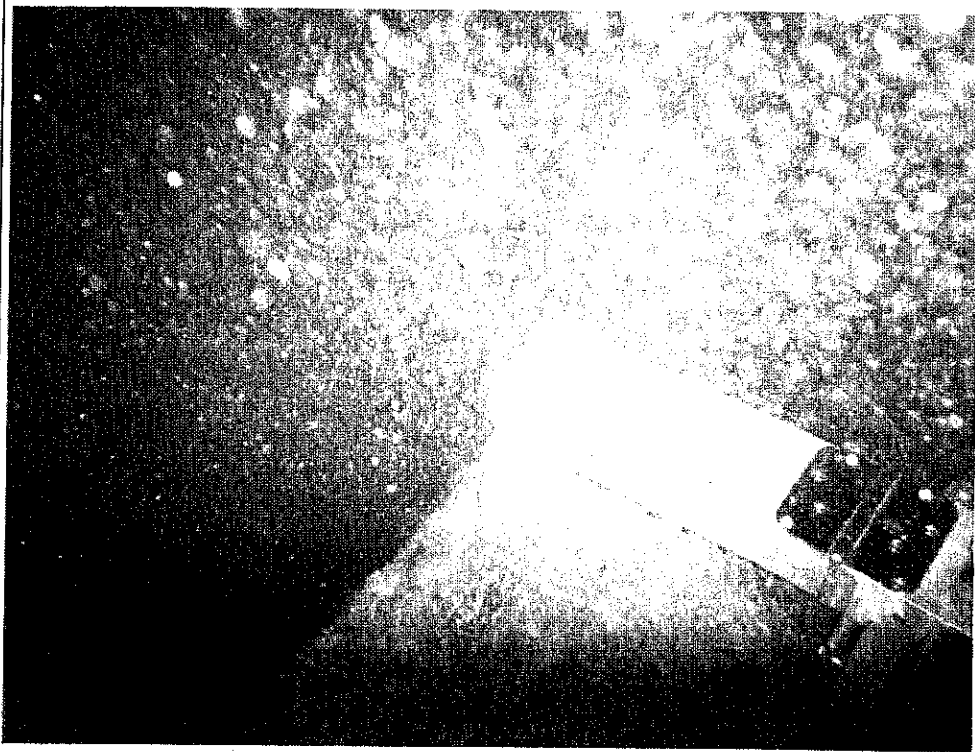
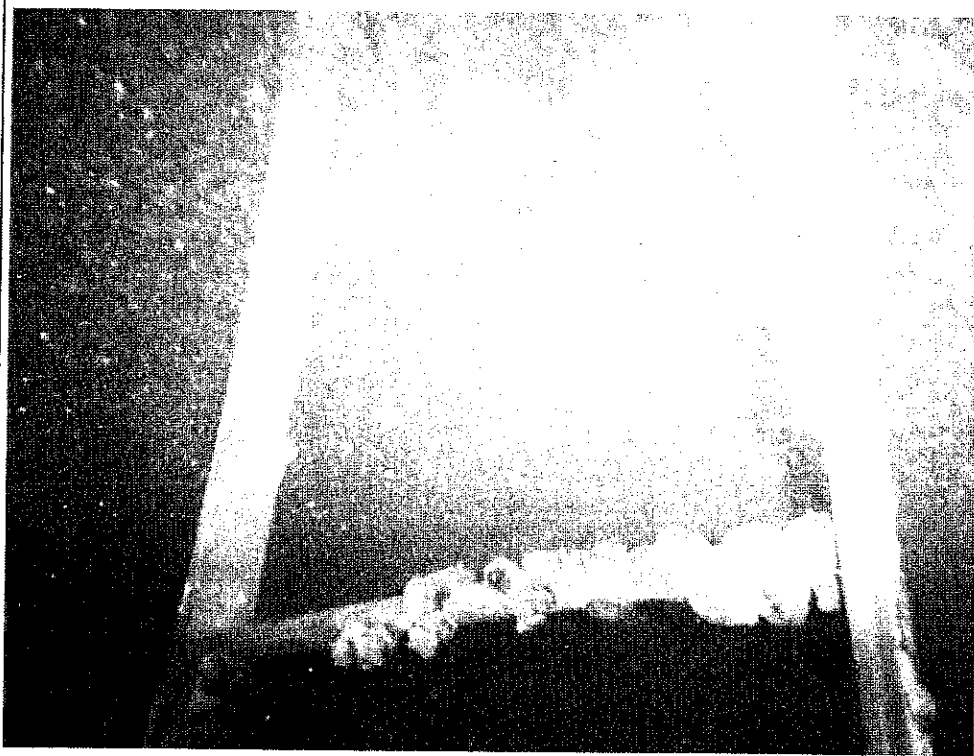


Image #18

Interior Ladder 12:00

Condition:
Rust Grade 1.

Description:
Interior Ladder
appeared to be in fair
condition with a heavy
amount of corrosion.



Reservoir 1

Image #19

Floor 12:00

Condition:
Concrete Deform³ GC

Description:

Floor appeared to be in good condition with no concrete problems.

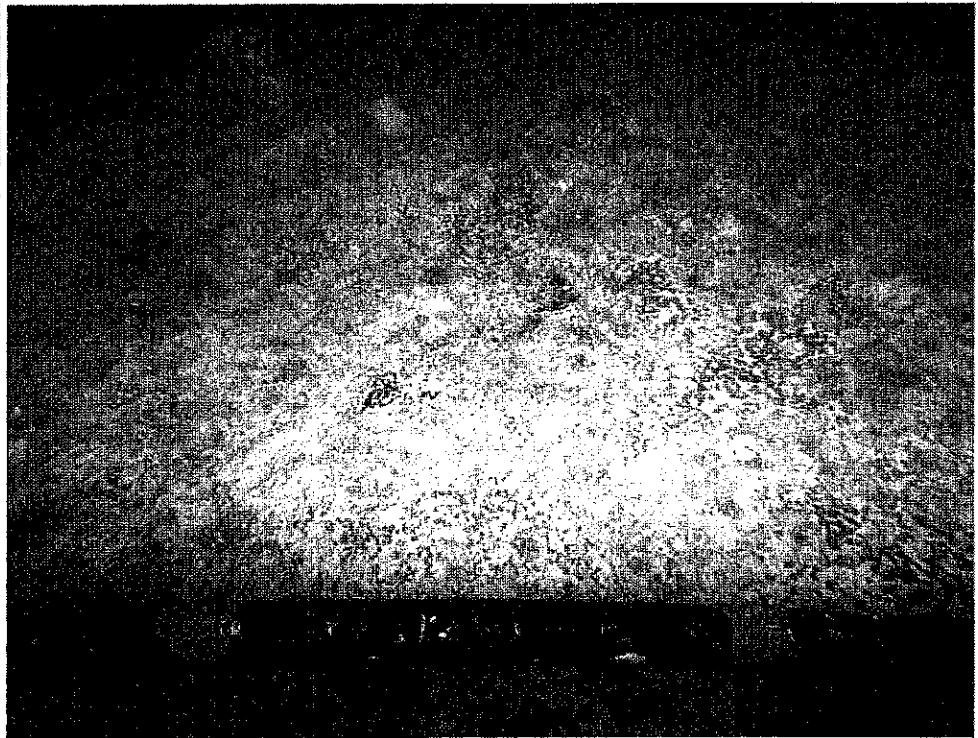


Image #20

Wall 12:00

Condition:
Concrete Deform³ PO

Description:

Wall appeared to be in good condition with a minor amount of popouts.



Reservoir 1

Image #21

Floor 3:00

Condition:
Concrete Deform³ GC.

Description:
Floor appeared to be
in good condition with
no concrete problems.

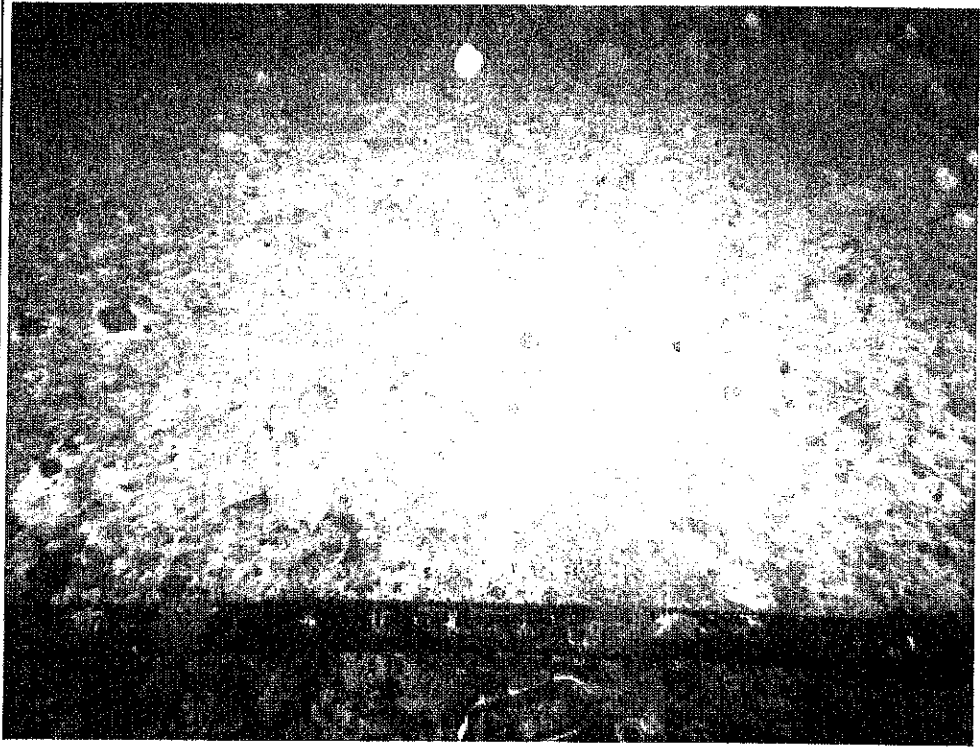
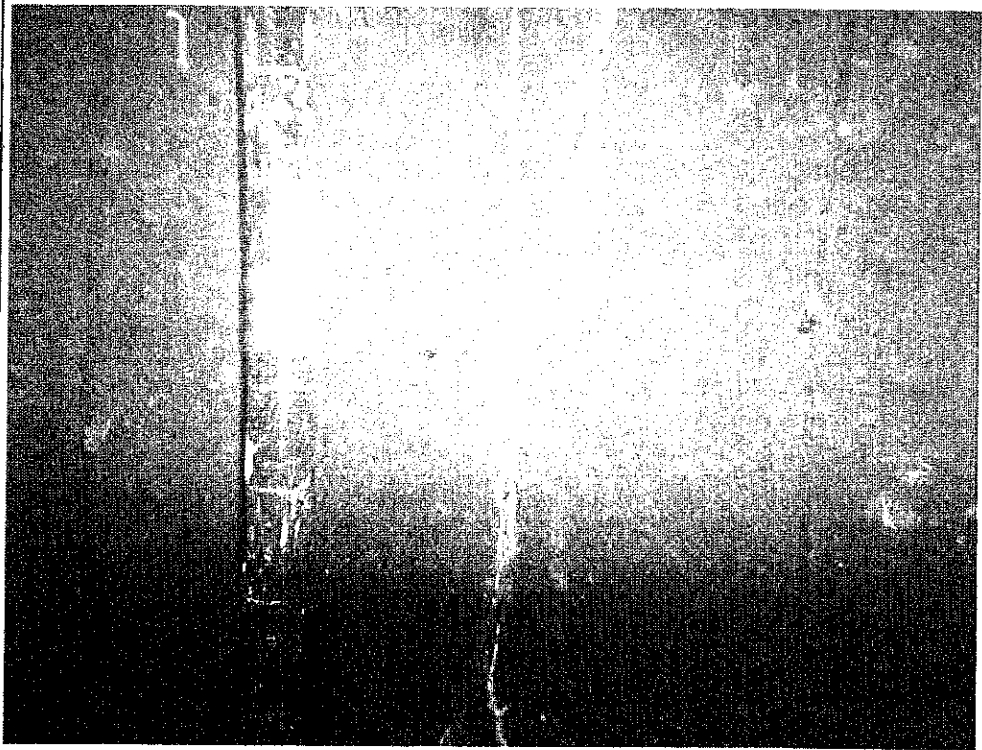


Image #22

Wall 3:00

Condition:
Concrete Deform³ CK,
PO.

Description:
Wall appeared to be in
good condition with a
minor amount of
cracking and popouts.



Reservoir 1

Image #23

Drain 5:30

Condition:
Rust Grade¹ 1.

Description:
8" Drain appeared to
be in fair condition
with a heavy amount of
corrosion.

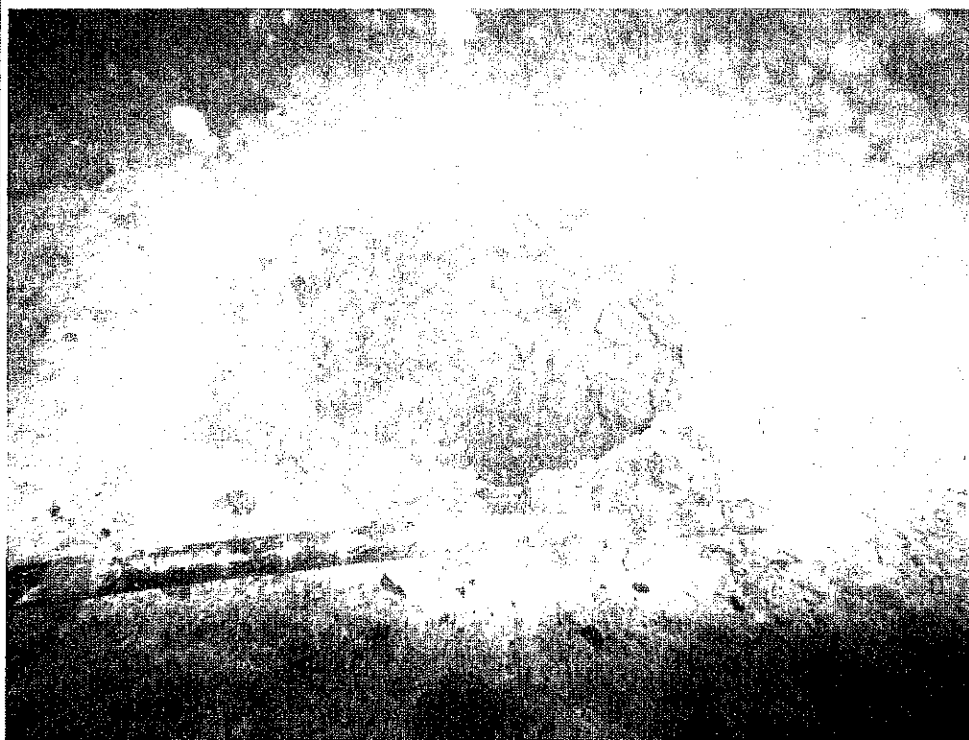
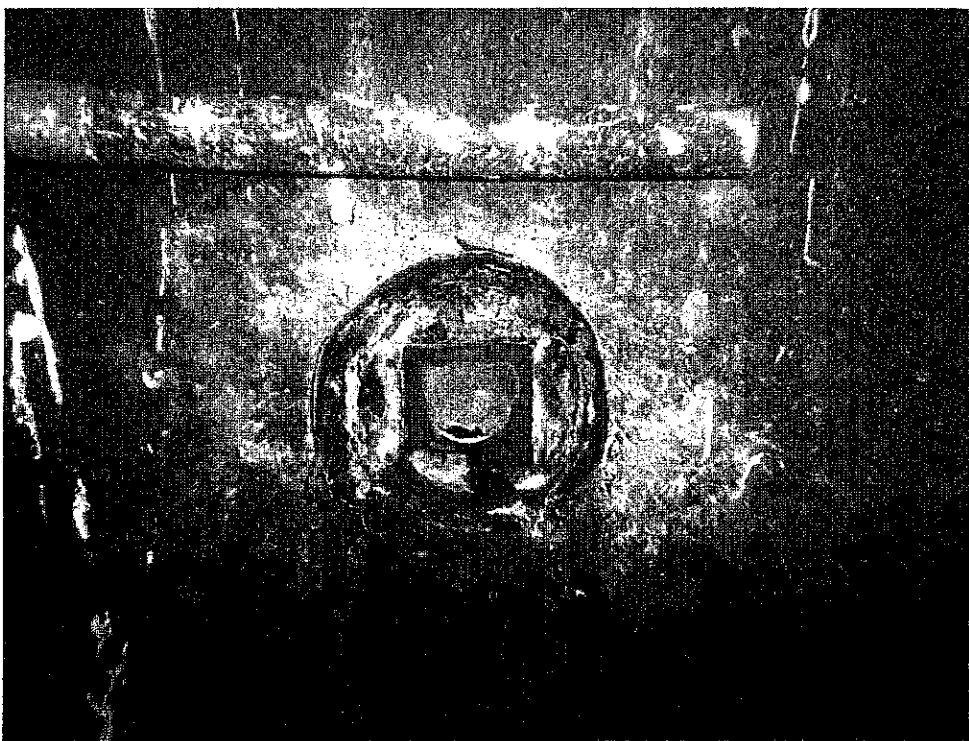


Image #24

Capped Off Penetration
5:45

Condition:
Rust Grade¹ 1.

Description:
3" Capped Off
Penetration appeared to
be in poor condition
with a heavy amount of
corrosion.



Reservoir 1

Image #25

Floor 6:00

Condition:
Concrete Deform³ GC.

Description:
Floor appeared to be
in good condition with
no concrete problems.

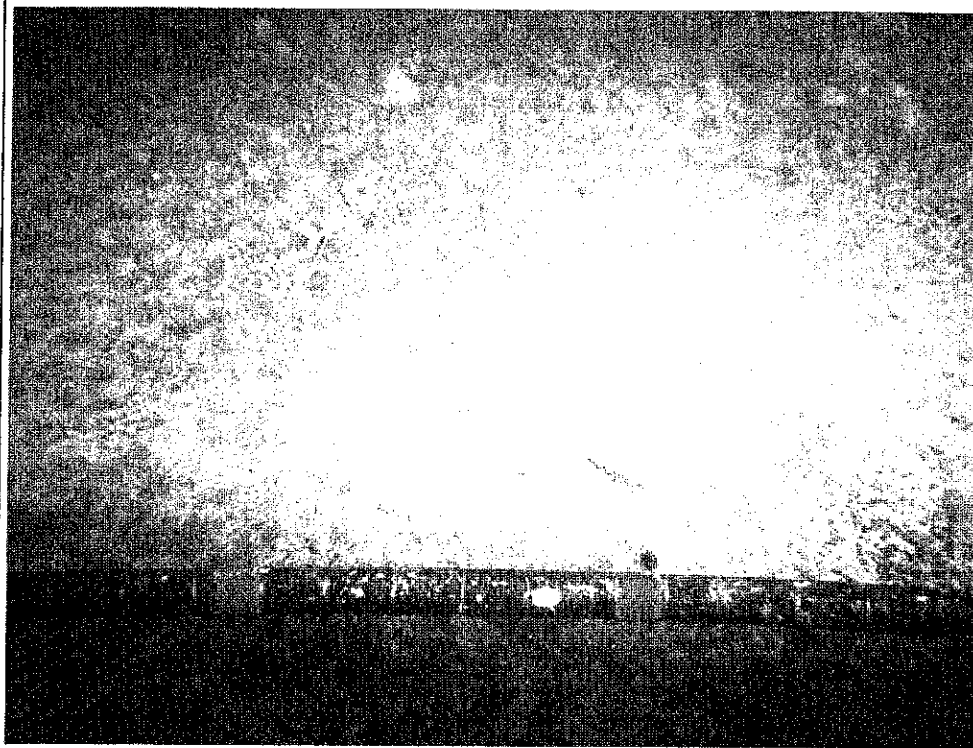
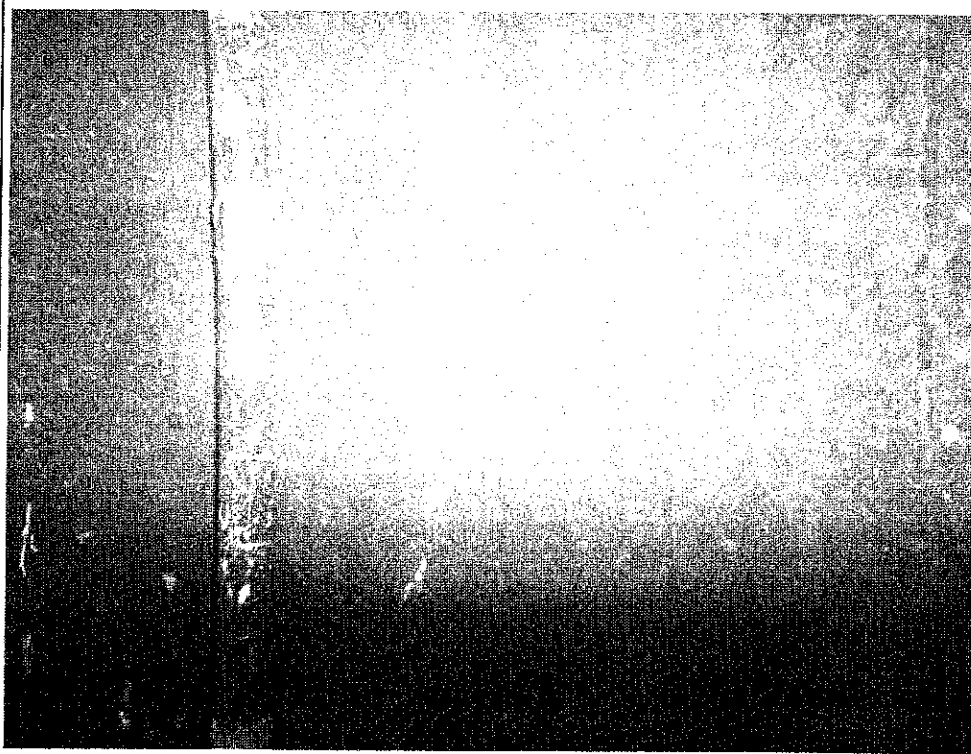


Image #26

Wall 6:00

Condition:
Concrete Deform³ CK,
PO.

Description:
Wall appeared to be in
good condition with a
minor amount of
cracking and popouts.



Reservoir 1

Image #27

Overflow 6:00

Condition:
Rust Grade¹ 0.

Description:
8" Overflow appeared to be in poor condition with a heavy amount of corrosion.

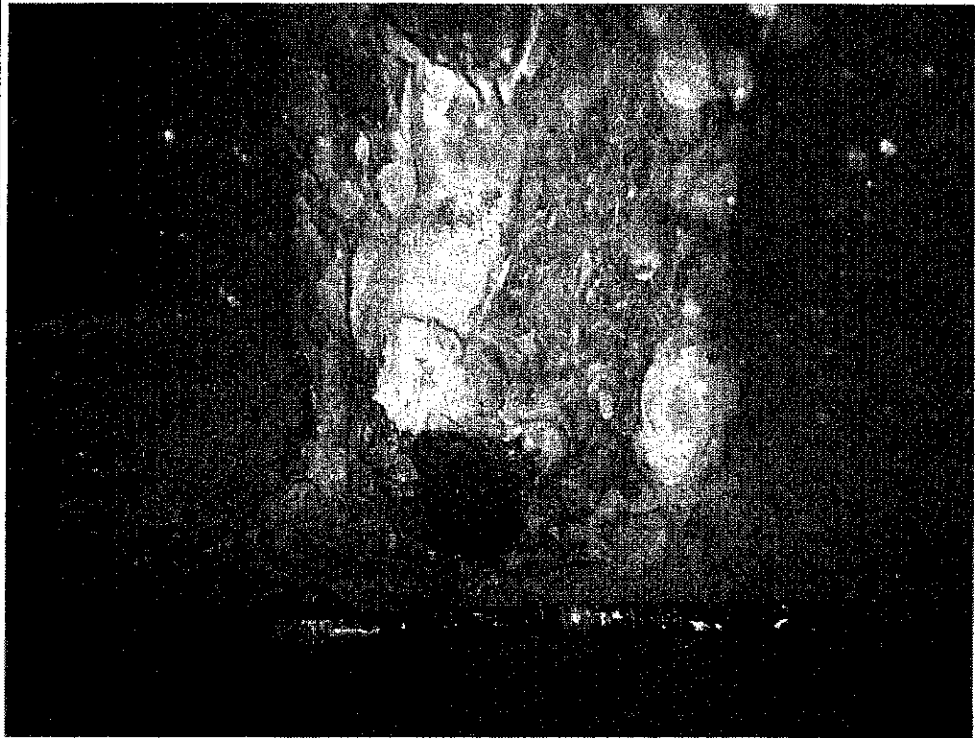


Image #28

Inlet 7:00

Condition:
Rust Grade¹ 1.

Description:
8" Inlet appeared to be in fair condition with a heavy amount of corrosion.



Reservoir 1

Image #29

Floor 9:00

Condition:
Concrete Deform³ GC

Description:
Floor appeared to be
in good condition with
no concrete problems.

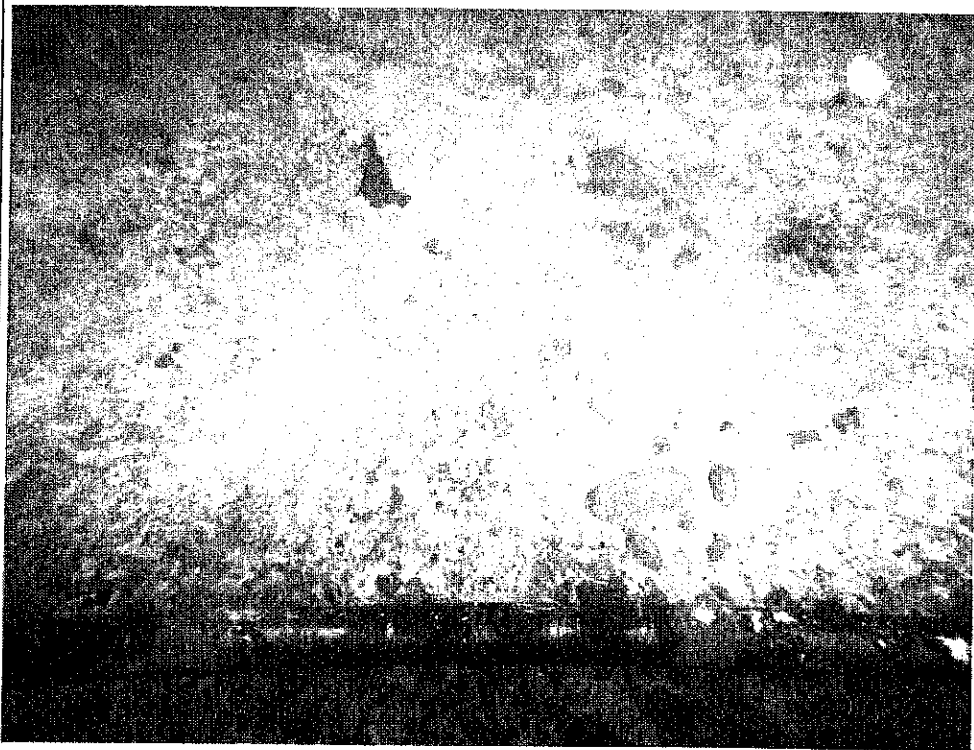
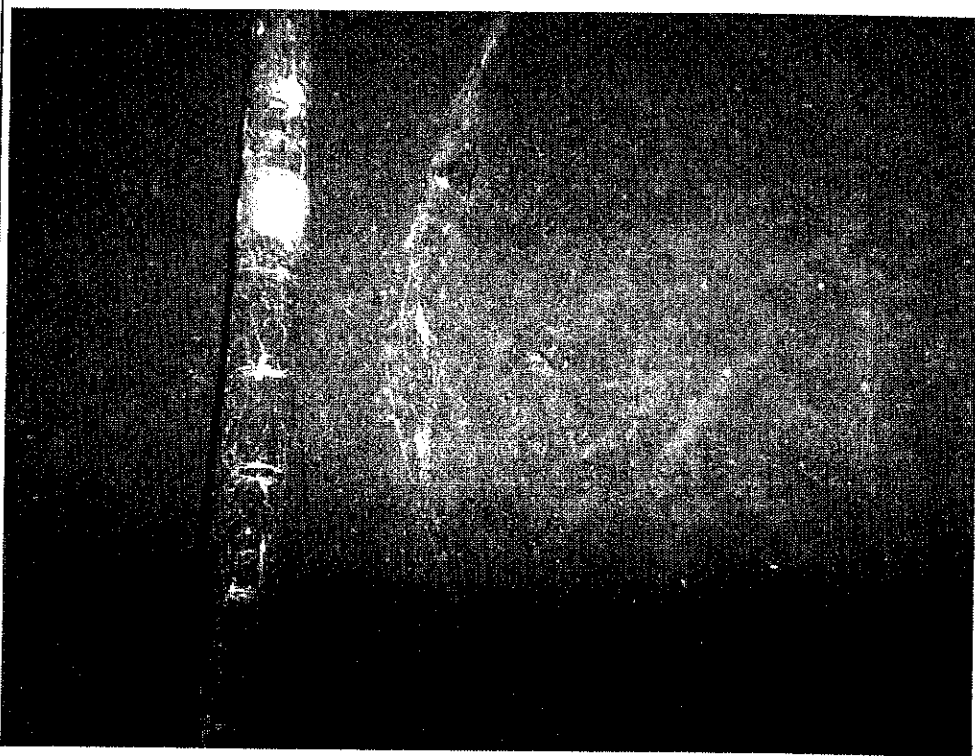


Image #30

Wall 9:00

Condition:
Concrete Deform³ CK,
PO

Description:
Wall appeared to be in
good condition with a
minor amount of
cracking and popouts.



Reservoir 1

Image #31

Outlet 11:50

Condition:
Rust Grade¹ 2.

Description:
12" Outlet appeared to be in fair condition with a heavy amount of corrosion.

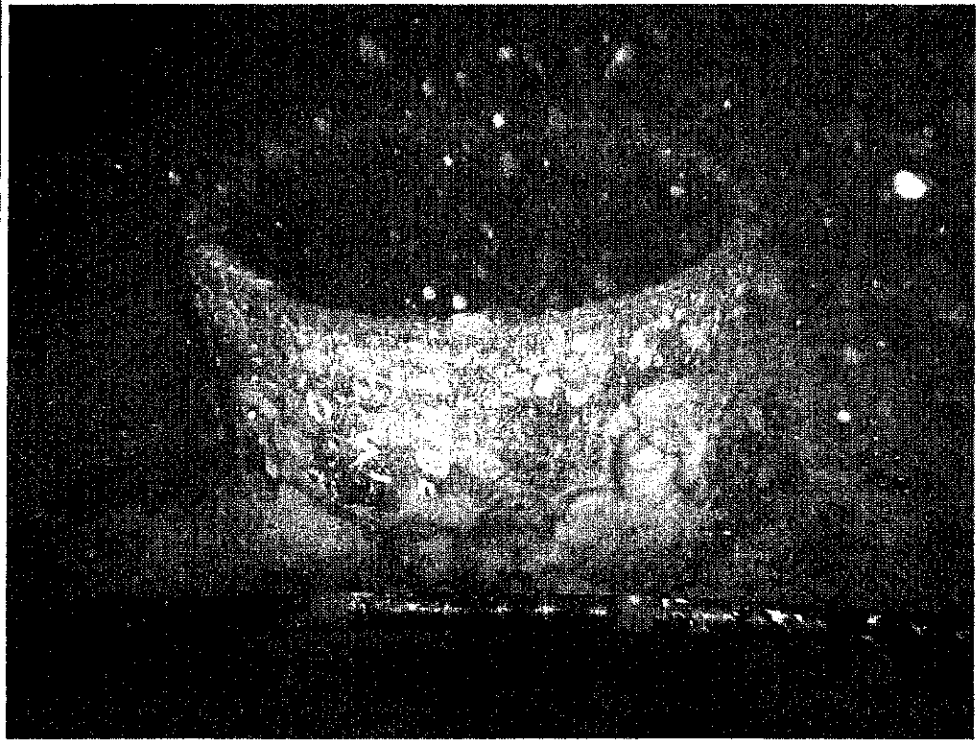
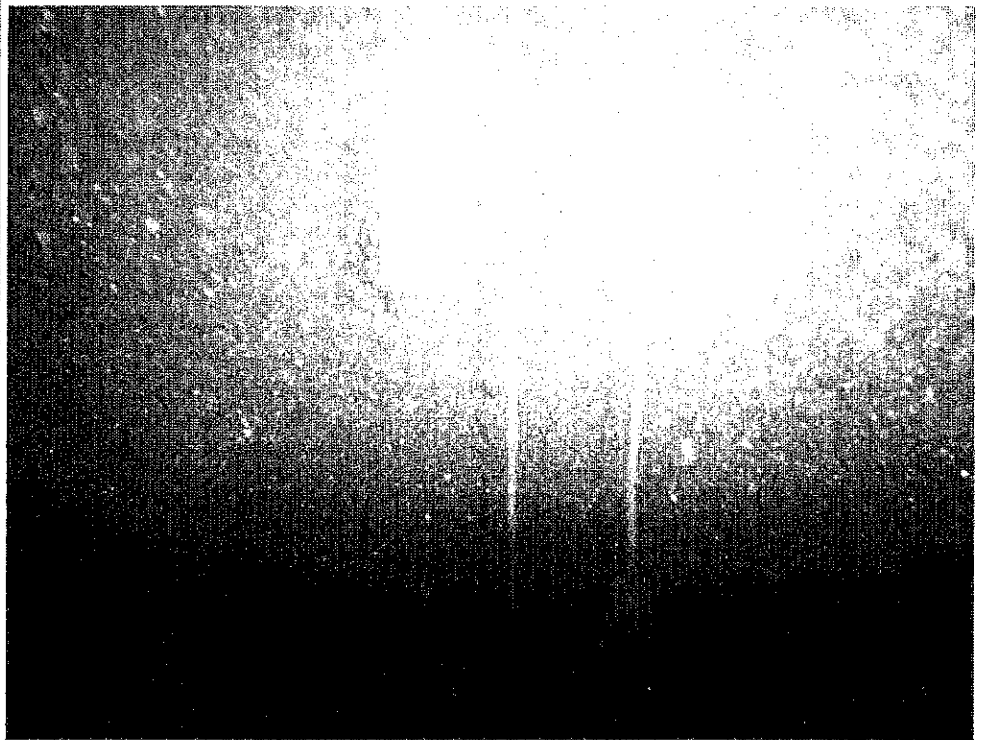


Image #32

Telemetry Sensor 11:55

Description:
Telemetry Sensor appeared to be suspended properly and in fair condition.



Reservoir 1

Image #33

Telemetry Line 11:55

Condition:
Rust Grade¹ 9.

Description:
Telemetry Line
appeared to be in good
condition with a minor
amount of corrosion.

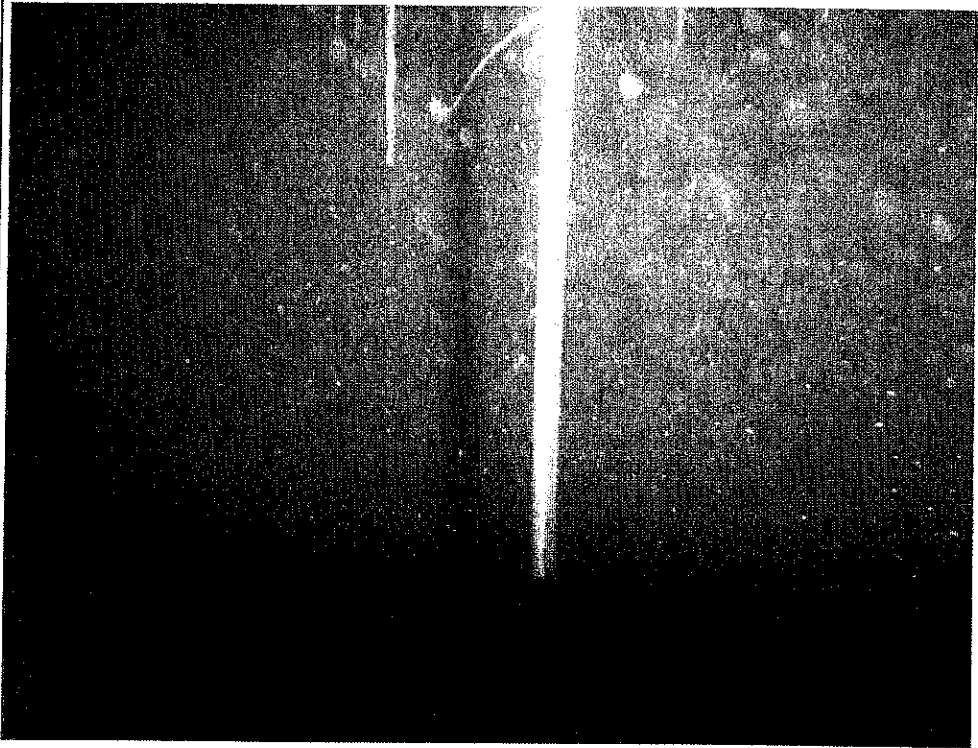
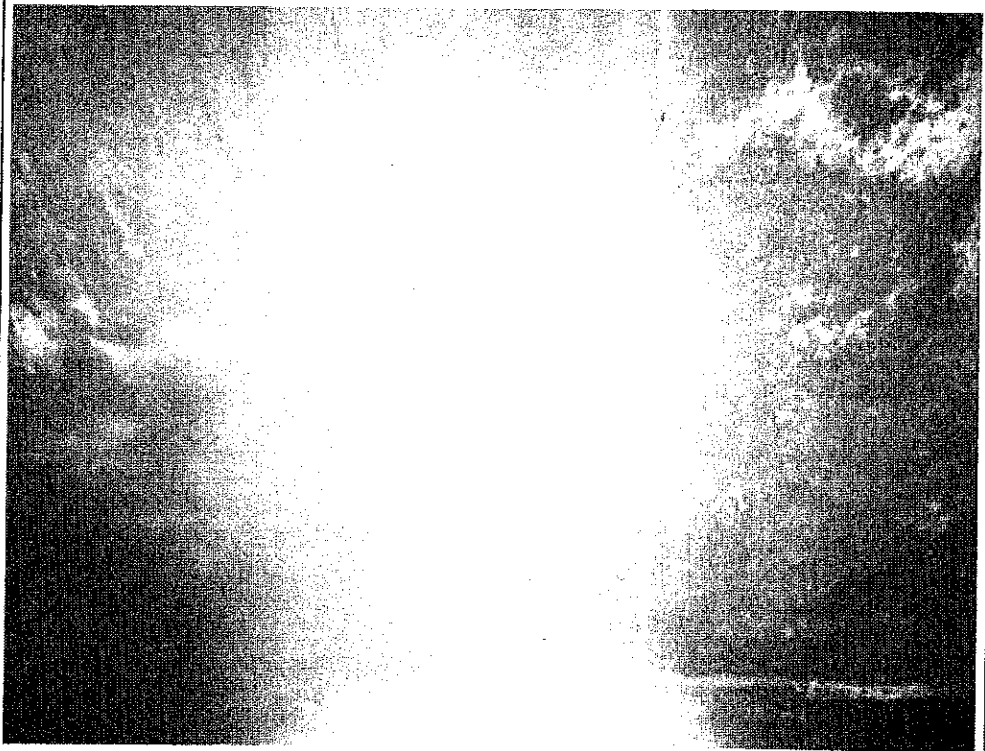


Image #34

Ceiling 12:00

Condition:
Concrete Deform³ CK.

Description:
Ceiling appeared to be
in fair condition with a
moderate amount of
cracking.



Reservoir 1

Image #35

Ceiling 3:00

Condition:
Concrete Deform³ CK

Description:
Ceiling appeared to be in fair condition with a moderate amount of cracking.

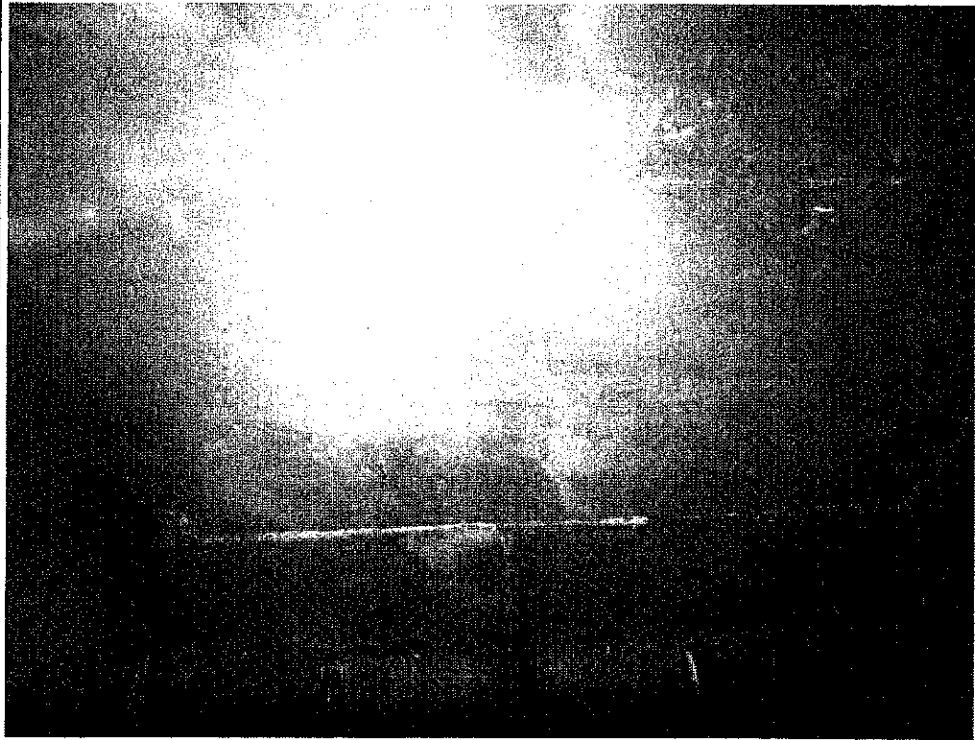
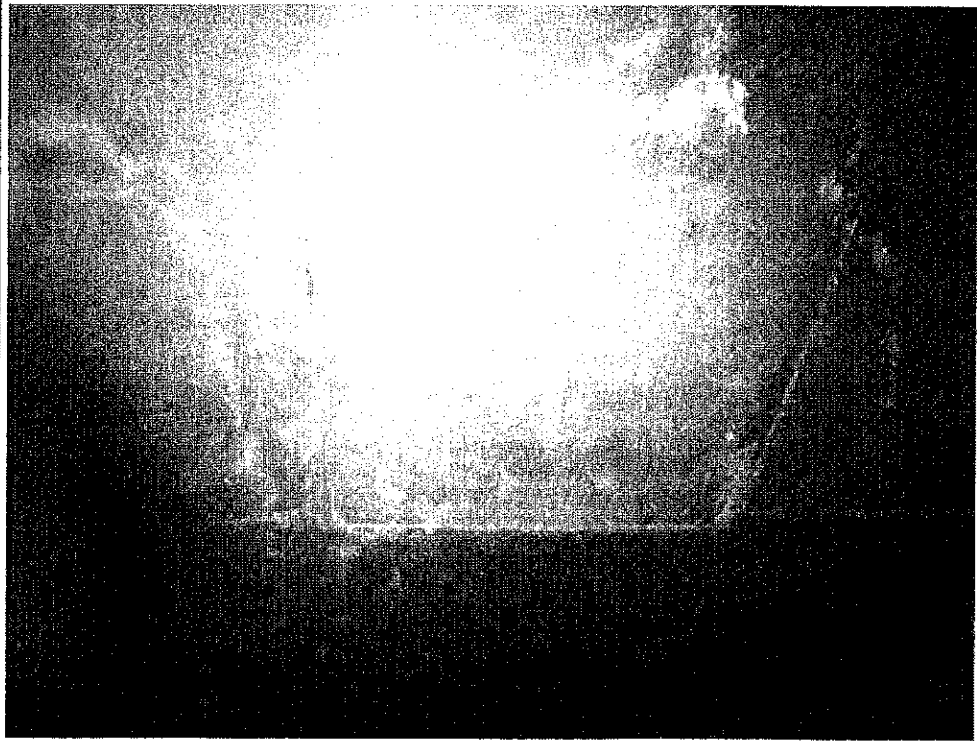


Image #36

Ceiling 6:00

Condition:
Concrete Deform³ CK

Description:
Ceiling appeared to be in fair condition with a moderate amount of cracking.



Reservoir 1

Image #37

Ceiling 9:00

Condition:
Concrete Deform³ CK

Description:
Ceiling appeared to be in fair condition with a moderate amount of cracking.

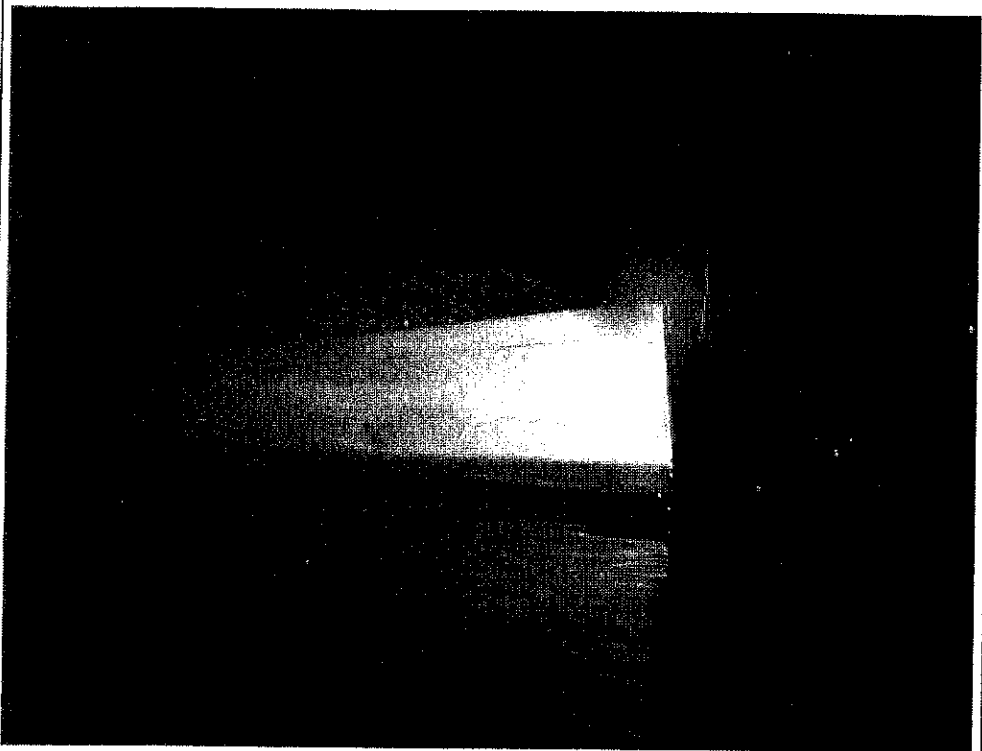


Image #38

*Liquid Level Indicator
Float 5:00*

Condition:
Rust Grade¹ 6

Description:
Liquid Level Indicator
Float appeared to be in fair condition with a minor amount of corrosion.



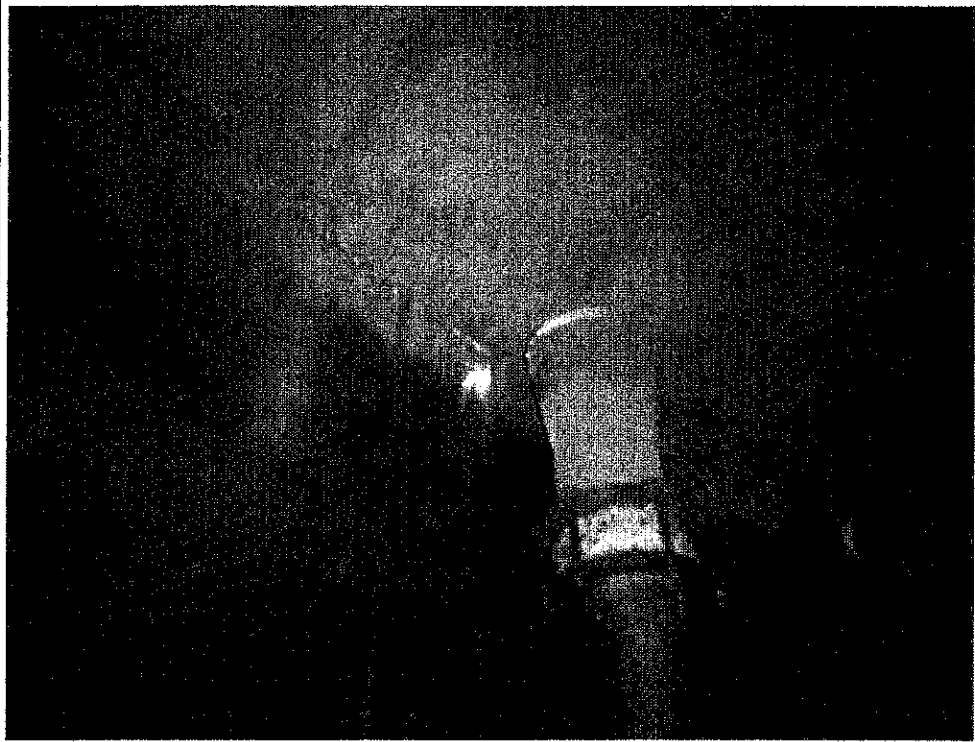
Reservoir 1

Image #39

Overflow Bell 6:00

Condition:
Rust Grade¹ 4.

Description:
12" Overflow Bell
appeared to be in fair
condition with a
moderate amount of
corrosion.



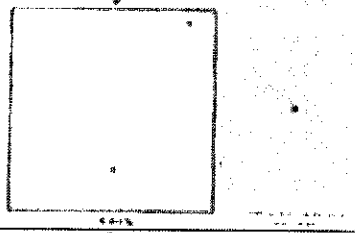
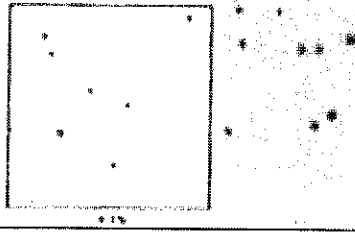
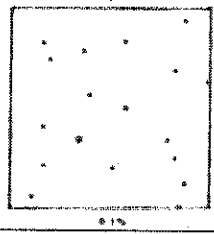
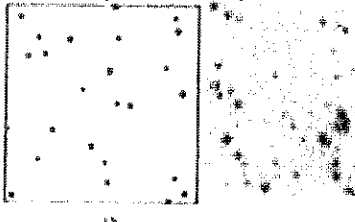
Reservoir 1

REFERENCES:

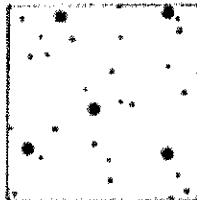
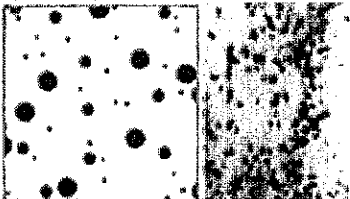
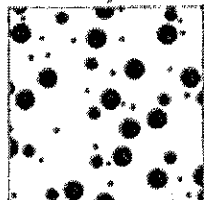
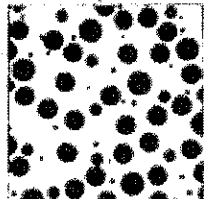
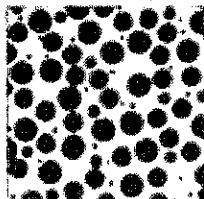
Standard Method of Evaluating Degree of Rusting on Painted Steel Surfaces – SSPC-Vis 2-82 & ASTM D 610-85 (1989)

The graphical representations show examples of area percentages, which may be helpful in rust grading. The use of photographic reference standards requires the following precautions:

1. Some finishes are stained by rust. This staining must not be confused with the actual rusting involved.
2. Accumulated dirt or other material may make accurate determination of the degree of rusting difficult.
3. Certain types of deposited dirt that contain iron or iron compounds may cause surface discoloration that should not be mistaken for corrosion.
4. It must be realized that failure may vary over a given area and discretion must therefore be used in applying these reference standards.
5. In evaluating surfaces, consideration shall be given to the color of the finish coating, since failures will be more apparent on a finish that shows color contrast with rust, such as white, than on a similar color, such as iron oxide finish.
6. The photographic reference standards are not required for use of the rust-grade scale since the scale is based upon the percent of the area rusted and any method of assessing area rusted may be used to determine the rust grade.

Rust Grades	Description	Graphical Representation
10	No rusting or less than 0.01% of surface rusted	Unnecessary
9	Minute rusting, less than 0.03% of surface rusted	
8	Few isolated rust spots, less than 0.1% of surface rusted	
7	Less than 0.3% of surface rusted	
6	Extensive rust spots, but less than 1% of surface rusted	

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5	Rusting to the extent of 3% of surface rusted	
4	Rusting to the extent of 10% of surface rusted	
3	Approximately one sixth of the surface rusted (16%)	
2	Approximately one third of the surface rusted (33%)	
1	Approximately one half of the surface rusted (50%)	
0	Approximately 100% of the surface rusted	Unnecessary