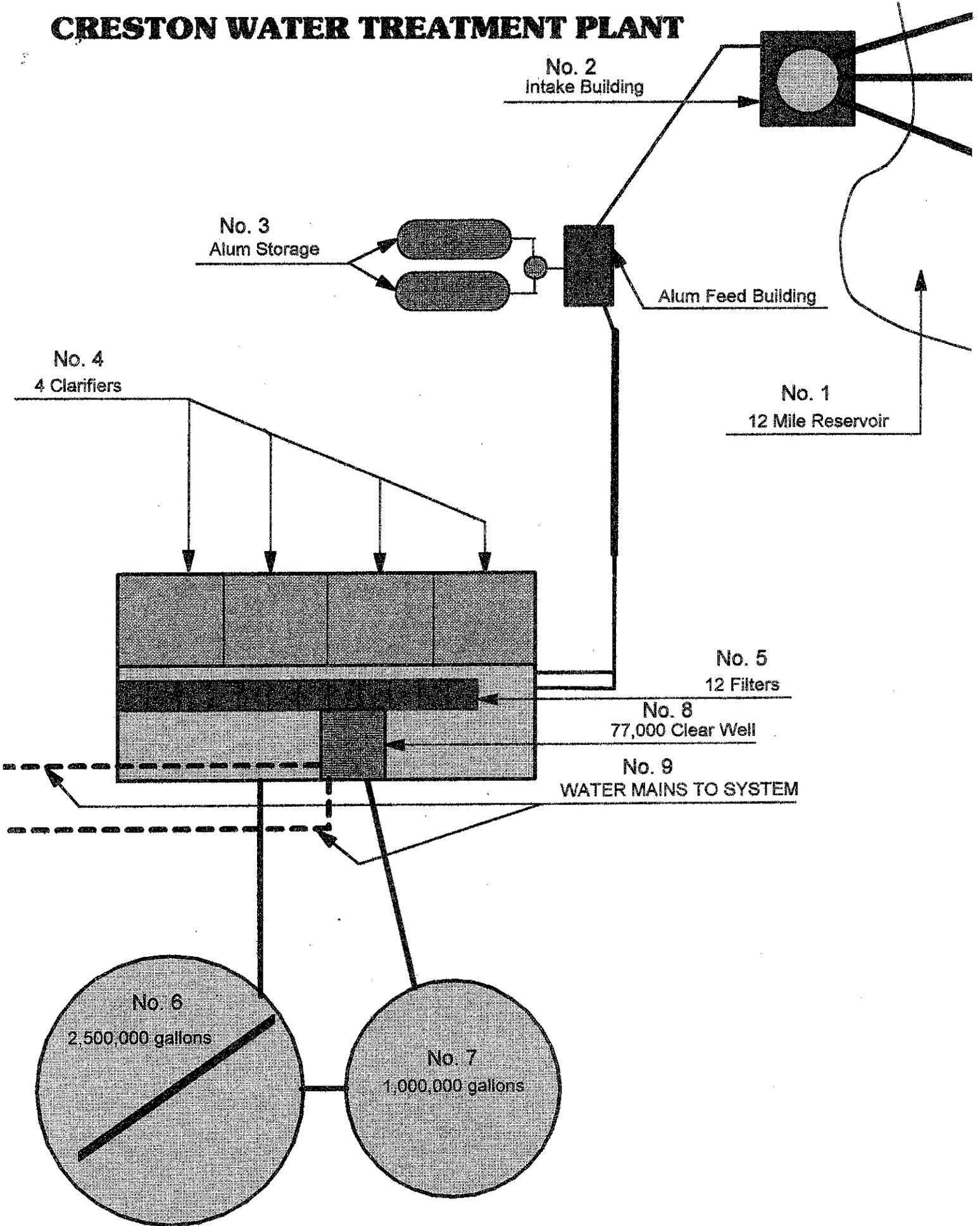


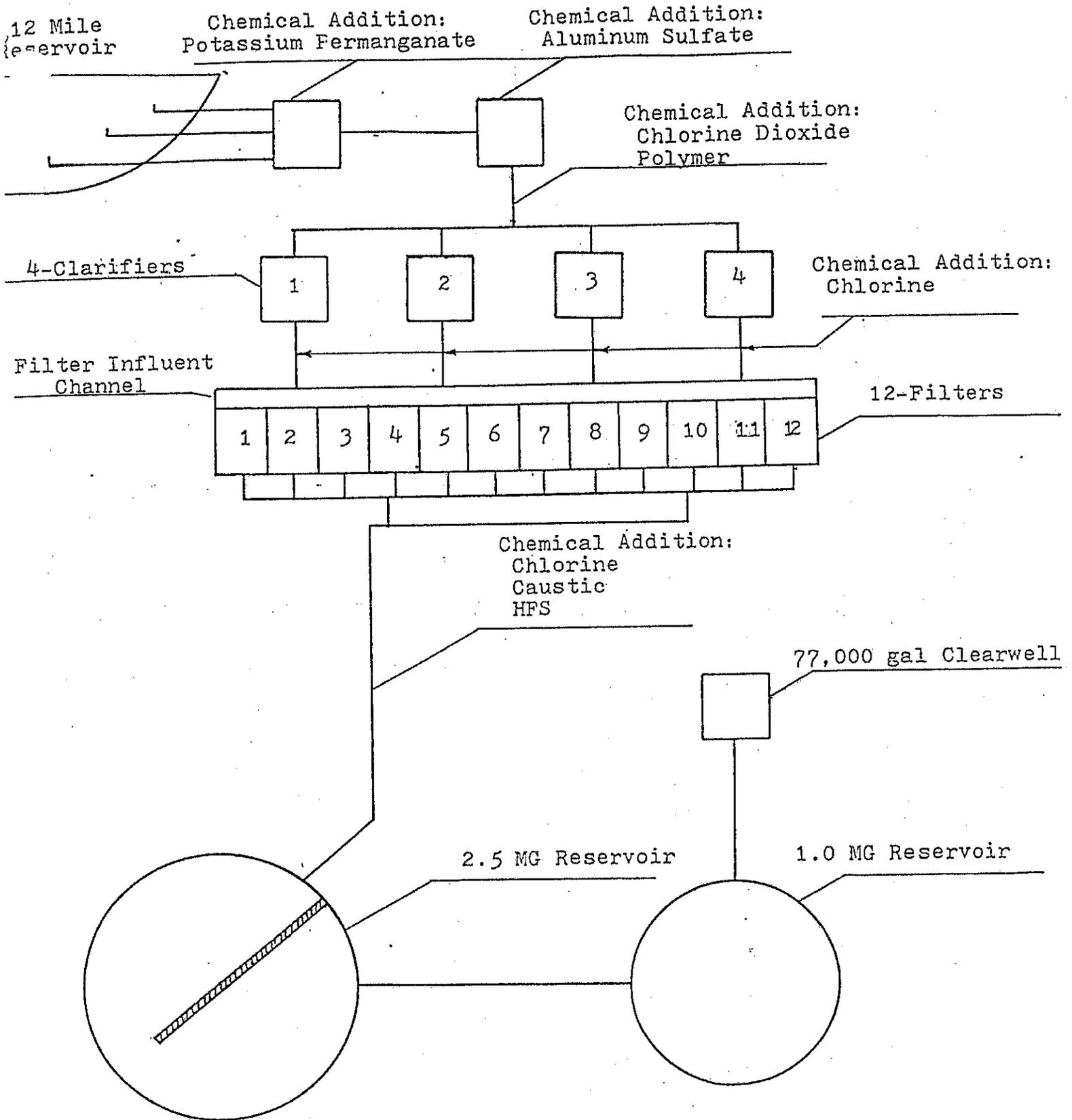
CRESTON WATER TREATMENT PLANT



Creston Twelve Mile Water Treatment Plant

- Number 1. Twelve Mile Reservoir (Lake) 3.2 billion gallons of water at normal pool, 640 surface acres.
Three Mile Reservoir (Lake) is also 3.2 billion gallons at normal pool, 960 surface acres. "Note 12 Mile is deeper than 3 Mile"
- Number 2. 12 Mile Intake Building; There are three intake lines that run out into the lake at different levels 12, 18 and 24 feet. There are three 150 H.P. raw water pumps which can each pump 3,000 gpm.
Chemical feed of Sodium Permanganate is added to the raw water.
Three Mile Intake has three 200 H.P. pumps and the intake lines are at 8, 12 and 16 feet.
- Number 3. Alum Feed Building; Chemical feed - liquid alum - cationic polymer blend, are mixed with the raw water at this point.
- Number 4. Treatment Plant – (4) Up-flow Pulsating Clarifiers with a flow rate of 1,285 gpm each for a total of 5,140 gpm. Chemical addition of anionic polymer and chlorine dioxide are just ahead of clarifiers.
- Number 5. Treatment Plant – (12) Declining rate multi-media filters at 22,000 gallons each. Chlorine is added before the filters. Chemical additions after filtration are chlorine, sodium hydroxide and HFS (fluoride).
- Number 6. Reservoir: Capacity - 2.5 Million Gallons of finished water.
- Number 7. Reservoir: Capacity – 1.0 Million Gallons of finished water.
- Number 8. Clear-well and High Service pumps. Clear-well capacity 77,000 gallons.
(3) High Service Pumps – 250 H.P. and 3,000 gpm.
Chemical addition of Ammonium Sulfate is added to combine with the free chlorine to form chloramines.
- Number 9. Transmission Mains: Going to the system, which includes the City of Creston and parts of 9 Iowa counties in southwest Iowa. There are approximately 32 towns. Some of which are – Cromwell, Kent, Arispe, Shannon City, Tingley, Grand River, Beaconsfield, Delphos, Redding, Maloy, Benton, Conway, Gravity, Sharpsburg, Clearfield, Ellston, Afton, Lennox, Bedford, Blockton, Diagonal and Mt. Ayr.

TREATMENT FLOWCHART
CRESTON, IOWA



TWELVE MILE WATER TREATMENT PLANT – LABORATORY ANALYSIS

	RAW	UNIT 1	UNIT 2	UNIT 3	UNIT 4	FI	W	FE	E	PE	SYSTEM
TOTAL ALK.	X	?					?			X	X
PHENAL ALK.	X									X	X
BICARBONATE	X									X	X
pH	X	X				X	X			X	X
MAGNESIUM	X									X	X
CALCIUM	X									X	X
NON CARB. HARD	X									X	X
TOTAT HARDNESS	X									X	X
TOTAL Cl2						X	X			X	X
FREE Cl2						X	?			X	X
COMBINED Cl2						X	?			X	X
ClO2 & Chlorite		?								X	
TURBIDITY	X	X				X	X	X		X x 6	X
AP COLOR	X	X				X	X	X		X	X
TEMPATURE	X	X								X	
FLUORIDE	?						?			X	
IRON	?						?			?	?
MANGANESE	X	X				X	X	X		X - 2	X
ALUMINUM							?			?	
NH3	?						?			?	
NITRATES	?						?			?	
TIME	12 M	8 AM				8 AM	8 AM			12 M	12 M

Notes;

X = Tests that are done at least once per day

? = Tests that are taken but not everyday.

Units are the clarifiers, at least one of the 4 is tested per day.

FI = Filter Influent, top of filters

FE = Filter Effluent, bottom of filters. One sample from each side.

PE = Plant Effluent, water going to system (town).

System is from the home of the person on the 11 PM - 7 AM shift.

Clear-Well =
A.I. =