

# **OXCIDE**

## **SCALE REMOVAL STUDY**

Cooling Tower #2, MountainView Hospital Las Vegas, Nevada

Conducted: September 26 – October 2, 2002

**Test Sponsor:**

Activated Systems, LLC  
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**Laboratory Analysis by:**  
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Background: The State of Nevada Health Division, Bureau of Health Protection Services, approved **OXCIDE** for use in public drinking water. After achieving successful results at Patrick's Restaurant (See Report), Activated Systems, LLC began treating the domestic water supply at MountainView Hospital. Subsequently, the hospital's chief engineer recognized the possibility that **OXCIDE** might also be effective in removing excessive scale from the cooling towers.

The tower chosen, Tower #2, had been mechanically cleaned three days earlier by hospital staff. Nonetheless, significant scale deposits were present throughout the media, with extreme deposits at the lower section.

Tower # 2 is one of the three hospital cooling towers. It was isolated from the common manifold ensuring the treatment would not cross over to the other towers. Without the use of electronic feed or dump controls, manual manipulation of the tower parameters was required.

Tests were conducted focusing on the activity indicator "ORP" (Oxidation Reduction Potential) and TDS (Total Dissolved Solids) as well as pH migration at various intervals throughout the trial.

Two temporary external 1.5 hp pumps with 2" diameter hoses were used to circulate treated water over the media. (One pumps and hose for each side)

Make up water: TDS 336, pH 7.77, ORP 650 mV (NOTE: Make up water is pre-treated with **OXCIDE** via the **OXCIDE** water treatment system that treats the entire hospital water distribution system)



**OXCIDE** Treatment System Treating all Hospital Water

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1<sup>ST</sup> DAY (SEPTEMBER 26, 2002)

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Prior to treatment, tower water samples and swabs were taken for general bacteria and Legionella testing. Laboratory analysis (received later) showed significant bacteriological contamination ( $>10^6$  CFU / ml) or TNTC (Too Numerous To Count).

The tower was taken off line, and isolated.

The existing water condition prior to dump was: pH 8.3, ORP 310 mV, TDS 2140 ppm

The tower was drained and refilled two times. Each time it was treated with **OXCID** to achieve +800 mV ORP.

The system was left running overnight.

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2<sup>ND</sup> DAY (SEPTEMBER 27, 2002)

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The tower was drained and refilled two times. Each time it was treated with **OXCID** to achieve +800 mV ORP.

The scale that had dropped out of media was shoveled out/hosed down drain. Scale generally became softer and more granular. Many large chunks of scale were dislodged. Tower was refilled.

The system was left running overnight.

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3<sup>RD</sup> DAY (SEPTEMBER 28, 2002)

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The tower was drained and refilled two times. Each time it was treated with **OXCID** to achieve +800 mV ORP.

The scale that had dropped out of media was shoveled out/hosed down drain. Both sides were substantially clear of scale... especially the middle of the media panels. Plugs were added to middle holes at top well so as to divert water to edges.

The system was left running overnight.

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4<sup>TH</sup> DAY (SEPTEMBER 29, 2002)

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The tower was treated with **OXCID** to achieve +800 mV ORP but not drained or refilled.

The system was left running throughout the day and overnight.

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5<sup>TH</sup> DAY (SEPTEMBER 30, 2002)

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The tower was drained. Scale that had dropped out of media was shoveled out/hosed down drain. Tower was refilled.

The water was treated with **OXCID** to achieve +800 mV ORP.

The sprayers to apply tower/treated water to west exterior face of media were started.

The system (2 pumps at media plus 1 pump at west exterior sprayer) left running overnight.

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6<sup>TH</sup> DAY (OCTOBER 1, 2002)

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The tower was drained. Each media panel was shaken to allow residual scale to drop. The scale was shoveled out or hosed down the drain and the tower refilled.

The water was treated with **OXCID**E to achieve +800 mV ORP

It was felt that the 1.5 hp pumps could not supply enough water to wet all media surfaces to reach full decalcifying effect in a short run time. Media was approximately 90% clean. , The media surface was clear of scale wherever water contacted media.

The system was left running overnight.

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7<sup>TH</sup> DAY (OCTOBER 2, 2002)

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The tower was drained. Remaining scale was shoveled out or hosed down the drain and the tower refilled.

The pile of scale shoveled out of the tower measured 30" tall x 36" diameter. Total quantity of scale flushed down drain is unknown.

All the treatment apparatus was removed from the site.

Final water samples and swabs were taken with a staff engineer as a witness. Test results of the final water sample resulted in ( $<10^1$  CFU / ml ) or greater than 4 log reduction.

The test/study was considered complete.

### **Conclusions:**

The targeted ORP of 800+ mV in the treated water removed, dissolved, and dislodged calcium and magnesium deposits (scale).

The higher the ORP, the faster TDS would rise.

The scale dislodged did not migrate to the sump. Therefore, descaling could have safely been achieved while the tower was online.

As a non-hazardous, non-caustic solution, **OXCID**E was completely safe and easy to transport, handle, and work with. Protective gear (eye goggles, gloves, protective clothing, respirators, masks, etc.) was NOT required.



**MountainView Hospital 3000 ton Marley Cooling tower. Note: Since the tower was off line, manual circulation pumps were required.**



**Scale accumulation causing water spouts prior to treatment  
NOTE: Engineering attempted manual clean 3 days prior**



Scale accumulation near water level on media.



Scale deposit on media prior to treatment.



Media condition after 8 hours **OXIDE** treatment showing softening of scale deposits. Note difficulty in separating media.



Media condition after **OXIDE** treatment



**Scale deposit showing media pattern 09/27/02 ...about 48 hrs**



**Solid scale removed from tower.**