ES and H PROJECT ADS

12/27/2001

ADS #: A98D0168 **TYPE:** ESH

ELIMINATION OF WATER TREATMENT CHEMICALS AT AGS

WHEN REVISING ADS - ATTACH ADDITIONAL SHEETS AS REQUIRED !!

PROJECT CHAMPION: LESSARD, E. ***EXT*** 4250

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PROJECT DESCRIPTION:

This ADS is intended to eliminate or reduce biocides and rust inhibitor chemicals at AGS.

A skid-mounted, fully automated and chemical-free water treatment system for cooling water systems is an alternative to conventional chemical water treatment. This is now the preferred method of operation according to many large facilities operators such as Jet Propulsion Lab and Kennedy Space Center. This system is easy to monitor and it keeps the cooling equipment operation in the hands of the C-A personnel. No outside chemical contractors need to be consulted, and no expensive chemicals need to go to the re-charge basins.

BACKGROUND INFORMATION:The secondary side of closed-cooling systems at C-A is well water with the addition of treatment chemicals to control bacterial growth and inhibit rust. Secondary waters do not have the potential to become activated. Water treatment chemicals are also added to open cooling systems. A total of 14 towers rely on chemical treatment at C-A. Two additional towers have been converted to ozone systems. The C-A staff relies on Drew Chemical, a subcontractor, to manage the chemicals used in cooling waters. Drew Chemical has installed all automatic systems used to add rust inhibitor and biocide. Drew Chemical does the weekly analysis of chemical concentrations. Each week, Drew Chemical notifies the C-A Group and issues an order to adjust the timer for each system if adjustment is required. Drew Chemical trains the C-A Water Systems Group every year on how to get a sample from each system. They also train on the hazards involved and the personal protective equipment needed. Traditionally, cooling waters, which contain water treatment chemicals, are released to recharge basins on the BNL site. The Environmental Services Division monitors these recharge basins periodically for radioactive, organic and metal contaminants.

The proposed non-chemical self-contained water treatment plant begins with a suction pump to draw water out of the tower sump. The water then goes through a permanent, magnetic energy inducer to increase the water solubility factor and begin the scale inhibition process. This also de-scales the existing scale build-up in the system. When this process takes place, a slight reduction in surface tension occurs which makes the water more soluble; thus allowing more solids to stay in solution or colloidal suspension before precipitating. This is a well-known and well-documented technology. The next stage of the unit is the ozone generator.

Ozone's oxidizing properties kill algae, slime and bacteria and enhance the magnetic descaling process. Ozone is used commercially as a disinfectant throughout the world. Beside bacterial and viral inactivation, its properties are used to oxidize both organic and inorganic substances, and to clarify and decomplex organically bound minerals. Ozone is manufactured by the corona discharge method that combines 3 oxygen atoms together. This so-called heavy oxygen has a half-life of about 20 minutes. When injected in the water phase, it immediately mixes with organics and inorganics in the water and the majority of it is dissipated before leaving the static mixing station.
Ozone dosage is controlled by ozone meter set points. The system's water pH is adjusted with air-dryer controls regulated by pH meter set points. A centrifuge separates solids that exceed 50 microns and 1.20 specific gravity by weight. The solids from the separator are automatically collected in a recovery tank that further polishes the precipitated solids to a 25-micron level.

The waste is collected in a filter that can be dumped in the trash dumpster. This waste contains no added chemicals and weighs about 25 lbs. per dump. Dump frequency depends on the size of the system and a variety of other factors. Clarified water is returned to the sump where the process repeats on a 10% to 20% by volume side-stream basis.
AGS GPP/KB project 1 of 8

The cost savings for applying this system to one tower are estimated to be $9,000 per year.

PROJECT APPRAISAL / JUSTIFICATION:

BENEFIT
Reduce chemical use at C-A

RISK/VULNERABILITY
Over use of chemicals has led to exceeding SPDES permit in past.

MITIGATING ACTIONS

GENERAL INFORMATION:

RPM SCORING:

Before Score -	*After Score +*	*Mgmt Adjustment =*	*Total Score*
50	0	110	160

BIN: 3

BEFORE SCORE

	Consequence x	*Multiplier x*	*Probability*	*= Score*
Public S and H	30	1.00	0.0001	0
Site S and H	10	1.00	1.0000	10
Compliance	20	1.00	1.0000	20
Mission	75	1.00	0.0001	0
Cost-Effective	15	1.00	0.0001	0
Environmental	20	1.00	1.0000	20

AFTER SCORE

Consequence x	*Multiplier x*	*Probability*	*= Score*
30	1	0.0001	0
10	1	0.0001	0
1	1	0.0001	0
75	1	0.0001	0
15	1	0.0001	0
20	1	0.0001	0

FUNDING: GPP/KB ***ACCOUNT#:*** ***ASSET_NO:*** 1020-AGS

COST_NOTES:

We are trying one system at RHIC for about 30K.

TEC:925

Two systems at RHIC have been done (PHOBOS and BRAHMS)

A Pollution Prevention (P2) proposal was submitted to DOE on 6/00 for the RHIC Star cooling system but was unfunded by DOE.

Additional systems are being added to SEM cooling system and the Booster Application Facility during FY01 through other funds.

Profile In Thousands

INSERT A

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	PY	FY99	FY00	FY01	FY02	FY03	UNFUNDED	TEC
Allocation								
Cost							1,000 ~~500~~	1,000 ~~500~~

ESH FUNCTIONAL AREA:

CW	%: 50	Protection of Water Quality
PP05	%: 50	Reduction/Reuse/Recycle - Toxic
	%:	
	%:	
	%:	
	%:	

ESH DRIVER: Secondary Drivers

Primary Driver

DOE N450.4

Cost Notes: Insert A

2-15-02

Systems installed: BRAHMS, PHOBOS, AGS SEM, BAF, RHIC rf

Systems needed: STAR, PHENEX, Cryo Refrigerator Tower 7, He Reliquifier To
AGS Cooling Towers 1,2,3,4,5, Linac Tower, B902 Tower
TVDG Tower

Experience with installed systems shows savings in chemical reductions are offset by increased monitoring and maintenance. Also, corrosion has been observed in one system and a study is under way to determine if poor maintenance of the ozone system was the cause. If not, then some chemical may also have to be used with ozone systems.

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