

1. Component NAVY	FY 2005 MILITARY CONSTRUCTION PROGRAM	2. Date 13 JAN 2004
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3. Installation and Location/UIC: N62395 (MARIANA ISLANDS, GUAM) NAVY PUBLIC WORKS CTR AGAT, GUAM	4. Project Title FENA WATER TREATMENT PLANT UPGRADE
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5. Program Element 0712776N	6. Category Code 84110	7. Project Number P256	8. Project Cost (\$000) 20,700
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9. COST ESTIMATES

Item	UM	Quantity	Unit Cost	Cost(\$000)
FENA WATER TREATMENT PLANT UPGRADE (5,619 SF)	m2	522		15400
WATER TREATMENT PLANT BUILDINGS (5,619 SF)	m2	522	7,010.00	(3660)
BONA/ALMAGOSA SPRINGS METER INSTALLATIONS	LS			(270)
FENA VALLEY LAKE RAW WATER PIPELINE MODS	LS			(80)
FENA VALLEY LAKE SCREEN HOUSE INTAKE MODS	LS			(120)
FENA WATER PS PRECHLOR SYS AND METER MODS	LS			(400)
WATER TREATMENT PLANT UPGRADES	LS			(10600)
BUILT-IN EQUIPMENT	LS			(10)
TECHNICAL OPERATING MANUALS	LS			(260)
SUPPORTING FACILITIES				2480
ELECTRICAL UTILITIES	LS			(920)
MECHANICAL UTILITIES	LS			(690)
PAVING AND SITE IMPROVEMENTS	LS			(780)
DEMOLITION	LS			(90)
SUBTOTAL				17880
CONTINGENCY (5%)				890
TOTAL CONTRACT COST				18770
SIOH (6.5%)				1220
SUBTOTAL				19990
DESIGN/BUILD - DESIGN COST				720
TOTAL REQUEST ROUNDED				20710
TOTAL REQUEST				20700

10. Description of Proposed Construction

Major water treatment process improvements, modernization of process control instrumentation, and new construction of support facilities. Construction includes reinforced concrete influent metering and rapid mix tank with new flow meters, mixers and appurtenances; an additional reinforced concrete flocculation-sedimentation tank with sludge transfer pumps; a reinforced concrete clearwell finished water storage tank; a reinforced concrete filter backwash settling tank with sludge transfer and supernatant pump stations; a reinforced concrete sludge holding tank; a sludge dewatering facility; a single story, reinforced concrete masonry unit (CMU) building, with reinforced concrete roof and floor slab, power and lighting; sludge feed pumps; mechanical sludge dewatering equipment and appurtenances; a single story air blower and emergency generator building with reinforced CMU walls, reinforced concrete roof and floor slab, power and lighting, steel doors, and monorail hoists; a single story maintenance shop with reinforced CMU walls, reinforced concrete roof and floor slab, power and lighting, steel roll-up door, monorail hoist, and electrical panel board with special outlets for miscellaneous maintenance and repair equipment; a single story addition to the existing chemical control building (Bldg. 585), with reinforced CMU walls, reinforced concrete roof and

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<p>floor slab, power and lighting, steel roll-up door, room ventilation, fire alarm system connection, and emergency eyewash facility; new sludge transfer pumps; sand water filtration and control systems; new motorized valves at the existing junction box; a single story chemical storage facility and an addition to the Chlorinator Building with reinforced concrete floor and roof, CMU walls, power lighting, steel roll-up door, monorail hoist, and concrete curbing surrounding the stored chemicals for containment of accidental spills.</p> <p>Electrical supporting facilities include electrical power distribution line, pad mounted transformer, emergency generator, and related switching and distribution panels. Other supporting facilities include pipeline to reroute existing water line bypass, and paving and site improvements.</p> <p>Demolition work involves removal of the old and structurally deficient inlet structure, meter pit, and baffled chemical mixing pit. Built-in equipment includes a hoist.</p> <p>Also included is modifying the screen house (Bldg. 1281) water intake to selectively draw source water from different lake depths; connecting a segment of the parallel 600-mm waterline to drain the lake bottom to the downstream side of the Fena Lake Reservoir spillway dam; installing a pre-chlorination system and a water meter at the Fena WPS; installing 200-mm water meter at Bona Spring and 300-mm water meter at Almagosa Spring.</p>				
<p>11. Requirement: <u>522m2</u> Adequate: <u>0m2</u> Substandard: <u>0m2</u></p> <p>PROJECT: This project renovates the mainstream treatment processes and constructs new tankage for unit process redundancy and reliability, even during heavy storms and typhoon recovery periods, to ensure compliant safe drinking water for consumers at the Apra Harbor Naval Base, military housing, and outlying service areas of Guam. (Current Mission)</p> <p>REQUIREMENT: Long-term improvements are needed at the Fena Water Treatment Plant (WTP) and its source water facilities to meet Federal Safe Drinking Water Act and U.S. Environmental Protection Agency (USEPA) drinking water standards and mitigate future storm and typhoon effects on water treatment systems. Variability in the quality of the raw water supply compounded by the antiquated condition and treatment processes employed at the Fena Water Treatment Plant need to be ameliorated if USEPA drinking water turbidity standards and microbial inactivation criteria of disinfection are to be uniformly met in plant operations. Overall improvements will</p>				

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<p>substantially enhance the restoration of plant operations to normal levels during heavy rains and typhoon recovery in this hurricane prone region.</p> <p>The Fena WTP, constructed in 1956, provides up to 13.5 million gallons per day of drinking water in support of fleet, industrial, and domestic water needs of military bases and operations throughout Guam and interspersed communities. Federal and local safe drinking water regulations require enhanced treatment when surface water such as that of the Fena Valley watershed is used as the source water.</p> <p>CURRENT SITUATION: Heavy rains and storms, such as the recent Super typhoon Pongsona, have a major impact on water turbidity. The undersized 47-year old water treatment facilities lack parallel treatment process tanks (unit redundancy), which consequently compromises the reliability of treatment and restricts effective preventive maintenance of process equipment. As a result, the finished water quality and quantity produced cannot consistently meet the Safe Drinking Water Act for turbidity and microbial disinfection.</p> <p>Operationally, the single treatment tanks are inadequate; a second set of tanks coupled with filtration treatment steps is vitally needed. The influent control structure does not have adequate freeboard; i.e., the high water level rises close to the top of the tank. The baffle-mixing pit does not effectively mix the chemicals with the raw water, causing inefficient use of chemicals and ineffective coagulation. The flocculation-sedimentation tank is hydraulically overloaded, which causes inadequate settling and shortened filtration runs in the downstream process tanks due to clogging of filters.</p> <p>During the rainy season from July through December, frequent torrential storms occur which may continue for three consecutive days. Heavy rainfall causes a drastic increase in raw water turbidity, which requires more frequent filter backwashing. In these instances, the plant cannot produce enough potable water due to the frequent clogging of the filter media and the high solids content of the spent filter backwash water that must be separated in a backwash settling tank of limited holding capacity.</p> <p>In addition, the lack of a redundant filter backwash settling tank precludes necessary cleaning and maintenance. When the settling tank cannot receive the spent filter backwash water, the backwash water and sludge are drained to the sewer. Such incidents already occur regularly when high turbidity raw water must be treated in the aftermath of rains. Industrial wastewater discharges of chemical sludge contain heavy metals (aluminum and others) that can adversely affect the biological treatment processes of the sewage treatment plant and its ability to comply with its ocean disposal discharge</p>			

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permit.

The water treatment plant lacks a covered weatherproof facility necessary to store mechanical equipment spare parts and devices to facilitate immediate maintenance and repair of critical water treatment plant equipment (pumps, motors, and valves) and control/metering devices.

IMPACT IF NOT PROVIDED:

Unless plant improvements are added, such as process upgrades; modernized equipment, instrumentation, and controls; and unit redundancy are constructed, the Fena WTP operation will operate in a failure mode with risk of operational shutdown or Notices of Violation (NOVs), public boil water notices, and loss of consumer confidence.

To not make these improvements will result in failure of the U.S. Navy Public Works Center to effectively perform its mission of providing safe, high quality, and reliable water supply to its Navy customers. Incidents will continue where chemical sludge must be disposed to the sanitary sewer, despite the adverse effect of this practice on operation of the sewage treatment plant to meet the requirements of the Clean Water Act in preventing coastal water pollution under discharge permit conditions of the National Pollutant Discharge Elimination System.

The plant will continue to be at risk of violating EPA regulations and will be subject to administrative NOVs and substantial monetary fines and penalties by the USEPA.

12. Supplemental Data:

A. Estimated Design Data:

1. Status:

(A) Date Design Start	082002
(B) Date Design 35% Complete	092004
(C) Date Design Completed	042005
(D) Percent Completed as of SEPTEMBER 2003	3%
(E) Percent Completed as of JANUARY 2004	3%
(F) Type of Design Contract	Design Build
(G) Parametric Estimate used to develop cost	Yes
(H) Energy study/Life cycle analysis performed	Yes

2. Basis:

(A) Standard or Definitive Design:	No
(B) Where Design Was Most Recently Used:	N/A

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<p>B. Equipment associated with this project which will be provided from other appropriations: NONE</p>																					
<p>JOINT USE CERTIFICATION: The Regional Commander certifies that this project has been considered for joint use potential. Unilateral Construction is recommended. This is an installation utility/infrastructure project and does not qualify for joint use at this location, however, all tenants on this installation are benefited by this project.</p>																					
Activity POC: CAPT Joseph Ludovici		Phone No: (671) 339-5100																			