ALASKA NATIVE MEDICAL CENTER

ANCHORAGE, ALASKA

POST OCCUPANCY EVALUATION

Office of Environmental Health and Engineering
Office of Public Health
Indian Health Service

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ALASKA NATIVE MEDICAL CENTER
Anchorage, Alaska
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POST OCCUPANCY EVALUATION

INTRODUCTION

This report is part of the Post Occupancy Evaluation Program consisting of surveys and reports of recently completed Indian Health Service (IHS) funded health facilities. The purpose of the program is to aid in the planning, design, construction, and operation of future IHS funded facilities. This is accomplished by identifying the good and bad features along with the lessons learned during the planning, design and construction process and making this information available to other offices that plan, design and construct health facilities.

The IHS funded program currently provides health services to Indians, Alaska Natives, Eskimos, and Aleuts in 51 hospitals and over 300 health centers and health stations. Since 1980, 16 hospitals and 22 health centers have been constructed and at the present time, 4 hospitals and 6 health centers are in the planning or design process.

ALASKA AREA AND ANCHORAGE VICINITY OVERVIEW AND HISTORY

The Alaska Native Medical Center (ANMC) serves the Anchorage service unit population as well as being the comprehensive medical center or referral hospital for the state of Alaska. The State of Alaska has an American Indian Alaskan Native (AIAN) population of 107,555 persons. ANMC has supported and fostered its growth as a referral center for the Native hospitals and related health facilities throughout Alaska.

Anchorage, the largest city in Alaska, is a modern progressive city located on a bluff 35 meters above Cook Inlet in south central Alaska. The city is also the commercial and transportation hub of Alaska and a logical location for the ANMC Referral Hospital. Strategically located between the Matanuska-Susitna valley and the Kenai Peninsula, Anchorage also has a breathtaking view of the Chugach Mountains to the east of the city. Anchorage has a modern utility system, but in contrast many rural areas do not.

The Anchorage Vicinity has a Great Lakes region climate with average temperatures of -24°C in January and 58°C for July. Annual precipitation is .376 meters with an annual snowfall of 1.6 meters. There are occasional extremes of -24°C in the winter for brief periods and in the summer the temporary high may reach 80°C.

PURPOSE OF POST OCCUPANCY EVALUATION

The Post Occupancy Evaluation (POE) is a survey and analysis of a recently completed and occupied health facility. The specific purposes of making such an evaluation include:

- Avoiding repetitious design or construction deficiencies, and verifying that functional requirements of the program are met at reasonable costs.

- Documenting noteworthy construction feature or practices for inclusion in future projects.

- Noting staffing patterns and comparing the adequacy of space provided to the original Program Information Documents. The team evaluates the entire planning, design, construction, and initial operation process.

- The main effect of the report is to provide feedback to those offices responsible for the planning, designing, constructing and operating health facilities funded by the IHS. The ultimate goal is to save future construction and operating costs by contributing to an efficient facilities design and construction program. Basically, the POE Report advises the IHS Health Facilities Advisory Committee (HFAC) of the significant concerns and findings which, after comprehensive review, may lead to health care facilities criteria revisions. Also, the findings and recommendations or "lessons learned" of the POE report will be placed on the OEHE website for use by all interested health facilities planning, design and construction offices.

PATIENT SATISFACTION SURVEY

The tabulated results of the Patient Satisfaction Survey are in Appendix 1.

SURVEY TEAM

The field survey of the ANMC commenced on April 30, 2001 and continued for 5 days until May 4, 2001. The following individuals participated as members of the POE team:

Joseph J. Corliss, P.E., IHS/OEHE, Civil/Structural Engineer, Tea
Arthur DiPadova, P.E., IHS/OEHE, Project Manager
Tommy Bowman, R.A., ES-Dallas, Architect
Donna Pederson, R.N., ANMC, Health Facilities Planner
Paul Ninomura, P.E., ES-Seattle, Mechanical Engineer
John Rogers, P.E., ES-Seattle, Electrical Engineer
Douglas Ott, P.E., IHS/Alaska Area Office, Civil Engineer
Gary Kuhn, P.E., ANTHC-DEHE, Electrical Engineer
Dan Paris, ANTHC-DEHE, Mechanical Engineer
Robert Wilson, P.E., ANMC, Facilities Manager

The team members prepared this report. In conducting the survey, the evaluation team appreciated the help and cooperation of the dedicated staff at the hospital.

PROJECT DEVELOPMENT MILESTONES AND COMMENTARY

Planning

Program Justification Document approved:	May 1987
Program Justification Document Amend.approved:	June 1988
Program of Requirements approved:	August 1988
Program of Requirements Amendment approved:	February 1989
Program of Requirements Amendment approved:	July 1990
Program of Requirements Amendment approved:	January 1991
Program of Requirements Amendment approved:	April 1991

Funding History

FY 1984	$ 2,000,000
FY 1987	4,500,000
FY 1988	5,000,000
FY 1989	2,500,000
FY 1991	995,000
FY 1992	26,660,000
FY 1993	50,541,000
FY 1994	58,000,000
FY 1995	16,969,000

FY 1996	750,000
Total	$167,915,000

Dates

Design Award:	May 1990
Design Completed:	September 1992
Construction Award:	February 1993
Construction Substantial Completion:	February 1997
Construction Contract Completion:	September 1999

Designer

NBBJ Group
111 South Jackson Street
Seattle, WA 98104

Construction

Ellis-Don Construction, Inc.
P.O. Box 5093
2045 Oxford St. East
London, ON, Canada N6A4M6

Size

ANMC (including CDC Laboratory - 1070 square meters):
35,443 square meters

Costs

Land:	$ 2,491,100
Planning, pre-design, Pre-bid:	2,512,880
Design:	9,459,242
Construction Admin:	16,025,382
ES-Seattle:	372,200
Other Admin Costs	2,813,693
Construction contract:	91,650,000
Change Orders:	18,608,290
Equipment:	15,694,250
Telecommunications	4,198,997
AANHS support contracts	2,471,574
Art Work:	224,499
	$166,522,107

Cost for CDC is included in the design and construction contracts. The costs were not separated.

VALUE ENGINEERING OR CONSTRUCTIBILITY STUDIES

2. **Exterior Features**

a. **General Observations/Design Criteria**

(1) The Medical Center is a multi-structure multi-story complex. The main footprint of the building is one and two story and containing ambulatory care clinics, administrative offices and support functions. There is also a distinctive five-story tower, which houses the inpatient wards and other medical support functions (photo ANMC-6). Within the tower there is also an interstitial floor dedicated to mechanical and electrical equipment, a majority of which is composed of HVAC equipment. This has worked very well with the special environmental conditions needed for the operating rooms and the inpatient wards within the tower.

(2) The octagonal entrance pods and other sloped roof areas have a metal roof system while the flat roofs are a membrane type.

(3) Exterior walls are clad with attractive, earth colored brick masonry.

(4) There is extensive landscaping, particularly at the front of the building.

b. **Specific Features/Findings**

(1) The interstitial space works well and provides the necessary space for the HVAC equipment, which services specialized medical space such as the surgery suites and the inpatient wards. This space provided the clearances for ease of installation and the needed access for maintenance and operation.

(2) There are two different types of roofs installed at the ANMC. The first is a standing seam metal roof system using either copper or Tern coated stainless steel over rigid insulation with 40 mil rubberized bitumen sheets laid on exterior gypsum board over 1-1/2"metal decking. The

second system is a membrane roof system used on the flat roofs. It consists of concrete pavers (ballast) on a filter fabric, over 2 layers of rigid insulation board, on top of a single-ply roofing membrane, on tapered rigid insulation board, over roof substrate board. Some of the Tern coating on the stainless steel roofing has been staining and is being reviewed by the roofing supplier and installer (photo ANMC-7).

(3) A sidewalk overhead canopy system has been provided at the south side of the main entrance, along the east clinic entrances and at the emergency entrance. It consists of fiberglass panels set in an aluminum frame, mounted on steel posts. An indirect lighting system is also under the full length of the canopy (photos ANMC-6 and 8).

(4) The brick masonry used for the exterior walls has proved to be a suitable, durable finish material. It is also noted that there is some glass block that has applied in the south elevation of the building at the clerestory level to introduce additional natural light mainly in common areas.

(5) Landscaping with local indigenous plantings has worked out well. The maintenance staff has indicated that the selected mulch performs well in the gardens areas requires minimal upkeep. An irrigation system is required to maintain healthy plantings.

(6) Building Signage/Identification: A main monument identification sign for the Medical Center is located at the Diplomacy Drive entrance from Tudor Drive in a landscaped area. Directional signage is provided to the main and emergency entrances.

c. <u>Comments/Recommendations</u>

(1) Interstitial space is a positive design feature of the ANMC. It is placed effectively where the greatest demands for environmental conditions exist; i. e., between the surgery suites and the

inpatient tower. Time and dollars were saved during construction and maintenance and operation of a complex HVAC system made more efficient for the life of the building. The initial costs are small compared to the life cycle costs of the ANMC. Consideration of and use of interstitial space is recommended for all IHS hospitals. In any event all equipment above ceilings that needs servicing needs walk around catwalk space for tools and workman; working from a ladder is difficult and less safe and should be avoided.

(2) The roof systems at the ANMC have performed well and there have been no reported leaks to date. The standing seam metal roof and the reverse single-ply membrane system should be considered in future facility designs. However, it must be noted that the most critical factor in the successful performance of any type of roof is contractor quality control and careful inspection during installation.

(3) The overhead sidewalk canopies work well for the use intended in the Anchorage climate, however in periods where melting occurs the water drains directly on the uplights causing bulb and circuit failure. The design detail needs some alteration to avoid this problem that is being worked on by the Project Manager's office.

(4) The exterior façade of the building has performed well and is attractive in appearance and would be suitable for any future health facility.

(5) Landscaping with indigenous plants with irrigated self contained, low maintenance gardens is suitable for all IHS health facilities.

(6) Signage and directions are suitable for IHS hospitals. The prominent entrance pods and main circular entrance drive and drop-off area compliment the directional signage.

(7) The children's playground located between the northeast staff parking lot and emergency

ambulance driveway is not well located based on safety and air quality requirements.

(8) The ambulance bay is a tight one-way arctic entry requiring the ambulance to enter forward and back out after dropping off the patient. Local ambulance companies have adamantly objected to the lack of a drive thru garage that would improve the door-to-door relationships for offloading, improve turnaround times, and prevent backing up into any pedestrian traffic.

3. Functional Relationships and Traffic Patterns

a. General Observations/Design Criteria

(1) This is a successful design in terms of interdepartmental relationships and patient and staff flow patterns, although much traffic is concentrated at the main entrance lobby, which is relatively small and at times congested.

(2) The layout of the building is readily comprehended, and departments are logically related and for the most part easy to find. Patients and visitors do experience some confusion attempting to locate departmental entrances. Any monument or unique symbol to identify the entrances would be helpful.

(3) Inpatient services are isolated on to higher floors away from outpatient functions.

b. Specific Features/Findings

(1) There are minimal provisions for locking off major sections of the building for security purposes. It would be useful to develop an after-hours secured areas system.

(2) The single story clinic design necessitates relatively long distances between some departments, mainly outpatient clinics and Radiology. Each department handles blood draws, which alleviates a proximity tie to Laboratory.

(3) Although no serious security problems or incidences were cited, tight security has been difficult to maintain, given the building configuration, with some exits located in low-visibility areas. The back doors to Obstetrics and Pediatrics are security concerns. Three security officers are on duty after normal business hours.

c. **Comments/Recommendations**

(1) Provide lockable gates to secure major areas of the building after normal business hours.

(2) Consider using more of a two-story scheme to provide a more compact layout and to reduce travel distances.

(3) Provide longer time delays on door releases at the back of Obstetrics and Pediatrics.

4. **Interior Features (General)**

a. **General Observations/Design Criteria**

(1) Interior public spaces, although limited in size, are generally appealing and well maintained. There is an obvious "pride of ownership" among the staff and users of the facility. The traditional artwork displayed in the public areas is excellent and reflects the dedication and understanding by the ANMC Auxiliary to the importance of native craft. (photos ANMC-9 and 10).

(2) The main outpatient and emergency waiting area is rather cramped, dark, and unattractive).

(3) The generally hard, reflective wall and floor surfaces in public areas facilitate cleaning, but they also produce a relatively high ambient noise level.

(4) Clerestory windows located over many of the major corridors provide an airy, pleasing quality of natural light (photo ANMC-11).

b. Specific Features/Findings

(1) Paint is cracking and peeling off wall surfaces in many areas. This is occurring mainly on gypsum board substrates where an improper primer or no primer was used. The poor durability and clean-ability of wall surfaces was evident in many places.

(2) The combination guardrails/handrails installed in most public corridors do much to protect wall surfaces from damage (photo ANMC-12). Rails are made of molded plastic with a textured finish, which tends to collect dirt and is difficult to clean. Wall surfaces below rails still receive considerable abuse. A more durable, cleanable material than gypsum board would be desirable.

(3) Floors in most public areas are finished with vinyl composition tile. Carpeting is used only in limited areas, and appears to be in generally satisfactory condition.

(4) Much of the finish hardware is of poor quality. Maintenance staff noted that it is difficult to repair or replace, since the manufacturer is no longer in business.

(5) Staff in almost all departments commented that storage space is insufficient. The team recognizes that this complaint arises in virtually all facility reviews. This is probably the result both of inadequate programming for storage space in the 1981 Program Information Document (PID), as well as inefficient use of the space that is provided.

(6) Modular systems furniture is used in most office areas, and appears to be appropriate for its intended function. The additional, non-systems furnishings and equipment contained in many offices makes maintenance and cleaning more difficult.

(7) Three remote cameras have been installed for security purposes. These are monitored at the security office adjacent to the switchboard. (There are no cameras on the building exterior.)

(8) Dust and insects brought into the building by air infiltration continue to present maintenance problems. Rodents have also been a problem at times.

(9) See comments under Section 9, 45.0 PUBLIC FACILITIES.

c. **Comments/Recommendations**

(1) Waiting rooms should be designed to be well-lighted, comfortable, and attractive spaces. They should be closely related to the departments they serve, and easily supervised by nursing or support staff.

(2) Better quality, more durable paints should be specified. In heavy use areas, vinyl wall covering should be substituted for painted surfaces.

(3) Guardrails or handrails are recommended in corridors to protect wall surfaces from damage. This facility is a good example of their use. Finishes on rails should be easy to clean and not collect dirt.

5. **Staffing Summary**

There are currently 85 (or 41%) more employees on duty than were projected at the time the PID was developed. Some departments presently have significantly larger staff than in the PID plan (e.g., Laboratory, Ambulatory Care, Community Health, Dental, Administration, Health Records, Housekeeping/Linen), while others have fewer (Pharmacy, Dietetics, Facilities Management.)

See Appendix 2a through 2d, Staffing Summaries, for details.

6. **Comparison of Building Areas as Programmed and as Designed**

General: The Final Construction Document Area Submittal (dated November 15, 1992) was used for the Summary of Building Areas (Table 1) on the following page.

a. Overall, the building design follows the area prescribed by the POR reasonably closely. The amended POR called for a total area of 340,695 gross square feet in the hospital building only. The actual area as built is reflected as 345,749 gross square feet, which represents a 1.5 percent increase over the POR.

b. The total of all department gross areas is about 0.2 percent under the POR totals although exact reconciliation was not possible. However, individual departments vary above and below their corresponding POR amounts.

c. The ratio of building gross to department gross area was set at 1.25 in the original PJD.

d. Space for major mechanical equipment was limited by the POR to 12 percent of total floor gross area. As built, major mechanical space was off the POR by .8 percent.

NOTE: This building was programmed, designed, and constructed using English units of measurement.

	TABLE 1					
	ANCHORAGE HOSPITAL - SUMMARY OF BUILDING AREAS					
		PROGRAM	ACTUAL			
Dept.		DEPT	DEPT	DIFF	DIFF	
No.	Department/Area	NET	NET	SQ FT		
	INPATIENT SERVICES					
11.00	**Acute Care Nursing**					
	Medical Nursing	4750	4897	147	3.1	
	Orthopedic	4740	4989	249	5.3	
	Surgical	4680	4897	217	4.6	
	Med-Surgical	4680	4897	217	4.6	
	Acute Care Nursing Pediatrics	4700	4706	6	0.1	
	Acute Care Nursing Obstetrics	3790	3800	10	0.3	
	Shared Support	2355	2277	-78	-3.3	
12.00	**Nursery**	1010	1106	96	9.5	
	Neonatal Intensive Care Unit (NICU)	1025	1027	2	0.2	
13.00	**ICU Nursing / Step Down Unit**	5445	5575	130	2.4	
14.00	**Labor & Delivery**	3885	3863	-22	-0.6	
	Surgery/Anesthesia/Recovery (PAR)	12550	12931	381	3.0	
		53610	54965			
	DIAGNOSTIC SERVICES					
21.00	**Laboratory / Pathology**	5690	5567	-123	-2.2	
22.00	**Radiology**	7465	7500	35	0.5	
		13155	13067			
	AMBULATORY SERVICES					
32.00	**Ambulatory Clinics**					
	Ambulatory Surgery	3070	3099	29	0.9	
	Outpatient Shared Support	4685	4736	51	1.1	
	Walk-in Clinic / Emergency	4550	4650	100	2.2	
	Pediatrics	1685	1642	-43	-2.6	*Removed from Bldg.*
	OB / GYN	1865	1857	-8	-0.4	*Removed from Bldg.*
	Medicine/Surgery	2165	2161	-4	-0.2	Med/surg. Split into:
						Outpat. Surgery Clinic
						Internal Medicine
						Orthopedics
	Family Medicine	945	911	-34	-3.6	*Removed from Bldg.*
	Eye Clinic	1060	1102	42	4.0	
	ENT Clinic	1485	1473	-12	-0.8	
	Oncology	825	818	-7	-0.8	*Created*
	Psychiatry / Mental Health	1900	1809	-91	-4.8	*Removed from*

						Bldg.
	Diabetes Program	420	409	-11	-2.6	*Created*
	Hepatitis B Program	305	315	10	3.3	*Created*
	Fetal Alcohol Syndrome Prevention	200	196	-4	-2	*Created*
	ICU & Nurse Internship Training	975	978	3	0.3	*Created*
33.00	**Community Health**					
	Community Health Aides	2750	2760	10	0.4	
	Social Services	1035	1061	26	2.5	
	Community Environmental Services (CES)	540	525	-15	-2.8	
	Patient Education	360	349	-11	-3.1	
	Public Health Nutrition	205	187	-18	-8.8	
	Community Health Nursing (CHN)	485	465	-20	-4.1	
34.00	**Dental Clinic**	4545	4539	-6	-0.1	
35.00	**Pharmacy**	4505	4607	102	2.3	
36.00	**Physical Therapy**	3630	3415	-215	-5.9	
37.00	**Respiratory Therapy**	950	973	23	2.4	
		45140	45037			
	ADMINISTRATION / PERSONNEL & FINANCE					
41.00	Executive & S.U. Staff	1525	1554	29	1.9	
	Nursing Administration	875	888	13	1.5	
	Computer Information Services	1195	1172	-23	-1.9	
	Financial Management	1065	1033	-32	-3	
	Utilization Review	760	802	42	5.5	
	Medical Director	200	190	-10	-5	
	Personnel	820	851	31	3.8	
	Communications & Travel	180	179	-1	-0.6	
	Contract Care	600	640	40	6.7	
	Hosp. Env. Coordinator Infection Control	440	428	-12	-2.7	
	Auxiliary Patient Services	1160	1078	-82	-7.1	
	Health Records	6335	5710	-625	-9.9	
	Admitting / Registrar	940	935	-5	-0.5	
	Quality Assurance	385	375	-10	-2.6	
	Employee Facilities	2606	2409	-197	-7.6	
	Consulting / Training	2820	2894	74	2.6	
	Public Facilities	10110	9576	-534	-5.3	
		32016	30714			
	SUPPORT FACILITIES					
51.00	Materials Management / CSR	12970	12413	-557	-4.3	
52.00	Purchasing & Supply	600	610	10	1.7	
53.00	Dietetics Service	7020	7560	540	7.7	
54.00	Housekeeping & Linen	2840	2746	-94	-3.3	
55.00	Maintenance / Building Services	4310	4153	-157	-3.6	
		27740	27482			
	NET TOTAL AREA	171,661	171265	-396	**-0.002307**	
	(Grossing, Mechanical Space, Entries, and other buildings not included.)					

	Program Totals (net to gross) sq.ft.					
		Inpatient	Diagnos	Ambulat	Admin	Support
	Net	53,610	13,155	45,140	32,016	27,740
	Net to Gross	1.52	1.4	1.3	1.18	1.15
	Dept Gross	81,487	18,417	58,682	37,779	31,901
	Dept Gross to Building Gross	1.25	1.25	1.25	1.25	1.25
	Building Gross	101,859	23,021	73,353	47,224	39,876
	Building Total Gross	285,333				

7. Comments by Hospital Department

NOTE: Department numbers and names correspond to the standard system used in the IHS Health Facilities Planning Manual, 1989 Standards.

11.0 ACUTE CARE NURSING (GENERAL MEDICAL, Orthopedic, Surgical, Medical/Surgical, PEDIATRICS, AND OBSTETRICS)

A. General Observations/Design Criteria

Net Areas	POR (sf)	As-Built (sf)
Medical	4750	4897
Orthopedic	4740	4989
Surgical	4680	4897
Med-Surgical	4680	4897
Pediatrics	4700	4706
Obstetrics	3790	3800

(1) Comparative Data:

(a) POR Beds: The POR called for a 150-bed hospital:

- 92 med/surgical (including 4 isolation & 1 security)
- 6 Level II NICU
- 19 pediatric (including 1 isolation)
- 17 obstetrical (including 1 isolation)
- 8 intensive/coronary care
- 8 step-down

These beds were to be located in 46 single-bed rooms, 6 isolation rooms, and 76 double-bed rooms (independent of the 8 ICU, 8 Step down Unit beds, and 6 NICU beds).

(b) Beds as built:

- 92 med/surgical (including 4 isolation & 1 security)
- 6 Level II NICU
- 19 pediatric (including 1 isolation)
- 17 obstetrical (including 1 isolation)
- 8 intensive/coronary care

- 8 step-down

(2) Room Changes:

OB/PP/Nursery:

- Exam Room was changed by adding a movable partition to an Exam Room and Education Room. The Birth Certificate Workstation was added two years post occupancy due to the infrequent need for the exam function.
- Conference Room was changed to a Midwife office in 1999. The Conference Room was active until that time.
- NB - Equipment was changed to a men's on-call room. (This was done in 1997)

Medical-Surgical:

- The Cast Room remote charting area is used as a storage area.
- The unit exam room is used for storage and conference room.
- The security room on 5 east is used as a patient room.

Pediatrics:

- Growth in department has caused the conversion of Family sleep room outside of the Pediatric Unit into office space. Parents are provided sleeping accommodations in the child's room. This was used as design until 1998.

B. Specific Features/Findings

(1) Inpatient Surgery - This department is located on the west half of the fourth floor. The two-bed patient rooms are insufficiently sized to accommodate passage of larger patient beds within the room, especially post-operative beds with attachments. Even though all of the inpatient units are designed essentially the same, the hospital has designated the units by specialty: Fourth floor east: Surgery, West: Orthopedics, Fifth floor

east: Medicine, West: Medicine/Surgery.

(2) Pediatrics - This department is located on the second floor in the southwest corner of the building. The neonatal ICU is an integral part of the department.

- Department deals with patients ages one to eighteen. More storage space is required to stock seven sizes of bed including climber cribs (full enclosure cribs).
- Picture Archiving Computer System for Radiographic Imaging (PACS equipment) must be adequately planned into department. A recessed area at the nurse's station would work best.
- The room sizes are tight. With a large bed in the room, medical staff has difficulty getting around end of bed.

(3) **Operating Room/Post Anesthesia Recovery/Anesthesia** - This department is located on the east half of the second floor.

- The door hardware at the Operating Rooms must allow access/egress for a scrubbed individual without compromising sterile status. Currently staff uses their elbows to enter, which is not the preferable opening method to maintain infection-control.
- The control room needs window access from the family waiting room for patients and family to obtain information.
- The ability to secure the department is necessary, especially for night shift staff. Currently, people stroll into the department inadvertently.
- Review nurse call protocol for usage. Present staff utilizes the telephone for this type communication.
- Code call system must be heard in more than the nurse's station to be useful. The telephone and overhead paging system are used in lieu of the nurse call system because of its ineffectiveness.
- It was preferred in the OR's to have PACs monitors on carts for flexibility rather than attached to the light booms.

(4) **Obstretics/PostPartum/Nursery** - This department is located on the northwest quadrant of the second floor.

Inpatient Pharmacy, Social Services and Administration separate the NICU from this area.

- The nurse's station must be central to the department to ensure maximum convenience with fewest steps.
- The unit must be secure to eliminate the possibility of infant abduction. The northwest stairwell and elevator are easily accessible from OB. This stairwell leads directly to the exterior of the building. The existing code alert hardware system should be extended to a 30 second time delay on the back door.

C. Comments/Recommendations

(1) General - Patient toilets, including showers, should conform to applicable accessibility standards. Showers appear to be accessible but the rooms were not configured to address the clear space requirement adjacent to the doorknob side of each door.

(2) Support Space - The staff lounge and break room were combined in Post Partum, limiting the options for staff breaks when they must remain on the unit. Staff is relegated to breaks in offices or conference rooms to enable them to stay on the units. Conferences with patients' families are scheduled in the limited conference space.

(3) OR/RR/Anesthesia - Review nurse call system to make it useful. It is not currently used at all.

(4) OB/PP/Nursery - The Labor/Delivery/Recovery (LDR) rooms should be investigated for automatic hold-open devices on doors to assist in patient movement with minimal staff.

12.0 NURSERY (NURSERY AND NEONATAL INTENSIVE CARE UNIT (ICU))

A. General Observations/Design Criteria

Net Areas	POR (sf)	As-Built (sf)
Nursery	1010	1106
Neonatal ICU	1025	1027

The nursery is located between labor and delivery and postpartum on the second floor (in the northwest corner). The neonatal ICU is in the pediatrics department in the southwest corner of the second floor.

B. Specific Features/Findings

The neonatal ICU is located adjacent to the inpatient pediatrics department, which is not adjacent to the labor-delivery or postpartum area of obstetrics

C. Comments/Recommendations

In design of future facilities with a NICU, efforts should be made to ensure this department is located near the postpartum area. This minimizes the distance compromised babies have to go after birth and ensures quick response from NICU staff to a complicated delivery. Also, it is advantageous for mothers to be in close proximity to the NICU during their convalescence so they are not required to leave the department to visit their baby.

13.0 INTENSIVE CARE UNIT NURSING/STEP DOWN UNIT

A. General Observations/Design Criteria

Net Areas	POR (sf)	As-Built (sf)
Medical	5445	5575

This department is located in the southwest corner of the second floor. This half of the second floor is shared by the operating room, day surgery program, recovery room, and office support space.

(1) Comparative Data:

The POR required the following bed configuration:

- 8 intensive/coronary care
- 8 step-down

(2) Beds as built - beds were incorporated in compliance with the POR. The eight step-down beds were an increase of four over the 1989 HFPM requirements.

(3) Isolation anterooms were originally planned in this department but were deleted in a 1990 POR amendment. The space was re-allocated to the step-down unit. The POR amendment stated that according to AID/DHHS 1987, "...isolation anterooms are not required when all single bed rooms are provided." However, this was a complaint of the department.

B. Specific Features/Findings

1. Area for Pyxis units (brand name for the automated medication and supply distribution system) was not planned into each department so storage rooms, alcoves, and hall space were used.

2. There are no full isolation rooms with anterooms to address tuberculosis patients or others needing infectious isolation.

3. Proximity to ER and OR is a necessity for inter-departmental trauma team's immediate access.

4. The dirty utility rooms are insufficiently sized to permit access to hazardous waste sinks when linen hampers are present.

5. The departmental configuration is not conducive to security. Controlled access is necessary at times when treating violent patients in the departmment.

6. Department and directional signage is present but marginally effective. Better identification of departmental entrances from down the hall would benefit patients, visitors, and vendors.

7. This is inherently a noisy unit.

C. Comments/Recommendations

(1) Size dirty utility rooms to permit use of hazardous waste sinks even when linen hampers are present.

(2) Seek additional ways to minimize noise between nursing stations and adjacent patient rooms.

(3) Improve signage layout to better identify departmental entrances.

- One existing dark room is utilized as a storage space due to the storage shortfall and the low demand for a dark room due to digital upgrades.

B. Specific Features/Findings

(1) Storage space is limited for the extensive size of this operation.

(2) A Fluoroscopic/Radiographic room reconfigured into the CT room is inadequately sized for efficient operation. The door to the CT room is too narrow for the trauma bed and attending medical team.

(3) The number of dressing rooms is considered excessive compared to actual utilization. In the 1990 POR, one dressing room was removed but 13 remained. A portion of this space could be better reconfigured within the space.

(4) Two ultrasound machines in one room to accommodate two patients simultaneously are totally ineffective functionally.

(5) The use of the Picture Archiving Computer System (PACS) and digital technology in general has impacted the needs in this department (photo ANMC-13). The dark room is no longer needed (now used for storage) due to the digital capabilities of the equipment. The computer room is much too small. Lighting and space planning are not appropriate for the computers associated with the PACS. Less film viewing and film file area is needed. The HVAC loads are increased due to the increase in computer equipment, causing offices with multiple PACS screens to be too warm.

(6) Staff and patient circulation paths are not separate. Operations would be more efficient with separate circulation paths.

(7) Of the three dark rooms built, only one is being used.

C. Comments/Recommendations

(1) Plan radiology departments for digital capability, even if wet processing is still needed. All recent facilities have used digital radiology equipment of some kind. This includes space for computer equipment, HVAC

considerations, and proper ergonomic configurations (lighting and positioning) for reading computer screens and inputting computer data. PACS system alcoves with proper ambient lighting should be a consideration (photo ANMC-14).

(2) Review carefully the need for wet processing (requiring dark rooms and special ventilation) before design is solidified.

32.0 AMBULATORY CLINICS

A. General Observations/Design Criteria

Net Areas	POR (sf)	As-Built (sf)
Ambulatory Surgery Clinic	3070	3099
Outpatient Shared Support	4685	4736
Walk-in Clinic and Emergency	4550	4650
Outpatient Surgery Clinic	2605	2605
Internal Medicine	2965	2965
Orthopedics	2855	2855
Eye Clinic	1060	1102
ENT Clinic	1485	1473
Oncology	825	818
Psychiatry and Diabetes Program	420	409
Hepatitis B Program	305	315
Fetal Alcohol Syndrome Prevention	200	196
ICU and Nurse Internship Training	975	978
Medicine/Surgery	2165	**
Pediatrics	1685	Removed from bldg**
OB/GYN	1865	Removed from bldg**
Family Medicine	945	Removed from bldg**
Mental Health	1900	Removed from bldg**

**Space utilized for outpatient surgery clinic, internal medicine, and orthopedics. Departments removed from ANMC were built in the Primary Care Center immediately across the street from ANMC. (Refer to POR amendment dated December 1996).

(1) Room Changes:

Ambulatory Surgery Clinic: (Day Surgery)

- One office was changed to a multipurpose waiting area.
- Storage area was changed to an office.

(2) Internal Medicine:

- One exam room was changed to a teaching area for pre-surgery.
- One screening room was changed to an office.
- One exam room has been dedicated exclusively to performing EKG's.

(3) Orthopedics:

- Part of waiting area was changed into an office.
- A nurse's office was changed to a doctor's office. (Room A1-H13B)
- Three exam rooms were changed into doctor's offices.

(4) ENT and Audiology Clinic:

- A conference room outside the department was changed to an exam room, and then subsequently divided into two exam rooms to accommodate expanding service requirement. (Rooms J19B, J19C)

B. Specific Features/Findings

(1) Surgery Clinic - This department is located on the first floor just east of the main lobby off the main corridor.

(a) There are no employee restrooms within the department or in close proximity to the department.

(b) Patient confidentiality is compromised due to the lack of sufficient sound attenuation in the patient rooms (both through the walls between procedure rooms, and from the hallway to the procedure rooms and vice versa).

(2) Emergency Department - This department is located on the northeast quadrant of the first floor. Radiology is to the immediate west of the department, laboratory and internal medicine clinic are adjacent on the south side of the emergency department.

(a) In the design stages, there were no plans to use PACS (computer support for digital equipment) or Pyxis (supply and medication distribution system). The Pyxis cabinets have sizeable counter and/or floor space requirements. These items are departmental function and must be accommodated into the layout.

(b) The number of patient restrooms (currently two) in the department is inconsistent with planning guidelines and is insufficient.

(c) The remoteness of the doctor's offices to the ER Department (second floor directly above the ER) compromises the primary provider's ability to respond to the patient workloads and emergency room scheduling demands.

(d) The distance between emergency and pharmacy departments is excessive. Patients have trouble finding it. The two departments adjacent to each other with the laboratory more remote would be a better layout.

(e) Patient confidentiality is difficult to maintain with patient registration located directly across from patient and family waiting.

(f) The soiled utility room does not currently meet the requirement of being centrally located in the department.

(g) There is an unmet need for a secure location for clerical and nursing staff's personal belongings in the department.

(h) The exam rooms are required by the Office of Safety and Health Administration (OSHA) to have lockable cabinets. The exam rooms in this department are conforming.

(i) The welded seam sheet vinyl flooring has proven advantageous to maintain in this department.

(3) Internal Medicine - This department is on the first floor and is surrounded by emergency/urgent care, laboratory, and the ENT clinic.

(a) There was no nurse's station programmed in the POR but one was constructed at the front of the department.

(b) Patient confidentiality is compromised if any information is gathered with the waiting area directly across from and on either side of the nurse's station. This facility's business office is in another building.

(c) Lab work sampling is performed within the department and sent through a pneumatic tube system to the laboratory. This is very patient-friendly and deletes the necessity for the laboratory to be immediately proximate to the department.

(d) X-ray view boxes are unnecessary with the implementation and commitment to the PACS in the entire facility.

(4) Orthopedics - This department is on the first floor located off the main corridor east of the main lobby. It is surrounded by other outpatient clinics on the south and east sides and by the laboratory on the north side. The proximity to radiology is not ideal. Patients have to be escorted to radiology most of the time because they have difficulty finding it themselves.

(a) A break area was included in the original POR but was later programmed out of the department.

(5) Ophthalmology - This department is located on the first floor contiguous to the audiology and ENT departments. The original Eye Dept. per the POR included 4 eye lanes and associated minimal support space. The recent re-configuration is less than ideal.

(a) Room sizes are too small for the electronic exam chairs being used. There is currently no working room behind the chair when the chair is reclined.

(b) The existing 4 - 20 foot eye lanes on segregated into the ENT side of the department. The re-configuration and department expansion generated only mirror refractory eye lanes on the Ophthalmology side of the department.

(c) The lack of consistency in the exam chair and note table layout causes doctor disorientation due to the right and/or left hand service requirements.

(d) The expanded department cannot be secured from the Audiology/ENT department.

(6) ENT and Audiology Clinic - This department is located on the first floor contiguous to the ophthalmology department.

(a) The overall department layout works well. However, based on current workload, the department needs two additional exam rooms. Existing conference space has already been converted to exam rooms. This department lost 65 square feet in the 1990 POR amendment when the four exam rooms and two microscope rooms were combined into four exam/microscope rooms.

(7) Oncology - This department is located on the first floor between the orthopedic clinic and ophthalmology department.

(a) The office and two exam rooms were previously used for the fetal alcohol syndrome program.

(b) The location of the janitor's closet, which opens to the patient area, disrupts department functions. To enter the closet, janitorial staff must walk through a staff work area.

(8) Diabetes - This department was added to the facility in the 1990 POR amendment. It is located on the second floor between ambulatory surgery and the office support area. The staff utilizes three exam rooms in the Internal Medicine department, which is immediately below them.

(a) The absence of windows in the department sometimes makes it difficult to employ distraction tactics during pediatric patient exams.

(9) Hepatitis B Program - This program is located on the east side of the 2nd floor adjacent to the internal medicine department. The program utilizes internal medicine exam rooms, which are difficult to obtain on high volume days. Security of patient information is critical to the success of this program. They have a separate server for their patient files and file space remains locked to prevent unauthorized access to patient files.

C. Comments/Recommendations

(1) In orthopedics, five spaces were changed into doctor's offices (including three exam rooms). Evaluate in future facilities whether more office space is needed initially.

(2) Lack of restrooms was a common complaint in many departments. This should be carefully evaluated facility-wide (including patient, staff, and public restrooms).

(3) In the planning and design of future facilities, evaluate early in the design process whether a Pyxis-type supply and medication dispensing system is to be utilized. This will ensure the facility has the proper power, data, and space issues resolved.

(4) In future facilities, the emergency department staff office space must be internal to the department.

(5) In future facilities, IHS must improve upon communicating patient confidentiality needs to designers. This is applicable both at registration areas and in regards to sound attenuation in exam rooms.

33.0 COMMUNITY HEALTH SERVICES

A. General Observations/Design Criteria

Net Areas	POR (sf)	As-Built (sf)
Community Health		
Health Aides	2750	2760
Social Services	1035	1061

Community Environmental Services	540	525
Patient Education	360	349
Public Health Nutrition	205	187
Community Health Nursing	485	465

B. Specific Features/Findings

(1) Community Health Aide Program (CHAP) - This department is on the first level on the far southwest quadrant of the facility. It has easy access to the hostel.

(a) Toilets are lacking in this area. The conference rooms, library, and demonstration kitchen in addition to the CHAP offices share one toilet.

(b) The paging system goes off in the classrooms and cannot be muted while classes are in session. This is disruptive to the learning environment.

(2) Social Services - This department is on the second floor immediately around the corner from the central elevator lobby. This space was downsized by 500 square feet in the 1990 POR amendment.

(a) This department is ideally located with easy access to both inpatient and outpatient departments. It is easy to find due to its close proximity to the central elevator.

(b) Due to patient confidentiality issues, it would be best to have enclosed offices instead of full height cubicle walls.

(3) Community Environmental Services - This office is located on the east side of the second floor.

(a) Environmental safety staff office is separated from the infection control office and department supervisor.

(4) Patient Education - This department is located on the first floor in the southwest quadrant of the facility. It was reduced in size by over half as part of the 1990 POR amendment. Office space is in close proximity to conference space.

(5) Public Health Nutrition - This space was combined with the community health nursing space.

(6) Community Health Nursing - This department was originally located on the east end of the first floor. The program was compacted and moved to another building on the campus.

(a) Two offices planned for public health nurses were taken by case managers. Thus, the department is two offices short.

C. Comments/Recommendations

(1) CHAP - There should be a way to mute the paging system in classroom settings. In new facility design, this possibility should be reviewed throughout the facility (e.g., for conference rooms and training areas).

(2) Consider more enclosed offices in Social Services to ensure patient confidentiality.

34.0 DENTAL CLINIC

A. General Observations/Design Criteria

Net Areas	POR (sf)	As-Built (sf)
Dental Clinic	4545	4539

The dental clinic is located on the first floor on the southeast corner of the building. The clinic has windows on three sides so nearly all operatories have natural light for patient comfort.

(1) Dental care is administered from the side, rather than from the back at the request of the local dentists involved in the design.

(2) The 1990 POR amendment called for three dark rooms but there are only two.

(3) The original POR called for four toilets but one was deleted as part of the 1990 POR amendment.

B. Specific Features/Findings

(1) Waiting area (programmed for 300 square feet) is too small. There is no room for a display booth for patient education materials. There is also no video monitor for patient education.

(2) A third dark room is required to service the 23 chair operatory. Digital images are not clear enough to define decay thus wet processing is still required. (Digital images can be used in endodontics and root canals.)

(3) Two patient toilets are located inside the department and one is adjacent to the waiting room outside the department. Two patient toilets inside the department are not adequate.

(4) One cephalometric x-ray unit and panoramic x-ray unit called for in the POR are insufficient for a department this size.

(5) There is no programmed space for staff changing and lockers. This is a common complaint in the design of new IHS facilities. For infection control purposes, dental staff prefers to change into work clothes inside the department and cannot utilize the main employee locker room.

(6) The department taxes the existing trolley system schedule to receive timely record deliveries. They see approximately 200 patients a day. Averages of 40 of those patients per day are emergency appointments, which must wait for records to be delivered prior to processing.

(7) The department needs an expanded business office to accommodate the existing workload. The POR included no business office functions in this area. The 2nd floor Dental Offices are presently being used to address business needs which generates a necessity for replacement office space. There is one 100 SF enclosed office (reduced from 120 SF) and six 80 SF cubicle offices scheduled in the 1990 POR amendment which is on the 1st floor. The department employs 16 dentists, 5 hygienists, and 30 dental assistants. The 2nd floor space across from ICU provides limited space for provider office space.

(8) The addition of a recovery room area for dental surgery patients would help keep the chair space available.

(9) A day surgery office is needed to accommodate patient coordination.

C. Comments/Recommendations

(1) Larger dental modules may require more than one cephalometric and panoramic x-ray unit. Evaluate during the planning stages of new facilities.

(2) Dental departments need staff locker and changing areas within the departments. Where not included in the original design, they are being retrofitted into the departments.

(3) Reasonable access or a track system from the dental department to medical records is needed to ensure a smooth record flow for appointment and emergency patients.

35.0 PHARMACY

A. General Observations/Design Criteria

Net Areas	POR (sf)	As-Built (sf)
Pharmacy	4505	4607

The outpatient pharmacy is located on the first floor between physical therapy and laboratory/pathology. The consult rooms open to a main corridor just north of the main lobby.

The inpatient pharmacy is located on the second floor adjacent to the administration department. It is central to labor and delivery, postpartum, operating room, and the NICU.

B. Specific Features/Findings

(1) Outpatient Pharmacy:

(a) Pharmacy shares a small waiting space with physical therapy. This was a complaint for both departments.

(b) A security panic button had to be added at the front desk for protection of the pharmacists.

(c) The pharmacy has added two major automated medication dispensers (Script Pro being the most recent addition) to the department that was not planned for in the original department layout.

(2) Inpatient Pharmacy -
Space appears adequately sized and located.

C. Comments/Recommendations

(1) In future facilities, review the possibility of the pharmacy using automated medication dispensers (such as Script Pro and Baker APS) during the planning stages so the appropriate floor space and infrastructure can be planned.

(2) Review the need for the panic button at the dispensing window in the planning of future facilities.

(3) Review future layouts to provide outpatient pharmacy with a larger waiting area near the main entry.

36.0 PHYSICAL THERAPY

A. General Observations/Design Criteria

Net Areas	POR (sf)	As-Built (sf)
Physical Therapy	3630	3415

The physical therapy department is located on the first floor on the far west side of the facility. This department is isolated from other patient delivery areas of the facility. Access to the elevator and inpatient orthopedics department is good.

B. Specific Features/Findings

(1) The amount of storage space appears sufficient but needs to be secure.

(2) The best staffing utilization require that the reception area also accommodate charting functions. The space is presently insufficient but utilized for both functions.

(3) The patient therapy area is fully visible from the waiting area when door from the reception is left open.

Normal operation generates constant staff access from reception to therapy area, which adds to the privacy concerns.

C. Comments/Recommendations

(1) Address secured storage for physical therapy department for equipment storage.

(2) Develop a plan with improved visual patient privacy from waiting area.

37.0 RESPIRATORY THERAPY

A. General Observations/Design Criteria

Net Areas	POR (sf)	As-Built (sf)
Respiratory Therapy	950	973

Respiratory therapy is located on the second floor of the facility immediately adjacent to the intensive care unit. Its proximity to ICU and Pediatrics is also good.

B. Specific Features/Findings

(1) To comply with the 1989 HFPM requirements, the 1990 POR amendment added space for a manager. However, the department manager requested space for a secretary and case manager to ensure patient privacy. The department has fifteen respiratory therapists and one secretary and has 80 square feet of office space. The manager's office is adjacent

(2) In emergencies, it would be better for staff to have key-card access to departments rather than keys. This would better accommodate quick ingress/egress from the department. Staff members in other departments have also requested key card access.

(3) Walls are being damaged by staff moving equipment in and out of the department.

C. Comments/Recommendations

(1) Examine possibility of providing key card access throughout the facility. This is a repeat comment.

(2) Provide bumper guards along all walls where equipment is staged and utilized.

41.0 ADMINISTRATION

A. General Observations/Design Criteria

Net Areas	POR (sf)	As-Built (sf)
Executive and S.U. Staff	1525	1554
Nursing Admin.	875	888
Computer Information Services	1195	1172
Financial Management	1065	1033
Utilization Review	760	802
Medical Director	200	190
Personnel	820	851
Communications and Travel	180	179
Contract Care	600	640
Infection Control	440	428
Aux. Patient Services	1160	1078
Health Records	6335	5710
Admitting	940	935
Quality Assurance	385	375
Employee Facilities	2606	2409
Consulting/Training	2820	2894
Public Facilities	10110	9576

B. Specific Features/Findings

(1) Executive and Service Unit Staff - These offices are located on the west side of the second floor with a stairwell access adjacent to the department.

(a) The clerical area is underutilized at the reception area within the department.

(2) Nursing Administration - This function is located in the executive and service unit staff space on the second floor.

(3) Computer Information Services - This space is located on the first floor off the north/south central corridor at the back of the facility.

(a) Staff complained about accessibility of computer cables run under the raised floor. They would have preferred access to cable trays above the ceiling.

(b) The facility is already outgrowing the computer room. Planned expandability has proven totally inadequate in light of the growth experienced.

(c) Preference for a card access security system to keyed locks was expressed.

(4) Financial Management - The Director's Office is located within the Executive and Service Unit Staff. The support staff functions have been located within the corporate offices.

(5) Utilization Review - This function is located on the first floor across the hallway from physical therapy and outpatient pharmacy.

(a) The staff members review records to verify appropriate actions are taken and interact with the insurance carriers. There is insufficient space for the large quantity of records that are in the area at any one time.

(6) Medical Director - This office is located within the Administrative Suite. The office space appeared adequate.

(7) Personnel - This office space appeared adequate.

(8) Communications and Travel - Both spaces are on the first floor. The communications space is located just to the north of the main lobby directly across from the gift shop. The travel space is located in a space directly off the main lobby with windows on seven sides of on octagonal area. The appropriateness of the location is notable.

(9) Contract Care - This space is located on the first floor across the corridor from the outpatient pharmacy and is of adequate size.

(10) Infection Control - This office and support space is located within the area designated as Utilization Review. It is an adequate office and support space location.

(11) Auxiliary Patient Services - The gift shop and corresponding office are located just to the north of the main lobby.

(a) Additional secure storage space was requested for Native art staging and displays to prevent theft. This is in addition to the programmed secure storage room for the craft shop and artwork on the first floor.

(12) Health Records - This space is located on the lower level in the far southeast corner of the building.

(a) The information supervisor prefers fixed shelving to accommodate multiple staff accessing records at same time.

(b) Information is transported on the track system between health records and the first floor clinical departments.

(c) Area is not secure. Locks are needed for privacy of information and protection of employee's purses and personal items within the department.

(d) Employees do not have a lockable space (either locker or cabinet) for personal items within the department.

(e) Bill preparation is a new function performed within the department. This exhausted the soft space in the department for work stations and is still insufficient in size. This function also requires robbing additional space for record staging.

(13) Admitting - This space is located in an octagonal space off the main lobby with other patient support functions.

(a) Utilization review and medical records are remote from Admitting but are connected by pneumatic tube system. The enlarged size pneumatic tube system is a necessity to accomplish this. Otherwise a closer proximity would be required if hard charts are routed through this department.

(b) Landmarks at department entrances are against the wall and at corridor junctions. Landmarks at

department entry that are perpendicular to wall would be more significant.

14. Quality Resources

This space is directly across the hall from the executive administrative staff on the second floor.

(a) There is a lack of privacy and confidentiality in this space. The risk manager occupies this space. Functions that take place here are tort claims management and corporate compliance. The space is also limited in size and does not accommodate sufficient file storage. The Risk Management function has been a new addition since the hospital opened.

(15) Employee Facilities - There were overall complaints about secure storage of personal items. The dental department needs lockers and changing space inside the department. Facility-wide, there are not enough employee restrooms within departments. Generally, there are an insufficient number of lockers for the non-office personnel e.g. dietary, housekeeping clerical workers.

(16) Consulting/Training

(a) A large number of conferences must be accommodated within the space available. For a facility with as many conferences and training functions as ANMC, the large conferencing area is barely adequate. Additional moderate size conference rooms would ease scheduling problems.

(b) The moveable Partitions in the large conference spaces are very heavy. Maintenance staff assistance is required to open and close them. It would be more manageable if these partitions were divided in the middle and opened to either side rather than opening from one side only.

(17) Public Facilities - The overall lack of restrooms, staff and patient, was a common complaint from staff throughout the facility.

C. Comments/Recommendations

(1) The planning of computer rooms, should consider future expansion space.

(2) The preference by staff for card access rather than keyed access to locked spaces was a complaint in several departments. Facility management staff also expressed a preference for card access throughout the facility. On future facility designs, IHS should consider the viability of this alternative.

(3) The limited number of restrooms and break areas thru out the building has impacted staff flow.

51.0 MATERIALS MANAGEMENT/Central Sterile Services

A. General Observations/Design Criteria

Net Areas	POR (sf)	As-Built (sf)
Matls. Management/CSR	12970	12413

Materials management/Central Sterile Services are located on the lower level of the facility. Access to receiving is well done.

B. Specific Features/Findings

(1) Decontamination area is insufficiently sized for the existing workload. This room was reduced by 100 square feet in the 1990 POR amendment to accommodate an office and to give more space to cart holding. The office and cart holding space were necessary, but decontamination should not have been reduced. The wall paint in this space is easily damaged.

(2) The dumbwaiter opens into the hallway. It would have been more logical to open it into the department.

(3) An arctic opening at the receiving dock is necessary in this climate.

(4) The staging area for receiving is insufficiently sized.

(5) The gates to the dock area are not necessary.

C. Comments/Recommendations

(1) Ensure in future facilities that any equipment planned for outdoor installation is, in fact, weather-resistant in the local climate.

(2) Consider hard wall surface materials in the decontamination areas for more durability and cleanability.

52.0 PURCHASING AND SUPPLY

A. General Observations/Design Criteria

Net Areas	POR (sf)	As-Built (sf)
Purchasing & Supply	600	610

The department shares dock area with department 51 - Materials Management.

53.0 DIETETICS SERVICE

A. General Observations/Design Criteria

Net Areas	POR (sf)	As-Built (sf)
Dietetics	7020	7560

Dietary services, kitchen, and cafeteria are located in the southwest quadrant of the first floor. The kitchen staff serves approximately 1300 meals a day. The cafeteria has seating for 97 with 1200 employees at the facility.

B. Specific Features/Findings

(1) Trash disposal is difficult due to location of the dock in comparison to the department. The dock is on the lower level and is accessed by elevators to the north of physical therapy (down three different hallways).

(2) Hallways outside dietetics are regularly lined with food carts. This blocks the means of fire egress and access to elevators for garbage disposal.

C. Comments/Recommendations

(1) Review cart storage options in all new facilities.

(2) Consider a trash chute in multi-level facilities or evaluate the proximity of the trash disposal area in relation to areas that generate large quantities of trash.

54.0 HOUSEKEEPING AND LINEN

A. General Observations/Design Criteria

Net Areas	POR (sf)	As-Built (sf)
Housekeeping and Linen	2840	2746

The housekeeping and linen department is located on the ground floor with janitor's closets scattered throughout the facility.

B. Specific Features/Findings

(1) The janitor's closets are too small to store equipment such as buffers and carpet cleaners in addition to normal cleaning supplies, mops, buckets, etc. This equipment is staged in several janitor closets throughout the facility within areas of coverage.

(2) The painted surfaces are not easily cleanable. Paints should be washable for long-term maintenance of the facility.

(3) The carpets, with three years of service, are not performing as well as expected. The wear and tear of daily use as well as numerous spills is showing signs of excessive wear.

(4) Furniture throughout the facility is not performing well to frequent cleaning/washing. Material selection is questionable due to cleaning difficulties after normal wear and tear.

C. Comments/Recommendations

(1) On future facilities, ensure paint and wall covering specifications require clean-ability standards for these finishes throughout the facility.

(2) Ensure carpets are hospital grade and bleach-resistant. Carefully evaluate location for carpet placement in new facility.

(3) Insure upholstery selections for furniture are readily cleanable.

55.0 MAINTENANCE/BUILDING SERVICES

A. General Observations/Design Criteria

Net Areas	POR (sf)	As-Built (sf)
Maintenance	4310	4153

Maintenance is located on the lower level of the facility.

B. Specific Features/Findings

(1) The San-I-Pac (solid and medical waste compactor) was originally located on the dock when the facility was completed. The equipment did not function properly in the winter due to ice locking up the compactor. An additional 1460 square feet of heated space had to be built to house the unit. This was incorporated through the POR process in 1997.

(2) The offices, as sized, leave no room for plans and numerous manuals required to maintain a facility.

(3) The facility currently has keyed locks throughout except for pharmacy, which has key cards. Facility management staff recommends key cards on all lockable doors throughout the facility instead. This has been discussed at other facilities in the recent past as well.

C. Comments/Recommendations

(1) Thorough evaluation should be done as to the feasibility of using key cards as opposed to keys on future facilities.

(2) Planners should consider plan review areas and an area for manuals either within facility management offices in future facilities.

8. ARCHITECTURAL SUMMARY

A. Generally, this is a well-planned facility, although a number of problems were discovered, as documented in this report. It is a good example of a hospital of its size, especially in terms of general layout and interdepartmental relationships.

B. The overall gross area of the building as designed is very close to the amount specified in the POR, although there are variations among departments.

C. The facility patient counts are as follows:

Year	Outpatient	Inpatient
1995 (Actual)	176,242	
1997 (Actual)	265,493	4,500
2000 (Projected)	206,777	
2000 (Actual)	409,786	7,500

The original POR did not address growth of this magnitude. The staff count was programmed to be 765 and is over 1200. The space problems generated by this growth are evident in nearly every department. This disparity between program and actual space requirements three years post-occupancy will have to be addressed in planning future projects.

D. Some of the problems experienced by the staff and observed by the POE team are the result of placing additional programs and staff into spaces, which were not designed for them. This is especially evident in the outpatient clinics (ENT and Internal Medicine most notably) and support space in nearly every department.

The Dietary department has no hope of seating more than a representative portion of the staff at lunchtime.

E. IHS should consider more multi-story schemes for hospitals, especially the larger ones, in order to improve interdepartmental relationships, reduce internal travel distances, and improve energy efficiency.

F. For specific recommendations, see the "comments/ recommendations" section under each department heading. Also see SUMMARY OF FINDINGS AND RECOMMENDATIONS at the end of this report.

G. The lack of restrooms and conference space generated, overall, the biggest complaint from staff in this facility. Much of the space reduction is a result of an HHS Inspector General investigation prior to the beginning of the design phase.

H. The operation methodology at this facility indicates that most laboratory samples (blood draws) are taken in the attending clinic. This indicates the laboratory could be more remotely located. The laboratory's present location near the lobby would be better utilized by the pharmacy for the convenience of patients and staff.

I. Considering the current 57 percent increase in staff positions and 100 percent increase in outpatient visits over the original plan, this facility still functions remarkably well.

CIVIL/STRUCTURAL

A. GENERAL

The hospital is located on a 15-acre site identified as the Tudor Centre in the southeastern area of the City of Anchorage, Alaska. The site slopes to the Northwest and has been utilized to obtain access to the ground floor at the loading dock area to the north. The hospital building is a complex facility of 35,443 square meters, composed of many one and two story wings and a central tower of five stories. The main entrance is located on the south side of the facility and the loading dock and service area occupies the northern area of the building (photo A-1). The hostel is attached to the west end of the main building and the Emergency clinic is accessed at the east side of the ANMC. The building structure consists of reinforced concrete footings, foundation walls and piers supporting a structural steel framing system, and a composite steel deck and concrete floor and roof system. The structural design was essentially based on the 1987 Life Safety Code, NFPA 101, and the 1987 Uniform Building Code. The Anchorage Water and Wastewater Utility handle the potable water and wastewater at the ANMC. There have been no reported problems with the utility company services. The ANMC also has experienced no snow removal problems from their roads and parking areas since this is included in the Tudor Center agreement. When piles of snow block parking spaces it is removed from the site.

1. Site Drainage and Groundwater

a. **Criteria/General Observations**

The site drainage at the ANMC is with adequate slopes from the southeast to the northwest area of the site.

b. Specific **Features/Findings**

The surface drainage has experienced few problems, however in the loading dock area there has been a surface freezing condition and manhole backup under severe weather conditions. Also, changes were made during construction due to groundwater problems in the northwest corner of the site. The fuel storage vault had to be moved to the northeast corner of the site. A dewatering well was placed in the area of the northwest corner of the building during construction so that the foundation

could be installed. An energy conservation project is planned by the Facilities Manager to use this groundwater for condenser cooling. This is an ingenious idea to save energy and potable water.

c. **Comments/Recommendations**

The design of the site drainage is good in general in the area of the loading dock. The problem of storm drain freezing probably depends on the minimum design slope criteria and severe freeze thaw cycles at the site. The soil retains significant amounts of moisture and the fuel storage vault continues to show groundwater intrusion and active sweating of the concrete walls. This continuous high moisture condition is harmful to the piping and controls needed for the fuel tanks. The Facilities Manager of the ANMC has adopted several strategies with projects to minimize the adverse effects of the moisture in the vaults.

2. Heliport

a. **Criteria/General Observations**

There is no heliport at the hospital and there was no requirement for a heliport in the POR for the ANMC. Future plans involving a parking structure will likely include a rooftop heliport with a sky bridge since ANMC is designated a Level Two Trauma Center.

3. Parking Areas

a. **Criteria/General Observations**

The POR called for 680 parking spaces, which were provided at the site. During the week of the study, there was always ample parking, and there was no complaint from the staff relating to parking problems. This was due to the fact that there are currently 1072 spaces available for hospital related parking.

b. **Specific Features/Findings**

The present ANMC site is fully utilized and health program requirements continue to expand. An adjacent parking area to the north of the existing parking lot is being leased (250 spaces) and additional PCC parking (140

spaces) are essential for the present 1072 spaces now required for the ANMC parking. Future plans at the Tudor Centre include developing the leased lot and concurrent plans are being formulated to build a parking structure for the ANMC.

c. **Comments/Recommendations**

Provide secure parking with an expandable feature, to help meet the program needs.

4. Solid Wastes

a. **Criteria/General Observations**

The routine solid waste (trash) generated at the hospital Is removed from the hospital by private contract.

b. **Specific Features/Findings**

A San-I-Pak unit was installed to treat infectious wastes so that it can be handled by the solid wastes contractor as routine solid wastes. This unit autoclaves and compacts the infectious wastes and converts it to routine solid wastes. The climatic conditions in the winter required that an enclosure be built for the unit so that it would operate efficiently in the winter (photo ANMC-15).

c. **Comments/Recommendations**

The San-I-Pak unit works well and is effective in converting the infectious wastes to routine solid wastes. Use of this or similar equipment should be considered for all IHS hospitals. The savings realized by avoiding the need for secure infectious waste storage and expense related to the transportation and disposal of these wastes is significant.

5. Loading Dock and Receiving Area

a. **General Observations/Design Criteria**

The loading dock and receiving area works fairly well and can handle several trucks simultaneously (photo ANMC-2).

b. Specific Features/Findings

There are three docking areas for large trucks and one area with an adjustable ramp for smaller delivery trucks.

c. Comments/Recommendations

The adjustable ramp for the smaller trucks is an important item and should be included for all health facilities with a loading dock (photo ANMC-3). The area is very tight when more than one large 18-wheeler delivery truck is unloading at the docking space. It is recommended that design turning radii for vehicles substantially greater than the minimum be used or design solutions be considered that depend less on the turning radius. There are several other items that should be considered for future receiving and loading dock areas. Provide staging area inside the building adjacent to the dock that would allow efficient handling of large deliveries avoiding excessive handling, breaking down large pallet loads and temporary storage. The NO2 storage room, which is adjacent to the dock, has a ceiling height in greater than 18ft. This is excessive and causes internal temperature control problems during the winter due to stratification.

6. Pedestrian Walkways

a. General Observations/Design Criteria

The pedestrian walkway system around the ANMC works well and is an effective system connecting the ANMC to the parking areas and other destinations in the Tudor Center.

b. Specific Features/Findings

The heated sidewalks are effective keeping snow and ice from forming on the heated sections. A problem developed at the junction with the unheated sections (photo ANMC-4). As the ground froze the unheated sections rose up several inches and became a tripping hazard. This was corrected by tying the sections together with reinforcing steel. Because of the costs of heating the sidewalks, snow removal is accomplished manually.

Another omission was pointed out at the west exits of the

Hostel where the exit doors emptied onto a concrete pad with no walkway leading away from the structure (photo-ANMC-18). This is a safety code violation and there are plans for a project to correct this. The sidewalks, especially under canopied areas near exits, are used extensively by smokers since smoking is prohibited in the ANMC. Designated smoking areas have been set up trying to balance the needs of smokers and non-smokers under the overhead canopies (photo ANMC-19).

c. **Comments/Recommendations**

Heated pedestrian walkways should be designed, considering the junctions with non-heated sections, especially in harsh climates where freezing is commonplace.

The designer should set up the designated smoking areas with shelters. They would then be convenient to the users and not interfere with normal pedestrian traffic.

DETAILED OBSERVATIONS

1. There is a problem with several retaining walls that exceed a four ft height (photo ANMC-20). They are readily accessible for children to play on and climb and are a potential falling hazard. This condition should be avoided in design or be topped with a non-climbable fence.

2. All crawl spaces are paved with concrete and are very serviceable for equipment and utility access. All future crawl spaces should be paved and have lighting available.

3. The ANMC structural systems have been designed in accordance with the 1988 UBC, Seismic Zone 4, using the Highest Importance Factor that is applicable to hospitals. The non-structural seismic design for utilities, equipment and associated piping and wiring was also evident throughout the hospital (photo ANMC-21).

ELECTRICAL

A. General

The Normal Power Distribution System distributes electrical power throughout the Hospital and Hostel. Equipment and lights operate in a manner that is safe for the patients as well as for Hospital personnel; and to safely interrupt circuits in the event of overload, malfunction, damage, or fault. The Hostel is served from the main hospital switchboard.

The utility, Municipal Light and Power, provides primary (high voltage) power to the hospital campus through a distribution system that loops the primary cable around the campus. In this type of system, any break in the loop can quickly be isolated and power can be fed from the opposite direction to all utility transformers on the loop thus providing added reliability over that provided by a single ended system.

The system is designed to minimize power loss caused by voltage drops in the various feeders and branch circuits. Voltage drop is maintained at less than 5% from the service entrance to the various pieces of equipment used in the hospital, by providing larger feeders for longer runs than would be required by code.

B. Main Electrical System and Equipment

1. Main Service

The main service consists of the service transformers, provided by Municipal Light and Power (photo ANMC-1), the entrance conductors and the main switchgear. The main switchgear, MDPN4A, is a 480Y/277 volt, 4000 amp, double ended switchboard, with individually compartmented drawout insulated case circuit breakers. A 480-volt, 4000-amp circuit breaker protects each end. Feeder breakers are provided for distribution switchboards BDPN4A, 3DPN4A, 3DPN4B, BN4A3, BDPN4Y, BDPN4Z; motor control centers BMCCN, 1MCCN, and 3MCCN; ATS X1; ATS Z1; the ATS in the CDC; panel BN4A2; and the transformer feeding the Hostel.

Two tie circuit breakers are located in the main switchgear. The first, a 4000-amp unit, connects the north half of the main switchgear with the south half of the switchgear. It is normally locked in the open position and is only manually closed if one of the two service transformers or main circuit breakers fails, and then, only after opening the failed main circuit breaker, removing the Kirk Key, and unlocking the tie circuit breaker. The other tie circuit breaker, a 2000 amp unit, connects the main switchgear with the generator switchboard EDP4A. This tie circuit breaker is used to provide generator power to the main switchboard, and to those normal power loads selected by the hospital when normal power has failed and the Hospital is running on generator power.

The Hostel's normal electrical power and distribution is fed from the main hospital building's main distribution switchboard "MDPN4" located in room AO-A07A with a 400 ampere 3 pole circuit breaker at 480 Volt, three phase. This circuit breaker feeds a 225-kVA dry type transformer to convert the voltage to 208Y/120V 3 phase, 4 wire for utilization in the hostel. The secondary side of the transformer feeds Panel "SN2" which serves as the distribution panel for the hostel. Panel "SN2" feeds branch Panels "1SN2", "2SN2", "3SN2", and "4SN2" which contain circuit breakers serving all electrical loads in the hostel except those served by the emergency generator system. Panel "SN2" also serves several other loads such as the elevator, and mechanical equipment. Both the dry transformer and Panel "SN2" are located in the lower floor mechanical room B1-K02E.

2. Motor Control Centers

Motor Control Centers BMCCN, 1MCCN, 3MCCN, and PMCCN are located on the basement, first, third, and penthouse floors respectively, and provide starting and stopping functions for mechanical and HVAC equipment. BMCCN has a 600-amp bus, and serves fan and pump motors of 1 to 25 horsepower. 1MCCN has a 1000 amp bus and serves fans of 1 to 100 horsepower. 3MCCN has a 600-amp bus and serves fans of 2 to 50 horsepower. 3MCCN also has a subfeed breaker for feeding PMCCN. PMCCN has a 600-amp bus and serves cooling towers and an exhaust fan.

3. Distribution Panels

Distribution Panels BDPN4A, BDPN4Y, and BDPN4Z are located in the basement, while 3DPN4A, 3DPN4B, 3DPN2A, and 3DPN2B are located on the third floor, in the fan room. BDPN4A feeds the smaller 480Y/277 volt branch circuit panels directly and the 208Y/120 volt panels through transformers on the basement, first and second floors. 3DPN4A and 3DPN4B feed the 480Y/277 volt branch circuit panel boards on the second, third, fourth, and fifth floors. 3DPN2A and 3DPN2B feed 208Y/120 volt panels on the second, third, fourth and fifth floors.

4. Branch Circuit Panel boards

In general, branch circuit panel boards are located in electrical closets throughout the hospital. Panel boards are rated 208Y/120 volts or 480Y/277 volts with current ratings from 100 amps to 400 amps. All panel boards have copper buses and are equipped with one-, two-, and three-pole circuit breakers which supply power to branch circuits for lighting, convenience receptacles, and permanently wired equipment.

5. Emergency Electrical Service

The purpose of the Emergency Power Distribution System is to provide emergency electrical power to selected equipment and systems during a utility power failure. During a utility power outage, emergency power is provided by a diesel engine generator system. Under this condition, power flows from the generators through automatic transfer switches to the selected equipment and systems.

An automatic transfer switch is an electrically operated 3- or 4-pole, double throw switch, which will transfer electrical loads from normal power to emergency, power and vice versa.

The Emergency Power Distribution System consists of three branches: Life Safety, Critical, and Equipment. The Life Safety branch serves emergency lighting, the fire alarm system, emergency communications equipment, and elevator support systems. The Critical branch serves patient medical equipment, selected food service equipment, and other selected critical equipment. The Equipment branch serves medical air, medical vacuum, sump pumps, elevator

lift motors, and selected heating and ventilation equipment necessary to keep the hospital in operation during a sustained power outage. These three branches are required by Article 517 of the National Electrical Code (NFPA), entitled "Health Care Facilities", which is, in turn, extracted from NFPA 99, "Standard for Health Care Facilities". The requirements for the emergency generators are given in NFPA 110, "Emergency and Standby Power Systems".

6. Special System

The following systems are grouped as special systems with details provided noting the features of the system.

-Building Lighting: The Lighting System for the Hospital and Hostel consists of lighting fixtures connected to electric circuits and controlled by individual switches in rooms and by the Direct Digital Control (DDC) System for hallways. Patient rooms have low voltage lighting control to permit operation of room lights from the patients' beds as well as from the wall switches.

-Area Lighting: The Area Lighting System for the Hospital and Hostel consists of the lighting fixtures used to illuminate the parking lots, canopies, steps, flagpoles and other outdoor features, together with the lighting contractors and controls that operate them.

-Paging and Music System: The Paging and Music System are capable of originating and distributing programs and paging to all speakers in the system throughout the Hospital and the Hostel. Program distribution to certain page areas is selectable at the main rack for program "A" or off.

-Intercommunication Systems: An intercommunication system in its simplest form consists of one master station connected to one or more staff stations. The master station can call any of its associated master station, but cannot call any other staff station. The purpose of an intercommunications system is to provide simple, direct voice communication between one point (master station) and several subordinate points (staff stations). Three separate, stand-alone systems have been provided

for the Hospital facility, one for the Dental Clinic, one for the Radiology/Emergency, and one for the Surgery Suite. Each system is a direct connected, keyed system with master stations and staff stations.

-Nurse Call System: There are three types of nurse call systems installed in the hospital. Visual Nurse Call Systems have been provided for non-acute patient care areas (Physical Therapy, Family Medicine/Surgery Clinics, Radiology, Pediatrics, Obstetrics and ENT Clinics). Audio/Visual (Full Service) Nurse Call Systems have been provided for the acute care areas (Emergency/Walk-In Clinic, Radiology, Step-Down Unit/ICU, Ambulatory Surgery, Surgery/Anesthesia/Recovery, Labor and Delivery, Obstetrics/Nursery, Pediatrics/NICU, Nursing Wing-Orthopedic, Nursing Wing -Surgical, Nursing Wing-Medical/Surgical, and Nursing Wing - Medical). Each system in each area has been provided with room for expansion for additional beds. An Audio/visual, Direct Selection system has been provided for the Emergency department.

-Central Dictation System: There are two separate, stand-alone dictation systems in the Hospital. One serves the Radiology and Laboratory/Pathology departments; and the other serves the Surgery/Anesthesiology/Recovery and Medical Records departments. Each system is comprised of a recorder unit with a minimum of 20 hours of dictation and 380 megabytes of data storage, expandable to 80 hours of dictation. Both systems are accessible from in-house dictation stations, in-house telephone systems, or from off site via telephone.

-Television Systems: There are two types of television systems in the Hospital. One is the Closed Circuit Video Surveillance (CCVS) System, and the other is the Recreational/Instructional Television System (RITV). There are four CCVS stand-alone systems. One is at the main Hospital entrance (camera at the main door, monitor in the telephone switchboard room), one at the "Secure Patient" room (camera in the 5th floor medical nursing floor, monitor in the Nurse Sub-Work Station), one at Psychiatric Observation (camera in the observation room, monitor in the supervisor's room), and one system in the second floor ICU/S area (cameras in six rooms, two monitors in each of the two nurses' stations with sequential switching so that all six beds can be

monitored from either nurses' station). The RITV system provides for off-the-air reception of local TV and AM/FM stations and distribution of the signals from these stations to all patient rooms, all instructional rooms, and all training areas. The system also provides for future reception of off-the-air, Cable TV (CAT), and Satellite Master Antenna System (SMATV) channels. The systems also provides the capability of using any TV outlet as a CCTV input jack so that locally generated video/audio signals can be injected into the system via an unused channel for distribution throughout the Hospital.

-Snow Melt System: The Snow Melt System keeps sidewalk areas around the entries to the building free of ice and snow buildup during winter months when snow is on the ground elsewhere (photo ANMC-4). The system consists of electric heating cables imbedded in the concrete which, when operated, produce sufficient heat to keep the surface of the sidewalk above freezing, thus preventing ice and snow accumulation.

-Clock & Elapsed Timer System: The Clock and elapsed timer system is required to keep all areas of the Hospital "time coordinated" and to provide a means for timing Surgical, Obstetrical and Emergency Trauma procedures. Regular time keeping clocks are provided in public waiting rooms and other selected areas. Elapsed Timer systems have been provided in the Emergency Area Trauma Rooms, Ambulatory Surgery procedure rooms, Labor/Delivery rooms, and Surgeries. The clock system is a microprocessor controlled master clock system. The clocks associated with the master are analog type. The master clock corrects all of the system clocks at 12:00 noon and 12:00 midnight. The Clock System and Elapsed Timer System are expandable. The master clock system can be expanded simply by adding clocks to the system and connecting back with wiring to any of the clock terminal cabinets in the communications rooms. The elapsed timer systems are individually installed and are not part of a "system". As such, an additional Elapsed Timer can be added without affecting the other. All that is required is a 120 Volt dedicated circuit from the equipment branch for operation.

-Fire Alarm System: The fire alarm system is a fully-addressable computer based system arranged so that each point in the system such as smoke detectors, heat

detectors and manual stations are assigned an address that will report to the main fire alarm control panel to show an alarm condition, trouble conditions and status of each device. The status is indicative of whether the device is in need of cleaning or replacement and its address is reported only if the device is other than normal.

7. POE Electrical Observations

a. General Observations/Current Status

(1). Efforts to lower electrical demand charges include a construction project awaiting funding for a groundwater heat exchanger in lieu of a mechanical chiller renovation.

(2). Some Variable Frequency Drives have been installed and an energy audit is to be conducted in 2001 and the results will identify where additional VFD's may required.

(3). Many exterior lighting have not performed satisfactorily and have been rebuilt and modified by the maintenance staff.

(4). Communications closets were generally undersized for the equipment required (photo ANMC-23).

(5). Some snowmelt cables and /or junction boxes in the sidewalk sections are disabled and require repair.

(6). Four Code Blue Pedestal CB-3000 emergency call systems are installed and working properly. When future parking lots or structures are built include these devices into the design.

(7). A complete security monitoring system is needed for the exterior of the ANMC.

(8). The primary 1500 KVA electric transformers are in close proximity to each other and may cause co-lateral damage to the adjacent transformer if either fails (photo E-5).

(9). A potential problem with the Emergency Generators was noticed and the need for pyrometers was recognized

to avoid a wet stacking problem downstream of the engine turbo-charger.

(10). Natural gas meter gauges were installed 12 ft. above the floor and are difficult to read.

(11). Problems have been experienced with many of the automatic door openers in the building.

(12). Un-interuptable power sources were not required for the Building Automation System Remote Panels resulting in unnecessary equipment shutdown.

(13). The Power Management System has never operated as intended by the designers.

(14). The interior of the fuel vault continues to have high moisture/condensation problems. Conduits have been sealed to the greatest extent possible and de-humidifiers deployed inside the fuel vault to reduce moisture in the vault.

(15). The exterior entrance doors, which are key locked, have proven less than satisfactory for the ANMC. Some doors have been retrofitted with the magnetic strip key card access points. All exterior doors should be retrofitted with this type of locking system.

b. Specific Features/Findings

(1). The normal, emergency and special electrical systems all are performing as specified by the project plans and specifications. The dual metering of the double-ended main electrical service has caused for higher than normal demand charges, which are reflected in higher electrical utility charges for the Hospital. The snowmelt system establishes the annual demand charge rate for one meter and the hospital chiller load establishes the other meter annual demand charge rate.

(2). Several Variable Frequency Drives have been added to the building electrical motors. The maintenance staff prefers these Allen Bradley VFD's. A simple drive was noted for reference, AB Cat. No. 1336VT-B020-EOP

(3). Exterior Canopy Lighting fixtures for up light are ECCO manufactured by SPI Lighting. These are metal halide fixtures, which have been failing for several reasons. These do not appear to be as weather resistant as are required for the environment. Some corrosion and subsequent safety switch failures have resulted in excessive maintenance required after about 3 years after installation.

(4). Some communications closets designed into the projects are too small. During design, program space was used to make the closets serviceable.

(5). The sidewalk snow melting and anti-icing system installed at the Alaska Native Medical Center (ANMC) is a Raychem Electro Melt system. It consists of EM-2XR heating cables, terminations, components, junction boxes, automatic controls, ground fault protection devices, and power contactors. The system has had a very high failure rate since it was installed. Also, since it is embedded in concrete it is extremely difficult and expensive to maintain. Some of the most common causes of failure are listed below:

-Splicing: The installation instructions provided by the manufacturer for splicing is inadequate. The method calls for wrapping the spliced conductors and ground with mastic (insulation) and heat shrink. When the system has a load on it the mastic melts and a siphoning effect takes place over time. Eventually, there is no mastic between the conductors and shorts and ground faults occur.

-Cable lengths too long: The length of cables installed may be appropriate for moderate climates but are too long for cold climates. During extremely cold spells the loads to sections of cable are so high that the breakers often trip.

-No redundancy: Only one run of heating cable is installed for each section of the sidewalk. If the system fails anywhere in the section, the system in that section is completely down until repairs can be made.

-Ice Heaves: Ice heaves cause the cables to shear.

ANMC staff met with a Raychem representative in the

spring of 2000 to discuss these issues. The Raychem representative presented a revised splicing technique that seems to work better than the one presented in the installation instructions.

(6). A lack or security in the parking areas prompted a need to install emergency call stations, Code Blue Model CB3000. A total of four pedestals were added, two in the east and two in the north parking lots. The need for the units were not anticipated and at least one event occurred about a year ago that required the emergency call station.

(7). Grounds security systems are lacking security cameras in the parking lots. The designer included underground conduits with pull strings to three of the light poles in the parking lots with the objective of adding the security cameras at a later date.

(8). The existing electric utility transformers that serve the hospital with a redundant feed are spaced too close to each other. There are two 1500kVA-power transformers on separate substation feeds that are located approximately eight feet apart on the property (photo ANMC-22). A wider separation is required to allow for greater reliability of utility service. Should one of the transformers fail and cause an electrical fire it may affect the other transformer because of its close proximity and cause the facility to lose access to all normal utility power.

(9). Additional pyrometers have been installed since May 2000 on the hospital emergency generators, just downstream of the engine turbo-charger in order to demonstrate to the Joint commission that wet stacking does not occur. These caterpillar 1250 kW generators do not utilize an exhaust waste heat recovery system but still need to have positive measuring and monitoring to meet the regulatory requirement more definitively.

(10). The boiler natural gas piping monitoring meters were placed along the piping in the mechanical room at approximately 12 feet above the floor. This is a very inconvenient place to routinely monitor these meters. Miner-Pisani totalizing counters w/ remote read were installed on the existing meters.

(11). Horton Automatic door openers for hands free entrance to the building and select rooms with in the building have had multiple failures. Solenoid failure is most common.

(12). Uninterruptible power supplies were added to the building automation system remote panels (MBC's). This Apogee System 600 responds too slowly across the network after a utility power outage. Once a power outage occurs the MBC relies on its last at rest state programming built into the on board EPROM. This brings all the equipment back to the rest state and all the rotating machinery must be re-initiated by staff, this occurs especially with small utility power glitches and causes the equipment to shut down prematurely. Once power is restored it could take up to ten minutes to fully restore an MBC with the current operating commands from the host unit. This causes unacceptable delays in resetting and starting building equipment.

(13). The GE Power Management System designed to monitor the power system is not working properly. This system has not worked since the building was initially commissioned. It appears the data registers are not logging data properly and the ANMC staff is currently working with GE to resolve the problems.

(14). The direct buried conduits providing power to the fuel vault allowed surface water to leak into the electrical piping and junction box system inside the fuel vault.

(15). Security access to the hospital was designed with a keyed system. This is cumbersome and does not provide a high level of access control or tracking to the medical building. A magnetic card access system should be installed in all exterior door systems to provide for better security and access control to the building.

c. Comments/Recommendations

(1). Currently, the hospital-chilled water system is scheduled to be reconfigured. This energy-saving project will use ground water to provide a source for chilling the cooling water for the hospital cooling

system. This revision will minimize the demand charges for one electric meter. No changes are scheduled to reduce the demand charges as a result of the snowmelt system operation. Replacing the electric snow melting system with glycol heating coils would be more energy efficient.

(2). Twelve pulse Variable Frequency Drives (VFD) should be applied to motor loads, which have variable loading conditions. VFD's were applied to the 100 HP Air Handler Units, for example, which could follow the load demand precisely. This method of varying the airflow to a space, as opposed to the guide vane modulation method of design is preferred for energy savings and load matching. Typically motors are oversized, for a variety of reasons, and should also be monitored for a load trending and replaced at the end of their useful life with one's more closely matched to the loads produced by either pumps, fans or other process loads. VFD's should be specified in order to more efficiently meet building requirements. Currently motors 5 HP and larger are considered for VFD's; It may be prudent to consider VFD's for smaller motors as well, depending on their application. Note: Twelve pulse VFD units are highly desired because of their excellent power quality characteristics. The results of FY 2001 facility energy audit will reveal where these potential ECM's exist.

(3). Select a different fixture for the application, e.g., canopy lights.

(4). Plan for more useful sized communications closets. A minimum size might be 8 ft. wide by 8 ft. deep and 9 ft. tall.

(5). Reviewing the snow melt issue with the design engineer indicated that first cost installation was the determining factor that led to installation of the electric heat tracing system. This decision process should be abandoned in Arctic and Sub-Arctic Regions to use electric heat tracing in a sidewalk system. Geographic areas where the cost of electrical energy or power demand provides a significant economic barrier for on-going operations, the electric sidewalk snow melt systems should not be the primary choice based on first cost only.

Specific installation suggestions:

-Consult the manufacturer for a better solution to splicing.
-Use heat shrink tubing to contain all splicing.
-Shorten up cable lengths.
-Pin the adjacent sidewalk sections together with steel rebar to prevent differential vertical movement between adjacent sections containing snowmelt heat tracing cables.

Future building expansion projects that require removal of sidewalk sections will be replaced with a tube and glycol system rather than the electric heat tracing system now in place. Ground Source Heat Pump (GSHP) technology would be a very good application for providing a very low cost source of heating for the snowmelt system.

(6). Include the Code Blue emergency call pedestals in future designs.

(7). Continue the practice of including the conduit support system to accommodate a security camera system for the parking areas. Provide for additional funding to include the surveillance system in the construction project, including the parking lots/structures. Most of the security systems available today are an expansion to a digital communication network or building automation system that is already built into the construction project. By adding the security system to the network it would significantly reduce the cost of a separate stand-alone security system.

(8). Space the transformers in future designs a minimum of 15 feet apart.

(9). ANMC reads the pyrometers and records the engine manifold temperature during generator load testing.

(10). On future projects design the gas pressure monitoring system with remote monitors at a location accessible to the O&M staff. Also, on future projects make provisions for monitoring through the building automation system.

(11). Specify/Utilize another manufacturer door opener with a more reliable track record.

(12). Order the building automation system with the UPS feature designed into the system.

(13). The Power Management System should have had an independent quality control inspector working for ANMC during the commissioning process.

(14). Provide a watertight conduit system and seal the conduits at either end so moisture cannot migrate. PVC coated rigid steel or PVC piping in non-traffic areas will serve this purpose.

(15). On all new IHS facilities, design security access for all exterior doors with a magnetic card access system.

FIRE/LIFE SAFETY AND SECURITY

A. Fire/Life Safety

1. General

This facility was designed according to the 1987 Life Safety Code (LSC) NFPA 101. There are currently no identified deficiencies according to the Statement of Conditions written in June 1, 2000 for the facility and is therefore considered in compliance with the requirements of the Existing Health Care Facilities, Chapter 12 of the 1997 version of the LSC. The hospital has been designed as a single occupancy type (Health Care) to avoid occupancy separation issues at present and for future remodeling. Hazardous areas onsite are fully protected and include Boiler/fuel fired heater rooms, flammable gas storage rooms, maintenance repairs shops, paint shop, soiled linen room and trash collection rooms. There is no central/bulk laundry on-site.

Corrected life safety drawings were provided with the as-built plans. These have proved very helpful in maintaining the integrity of the building life safety design during planning for renovations and modifications to the building.

The first Statement of Condition was filled out by the Engineering Services Project Manager within six months of occupancy. This allowed the initial document to incorporate the basic facility design philosophy and allows carryover into future editions of this important document with time.

2. Fire Protection Water System

The Fire Protection Water System for the Alaska Native Medical Center was designed and installed in accordance with NFPA 13, "Standard for the Installation of Sprinkler Systems"", NFPA 14, "Standard for the Installation of Standpipe and Hose Systems", and NFPA 20, "Standard for the Installation of Centrifugal Fire Pumps".

Four 25,000-gallon water storage tanks are located in the southwest corner of the Alaska Native Medical Center basement. The water storage tanks serve as an emergency supply for the domestic water and fire protection systems

in the event that the water supply to the complex is not available. Each tank has a 10,000-gallon reservoir reserved for fire protection. The 40,000 gallons (all four tanks) reserved for fire protection is enough capacity for approximately 120 minutes of fire flow at 300 gpm.

There are four different types of approved automatic sprinkler systems installed in this facility. The wet pipe system is the standard system used throughout the hospital and Hostel except as noted as follows. The preaction system protects the Switchgear and Electrical Rooms, Telephone Room, MRI Room, CT Scan Room and the CI Machine Room. The dry pipe system protects the Electrical Generator Room, Loading Dock, Unheated Storage Areas, Mechanical Plenum, and the Level 3 outside Air Intake Plenum. The antifreeze loop systems protect each vestibule entry.

The fire protection systems keep all wet pipes pressurized at all times. The Fire Alarm System monitors each zone served by the fire protection system. If the flow control valve serving a zone (whether it is a wet pipe, dry pipe, preaction or antifreeze type system) detects water flow, the Fire Alarm System is notified. The fire pump starts when the pressure in the fire sprinkler piping drops below 140 psi. Water is supplied to the system from the main incoming water source to the building. The fire protection water is routed through a double check valve assembly to the fire protection main. A branch of the fire main is connected to a fire department pumper connection, which is used to permit the introduction of fire water into the fire water system directly from an alternate source such as fire department pumper truck, nearest fire hydrant, etc.

a. Criteria/General Observations

There have been a few instances of clearance conflicts between the ceiling-hung fire sprinklers to the fixed and movable shelving systems.

b. Specific Features/Findings

Sprinkler clearance equivalency has been granted by the JCAHO in three existing storage areas, including linen storage/clean linen room, medical records file room and the radiology records/file room. The three areas share a

common problem of tall shelving systems (some fixed, some rolling) in 8 foot ceiling rooms lacking the specified free clearance from the bottom of the pendant-style sprinkler heads (photo ANMC-24). Since the spaces have complete smoke-detection systems coverage and automatic sprinkler system coverage, an appeal was made to the JCAHO. After review of the situation and the available As-Built drawings and sprinkler system hydraulic calculations, the JCAHO granted the requested equivalency for this situation.

c. Comments/Recommendations

Coordinate shelving system designs with fire sprinkler plans and clearances during design phase.

3. Fire Alarm, Security and Duress Alarm System:

The Fire Alarm, Security and Duress Alarm system is manufactured by Edwards Systems Technology and is a distributed, integrated, multiplexed system consisting of standalone panels in a network configuration. Control panels are microprocessor based and field programmable. Detection, supervisory input and control devices are individually addressable. The fire detection portions of the system employ analog smoke and heat detectors. The system is powered from the life safety branch of the emergency power system and also has been provided with 4-hour battery back-up capacity. A fire control station with color video display and event printer with the same devices for the security/duress alarm portion have been provided at the Fire/Security Control Office located at the building control center adjacent to the boiler plant. Remote enunciators have been provided at the Telephone Switchboard Office, Hospital Security Office and the Hostel Manager's Office. The fire control system also has a dual channel supervised voice alarm with redundant amplifiers. The Fire Alarm and Detection system was designed to comply with the National Fire Protection Association (NFPA) National Fire Codes (NFC). Specifically, NFPA 72 (National Fire Alarm Code), NFPA 90A (Installation of Air Conditioning and Ventilating Systems) and NFPA 101 (Life Safety Code). It was also designed to be in compliance with applicable sections of the Uniform Building Code (UBC), Uniform Fire Code (UFC) and the American National Standards Institute (ANSI) A17.1, Elevator Code.

Fire Alarm initiation and detection zones correspond to the smoke barrier compartments of the building. Photoelectric and ionization smoke detectors are installed as well as fixed temperature heat detectors. The sprinkler systems are supervised for alarm and abnormal conditions by the fire alarm system. Manual pull stations are located throughout the facility. Smoke detectors in ducts are interlocked with fan controls to shutdown air distribution systems except those serving smoke proof enclosures or of more than one story which will operate in the smoke evacuation mode.

a. Criteria/General Observations

Soon after occupancy, doorstops began appearing to prop open some office doors designed to be closed, where the supervisor insisted on an "open door" policy of management. This violated life safety building designs and interfered with ventilation design flows, etc.

b. Specific Features/Findings

In order to accommodate the office occupant the hospital added magnetic hold open devices to these doors to allow them to automatically close upon activation of the fire alarm system. Approximately 50 were added at $300 - 400 each within the first six months of occupancy. Still more requests continue to arrive on a routine basis. This amounts to a large expense and burden upon the maintenance department to fund the modification as well as to oversee the installation and verify its integrity.

c. Comments/Recommendations

A thorough discussion of the implications of the door position in fire and smoke compartment walls needs to take place between the staff and the designers to arrive at an acceptable approach to this issue at the time of the design. This will reduce high cost of retrofitting the hardware after building occupancy.

4. HVAC Smoke Damper System

When smoke is detected in the supply duct downstream of the Air Handling Unit (AHU), the supply fan for that AHU will be automatically shutdown and its smoke dampers and

combination fire/smoke dampers will also be closed. Because of the electrical interlock to the supply fan, the associated return and exhaust fans and their dampers will also be automatically shut down and closed under this condition. If smoke is detected in the return or exhaust air (or if a manual fire alarm pull station or any of the room/smoke zone smoke or heat detectors are activated), then the Supply, Return and Exhaust fans on that AHU shall automatically run with the Return Air Damper automatically closed and the Relief Damper and the Outside Air Damper being opened.

Fusible-link Spring closer actuated fire dampers are located in the ventilation duct penetrations through the fire/smoke wall barriers.

a. Criteria/General Observations

Fire dampers are required by code to be inspected annually to insure they are open and functional.

b. Specific Features/Findings

At some locations the duct mounted access hatches are too small for easy access to the internal mounted fire damper hardware.

c. Comments/Recommendations

Specify a minimum size of access hatch based upon receiving duct size and ergonomics to insure installed fire dampers can be conveniently accessed.

5. Miscellaneous Safety Issues

a. Criteria/General Observations

No connection of two secondary exits from west ends of Hostel to existing public way.

b. Specific Features/Findings

The existing west exits of the two Hostel wings discharge to a grass-covered sloped landscaped area, with no easily found route to the adjacent sidewalk (photo ANMC-18).

c. Comments/Recommendations

Provide for extensions of concrete sidewalk to these exits.

a. Criteria/General Observations

Several playground safety issues had been addressed by the staff to make the playground area more safe including installing fencing at the traffic lane and providing for padding on light posts and under swings.

b. Specific Features/Findings

Fencing was installed where the playground area was adjacent to the traffic lane in the parking lot and padding was installed under swings and to light posts.

c. Comments/Recommendations

Attention to safety issues is paramount when designing playgrounds.

a. General Observation/Design Criteria

Evergreen trees were planted in some the parking lot median strips and at intersections of the traffic lanes.

b. Specific Features/findings

Several automobile accidents have occurred where these trees have limited the site distance at these traffic intersections.

c. Comments/Recommendations

In the future the landscape designer should specify shrubs or hardwood trees in these spots to avoid visibility problems at parking lot intersections.

B. Security

The security devices provided include door monitor switches, motion detectors, key switches with LED secure

access display, duress push button switches, and glass break detectors and rough in for future card readers at exterior locations. All of these devices report to the Fire Alarm/Security Control office in the hospital control room. Glass break, Motion detectors and Door status switches are used for intrusion detection during off hours, with keypad allowing for zone alarm/disarm with adjustable entry and exit times.

Lockable cabinets are now required per OSHA regulation in patient accessible areas where chemicals/medicine are stored. All exam room cabinets had to be retrofitted with this hardware.

a. Criteria/General Observations

Soon after move-in, it was decided that additional measures were needed to monitor child and infant patients for security purposes. This measure is strongly recommended by the JCAHO.

b. Specific Features/Findings

Closed circuit security camera systems consisting of cameras, recording equipment and locking doors were added to monitor the LDRP, Nursery, NICU and Pediatric areas of the hospital. The video images are recorded on a 12-hour continuous cycle tape system.

c. Comments/Recommendations

Security systems should be investigated and specified as a part of the building equipment planning process.

a. Criteria/General Observations

Also, after occupancy of the ANMC it was recognized that security of the patients and staff could be compromised in going to and from the parking lots where they parked their cars.

b. Specific Features/Findings

"Code Blue" pedestals have been added for all large capacity parking lots with voice communication to the security center, as well as a horn signal and flashing

blue light to give visibility to the user. Pull wires have been placed to allow for future installation of security cameras at light poles in the parking lots.

c. Comments/Recommendations

Parking lot security systems should be investigated and specified as a part of the building equipment planning process.

a. Criteria/General Observations

Keyed hardware was specified and has been installed on all exterior doors of the ANMC.

b. Specific Features/Findings

Security lost a grand master key. Cost was $60,000 to re-key entire lock inventory.

c. Comments/Recommendations

Magnetic card entry sensors inter-tied to electronic locks should be investigated for normally locked doors with a need for security monitoring. Staff photo ID cards with magnetic codes can be used for controlled access. This type system also solves key control issues.

MAINTENANCE AND MISCELLANEOUS SYSTEMS

A. GENERAL

Maintenance at the ANMC has been a challenge to the staff from several standpoints. The climate in the Anchorage area is severe and has a seasonal cycle demanding careful planning for ordering of supplies and scheduling for all major projects. Also, the facilities engineering staff has been tasked with many projects that have resulted from increased patient loads and program changes to meet the medical challenges. The facilities engineering program at the ANMC is solid and has effectively responded to these challenges. Some of the problems and solutions are listed below.

B. MAINTENANCE

1. Equipment Access

a. General Observations/Design Criteria

Some heat pumps and other equipment needing periodic maintenance have been placed above the ceiling. The only access for maintenance is by ladder and removal of ceiling panels (photo ANMC-25).

b. Specific Features/Findings

In addition to being very inconvenient, the access by ladder exposes the workmen and the hallway pedestrians to an unsafe situation. Equipment that is difficult to access and work on will also tend to be neglected.

c. Comments/Recommendations

Placing of equipment needing periodic maintenance above ceilings should be avoided. If proper height exists above the ceilings, suspended catwalks are recommended around this equipment.

2. Maintenance Staff and Space

a. **General Observations/Design Criteria**

(1). There does not seem to be any cohesive policy for hiring the complete maintenance staff prior to acceptance of a new hospital. The facilities engineer was hired early in construction through commissioning

(2). The office space programmed for the crafts personnel in the maintenance section is needed and none was provided.

(3). No space was provided for storage of as-built drawings and a black line copier for drawings was not provided.

b. **Specific Features/Findings**

(1). Maintenance staff was not hired until just before the hospital was placed in operation.

(2). Office space was not programmed for the crafts personnel and they have had to set up temporary desks in the break areas.

(3). As- built drawings has been set up in remote mechanical alcove in the interstitial level.

c. **Comments/Recommendations**

(1). Bring on the maintenance staff early, while the facility is still under construction. The staff will gain valuable knowledge of the complex systems and can participate in the commissioning of the building systems. Developing maintenance plans and stocking supplies will be much more efficient during building start-up.

(2). In a medical center or large hospital, consideration should be given to providing office space for craft personnel especially the foremen and team leaders.

(3). Space for the storage and reproduction of drawings should be provided. The As-built drawings are key to the development of repair and renovation plans and must reflect the changes made to the facilities.

3. Operation and Maintenance Manuals

a. **General Observations/Design Criteria**

ANMC specific O&M manuals were prepared as part of the construction management services by the Architect/Engineer.

b. **Specific Features/Findings**

The end product manual was a series of 83 volumes in hardcover, which included the design intent, system operating parameters, cut sheets from the original submittals, maintenance requirements and other useful data. Reference shelves for the manual have been set up in the maintenance shop for easy reference.

c. **Comments/Recommendations**

The O&M manual has been a valuable tool for the facilities engineering staff and has been used for maintenance and trouble shooting as well as for all renovation projects. It is recommended that O&M manuals be prepared for all IHS medical centers and large hospitals.

C. MISCELLANEOUS FACILITY SYSTEMS

1. Interstitial Space

a. **General Observations/Design Criteria**

Present design guides used by IHS do not require interstitial space to house major air handling units and ductwork necessary to provide the environmental conditions for medical treatment spaces in a modern hospital. However hospital designers are encouraged to study and evaluate new systems for hospital design.

b. **Specific Features/Findings**

Interstitial space at the ANMC is located at the third floor level between the second and fourth floor of the inpatient tower. It contains all air-handling units for the inpatient wards of the tower and the surgery suites below. The interstitial area is very efficient by reducing lengths of supply duct runs and in providing necessary space for maintenance, including filter replacement. The space works well and has been a good design feature of the ANMC.

c. **Comments/Recommendations**

All new hospitals, especially multiple-story, should be constructed with interstitial space between medical treatment areas with special environmental requirements, to assure the ability to meet changing program, technology, and operational requirements well into the next century. Interstitial spaces must be constructed and maintained in accordance with strict protocols to maximize the benefits of the space.

2. Material Handling Systems

a. **General Observations/Design Criteria**

(1) There are two material handling systems that have operated in an excellent manner. The most user friendly and reliable has been the 6-inch pneumatic tube system (photo ANMC-26). It has been so successful for inter-department delivery of small samples, forms and letter size documents of several pages that there is a project being planned to expand the capacity and routes of the system; maybe to double the size of the system.

(2) The other successful system is the miniature cart and track system (photo ANMC-27). It will deliver a thirty-pound load to the offices on the stops. Both systems are easy to use with the proper coding and save time and effort in the delivery of important medical information.

(3) A dumbwaiter was also installed adjacent to the center elevator bank and runs from the ground

floor to the patient wards on the 4th and 5th floors (photo ANMC-28).

(4) The elevators are placed strategically at the east and west ends of the building, with direct access to the wards as well as a central bank connecting all floors of the medical center.

b. **Specific Features/Findings**

(1) The 6 inch vacuum tube system is very efficient and a time saver. The hospital is contemplating installing another parallel system due to the workload.

(2) The cart and track system is very useful. Some problems were encountered when the carts were full and had to make the vertical transit between floors. Carts were breaking down on the vertical portion of the track. Lowering the max load transported by the carts eliminated this problem. The tracks and stations for this system tend to be fixed in the facility and problems occur when offices and departments are moved for program changes.

(3) The dumbwaiters are useful and are used but their capacity is limited for a large medical center. Many materials are just transported via freight elevators.

(4) The elevators worked well and are strategically placed for meeting ANMC vertical transportation requirements (photo ANMC-29).

c. **Comments/Recommendations**

(1) All hospitals and medical centers should be equipped with a vacuum tube system, of a minimum 6-inch diameter.

(2) Medical centers and hospitals should study the efficacy of alternate materials handling systems such as the cart and track system.

(3) Dumbwaiters should also be studied and considered on a life-cycle costs basis. Multi-floor hospitals and medical centers need a comprehensive vertical transportation plan.

MECHANICAL

A. GENERAL

Overall, the design provides good flexibility as well as reliability. This design reflects good hospital engineering design. These general design features provide for very good flexibility, good redundancy, and incorporated many energy conservation strategies. There are three boilers and three chillers to provide the environmental heating and cooling for the hospital. This design has been developed to provide the necessary redundancy for the patient treatment mode. If one boiler or chiller is inactivated for any reason, e.g., maintenance or repair, the other two units can effectively provide the necessary heating /cooling demand of the hospital without interruption.

B. HEATING, VENTILATION AND AIR-CONDITIONING

1. MAIN MECHANICAL (BOILER) ROOM

a. General Observations/Design Criteria

Three 21,540 MBH (700 boiler horsepower) high-pressure steam boilers are furnished for space heating, humidification and process requirements (photo ANMC-30). Under maximum design conditions, two boilers operating at 92% of rated capacity will supply the plant load. One of boilers is for standby service. The boilers produce steam at 125 psi.
Feed water leaves the deaerator at 227F and the temperature is raised to 248 F in the boiler flue gas stack economizers. Each economizer recovers 519 million btuh from the flue gases when the boiler is operating at its full rated load.
The central plant also has three water chillers (photo ANMC-31). Each chiller is 335 tons. Two chillers will handle 100 % of the total cooling load. The calculated total building cooling load is 807 tons at the design outdoor ambient conditions of 75.5 F dry bulb and 60.5 F wet bulb temperature. The main power supply may be provided to one chiller from the emergency generator. Auxiliary condenser water system (ACS) is a constant volume closed loop system. The ACS fluid picks up excess heat from various pieces of equipment, such as

refrigeration equipment, hydronic heat pumps, and computer room air conditioners. This heat is used to preheat the domestic hot water supply via a plate heat exchanger.
The HVAC design incorporated a clean steam generator to provide "clean steam." The piping for the clean steam system is stainless steel.
Steam traps on the high pressure, medium pressure and low pressure steam lines are venturi type orifice traps.

b. **Specific Features/Findings**

(1) Boiler room: The boiler room is large enough to provide adequate space around equipment to allow access to equipment for maintenance and repair. The boiler room is approximately 18 feet high to accommodate the boilers. An upper deck was utilized for the installation of mechanical equipment.

(2) Chilled Water Pumping: The chilled water pumping system is a constant volume pumping arrangement. This system utilizes three way valves to modulate the flow through the coils to control the cooling. Furthermore, the existing design prevents the ability to fully load chillers when more than one chiller is running.

(3) Cooling Towers: The towers, manufactured by EVAPCO, are induced draft, counterflow type with two-speed axial fans. The towers are located on the central roof. A chemical injection type water treatment system has been furnished for the cooling towers; and is located on the 3rd floor.

(4) Clean Steam Generator. High temperature / pressure condensate was piped to low (atmospheric) pressure condensate return. Resulted in failures from water hammer and elevated condensate receiver temperatures. Should have piped returned to dearator, cannot pipe to deaerator now as deaerator is not sized to accommodate. In process of adding secondary heat rejection loop to lower condensate temperature off of clean steam generator.

(5) Excessive cold air leakage through make-up air louvers to generator room.

(6) Orifice traps on the steam system have been less satisfactory than traditional steam traps.

c. Comments/Recommendations

General- Overall, the central plant appears well laid out with adequate space for operation and maintenance (photo ANMC-31). The design provides good flexibility as well as reliability.

(1) Boiler room: The design features a boiler/mechanical room which provides adequate clearance around mechanical equipment such as boilers, pumps, chillers, etc. This facilitates maintenance, inspection and repair work. The layout of the equipment is very functional.

(2) Chilled water pumping: The chilled water system is a well designed system and is providing reliable chilled water throughout the facility. It is a flexible system and has capacity for future expansion and increased cooling needs. It is noted that a primary/secondary chilled water system is a more widely used system. (It is acknowledged that the design was completed in 1990, and that VFD technology has improved since that time.) The main chilled water is the primary loop. A VFD to maintain the system pressure controls the primary pump. Chilled water control valves are two-way control valves. Secondary pump off of primary loop thru chillers for temperature control. This is a more energy efficient design because the VFD will result in reduced pumping horsepower. The existing design prevents the ability to fully load chillers when more than one chiller is running.

(3) Cooling towers have been reliable.

(4) Clean steam generator. High temperature / pressure condensate was piped to low (atmospheric) pressure condensate return. Resulted in failures of pumps from water hammer and elevated condensate receiver temperatures. Should have piped returned to deaerator, can not pipe to deaerator now as deaerator is not sized to accommodate. In process of adding secondary heat rejection loop to lower condensate temperature off of clean steam generator.

(5) Excessive cold air leakage through make-up air louvers to generator room was controlled by the

construction of a "cold air" dam, utilizing a sliding sectional door covering the bottom 1/3 of the air intake during cold weather.

(6) Orifice traps: Orifice traps on the steam system should be carefully considered. Maintenance personnel are much more familiar with traditional steam traps, e.g., float & thermostatic, Inverted bucket, etc.

2. VENTILATION SYSTEM

a. General Observations/Design Criteria

(1) Heating/Cooling System: 28 air-handling units (AHU's) with heating and cooling coils serve the facility.

(2) The air distribution system utilizes variable volume air handling units and terminal boxes to the extent allowable by the 1987 edition of *Guidelines for Construction and Equipment of Hospital and Medical Facilities* and IHS requirements. Generally, variable air volume is provided for all areas that are not required to have a specific air pressure relationship with adjacent spaces.

(3) For areas in the hospital where variable air volume cannot practically be used due to air pressure relationship requirements, a single duct with terminal reheat system is provided. These areas include the laboratory and operating rooms.

b. Specific Features/Findings

(1) Variable Air Volume Air Distribution: Should a space require maximum cooling, the variable volume box serving that space would be 100% open. As the space temperature is satisfied, the VAV box modulates closed. As the air quantity is reduced, the air handling unit fan horsepower is reduced; the air handling unit fan horsepower is reduced resulting in a savings in energy. Variable speed motor controllers are utilized to reduce fan speed and maintain control over duct static pressure.

(2) Single Duct with terminal reheat Air Distribution:

This utilizes a single duct system that supplies air to terminal boxes with reheat. All terminal boxes throughout building have hot water heating coils.

(3) Minimize Duct Runs: The interstitial floor locates major air handling equipment at a middle floor of the facility. This conserves air transport horsepower, since the air handling units are located close to the area/departments they serve.

(4) Duct Leakage: Duct leakage was identified as a deficiency during construction. The supply ducts were generally well constructed and adequately sealed and confirmed to the duct leakage specified. The return ductwork was determined to exceed the specifications for duct leakage. This was largely remedied as a construction punch-list item.

(5) Isolation Room exhaust system: The exhaust from the isolation rooms is collected into one duct which is connected to an AHU which then discharges the exhaust in a common exhaust plume from the roof.

(6) Hostel: Room temperatures as high as 80 degrees F. in the hostel were experienced during warm sunny weather. The design of the hostel originally only provided ventilation and heating.

c. **Comments/Recommendations**

General- Overall, the design provides good performance with flexibility. There were only limited complaints regarding temperature and thermal/indoor air quality comfort.

(1) Variable Air Volume Air Distribution: Variable volume air systems conserve energy by supplying only the amount of air to a given space necessary to maintain space temperature.

(2) Single Duct with terminal reheat Air Distribution: The single duct with terminal reheat system is an energy efficient system that utilizes the building internal heat to provide any necessary heating in interior zones to maintain space temperatures. This system has been appropriately utilized for the Operating Rooms and Lab

spaces.

(3) Minimize Duct Runs: This minimizes the amount of static pressure loss in the duct system resulting in a reduction of motor horsepower.

(4) Duct Leakage: Duct leakage was identified during construction and was largely remedied. Prompt assertive action by the owner is necessary to ensure compliance. Duct leakage is a cause for loss of efficiency (and reduced energy efficiency) for an air handling system.

(5) Isolation Room exhaust system: The CDC Guidelines for TB 1994 provide explicit recommendations that the exhaust should be ducted via a dedicated exhaust duct and discharged directly outside.

(6) Hostel temperature controls: Air conditioning is necessary in Alaska. Decisions regarding air-conditioning of facilities must be based on engineering cooling load calculations, not on preconceived notions. Chilled water cooling was extended to the Hostel as a follow-on project by the hospital in 1999.

3. CONTROL SYSTEM

a. General Observations/Design Criteria

Control of the HVAC system is accomplished through a Direct Digital Control System (DDC) system actuating electric/pneumatic operators. DDC panels were well planned. One panel serves one type of system and one system is typically controlled from one panel.

b. Specific Features/Findings

Control System: Control of the HVAC system is accomplished through a Siemens (aka Landis & Staefa) Direct Digital Control System (DDC) actuating electrical/pneumatic operators. This type of control system is more precise and accurate than the standard pneumatic system. Utilizing electronic controls eliminates the "drift" that has been associated with pneumatic controls and therefore maintains temperature set point with a greater degree of accuracy.

HVAC System, Acceptance phase, Operating Tests and Checks Commissioning: The design sequence of operation

is relatively complex. Commissioning was helpful in ensuring the design sequence was installed.

c. **Comments/Recommendations**

Control System: The control system appears to be appropriate for a facility of this size.

HVAC System Commissioning: The commissioning is a very useful tool for ensuring that a relatively complex HVAC system is accepted and is operating as designed.

4. **SURGERY**

a. **General Observations/Design Criteria**

The ventilation supply system in the operating room consists of ceiling mounted four-way supply diffusers. Humidity in the operating rooms was reported to be a problem.

b. **Specific Features/Findings**

It was reported that humidity was high, e.g., 75%-80% RH, in the surgical unit when ambient humidity are high. During periods when the outside air is warm and humid, the humidity in the operating rooms has been recorded to be over 70 RH.

c. **Comments/Recommendations**

Humidity control in surgery unit: A design for the HVAC system is needed to provide the capability to dehumidify the air supplied to the operating rooms. The design may incorporate changes to the control sequence for the HVAC system. The design may require additional equipment or components such as a dehumification unit.

5. **DENTAL**

a. **General Observations/Design Criteria**

The ventilation and the exhaust for enclosed dental operatories were reported to be an excellent system. Exhaust in dental lab area is a continuous slot placed in the wall along the counter. It was reported that Glutaraldehyde is not utilized.

b. **Specific Features/Findings**

The air was supplied near the head of the patient; and the exhausts were located low in the wall in the opposing side of the room. This caused a general airflow pattern from the head of the patient towards the feet.
Exhaust in dental lab area is a continuous slot placed in the wall along the counter.

c. **Comments/Recommendations**

The airflow pattern in the enclosed operatory provides excellent capture of nitrous oxide.
The continuous exhaust slot in the dental lab is a reasonably good design practice. It is believed to be more effective than general ventilation.

6. **TELEPHONES AND COMMUNICATIONS EQUIPMENT**

a. **General Observations/Design Criteria**

The telephone and communications rooms were warm.

b. **Specific Features/Findings**

The telephone and communications rooms were warm. Temperatures were approaching 80F. The amount of equipment was considerable (photo ANMC-22).

c. **Comments/Recommendations**

The telephone and communications rooms cooling loads need to be calculated and provision for future equipment and increase cooling load are necessary. Additional heat pumps as part of the Auxiliary Condenser Water System

were added to the main Telephone Equipment Room and communications closet #31 to provide additional cooling.

7. INTERSTITIAL FLOOR

a. General Observations/Design Criteria

The interstitial floor is located on the 3rd floor level between the 2nd and the 4th floor. It is utilized for major air handling units, and primarily serves the 2nd, 4th and 5th floor.

b. Specific Features/Findings

The interstitial floor provides a central location for major air handling units. The units are provided with clearance to facilitate maintenance, inspection and repairs.

c. Comments/Recommendations

The interstitial space is very desirable for a large multi-story hospital and has many advantages for installation and maintenance of the air handling equipment. Refer to section specifically dealing with interstitial space under Maintenance and Miscellaneous Systems for detailed recommendations.

8. PATIENT ROOMS

a. General Observations/Design Criteria

Supplemental heating provided by radiant ceiling panels were installed near the windows of patient rooms.

b. Specific Features/Findings

Radiant ceiling panels are installed near the windows of patient rooms and provide supplemental heating to offset the natural convective heat loss and radiant heat loss from the windows of the patient rooms. This is necessary due to the extremely cold temperatures experienced in this climate.

c. Comments/Recommendations

Double pane glass is being provided; however, due to the cold ambient air temperatures outside and the humidity requirements of certain spaces inside, the possibility exists of condensation occurring on the inside face of the glass. By providing Radiant ceiling panels near the glass, or discharging air along the glass, the design can minimize the potential for frost; and equally importantly increase the comfort level of persons in close proximity to the glass by reducing (induced) cold drafts.

9. **RESTROOMS.**

a. General Observations/Design Criteria

The staff and public restrooms were one of the few occupant complaints related to the ventilation of the facility.

b. Specific Features/Findings

The restroom was often reported as a complaint related to the ventilation for the facility. Specific complaints were reported by Radiology.

c. Comments/Recommendations

The ventilation for restrooms in IHS facilities should be evaluated during the design. It seems that the amount of space allocated for restrooms is relatively small. This results in patterns of higher occupancies. Therefore higher ventilation rates should be considered for this situation.

10. **HVAC SYSTEM-ACCEPTANCE AND COMMISSIONING**

a. General Observations/Design Criteria

The HVAC design is relatively complex with many energy conservation strategies.

b. Specific Features/Findings

Operational tests and inspections were performed by the design A/E to verify conformance to the control sequence

and operations as designed.

c. Comments/Recommendations

The operational tests performed by the design A/E design provided assurance that the control strategies were installed by the contractor in accordance with the design documents. It appears that this effort resulted in identification of numerous control schemes that, initially, did not operate properly (even though the contractor indicated that the control system was operational). Operational tests of the HVAC system should be conducted for major systems. The benefits include smooth operation upon acceptance by the Government.

C. PLUMBING

1. MECHANICAL AND BOILER ROOM

a. General Observation/Design Criteria

MAIN SERVICE: The main water service to the building is a six-inch (150mm) main to the building.

HOT WATER SYSTEM: Two hot water heaters provide domestic hot water for this facility. They are located in the mechanical room.

b. Specific Features/Findings

MAIN SERVICE: The main service includes a backflow preventor, which is required to prevent cross contamination of the local water supply.

HOT WATER SYSTEM: The two domestic hot water generators, HWG 1 & 2, are steam heated, and provide hot water at 120F. Two additional hot water generators, HWG 3&4, are steam heated, and provide high temperature (180F) water to the kitchen for various appliances, central sterile and the dental wing.

c. Comments/Recommendations

The main service and hot water systems are well suited for a hospital facility.

2. **HANDS FREE FAUCETS**

a. **General Observation/Design Criteria**

Hand free faucets are provided in various locations and scrub sinks are equipped for "hands-free" operation.

b. **Specific Features/Findings**

(1) OPERATING ROOM: Scrub sink faucet has electric eye for "hands-free" operation. This has not always performed in a satisfactory manner.

(2) CLEAN STERILE SUPPLY: Scrub sink area is considered small compromising intended use of the scrub sink.

c. **Comments/Recommendations**

(1) The application of "hands-free (electric eye) faucets" in hospitals continues to present reliability problems. Designer should review types that are located on the wall and scans the area in front of the sink.

3. **MEDICAL GAS**

a. **General Observation/Design Criteria**

Medical gas system: The medical gas system is operating well. A certified medical gas specialist prior to acceptance inspected it.

b. **Specific Features/Findings**

The mechanically refrigerated air driers sometimes allow high humidity to occur. This occurs when the demand for medical air is small and the flow is low.

c. **Comments/Recommendations**

A desiccant drier should be considered when the patient load/occupancy might result in low demand for medical air.

4. FIRE PROTECTION SYSTEM

a. General Observation/Design Criteria

(1) FIRE PROTECTION: A complete fire sprinkler system is installed in this facility. In addition, fire protection includes hand held extinguishers and outside fire hydrants.

(2) FIRE DETECTION: A complete fire detection panel is located in the facility.

b. Specific Features/Findings

(1) The clearance between fire sprinkler heads and the rolling shelving in the clean linen room (Basement level) was less than 18 inches. This is a deficiency in NFPA 13, Installation of Sprinkler Systems.

(2) The operating rooms were sprinklered.

c. Comments/Recommendations

(1) There is a need to improve coordination between the design of the rooms and the selection of the shelving in the rooms. One recommendation is that the maximum height of shelving be clearly indicated on the walls of the room.

(2) This facility is fully sprinklered. Inspection and testing should be performed as required by the local fire department.

SUMMARY OF FINDINGS AND RECOMMENDATIONS

General

This section contains listings of major desirable and undesirable design features, and also the major recommendations for consideration by the Health Facilities Advisory Committee for revision to the Health System Program Plan (HSP), which would result in the criteria being included in future Programs of Requirements (PORs). An IHS medical center/hospital with the same requirements being designed using the HSP criteria would contain approximately 15% additional program space which would result in a 20-25% larger facility. A more detailed analysis of the additional space is not warranted for the ANMC since the program focus and user population has drastically changed during the past decade.

A. Desirable Design Features

1. This facility and site development features work well overall. There is adequate signage and physical separation of the patient and service access.

2. The exterior of the ANMC is attractive and has performed well in the Anchorage climate. The metal roofs, brick masonry veneer and moderate fenestration has presented no major maintenance or repair problems.

3. The pods that serve as entrances and vestibules are well located and shield the waiting areas from the arctic weather.

4. Layout of main mechanical room allows good access for equipment maintenance and repair.

5. Vertical patient transportation is excellent. Elevator locations distribute the pedestrian load avoiding overcrowding in the various elevator lobbies.

6. The interstitial space works well and was invaluable for installation and subsequent maintenance of the major air handling units serving the surgery suits and patient areas in the four-story portion of the building.

7. The six-inch diameter pneumatic tube materials handling system works well and is very efficient, saving staff man-hours and cutting delivery times.

8. The welded sheet vinyl flooring has performed well and is easily maintained.

B. Undesirable Design Features

1. There are retaining walls on the exterior public access walkway, west side of the building, that are hazards for children playing outside. Security screening is required where potential falls can occur where children have access to climb or play.

2. There is a shortage of public toilets throughout the hospital.

3. There is no convenient locker room/break area, within the confines of many large medical departments. Central locker areas are to remote for many staff in this large medical center.

4. The cafeteria area is undersized for this large medical center with an interconnected hostel.

5. There is no satisfactory space for an all hands meeting.

6. Paint shop and welding shops were not designed to meet OSHA standards and had to be renovated with M&I funds

7. Sprinklers in the medical records area were not coordinated with the file layout plan. File equipment layouts must be coordinated with sprinkler plans to avoid code violations.

8. There are two ultra sound machines in one treatment room but there is no practical way to treat two patients simultaneously.

9. Patient confidentiality is compromised by poor sound transmission between patient rooms and treatment rooms and corridors.

C. Recommendations

1. Partnership initiatives are desirable on large complex construction projects such as the ANMC. The key purposes are to allow each party to accomplish their individual objectives within a common goal, provide a formal mechanism to resolve problems quickly, and complete the project within schedule and budget without litigation. To be effective, basic rules must be followed. The group has to be limited to a small, optimal size and must only include key decision-makers from each of the construction-phase stakeholders (Owner or Agent, Contractor, Architect or Construction Management team including the Contracting Officer). Each stakeholder representative must receive full support and authority from top management. The disagreement/dispute resolution process must be followed to force decisions. Project documents should assist this voluntary partnering with clear language on process and disputes resolution. Professional facilitators must begin and continue to reinforce these goals and processes from beginning to completion of the project. The partnership initiative will be unable to produce positive cost effective results if these ground rules are not followed.

2. Better attention during design should be paid to building security, both interior (limiting after-hours access to certain areas) and exterior entrances and storage areas. A card access system is recommended for all entrances except the main public entrances.

3. A comprehensive Moving Plan is a must for occupying a new hospital and moving patients and staff from an existing one. The "Dartmouth

Model", used for the ANMC move, is highly recommended. Planning efforts must begin more than one year before the new hospital is ready for occupancy.

4. Arctic Entries are needed at all entries for Alaskan facilities. Public entrances are handled well at the ANMC but the loading dock was not sufficiently protected from the weather. The loading dock needs special consideration for designing a satisfactory climate protected entry.

5. Consideration should be given to programming conference space, with flexible partitions to use for "all hands" meetings.

6. Easy and independent roof access should be provided in all facilities with flat roofs. A ship's ladder or stairs is recommended for roof access in all facilities.

7. Flexibility of services is needed for hospital rooms with the changing program needs and advances in technology. Many factors now favor interstitial space as the most effective method of achieving this flexibility and slowing obsolescence in our hospitals. It is recommended that all future designs consider interstitial space for medical and other special purpose space, especially in multi-floor facilities.

8. Include in design criteria the provision of optimal location of designated smoking areas. This will help to provide acceptable facilities for smokers and avoid conflicts of non-smokers having to intrude on hastily designated areas.

9. Loading docks for large hospitals and medical centers has some additional design requirements associated with the high volume materials handling. A staging (temporary storage) area is needed when dealing with a large shipment. Also, a sink would be very useful for cleanup in the loading dock area.

10. Carpet cleaning equipment has increased in size in recent years and will not fit into janitor closets. Recommend that size and function of these closets be reviewed.

11. Require a materials handling study for all future major hospitals and medical centers. Proper use of pneumatic tube and track conveyor systems is very effective and efficient, saving message/material delivery and staff time. The efficiency of the pneumatic tube system allows lab work sampling to occur in internal medicine, which is patient friendly, and the samples instantly sent to the laboratory. This also eliminates the need for the laboratory to be in close proximity to the Internal Medicine Department.

12. High quality, durable and easily cleanable finish materials, components and hardware should be mandated in the POR and specified in the design documents. All wall finishes, including paint, should be cleanable and durable. Ensure that carpets are hospital grade and their application carefully analyzed if used in or adjacent to any patient or wet areas. All fabrics used in public areas should also be durable and readily cleanable by the housekeeping staff.

13. Major hospitals and medical centers require as-built drawings and detailed description of all the materials and systems that are contained in the health facility. The ANMC has an Operation and Maintenance Manual that was developed for use by the facilities manager to aid in the maintenance and repair of all systems at the Medical Center. The manual is used daily and is key to all maintenance and repair projects through out the facility. It is recommended that this type of manual be developed for all IHS Hospitals. The manual was prepared under the design contract but is expected to pay for itself many times over

14. Require convenient access to all equipment and shutoff valves not otherwise clearly and easily

accessible. This may mean metal catwalks above ceilings and access doors in ducts and walls.

15. Disinfection of infectious wastes should be studied for all IHS hospitals and health centers. After treatment the infectious wastes can be handled and disposed of as regular solid wastes. This can result in numerous cost saving opportunities, including elimination of infectious waste storage areas and the need for an infectious wastes disposal contractor.

16. Security is a major concern at IHS Hospitals and extensive security cameras, both outside and inside the hospital, monitored from the security office is desirable.

17. Consideration of lockable areas within the Health Records and Physical Therapy is required for a secure operation.

18. Installation of the Code-Blue towers in the parking lots is recommended for all IHS hospitals.

17. Provide switching so that half of the lamps in general lighting may be used as an energy-saving method.

18. Task lighting should be required for specialized departmental needs. Areas such as blood-drawing rooms and cast rooms, etc., should have design criteria to provide for specialized task lighting.

19. Provide uninterruptible power supply for the laboratory to provide continuity of results and protection of sensitive equipment.

20. The Doctors offices for the Emergency Department are located outside the department on the second floor. This is especially difficult for the supervising Doctors to respond to patient workloads and other Emergency Room demands.

21. Orthopedics has a strong proximity relationship with Radiology which should be carefully considered in all future designs.

22. Major medical and dental departments should consider staff changing and lockers within the department confines. The dental department complained that the staff lockers were provided for them at the other side of the hospital and were so inconvenient that they were not used by a majority of the dental staff.

23. Provide special air-conditioning for areas of high loads such as communication and computer rooms and the laboratory dept. Consideration should be given to placing the laboratory on a separate unit due to the increasing use of new specialized equipment.

24. Provide for expansion space in the vicinity of the computer room.

25. Utilize a commissioning system for final testing and acceptance of the complex mechanical system.

26. At the Pharmacy dispensing window it is recommended that a panic button be installed for security reasons.

27. Automated dispensing and supply systems must be identified early in the design phase so that the respective departments and furnishings can be properly designed and integrated with the automated system. Also, associated cart storage must be considered in the design.

28. All new IHS Radiology Departments should be designed for digital imaging even if wet processing is still needed. The Picture Archiving Computer System (PACS) requires many specific planning considerations for the system to work throughout the hospital. This includes space for double monitors, and associated services for power and increased HVAC loads.

29. Install 600 mm cable tray system above suspended ceiling system of each hallway.

Present data/communication cabling lacks a logical means of routing, which complies with present National Electric Code requirements (Article 300-23). Also, the IT staff indicated a preference for all computer cables to be installed above ceilings rather than using a raised floor system.

APPENDIX-1

Patient Satisfaction Survey

APPENDIX - 1

RESULTS OF PATIENT SATISFACTION SURVEY (DESIGN/CONSTRUCTION)

Alaska Native Medical Center (NAME OF FACILITY) **Anchorage, Alaska** (LOCATION)

Patients have been requested to express their opinion of this Indian Health Service (IHS) health care facility. Their comments will assist us in the design and construction of future IHS and Tribal health care facilities and the results have been tabulated below.

Ratings of the following items in the building have been totaled for 97 returned survey forms and are totaled as follows ranging from **5** (excellent) to **1** (poor).

	Totals	5	4	3	2	1
Location (is the facility convenient to community)	42	22	22	8	1	
Exterior Signs (are road and entrance sings adequate)	40	30	23	2	0	
Parking (are there enough parking spaces)	27	20	23	10	8	
(are parking lots convenient to the entrance)	34	23	17	3	2	
Sidewalks (are there enough)	52	40	19	3	0	
(are they where needed)	43	25	10	2	0	
Exterior Building Appearance	50	21	11	1	0	
Interior Finishes – Walls (Type/Color/paint/wallpaper, etc.)	51	20	11	1	0	
Floors (Type/Color/carpet/floor/tile, etc.)	51	22	9	1	2	
Artwork – Preference (Like or not)	67	13	16	0	0	
Location of patient check-ins (Easy to find)	48	18	25	1	1	
Bathrooms – Convenient to waiting area	47	19	23	2	3	
Heating/Cooling Comfort(Temperature, Hot/Cold, Drafts)	43	27	23	1	2	
Level of noise in the building	40	28	21	6	1	
Patient paging system (Can you hear it okay)	40	21	23	7	1	
Waiting Areas – Location (Convenient to Clinics)	50	30	23	3	0	
Furniture (Comfortable)	45	16	15	2	2	
Public telephones (Are they available and easy to find)	40	25	22	6	1	
Stairs (Are they easy to find and convenient)	39	30	19	5	1	
Elevators (Are they easy to find and convenient)	49	27	17	1	1	
Examining Rooms – Size	38	27	13	4	2	
Drinking fountains (Are they convenient)	29	22	30	10	2	
Lighting – Entrance/Public Area	51	26	13	0	1	
Location – Information assistance (near entrance)	51	26	15	1	1	
Business Office (Ease of Access)	43	22	21	3	3	
Signs in building (Can you easily find your way in the building)	42	29	19	4	4	
Overall quality of construction – (Your opinion)	54	21	18	1	1	

Appendix-2

ANMC Staffing Summary (4 pages)

Alaska Native Medical Center
Staffing Summary
June, 1997

Staffing Catagories / Departments	RN's	LPN	Telemetry Tech	Ward Clerk	Patient Service Assistant	Intermittent Nursing	Intermittent LPN	Physician	Physician,Contract	Nurse Anesthetists	Psychologist	Midlevel Practitioner	Nutritionist	Audiologists	Optometrists	Intermittent Midlevel	Health Educator	Mrdical Clerk/Assistant	Patient Representative	Clerk, Receptionist	Secretary	Medical Technician	Medical Tech (Part time)	Medical Supply Tech	Computer Programmer	Program Assistant	Patient Care Coordinator	Psychiatrist	Masters Level Therapist	Mental Health Technician	Dentist, Management	Dentist, Staff	Dentist, Contract	Dentist, Residents	Dental Hygentists	Dental Assistants	Medical Assistant	Billing Specialist	Clinical Lab. Scientist	Medical Laboratory Tech	Histology Tech.	Radiologic Tech.	Specialty Tech	Management	Staff Pharmacist	Pharmacist Tech	Warehouseman	Physical Therapist	PT Aide	Respiratory Therapists	
Critical Care	32		1	2	4	4																																											
Dental																										1	1				5	1	3	4	3.5	21	3	1.5													
Emergency Room								7.5	2			6.5			4		14.0	2			3.0	1																														44
Family Mediciane	6	18						12.0				6.0								8	1																														40
Internal Medicine	4	1			3			8.0			1							5			1																														51
Cardiovascular	2							2.0														5																													23
Diabetes								1.0				1.0	1								1																														9
Oncology	3							1.0																																												4
Hepatitis Program	6							0.5				2.0													1	1																										4
Inpatient Nursing	17	2			7												2.8																																		10.5
Mental Health	2										2	2.0						2			1						5	1	1																						28.75
Ophthalmology	1							2.0							3			2			2	3																													16
Orthopedic Clinic	4				3			5.0				3.0						3			1																														13
Orthopedic Inpatient	17	2			7													3																																19
Ambulatory Surgery	10	1		1	3																																												29
Operating Room	16			1																	10		2																												15
PAR	6																																																		29
Anesthesia Service								4.0		10																																									6
Pediatric Clinic	9	3						3.5				3.0								5																																14
Pediatric Inpatient	27					3		2.0										3																																	23.5
Pediatric Field	3							1.5										1																																	35
Surgery Clinic	7	3						7.0										5.5																																	5.5
Surgery Inpatient	16	5			6	7												3																																	22.5
Med/ Surgery Inpatient	17	1			7	2												3																																	37
Otolaryngology	2							5.0						3							2	2																													30
Women's Health Clinic	6	5			6			7.0				7.3					1					2																													14
W. Health Inpatient	25	2			3													4																																	34.3
Clinical Laboratory								3.0												1	2																			27.5	5	3									34
Radiology								5.0													1	4																														41.5
Pharmacy																		1		1																								16	9	2							37
Physical Therapy																					2																										3	18	12	1				36
Respiratory Therapy																																																	5	2		9
																																																1			5	6
Appendix-2a																																															Total Employees this page					720.55

Staffing Catagories / Department	Administration	Management	Medical Director	Coordinator	Supervisor	CHAP Instructors	Educators/Librarian	Trainer,Team Coordinator	Database Specialist	Alt. Health Specialist	Clerk/Data Entry	Secretary/Admin Assistant	Runner	Risk Manager	Paralegal	RN	Medical Record Tech	Contact Representative	Budget Analyst	Accounting Technicians	Program Assistant	IT Programmer Specialists	IT Programmer Analysts	Media Specialist	Environ. Health Specialist	Environ. Control Officer	Technicians	Equipment Repairmen	Facility Technicians	Facility Mechanics	Facility Trades	Custodial Workers	Personnel Professionals	Property Management	Materials Handling	Supply Technicians	Mail Room	Inventory Specialists	Dieticians	Cooks	Food Service Workers	Diet Aides	Telephone Operators	Social Workers	Social Work Associates	
Auxillary Patient Svs.				1																																								1
Biomedical Services		2																			1						14	1																	18
Cental Admitting Svs.					1				2	3																																			6
Central Nursing Office	1	1			4						1	1	1			2																													11
Central Sterile Supply		1			1							1																								23		2								28
Community Health Aide Program	1	1	1	1		7					1	2																																	14
Contract Health Services	1	1									1	1				1		6	1																										12
Executive Direction	4	1	1	1							2																																			
Financial Management*	1											1							8	5																									15
Hospital (Health) Education	1						2				1	1												1																						6
Health Information Services		2									35.5		4				15																													56.5
Hospital & Comm. Environ.Svs.		1																			1				2	2																			6
Hospital Facility Engineering		3										2																	3	14	8														30
Housekeeping**		4																														56													60
Human Resources	1										2	3																					15													21
Infection Control												1				2																														3
Information Technology	1										1	1										18	12																							33
Library							1																																						1
Materials Management		1										1																																		14
Nutrition and Food Service**		1			4							1																							4	4	2	2		6	7	32	4				55
Public Affairs				1																																									1
Quality Resources		1		1				1	1			2		1	1	1																													9
Social Services		1																																									6.5	3	10.5
Telecommunications		1		2																																						9			12
																																				Total employees this page									423
																																				Total employees page 1									720.5
* This offices provides financial support for both the Alaska Area and the ANMC																																				Total employees (1997)									1143.5
** Numbers are totals of both Federal and Contract staff																																												
Source: Alaska Native Medical Center, Plan for Provision of Services, FY 1998																																												
Appendix-2b																																													

Staffing Catagories	Administration	Management	Medical Director	Coordinator	Supervisor	CHAP Instructors	Educators/ Librarian	Trainer,Team Coordinator	Database Specialist	Alt. Health Specialist	Clerk/Data Entry	Secretary/Admin Assistant	Runner	Risk Manager	Parafegal	RN	Medical Record Tech	MEDICAL RECORD CODERS	Contact Representative	Budget Analyst	Accounting Technicians	Program Assistant	IT Programmer Specialists	IT Programmer Analysts	Media Specialist	Environ. Health Specialist	Environ. Control Officer	Technicians	Equipment Repairmen	CLINICAL ENGINEERING/PHYSICIS	Facility Technicians	Facility Mechanics	Facility Trades	Custodial Workers	Personnel Professionals	Property Management	Materials Handling	Supply Technicians	Mail Room	Inventory Specialists	Dieticians	Cooks	Food Service Workers	Diet Aides	Telephone Operators	HOUSING & TRAVEL ASS'T	Social Workers	Social Work Associate	
Department																																																	
Auxillary Patient Svs.				1																																												1
Clinical Engineering (Biomed.)		3																				1						1	15	6																		26
BUSINESS OFFICE		1			2							1									22																												26
Cental Admitting Svs.				2	1																																											3
Central Nursing Office	1				5							1																																					7
Central Sterile Supply		1			1							1																																					31
Community Health Aide Program	1	1	1			8						1.5																									4	20		4									12.5
Contract Health Services		1									1	1				2			4	1																												10
Executive Direction	3	1										3																																					7
Financial Management*																																																0
Health Education		1					1					1																																					3
Health Information Services		2									23		2				26	9																															62
HIS MANAGED BY SCF													2				3																															5
Hospital & Comm. Environ.Svs.		1																				1				2	2																					6
Hospital Facility Engineering		3										2																			3	8	14																30
Housekeeping**		3																																71														74
Human Resources***																																																0
Infection Control												1				1																																	2
Information Technology	1				2							1											14	9																									27
Library							1																																										1
Materials Management		1										1																									3		2										7
MEDICAL STAFF OFFICE			1									3																																					4
Nutrition and Food Service***		1			3																																							6	29	4				43
OP NUTRITION SVS. MANAGED BY SCF												1																															4						5
Public Affairs				1																																												1
Quality Resources		1										1		1	1	6.5			1		1			1																									13.5
QUYANA HOSPITALITY SERVICES		1																	1																													17
Social Services		1																																											8	7				7
SOCIAL SERVICES MANAGED BY SCF																																														2	4		2
Telecommunications		1		2																																													3
* This is an office of the Alaska Native Tribal Health Consortium responsible for the corporation's financial activity, including ANMC																																																	
** Numbers are totals of both Federal and Contract staff																																																	
*** Human Resources is an office of the Alaska Native Tribal Health Consortium and is responsible for the corporations's personnel acitivities, including ANMC.																																																
BOLD FACE = Added departments or catagories since 1997																																																	
Source: Alaska Native Medical Center, Plan for Provision of Services, June, 2000																																																
Appendix-2c																																																	

Total employees this page	436
Total employees p.3	968
Total employees (2001)	1404

Staffing Catagories	RN's (Includes Case Managers)	LPN	Telemetry Tech	Ward Clerk	Patient Service Assistant	Intermittent&Part Time Nursing	Intermittent LPN	PATIENT OBSERVER*	Physician	Physician,Contract	Nurse Anesthetists	Psychologist	Midlevel Practitioner	INTERMITTENT MIDLEVEL PRACT	Nutritionist	Audiologists	Optometrists	Intermittent Midlevel	Health Educator	CLINIC COORDINATOR
Departments																				
Critical Care	34		2	1	2	5														
Dental																				1
Emergency Room	15	7				11	5		7.5	2			6.5	12.0						
Family Mediciane	16	22							22				4							2
Internal Medicine	6.5	3			3				8											
Cardiovascular	2								2											
Diabetes									1				1		1					
Oncology	3.5								1											
Hepatitis Program	6								0.5				2							
Inpatient Nursing	14	1			3	10		8												
Mental Health	2								6			3	3							1
Ophthalmology	1								2.6								3			
Orthopedic Clinic	1	1			2				5				4							4
Orthopedic Inpatient	16	1			8															
Ambulatory Surgery	11	1		2		3														
Operating Room	16			1		3														
PAR	6																			
Anesthesia Service									5		9									
Pediatric Clinic	13	1				4			4				2.5							1
Pediatric Inpatient	28					14			6											
Pediatric Field																				
Surgery Clinic	9	2				2			8	5			1							
Surgery Inpatient	20	5			5															
Med/ Surgical Inpatient	15				6	4														
Otolaryngology	2								5											
Women's Health Clinic	9	5							9				7						1	1
W. Health Inpatient	25	1			4	7														
AUDIOLOGY MANAGED BY SCF																3				
Clinical Laboratory									3											
Radiology																				
RAD. MANAGED BY SCF									7.5											
Pharmacy																				
PHARMACY MANAGED BY SCF																				
Physical Therapy																				
Respiratory Therapy																				
* For hospital wide use																				
Appendix-2d																				

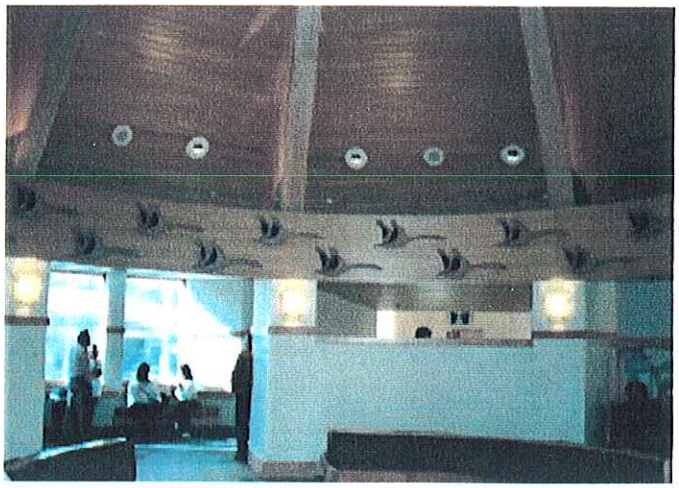
Staffing Catagories	CASE MGT. SUPPORT	CLINIC MANAGER	Medical Clerk/Assistant	Patient Representative	Clerk, Receptionist	Secretary/ADMIN. ASS'T	Medical Technician	Medical Tech (Part time)	Medical Supply Tech	Computer Programmer	Program Assistant	Patient Care Coordinator	Psychiatrist	Masters Level Therapist	Mental Health Technician	ADDICTION COUNSELOR	Dentist, Management	Dentist, Staff	Dentist, Contract	Dentist, Specialist
Departments																				
Critical Care																				
Dental												2					5	5	2	4
Emergency Room			19				5													
Family Mediciane	5				11															
Internal Medicine			5			1														
Cardiovascular						1	5													
Diabetes						1														
Oncology											1									
Hepatitis Program										1	1									
Inpatient Nursing			1																	
Mental Health		1	3			1								2	1	4				
Ophthalmology					1	1	4													
Orthopedic Clinic			4			1														
Orthopedic Inpatient			3			1														
Ambulatory Surgery																				
Operating Room			1			1	11													
PAR																				
Anesthesia Service																				
Pediatric Clinic			8																	
Pediatric Inpatient			3			1														
Pediatric Field																				
Surgery Clinic			4																	
Surgery Inpatient			3			1														
Med/ Surgical Inpatient			3																	
Otolaryngology						1	3													
Women's Health Clinic	1		9			2	2													
W. Health Inpatient			4			1														
AUDIOLOGY MANAGED BY SCF						1														
Clinical Laboratory					1						1									
Radiology						1	5													
RAD. MANAGED BY SCF							1													
Pharmacy											1									
PHARMACY MANAGED BY SCF																				
Physical Therapy						1														
Respiratory Therapy																				
* For hospital wide use																				
Appendix-2d																				

Staffing Catagories	Dentist, Residents	Dental Hygenists	Dental Assistants	Medical Assistant	Billing Specialist	Clinical Lab. Scientist	Medical Laboratory Tech.	Histology Tech.	LAB COMPUTER PROGRAMMER	Radiologic Tech.	Specialty Tech	Management	Staff Pharmacist	Pharmacist Tech	Pharm Tecnology Specialist	Warehouseman	Physical Therapist	PT Aide	SPEECH PATHOLOGIST	Respiratory Therapists	
Departments																					
Critical Care																					44
Dental	3	4	26	5	2																59
Emergency Room																					90
Family Mediciane																					82
Internal Medicine																					26.5
Cardiovascular																					10
Diabetes																					4
Oncology																					5.5
Hepatitis Program																					10.5
Inpatient Nursing																					37
Mental Health																					27
Ophthalmology																					12.6
Orthopedic Clinic																					22
Orthopedic Inpatient																					29
Ambulatory Surgery																					17
Operating Room																					33
PAR																					6
Anesthesia Service																					14
Pediatric Clinic																					33.5
Pediatric Inpatient																					52
Pediatric Field																					0
Surgery Clinic																					31
Surgery Inpatient																					34
Med/ Surgical Inpatient																					28
Otolaryngology																					11
Women's Health Clinic																					46
W. Health Inpatient																					42
AUDIOLOGY MANAGED BY SCF																					4
Clinical Laboratory						27	13	3	1												49
Radiology										12	8	2									28
RAD. MANAGED BY SCF										2	2										12.5
Pharmacy												3	16	10	1						31
PHARMACY MANAGED BY SCF												1	4	3		1					9
Physical Therapy																	7	5	1		14
Respiratory Therapy												1								13	14
														Total employees this page							968.1
* For hospital wide use																					
Appendix-2d																					

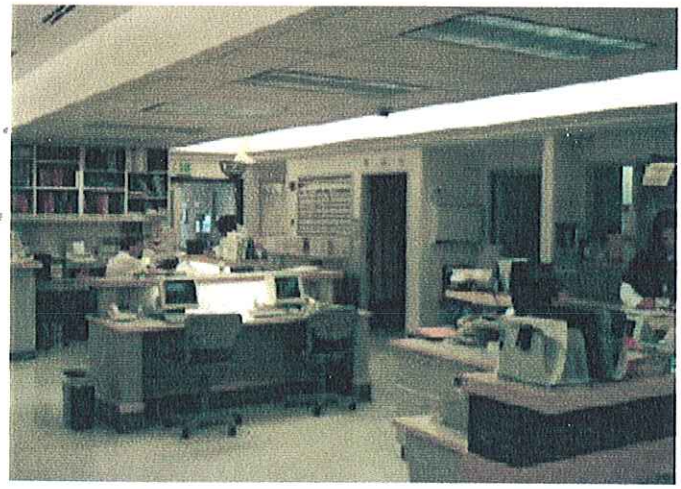
APPENDIX-3

ANMC Photographs

ANMC-1 Hospital Main Entrance



ANMC-2 Dome at Main Entrance Lobby



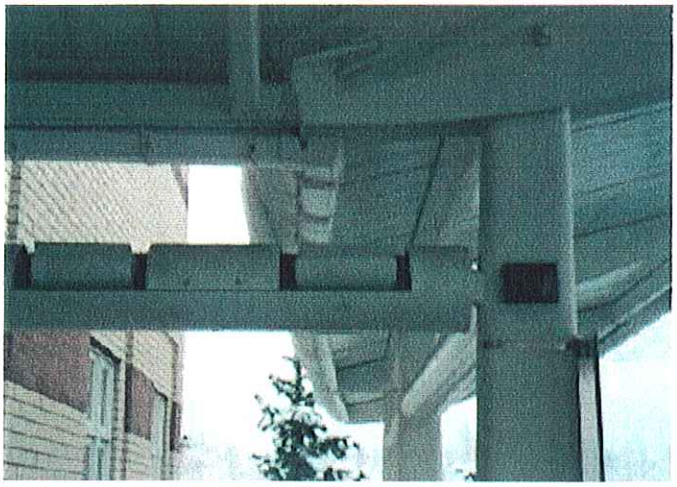
ANMC-3 Emergency Room Reception Area

ANMC-4 Freezing Walkway

ANMC-5 Outpatient Entrance Vestibule

ANMC-6 Inpatient Tower

ANMC-7 Metal Roofing on Entrance Pod



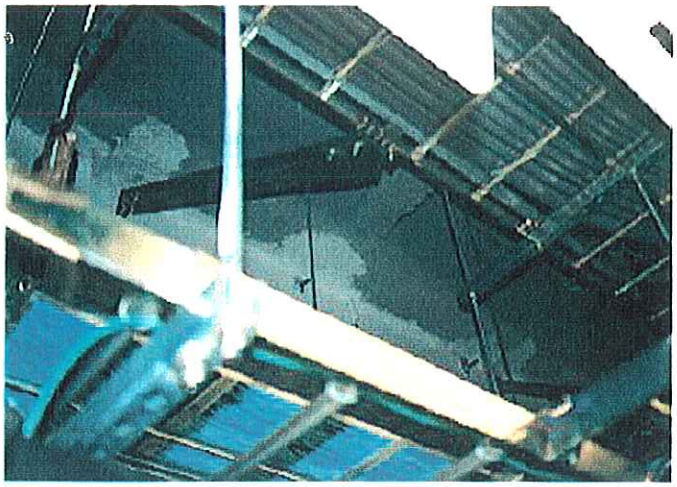
ANMC-8 Canopy with Lights

ANMC-9 Artwork in Corrodor

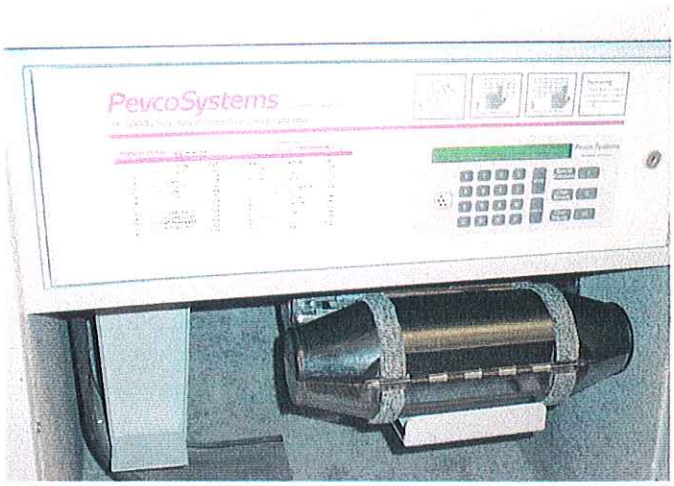
ANMC-10 Display Case in Elevator Lobby

ANMC-11 Clerestory Natural Light

ANMC-12 Note Handrail in Patient Corridor



ANMC-25 Above Ceiling Equipment



ANMC-26 Pneumatic Tube System

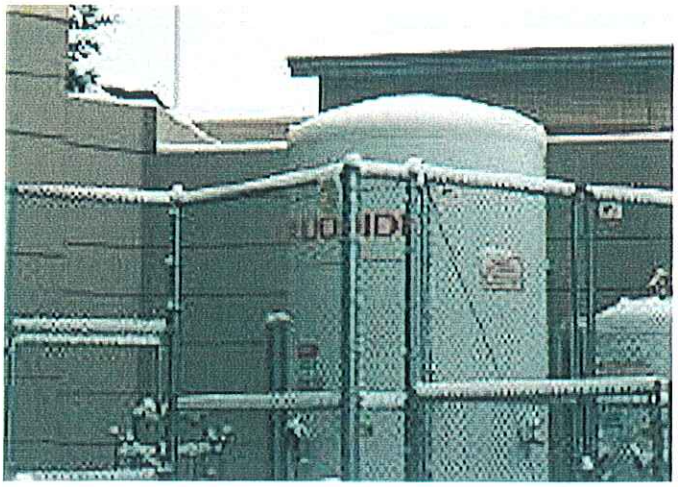
ANMC-27 Materials Handling Cart/Track System

ANMC-28 Dumwaiter Station at Ground Floor

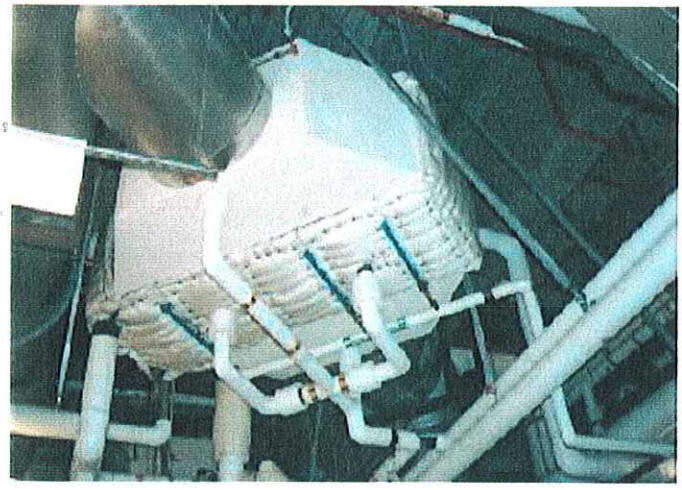
ANMC-29 Main Elevator Lobby

ANMC-30 Main Boiler Room

ANMC-19 Outside Smoking Area Under Canopy

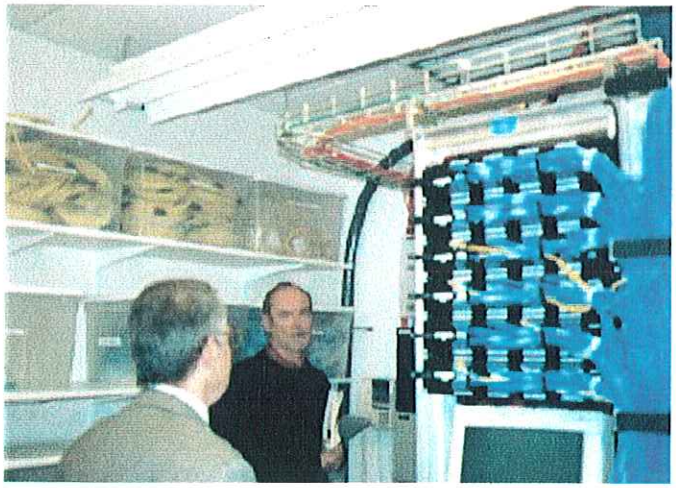


ANMC-20 Unfenced Retaining Wall Behind Tank



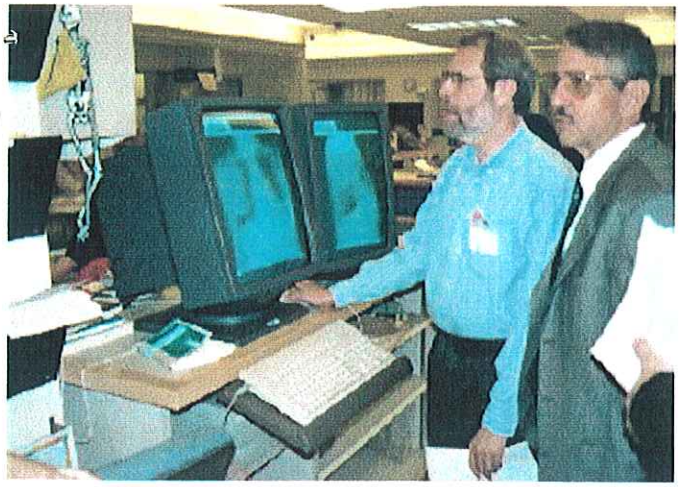
ANMC-21 Seismic Bracing on Piping/Ductwork

ANMC-22 Main Transformer Vault



ANMC-23 Communications Equipment Room

ANMC-24 Shelving Conflict with Sprinklers



AMNC-13 PACS Units Set on Bench Space

ANMC-14 Well Designed PACS Alcove

ANMC-15 Sani-Pak Unit at Loading Dock

ANMC-16 Loading Dock

ANMC-17 Adjustable Loading Dock Bay (right)

ANMC-18 Hostel Exit with no Walkway

ANMC-31 A/C Chillers, note Maintenance Space