



# Rugged Charm

## Ranger Cabin (HS-1) Historic Structure Report

Jewel Cave National Monument  
Custer, South Dakota

Alan W. O'Bright

November, 1999

*Shirley Wolf - 1942*

*Elwood Wolf - 1942*



*Ranger Station - 1942*



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## EXECUTIVE SUMMARY

### *Statement of Purpose*

The purpose of this document is to supplement and refine information presented in the 1995 “Historic Structure Report” authored by Nancy MacMillian. While that report briefly covers site history, existing conditions, room descriptions, and treatment recommendations, it fails to fully address specifics on key issues and a contemporary use program. This report will tie documented oral and written accounts with what now exists, to develop a sense of changes to the cabin over time. It will also posit alternative treatments for key issues, and propose materials treatments that will, hopefully, preserve the building well into the twenty first century.

### *Project Team Members*

Information and Management Assistance:

Jewel Cave National Monument  
Superintendent Peggy O’Dell  
Chief of Maintenance Larry Dilts  
Chief of Interpretation Karen Rosga  
Resource Manager Mike Wiles

Chief of Interpretation Tom Richter,  
Midwest Region Support Office

Contract Design Services:  
Black & Veatch, Denver, Colorado

NPS Contracting Assistance:  
Contracting Officer Dick Neider, Mount  
Rushmore National Memorial

### *Investigation History and Methodology*

The first serious investigation of the Ranger Cabin is believed to have begun in 1988 when park ranger Bruce Bitz interviewed Shirley Wolf about the cabin and cabin life with her ranger-husband during the period

that they occupied the structure from 1941 through 1943. Perhaps the need for more information was precipitated by the fact that the cabin had then exceeded its 50<sup>th</sup> year when deemed “historic.” This, combined with the great loss of interior fabric in the early 1980s, and the continued decay of the exterior, required an urgency to document early life in the structure before important information was lost to the ages. This work was followed by further documentation by then park Chief of Interpretation Tom Casey. National Park Service’s Nancy MacMillian, an employee of the Rocky Mountain System Support Office, then prepared a historic structure report on the cabin in 1995. The report was an attempt to document some of what was known about the cabin, its existing conditions, and treatment recommendations.

After Jewel Cave National Monument was reorganized into the Midwest Systems Support Office in 1996, review of MacMillian’s report revealed specific weaknesses that needed to be corrected or supplemented. In 1996 the challenge was assigned to Midwest Systems Support Office Historical Architect Laura Johnson to document additional information in preparation for a supplemental historic structure report. Johnson documented existing conditions, collected drawings and photographs, and documented additional information via an interview survey form sent to numerous persons known to have had contact with the cabin. At that time a physical examination was made of building components during removal of much of the interior fabric installed during the 1980s. Unfortunately, Johnson left her position in 1997 before completing the project. The

report was made even more time-urgent when funding was procured in 1998 for treatment of the structure.

This report relies heavily upon the work completed to date by all of the above. A thorough emphasis is placed on historic room function and appearance, and former building systems and materials chronology and historic material integrity by culling through oral accounts, examining remaining historic fabric, and researching historic materials. Note that MacMillan's report includes existing conditions when the interior was intact prior to 1996 investigation removals. This report addresses alternatives and recommendations for critical issues such as handicap accessibility and fire suppression. Much-needed engineering expertise was garnered through the contracting of outside design services.

It is not the intent of this report to compete with MacMillan's 1995 historic structure report, or to provide a complete social history of the site due to project time constraints. However, it is important to document known important events that had

an impact on the how the building evolved in time. The history-portion of this report compiles information not covered in the 1995 MacMillan report.

### ***Use Program***

It is the intent of the park that the Ranger Cabin be included within a comprehensive guided tour that will take visitors from the visitor center through Jewel Cave at historic cave entrance. "This will place the monument within the context of the Twentieth-century conservation/preservation movement, the growth and development of the National Park Service, the Civilian Conservation Corps, and the evolution of tourism in the Black Hills in the twentieth century."<sup>1</sup> The tour will include access to the Ranger Cabin interior, restored to its circa 1940 appearance if there is sufficient documentation to do so.

### ***Project Goals***

The goals of this project is assess the condition of remaining historic fabric, develop historic chronologies, and propose treatment recommendations that will be consistent with the use program, and provide a serviceable, safe, and enjoyable structure for park visitors.

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<sup>1</sup> Tom Richter, "Historic Area Interpretive Plan," (undated).

# **PART ONE: DEVELOPMENTAL HISTORY**





## HISTORY

### *Historic Photographs*

There is a good time-range of exterior photographs taken of the Ranger Cabin, but, unfortunately, no interior photographs are known to exist prior to 1972.<sup>2</sup> There is a series of seven photographs capturing cabin construction process. After that only subtle changes are evident on the cabin and, to a certain extent, the surrounding landscape. These small changes give clues as to when most of the unmarked and undated photographs were taken. The most glaring character change occurs during the 1960s with the construction of an information kiosk just outside the front porch, and addition of a soda machine.



**Figure 1.** "July 2, 1935, Stevens Studio, Hot Springs, S.D." View to the northwest showing first few log courses. Jewel Cave NP photo archives, Neg. No. 789.

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<sup>2</sup> See photos attached to Mary Jo Silbernagle survey prepared by Laura Johnson, (1997). The circa 1972 photographs are narrowly focused within the kitchen.



**Figure 2.** "Ranger Cabin Under Construction, 1935." View to the northwest showing near-completion of wall logs. Jewel Cave NM photo archives, Neg. No. 2793.



**Figure 3.** The Ranger Station during construction, 1935, view to the east. Note that the gable end logs and roof framing have been completed. Jewel Cave NM photo archives, Neg. No. 844.



**Figure 4.** “Ranger Station, Serran, 1935.” In this view to the northeast the roof and chimney are complete, but the windows have not been installed. Jewel Cave NM photo archives, Neg. No. 2618.



**Figure 5.** The Ranger Cabin during construction, 1935, view to the northwest. By the time of this winter photo some of the windows had been installed. Jewel Cave NM photo archives, Neg. No. 2626.



**Figure 6.** "11/30/35, Stevens Studio, Hot Springs, S.D." View to the southeast. Note that the kitchen windows are in place. Jewel Cave NM photo archives, Neg. No. 2628.



**Figure 7.** The Ranger Cabin upon exterior completion, ca. 1936, view to the southeast. Jewel Cave NM photo archives, Neg. No. 2614.



**Figure 8.** "8/9/38 Child's Ranger Station." Work was proceeding to finish the interior. Jewel Cave NM photo archives, Neg. No. 2620.



**Figure 9.** "Ranger's Station, Jewel Cave National Monument." Note the sign in the foreground indicating that the cabin was in use at the time. Log joints had yet to be daubed. From Albert Good, *Park and Recreation Structures*, Boulder, Colorado: Greybooks, 1990, (1938), 84.



**Figure 10.** The Ranger Cabin, circa 1940. Note the informational sign along the trail and four women on the front porch. Jewel Cave NM photo archives, Neg. No. 2807.



**Figure 11.** "Taken from the well (water fountain), circa 1942." This is the first image showing log joint daubing. Smoke from the chimney indicates the building was occupied during the winter. Jewel Cave NM photo archives.



**Figure 12.** Woman at west elevation of Ranger Cabin, circa 1942. This woman is believed to be Shirley Wolf, wife of park ranger Elwood Wolf. The two lived full-time in the cabin from 1941 until 1943. Jewel Cave NM photo archives.



**Figure 13.** "Wolfe [*sic*] in his outdoor winter wardrobe, circa 1942." Jewel Cave NM ranger Elwood Wolf seen here amongst chord wood used to cook, and heat the cabin. Jewel Cave NM photo archives.





**Figure 14.** Ranger Cabin, view to the northwest, circa 1950. Jewel Cave photo archives, Neg. No. 2612.



**Figure 15.** Ranger Cabin, view to the northwest, 1952. This photo was taken by ranger naturalist Joseph L. Orr while he was stationed at the cabin. Taken from original color photo from personal collection of Joseph L. Orr.



**Figure 16.** "Ranger Station," circa 1952. In this image the board shutters in place on the windows, and a clay flue pipe extends from the chimney. Jewel Cave NM photo archives, Neg. No. 2616.



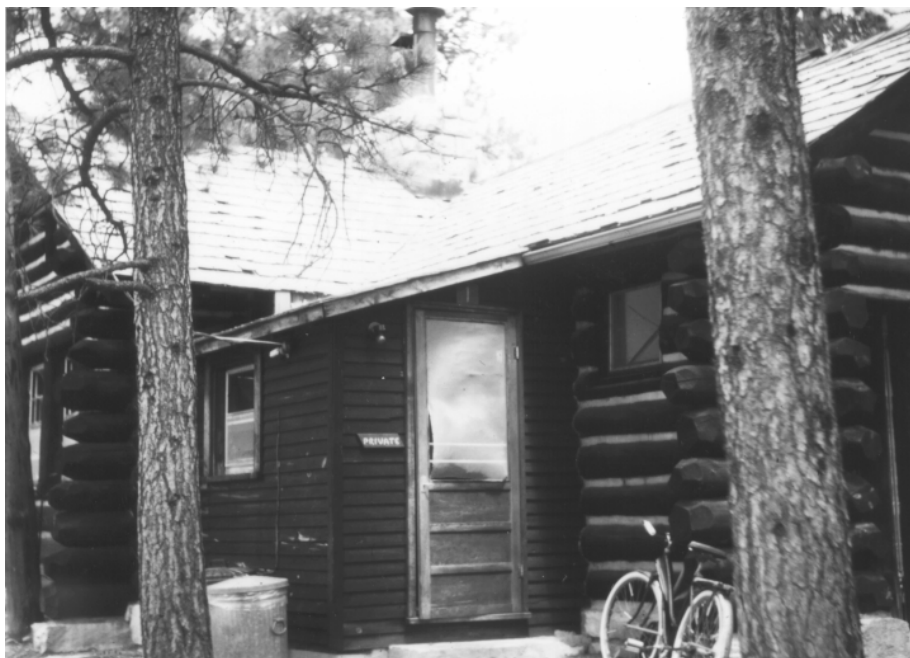
**Figure 17.** "Ranger Station and Pop Machine, Fassbender, 1965." By this time the cabin had been modernized with aluminum storm windows, a pop machine, and a drinking fountain. Jewel Cave NM photo archives, Neg. No. 2286.



**Figure 18.** Information kiosk at the Ranger Cabin, circa 1966. The pop machine, kiosk, and other site furniture tended to crowd out the front porch at this time. Jewel Cave photo archives, Neg. No. 1908.



**Figure 19.** "Quarters #1 (Ranger Station), D.F.G., 10/19/67." By this time railing had been added to either side of paths leading to the cabin, and half-log benches are prolific. Jewel Cave photo archives, Neg. No. 1898.



**Figure 20.** Shed addition at rear of the Ranger Cabin, 1972 or 1973. The only known photo of the shed that was constructed around 1946 and demolished in 1982. It may have housed an electrical generator and ice box into the 1950s. From Mary Jo Silbernagle photo collection.

### *Administrative Background*

Constructed in 1935 for use as an administrative office building, the Ranger Cabin (HS-1) was added to the NPS List of Classified Structures (LCS) in 1975 (IDLCS 10706). Incredibly, the LCS form recommended that no historic study was required for the cabin. The Ranger Cabin was placed on the National Register of Historic Places April 1995. The structure has gone by several names including Ranger's Cabin (1935), Old Administrative Office Building, Ranger Station, Building No. 1, and Residence No. 1. It is the only historic structure at Jewel Cave.

### *Brief Construction History*

The Ranger Cabin was designed in 1935 and constructed soon after by a unit of the Civilian Conservation Corps (CCC). That CCC unit may have also been responsible

for development of Wind Cave National Park and nearby Custer State Park. Several remaining sequential construction photographs document the cabin construction process (see Figures 1-7). The cabin was instrumental in providing early park rangers with an office from which to conduct tours to the natural cave entrance.

Photographic evidence suggests that the cabin may have been unoccupied for at least the first three years after log erection. In Figure 8, dated 1938, sheets of wall boards are believed to be leaning against the interior face of the living room windows. This suggests that interior finishes had yet to be installed. Interior finishes and log joint daubing may have been held off until the logs had time to season.<sup>3</sup> Also in this

<sup>3</sup> Nancy MacMillan, "Ranger Station Historic Structure Report, Jewel Cave National Monument,

photograph a concrete float trowel rests on the porch railing, suggesting that bathroom slab work had just been completed or was in the process of completion.

During its early years, life in the cabin was akin to backwoods camping. The cabin was furnished with a reliable water supply and sanitary plumbing, but apparently no electrical and phone service. The nearest phone, and grocery and gasoline supplies was six miles distant. Heating was supplied by a wood or coal-burning kitchen range, and sometimes by the living room/office fireplace. Hot water was prepared on the range.<sup>4</sup> Summer cooling of food stuffs was intended to be provided by the built-in cooling closet just off the kitchen, but early accounts indicate that the closet may have been unused as intended.<sup>5</sup>

It is unknown if the intent was to provide full-time or seasonal living quarters for a ranger. The cabin was probably occupied soon after completion of the interior around 1938. In 1941 the cabin was occupied year-round by a ranger and his wife, principally due to events surrounding World War II. The best oral accounts of early life and objects within the cabin were recounted by Shirley Wolf, the wife of park ranger Elwood Wolf, to park ranger Bruce Bitz in 1988 and 1989. The Wolfs occupied the structure during the period 1941 to 1943, but made only minor cosmetic changes to the interior and more than likely provided the cabin with its first source of electrical power.

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Custer, South Dakota,” (15 September, 1995), (hereafter cited as MacMillan, “HSR”), 6. MacMillan writes that oral histories confirm this, but the source of her material is not cited.

<sup>4</sup> Shirley Wolf to Bruce Bitz, Unpaged interview notes, (January 1989).

<sup>5</sup> Shirley Wolf to Bruce Bitz, unpaginated interview notes, (August 1988).

In 1946 a shed constructed of salvaged building materials was added to the kitchen ell (Figure 20). The purpose of this addition may have been to house fire wood or coal, an electrical generator, and an ice box.

Park ranger naturalist Joseph L. Orr occupied the structure during 1952, noting few physical changes to the cabin at that time. He did, however, note that a “light plant,” presumably a generator, was installed “in back of the cabin.”<sup>6</sup>

Changes were made to the surrounding landscape, such as the addition of paths, half log benched, railings, parking lots, and a ticket booth just outside the front porch (Figure 18). Some remodeling work may have been accomplished in 1949, but the cabin remained virtually untouched until the early 1980s.<sup>7</sup> At the exterior, wooden storm windows had been replaced with aluminum units during the 1970s, and portions of the roof eaves were furnished with gutters and downspouts. The roof was replaced, and the unusual log ridge cap removed in 1959.<sup>8</sup>

Most interior changes from the late 1940s until 1980 were cosmetic in nature. Kitchen appliances were replaced in response to the availability of reliable public electrical service and tanked propane. Kitchen and office floors were covered with linoleum in

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<sup>6</sup> Joseph L. Orr in interview survey prepared by Laura Johnson, (1997), 2. It is unknown from Orr’s account if the 1946 sheltered the generator, or if a separate structure was built to house it.

<sup>7</sup> Ken Karsmizki, “National Register of Historic Places Registration Form, Ranger Station, Jewel Cave National Monument” (26 January, 1995), Section 7, page 4. The work was apparently unspecified.

<sup>8</sup> MacMillan, “HSR,” 18. According to Tom Casey notes from Superintendent’s Reports.

the early 1940s and 1953 respectively.<sup>9</sup> During the late 1950s all floors were covered with asbestos tiles. The rugged fiberboard walls and ceiling were painted several times. Furnishings were moved in and out in response to the personal needs of the rangers, and window shades and curtains added for privacy. During this time period the cabin remained open only during the tourist season.

By 1980 the interior and exterior of the cabin had fallen into disrepair. The need for employee housing space precipitated an extensive log condition survey with treatment recommendations in 1980.<sup>10</sup> In 1981 the park initiated interior renovation work to replace most interior finishes and utility systems. This work, unfortunately, resulted in removal of much historic finishes, millwork, and electrical and plumbing fixtures.<sup>11</sup>

In 1982 design and construction work was initiated by the Denver Service Center to repair log crowns and replace the roof.<sup>12</sup> While the Goodall log survey report recommended epoxy repairs and log replacement, the construction work only specified log replacement. Even then, work was not accomplished on some logs identified for repair or replacement. During

that same year aluminum storm windows were replaced with wooden ones, and the small, 1946 shed addition was removed.

Public restrooms were extensively renovated in 1984. This work included demolition of the interior partition separating the two restrooms, finishes, and fixtures, and installation of all new fixtures and finishes.

With the inclusion of the Ranger Cabin to the National Register of Historic Places in 1995 and the completion of MacMillan's historic structure report that same year, the importance of the structure to the park with regard to early NPS operations was elevated. Physical research work initiated in 1996 by the park resulted in removal of most finishes installed in 1981 for the purpose of investigating what remained of historic interior finishes.

### ***Room Function and Appearance***

The following briefly describes the historic room function and significant features and changes made to the spaces prior to 1981 renovation work. The intent of these summaries is to assist the reader to develop mental images of how the rooms appeared in time. Specific information with regard to elements and building materials can be found within existing conditions portion of this report. Names ascribed to each room are current use names.

### **Living Room/Office (101)**

Early on this space was mostly considered for use as a ranger office for visitor contact into the 1970s.<sup>13</sup> The 1935 construction drawings specifically refer to the room as an "office." During summer months sparse office furniture were moved to the front

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<sup>9</sup> Shirley Wolf to Bruce Bitz, unpaginated interview notes, (January 1989), and MacMillan, "HSR," 18.

<sup>10</sup> See Harrison Goodall, "Field Survey, Old Administration Building/Ranger Station, Jewel Cave National Monument, Custer, South Dakota." (29 April, 1980), (hereafter cited as Goodall, "Field Survey").

<sup>11</sup> Blaine Foss in survey prepared by Laura Johnson, (1997), 7. Foss indicated that cabin work was initiated as it had become infested with rodents and the electrical system was a safety hazard.

<sup>12</sup> See "Historic Administration Building Preservation, Jewel Cave National Monument," Drawing Number 146/80006, (19 April, 1982).

<sup>13</sup> Mary Jo Silbernagle and John Hannan in survey prepared by Laura Johnson, (1997), 4 and 4 respectively.

porch to provide occupants with more personal living quarters.<sup>14</sup> Later occupants doubled up the function of the space for use as a living room and office due to the cramped living quarters. By the early 1970s a sofa had been moved into the room for private use.<sup>15</sup>

The office was initially finished with Celotex fiberboard wall and ceiling finishes with exposed nail heads. The nails had small heads unlike nails throughout the rest of the cabin. The ceiling featured a shallow soffit set out twelve inches from the wall faces. The soffit was completely finished with Celotex. No attempt was made to conceal fiberboard joints. Walls and ceiling may have been painted between 1940 and 1943 with pink paint.<sup>16</sup> During the early 1950s the room may have been painted “off white.”<sup>17</sup>

All baseboard trim, and door and window millwork were heavily stained and varnished plane sawn pine. This finish survived until 1981. The floor was of stained and varnished wood strip until covered with linoleum around 1953. In the late 1950s the floor was covered with asbestos tiles.

The fireplace is an important focal point within the space and structure, and was also used from time as a supplemental heat source. Little has changed on the fireplace since its construction, except for the patina of use.

Although the cabin was provided with an electrical system, generators supplied

electricity on and off into probably the 1950s.<sup>18</sup> Most night lighting was provided by camp lanterns according to a couple of early reports.

Perhaps the most formal light fixtures in the cabin were located in the office. There was a light fixture centered on the ceiling and two sconces flanking the fireplace. Unfortunately, there is little information on their appearance. A three-switch plate just south of the front door controlled room and front porch lights, and a duplex plate adjacent to the kitchen door control sconce and the ceiling light.<sup>19</sup> There were only two receptacles at the east and west walls according to the 1935 drawings. The receptacle cover plates may have been dark brown with a lined pattern.

Office furnishings were simple, probably a function of the space’s use as an office and occasional visitor contact. During the early 1940s the office was furnished with a small desk, chair and cash register.<sup>20</sup> Later occupants tended to move furniture around to suit their own tastes. At times a file cabinet may have been moved into the office from the bedroom, and a bookcase may have been added.<sup>21</sup> Windows had no treatments during the early 1940s, but curtains and blinds were installed later for privacy.

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<sup>14</sup> Shirley Wolf to Bruce Bitz, unpaginated interview notes, (January 1989).

<sup>15</sup> Dennis and Penny Knuckles in survey prepared by Laura Johnson, (1997), floor plan notes.

<sup>16</sup> Shirley Wolf to Bruce Bitz, unpaginated interview notes, (January 1989).

<sup>17</sup> Joseph L. Orr in survey prepared by Laura Johnson, (1997), 4.

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<sup>18</sup> Shirley Wolf to Bruce Bitz, unpaginated interview notes, (January 1989), and Joseph L. Orr in survey prepared by Laura Johnson, (1997).

<sup>19</sup> See “Jewel Cave National Monument Ranger’s Cabin,” Drawing Number NM-JC-001, (5 March, 1935), floor plan.

<sup>20</sup> Shirley Wolf to Bruce Bitz, unpaginated interview notes, (January 1989).

<sup>21</sup> Joseph L. Orr in survey prepared by Laura Johnson, (1997), 4. A file cabinet indicated by Orr may have been the one the Wolf’s kept in the bedroom.

**Kitchen (102)**

The kitchen was probably the most important room within the private quarters. It was a place to meet friends, do personal work, and of course cook and eat. During the brutal winter months it was the warmest room in the cabin.

As with most rooms, the kitchen was finished with Celotex fiberboard finishes fastened with checker-head roofing nails. The finishes remained exposed until painted pink in the early 1940s, and possibly off white by the early 1950s. All trim, cabinet and other millwork was darkly stained and varnished. Floors featured darkly-stained and varnish wood strip pine flooring. Linoleum covered the wood floor during at least the early 1940s.<sup>22</sup> Tan asbestos floor tiles were installed in the late 1950s.

Kitchen cabinets were, and continue to be, the most prominent feature in the kitchen. This millwork is amply detailed in the 1935 construction drawings. Base cabinets and cupboards were located then, as now, against the north and a portion of the west walls. The cabinets were fitted with paneled doors, and two metal-lined bread box drawers. The counter top may have been constructed of solid boards with a linoleum finish and stainless steel edging.<sup>23</sup> There may have been a short splash back also covered with the same linoleum. Centered on the north kitchen window was a single-basin, white porcelain sink. The appearance of sink fixtures is unknown, but may have been simple chrome plated knobs and faucet with a hose sprayer. The area beneath the sink was completely open to view.

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<sup>22</sup> Shirley Wolf to Bruce Bitz, unpaginated interview notes, (January 1989).

<sup>23</sup> Don Lytle to Alan O'Bright, (12 February, 1999). Lytle recalls seeing the linoleum during the early 1960s.

A coat and broom closet located in the southwest corner of the kitchen has never been removed or changed. It features a Celotex interior lining at the exterior log walls and ceiling. Stained and varnished cove moulding sealed the joint between all cabinets and wall and ceiling finishes.

According to 1935 construction drawings there was a 100 watt light fixture centered on the ceiling, controlled by a switch north of the bedroom door. The appearance of the fixture is unknown. A 75 watt pull chain fixture above the sink, was probably a simple porcelain socket. A switch adjacent to the rear door controlled an exterior light. Only two receptacles at the counter and centered on the west window mullion provided power.

Early appliances included a wood and coal-burning range located against the east wall to take advantage of the chimney flue thimble. A flue cleanout was located directly below the thimble near the floor. The early range not only allowed the occupants to cook, but was also a primary winter space heating source for the entire cabin, and provided hot water for personal clean up. This range may have serviced the cabin well into the 1950s before being replaced with a propane-fueled range and then an electric range in the 1980s (see *Existing Conditions, Kitchen Appliances*). During the early 1940s a Coleman camp stove was used to prepare meals in the kitchen.<sup>24</sup>

Food refrigeration was intended to be provided by a small closet at the north wall of the kitchen (see *Storage Closet (102A)*), but its thermal inefficiency may have provoked early cabin occupants to acquire an ice box unit (see *Storage Closet*

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<sup>24</sup> Shirley Wolf to Bruce Bitz, unpaginated interview notes, (August 1988).



(102A)).<sup>25</sup> Perhaps because the kitchen was hampered for space, the ice box was located in the storage shed built outside the rear door in 1946. When reliable electrical power was routed to the cabin, contemporary electric refrigerators have been the norm. These have been located against the south kitchen wall, and the east wall adjacent to the range.

Spatial constraints allowed only for a small kitchen table centered at the west windows and a couple of chairs. Although the appearance of the table is unknown, the chairs may have been director's chairs during the 1940s (see *Existing Conditions, Furnishings*). This furniture was undoubtedly replaced many times over. There may have been no window treatments until the 1950s.

### **Storage Closet (102A)**

This unusual, small closet was intended to serve as a combination food cooler and storage area, in other words a kitchen pantry. According to the 1935 construction drawings the enclosed cooling cabinet was located against the west log wall, accessible to a pair of exterior louvered vents. Additional shelves were simply constructed between the cooling box and the east wall and used to store food, supplies, and books.<sup>26</sup>

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<sup>25</sup> Shirley Wolf to Bruce Bitz, unpagged interview notes, (August 1988), and Joseph L. Orr in survey prepared by Laura Johnson, (1997), 2 & 5. Wolf seems to discuss the cooling closet, referring to it as an ice box, but then states that she "placed a Coleman stove on top of it which was used in most of the cooking. If there was an ice box unit, its location within the kitchen during the Wolf's occupation is unknown. By the early 1950s Orr was using a separate ice box unit "on the back porch," and the cooling closet louvers had been covered by then.

<sup>26</sup> John Hannan in survey prepared by Laura Johnson, (1997), 4.

The design intent of the cooling cabinet is unclear. The cooling cabinet did not include provisions for ice and ice melt, and had inadequate insulation to be able to function as a true ice box. Perhaps it was intended to be used during the winter months when cold air naturally flowed into the closet through the external vents. But poor insulation combined with cold outside air may have caused frost accumulation on the finishes or drafts into the kitchen. Available information on other northern United States CCC residential structures show no feature like this.<sup>27</sup>

Early on the cooling closet may have fallen into disuse for its intended purpose. By the early 1940s a separate ice box unit was already in use within the kitchen, even during the winter months.<sup>28</sup> By the early 1950s the louvers had been sealed over at the exterior.<sup>29</sup>

Closet walls consisted of Celotex with a screen backing as rodent proofing. The Celotex has never been painted. Screening was also detailed between the sub and finish wood floor according to the 1935 drawing. While the cooling shelf closet millwork matched the appearance of kitchen cabinets, adjacent open shelves were of unfinished boards set on ledger blocks nailed into the walls. The wood strip floor was broken by a hatch to the crawlspace. According to the 1935 construction drawings there was a single 50 watt, pull chain light fixture in the ceiling.

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<sup>27</sup> Albert Good, *Park and Recreation Structures*, (Boulder, Colorado: Graybooks, 1990), 78. A structure of similar size in nearby Custer State Park includes no closet of this sort in its design drawing.

<sup>28</sup> Shirley Wolf to Bruce Bitz, unpagged interview notes, (August 1988).

<sup>29</sup> Joseph L. Orr in survey prepared by Laura (Johnson, 1997), 2.

### Bedroom (103)

This space has always functioned to provide very simple sleeping accommodations. The cramped nature of the bedroom may have been further enhanced by the absence of a clothes closet (see *Bathroom (104)*). Like the rest of the building, the walls and ceilings were of nailed Celotex, and the floors stained and varnished wood strip. There was no built in furniture. Walls and ceiling may have been painted pink during the early 1940s, and then various colors afterwards. A 100 watt light fixture centered on the ceiling was switched at the bedroom door. There were single receptacles at the north and south walls.

Early furnishings usually consisted of a bed, night table, and a home-built clothes tree.<sup>30</sup> By the early 1950s there were two bunk beds and one or two chairs.<sup>31</sup> The simplistic furnishing arrangements lasted well into the 1970s, except the old furniture was replaced by new from time to time. There were apparently no window coverings during the early 1940s, but this quickly changed when privacy became an issue.<sup>32</sup> By the early 1960s a sink was added to the bedroom, probably against the west wall.<sup>33</sup>

### Bathroom (104)

The 1935 construction drawings and the 1938 Albert Good publication show this small space designed as a clothes closet. It is unknown if this space was constructed as designed, or if field design revisions precipitated construction of a bathroom.

<sup>30</sup> Shirley Wolf to Bruce Bitz, unpagued interview notes, (August 1989). Bitz notes that the table within the cabin at the time of the Wolf interview may have been from the 1940s.

<sup>31</sup> Joseph L. Orr in survey prepared by Laura Johnson, (1997), 5.

<sup>32</sup> Shirley Wolf to Bruce Bitz, unpagued interview notes, August 1989.

<sup>33</sup> Don Lytle to Alan O'Bright, (12 February, 1999).

Regardless, by 1941, and into the 1980s, the space functioned as a simple bathroom featuring a toilet and shower.<sup>34</sup>

According to the original design, the closet was to feature a rod and shelf at the north and south walls, and a single 50 watt pull chain ceiling fixture. Finishes were to be Celotex. A portion of the original ceiling finishes and the light fixture still remain. The floor system was have been wood frame with wood strip flooring.

In 1941 a shower was located against the south wall, and a toilet against the north wall. The floor was concrete slab, possibly painted, and walls and ceilings may have been painted pink. The shower may have been lined with a rough, hand-applied plaster. The toilet had a tank raised slightly above the stool with a goose-neck brass pipe connecting the tank to the stool. A decorative cast iron toilet paper roll from a local plumbing supplier may have been mounted to the wall.<sup>35</sup> Any window treatments is unknown.

### Public Restrooms (105 & 106)

These two spaces have always functioned as public restrooms and remained relatively intact until 1980s renovation work. As designed and constructed the restrooms had a concrete slab floor and perhaps Celotex wall and ceiling finishes (see 1935 construction drawing). By the 1960s wall and ceiling finishes consisted of lath and plaster.<sup>36</sup> Both rooms shared a common plumb wall partition with a single toilet

<sup>34</sup> Shirley Wolf to Bruce Bitz, unpagued interview notes, (August 1989).

<sup>35</sup> Don Lytle to Alan O'Bright, (12 February, 1999).

<sup>36</sup> Don Lytle to Alan O'Bright, (12 February, 1999). Plaster finishes were removed during subsequent renovation work.

stool and wall-mounted lavatory.<sup>37</sup> There was a 50 watt ceiling fixture and wall switch in each room, and apparently an attic scuttle in the men's room ceiling. Nothing else is known about window treatments, paint colors, and accessories as both rooms were entirely gutted during the 1980s.

### **Porch (107)**

The rustic front porch has not changed since its construction, except for 1982 selected log replacement. Although porches are usually deemed an exterior decorative element, activities that took place on this porch require an overview. Early rangers tended to move visitor contact activities onto the front porch to be able to expand use of the cramped living quarters. Normally the living room functioned as a visitor contact and office space, but during good summer weather the desk and chair were moved to the porch (Figure 2807).<sup>38</sup>

The importance of the porch for visitor contact is strengthened by the images of signs hung from beams and log walls in photographs dating to the early 1950s. These signs may have given visitors cave tour and cost information, trail and road maps, and other information while the ranger was on tour with another group. It is unknown if signs or other information media were present during the 1940s. There still remains an original light fixture south of the door. Photographs from the 1960s show a

drinking fountain at the northeast corner of the for thirsty visitors.

### **Drawings**

Few drawings have ever been completed for the Ranger Cabin. The first, and most important, is a construction drawing completed in 1935 by the National Park Service (NM-JC-001). The drawing includes plans, exterior elevations, a building section, and chimney and millwork details. The floor plan from this drawing is believed to have been used in the 1938 publication by Albert Good, *Park and Recreation Structures* to illustrate the Ranger Cabin.

A log condition survey report prepared by Harrison Goodall in 1980 includes plan drawings for specific log repairs.

A portion of the 1935 construction drawing was used to prepare construction documents for 1982 log repair (146-80006). Prepared by the Denver Service Center, National Park Service the drawing shows the floor plan, exterior elevations and building section for identification of logs that needed to be replaced or repaired.

Other sketch drawings were found in park maintenance files that detail water and electrical systems.

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<sup>37</sup> Shirley Wolf to Bruce Bitz, unpagged interview notes, (August 1989). Wolf stated that there was no water service to these restrooms, and Bitz follows with a note that these may have been pit toilets instead. The septic system designed and installed in 1935, and the close proximity of the toilets to the living quarters would seem to preclude the thought of pit toilets here. Perhaps water was turned off to the public toilets during the winter to prevent freezing.

<sup>38</sup> Shirley Wolf to Bruce Bitz, unpagged interview notes, (August 1989).

## EXISTING CONDITIONS

### *Site Features*

#### **Siting**

The cabin is on a rise situated between a deep gully to the east, and Hell Canyon to the west. The cabin is sited directly over a branch off the historic cave entrance according to maps provided by the park.

#### **Soils**

Limestone, approximately 100 feet deep, separates the cave from the cabin. According to park sources heavy rain will percolate through the rock within the cabin area, and reach the cave in two to three days.<sup>39</sup> A thin covering of loamy, sandy soil, averaging one to two feet deep, covers the bedrock in the cabin area.

#### **Grade**

The cabin site slopes down moderately from north to south, and down away from the building at the east and west elevations. According to the park there is no history of poor drainage or flooding in and around the cabin area.

Over time the grade has been built up around the cabin foundation when comparison is made between historic photographs and present conditions. Some grade rise, particularly at the west elevation and northwest corner of the building, was precipitated by poor drainage and standing water next to the building. Some of this infill work was carried out in 1982. The grade has risen to such extent at the west elevation that a crawlspace vent is completely blocked.

During a February 1999 site investigation standing water was noted at the southeast corner beneath a gutter with no downspout, and at the northwest corner where there are no gutters.

#### **Vegetation**

The building is sited within a grove of tall ponderosa pines. These appear to pose no immediate threat to the building except in the case of wild fire or a windfall.

Short prairie grasses and mown grass surround the cabin grounds. At the northeast and northwest corners groves of volunteer young saplings have spouted to a height of about ten feet.

#### **Trails and Walks**

A trail leads from the parking area to a fire pit located about 80 feet south of the cabin. Visitors gather at the fire pit prior to being led on tours to the historic cave entrance. The cave entrance hugs the east wall of Hell Canyon.

From the fire pit a steeply pitched concrete walk leads directly up the hill to the cabin. About twenty feet from the cabin the walk changes to asphalt, before forking into two paths leading to the front porch and public restrooms. A steep, asphalt-paved walk emanates from the parking area north of the cabin, and terminates at the front porch.

Dry laid flagstone paves an area roughly bounded by the ell formed by the kitchen and public restroom wings. The flagstone forms a very rough walking surface.

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<sup>39</sup> Mike Wiles to Al O'Bright (9 February, 1999).



**Figure 21.** Ranger Cabin, view to the northwest, February 1999. Photo by the author.



**Figure 22.** Ranger Cabin, view to the southeast, February 1999. Photo by the author.

### **Exterior Furniture**

Over the cabin's lifetime a series of exterior furnishings including benches, garbage cans, and signs, within arm's reach of the structure have come and gone. The earliest photograph of the structure in use occurs in Albert Good's 1938 publication. In that photo a small sign northeast along the path reads "Rangers Office Register Here." The sign may have survived into the 1940s (Figure 9).

An image of what might have been a half-round log bench founded on large log sections is seen just to the south of the porch in the Good publication. This may have been the bench specified to have been added to the front porch in the 1935 construction drawings. However, later photographs show no such bench until around 1950, perhaps because the bench was moved about. Benches such as these seem to become numerous by the 1960s.

By 1953 a small round trash can, painted green, was located at the southeast corner of the front porch (Figure 15). During the 1960s it appears that commercial-grade trash cans were in use (Figure 17).

By the 1960s a pealed log railing had been added along the paths including those to the restrooms (Figures 17 and 18). A small information and ticket booth was constructed just across the path from the porch. By the 1960 a drinking fountain was placed on a concrete slab at the northeast corner of the porch. If that didn't quench visitors' thirst a soda machine was nearby pushed up against the building. At present there are no furnishings or signs near the cabin.

### **Structure**

#### **General Building Description**

The Ranger Cabin is sited between two canyons on a sharp-rising hill. When approached from the current trails, the building has an appearance of being much larger than it is due to subordinate view of the eye in relationship to the cabin level. In reality, the cabin has a footprint of only about 450 occupiable square feet; almost doll house in size and appearance. The kitchen, public restroom, and porch wings are asymmetrical with respect to the main body of the cabin, giving it a more sprawling appearance. Its rustic character is embellished by liberal use of round, pealed logs for walls, porch, and roof, and an oversized wood shake shingled roof. Historically, the roof was terminated by an unusual log ridge, but this was removed during subsequent roof replacement work. Limestone foundations and the bit of chimney are almost subordinate to the darkly-stained logs and millwork. The windows are stock one over one-style millwork, but set within rustic exterior trim. Doors follow the rustic theme, but most of the heavy hardware has been replaced.

The interior was, unfortunately, gutted during 1980s renovation work, and then again in 1996 for physical investigations. Little of the historic interior finishes remain except for the important millwork such as doors and kitchen cabinets. Nearly all historic plumbing and lighting fixtures have been lost. The original cornered living room fireplace remains intact however.

#### **Foundations**

According to the 1935 construction drawing details, the foundation was to consist of about twelve inches of stone laid beneath the log structure with a six inch thick cast in place concrete inner wall. This composite

foundation was to be constructed upon a stone spread footing laid about eighteen inches below grade. The intent of the concrete stem wall was support for the first floor framing. Present conditions appear to confirm these details, although the footing construction and depth could not be directly viewed without excavation. All foundations appear to be in good condition with no settlement noted. It is possible that the foundation bears directly upon bedrock.



**Figure 23.** Log crowns at southwest corner of kitchen wing. Photo by the author.

### Log Walls

All perimeter bearing walls of the cabin are constructed of peeled ponderosa pine logs measuring an average of ten inches diameter. The logs extend well beyond their double saddle-notched corner joints, and are

finished with rustic, axe-tapered ends (Figure 23). According to the 1935 construction drawings, the logs are anchored to the stone portion of the foundation with steel dowels. Joints are packed with plain oakum, and finished with a light gray mortar daubing. A very dark brown stain, possibly creosote-based, finishes the original logs.

Daubing may not have been added to cabin log joints until the early 1940s. No daubing can be seen in any of the historic photographs until 1942 (Figure 11). In the 1935 construction drawings an alternate chinking detail is shown to include no mortar daubing. In that detail the underside of the top log was to be scribed to tightly fit the top of the lower log, and the joint packed with oakum. It is unknown if this detail was initially constructed with the intent of installing no daubing, or if there was another reason for later adding the mortar daubing. Perhaps the logs were allowed to season before daubing was applied. If daubing had been applied to green or unseasoned logs, the daubing would have failed when the logs shrank and twisted during the drying out process. Interior finish work may also have been delayed until the logs seasoned (see *Interior, Finishes*). Daubing may also have been added as an afterthought to stem drafts or rodents.

Extended log crowns, in concert with long-term, uncontrolled flow of roof drainage over them, combined to degrade the condition of the log crowns. Roof drainage splashing and ponding at the foundation has also contributed to base log problems. A 1980 log condition survey recommended epoxy consolidation of twenty two log crowns and purlins, replacement of seven log crowns, and replacement of two sill logs.<sup>40</sup> By 1982 these recommendations

<sup>40</sup> Goodall, "Field Survey." See drawing.

were used to prepare construction drawings for treatment of twenty deteriorated logs by construction contract.<sup>41</sup> During this work, decayed log crowns were removed to the saddle notch and replaced with new logs essentially “toe-nailed” with hardwood dowels and lag bolts. All daubing was removed and replaced at that time.<sup>42</sup> The drawings specify no epoxy restoration work.

Recent examination of log crowns revealed that the decay process continues to this day. In fact, many of the 1982 replacement log crowns have themselves decayed due to roof water continuously soaking them. Presently, approximately fifteen log crowns require work from epoxy patching to total replacement.

### Framing

The first floor is framed with nominal two by six inch joists at twelve inches on center. This conflicts with the two by eight inch framing at sixteen inches on center in the 1935 construction drawings. Joist ends bear on concrete bearing walls poured against the stone foundation walls. The floor is sheathed with three quarter inch diagonal boards. The floor system appears to be in good condition with no noticeable deflection or soft spots.

The ceiling is framed with unusually-dimensioned lumber (1 $\frac{3}{4}$ ” by 6 $\frac{1}{2}$ ”) at sixteen inches on center. This framing appears to be suitably-sized for ceiling loads. There appears to be at least three joists missing from the middle of the kitchen

ceiling. Perhaps an attic hatch existed at the opening prior to recent finish removal.

The roof is framed with another unusually-dimensioned lumber (1 $\frac{5}{8}$ ” by 6”) fastened to a ridge board. The rafters are set at twenty-four inches on center and bear on a single piece of nominal lumber laid flat over the top logs. The roof framing appears to be in good condition.

Front porch roof rafters consist of peeled logs measuring about six inches in diameter. The logs are exposed at the porch ceiling but are concealed beyond the east log wall of the cabin. The lower ends of these rafters bear on large log beam spanning the porch, the upper ends bear on the framed roof. The front porch framing appears to be in good condition.

Faux ridge beams measuring approximately eight inches in diameter, extending well beyond the gabled roof rake, contribute to the rustic character of the building. The ridge beams extend only through the first framed joist cavity within the attic space. This conflicts with the 1935 construction drawing that called for a continuous ten inch ridge log.

A 1980 log condition survey cites three log “ridge poles” in need of replacement.<sup>43</sup> The recommendation apparently went unheeded during the 1982 log restoration work. The exposed and unprotected nature of these ridge beams has allowed water to penetrate and lead to decay from the top surface to the point that most of these faux beams will need to be replaced.

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<sup>41</sup> “Historic Administration Building Preservation,” NPS Drawing No. 146/80006.

<sup>42</sup> “Completion Report, Historic Administration, Jewel Cave National Monument,” (10 October, 1989), JECA maintenance files, (hereafter cited as “1982 Completion Report”), attached weekly field report dated 10-17 September, 1982.

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<sup>43</sup> Goodall, “Field Survey.”



## ***Exterior Envelope***

### **Roofing**

Twenty four inch long wood shakes with a ten inch exposure clad the current roof. The 1935 construction drawings called for twenty six inch hand split shake shingles with an eleven inch exposure. Measurements compared against historic photographs indicating thirteen, ten and one half inch shingle exposures.

The ridge was topped with an eight inch diameter, three-quarter peeled log. This important feature was removed around 1959 and slated for replacement in 1982, but the work was not accomplished.<sup>44</sup> Instead, a Boston cap was installed on the roof ridges. Extensive moss growth and eave-edge decay indicates that the present roof is due for replacement.

All valley and stepped flashing is of copper that may have been installed at the time the building was constructed. According to the 1935 construction drawings all flashing was to be 26 gauge steel flashing, but it is unknown if copper superceded the steel initially. All existing flashing appears to be in good condition.

Roof sheathing consists of one by six and one by eight inch boards with tight joints. All of the sheathing appears to be in very good condition.

### **Gutters & Downspouts**

The cabin had no gutter system until the 1960s (Figure 17). The existing ogee, or K-style, gutters and downspouts consist of painted galvanized steel and aluminum. Some of the gutters are in poor condition, and others were incorrectly installed

allowing water to pass though joints. Water pours from a gutter joint above the front porch steps. At the southeast corner the absence of a downspout allows water to splash and pond at the foundation base, wetting the base logs. Historically, no gutters were installed on the cabin to promote a simple, rustic charm. It is unknown when the present gutters were installed.

### **Porch & Stoops**

The front porch is a primary element in development of the rustic charm of the ranger cabin. The deck and roof structure is constructed of heavy log framing and trimmed in rough boards. The deck and steps consist of peeled half logs. Even the massive log railings, while set low, provide a sense of scale to the porch. The front porch is in good condition, although the lowest step is in contact with the soil and is therefore believed to be rotted.

Various portions of the log porch were replaced in 1982. The half-log deck was removed to replace two primary sill logs, and the lower half-log step was replaced.<sup>45</sup>

Stoops at the public restroom doors and rear kitchen door are constructed of limestone flagstone set in mortar. These are in good condition.

### **Windows & Vents**

The historic windows generally survived 1981 and 1982 renovation work, but nearly all historic interior case work was demolished in favor of new millwork. Frames were extended into the interior to accommodate thicker interior perimeter walls installed to provide thicker insulation.

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<sup>44</sup> "Historic Administration Building Preservation," NPS Drawing No. 146/80006. The ridge logs are clearly noted for removal and replacement.

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<sup>45</sup> "1982 Completion Report," attached weekly field report dated 13-20 August, 1982.

According to one 1940s account the windows had no curtains. However, in a photograph dated to around 1940 and 1942, simple curtains can be seen in the north living room windows (see Figures 10 and 11).<sup>46</sup> The only other evidence for window coverings occurs in a 1965 photograph where metal blinds can be seen in living room windows.

Windows consist of wooden one over one double hung sash trimmed at the exterior with rustic quarter-round logs. The two public restroom windows are of a hinged, hopper style. All exterior elements, including the sashes, are finished with the same stain as used on the log walls. There is no evidence that the windows had sash locks at the meeting rails. Instead spring-loaded pins mortised through the sash stile into the frame jamb secure the sashes. There are no sash counter-balance systems.

During at least the 1950s simple board shutters were installed during the winter months when the structure was unoccupied (Figure 16).<sup>47</sup> It is unknown if that tradition dates back to the early 1940s.

There is one account that there were screen and storm windows during the 1940s.<sup>48</sup> This is confirmed by historic photographs into the 1950s that show wooden storms or screens. These were replaced with aluminum combination storm windows by the 1960s (Figure 17), and these in turn replaced with wooden storm windows in 1986 that now exist.<sup>49</sup> There are no screen

windows except at the public restroom windows.

The present storm windows are fastened to the frames with contemporary galvanized steel hangers and interior hooks and eyes. However, there is physical evidence that storm windows were fastened by a somewhat differing system. Hangers are screwed to a mortise provided at the quarter-round head trim to provide a flush surface for the hanger. However, the mortise had to be chiseled wider to accommodate the newer steel hangers. There is physical and photographic evidence that the historic hanger system fit a more vertical rather than horizontal mortise.

At each jamb quarter-round trim there are two, now unused mortise pockets that extend to the jamb frame. At the base of each pocket is a single screw hole. Examination of a photo taken around 1982 indicates that door buttons were used at the mortise locations to hold the storm windows to the frame. Apparently, blocks of wood or ferules held the buttons aloft to the depth of the storm window. The mortise provided enough room for the button to be turned within the curved surface of the quarter-round trim.

All windows, storm windows, exterior trim and hardware appear to be in good condition. All window glazing needs to be replaced however. A single glass pane needs to be replaced at window 101-W1.

Three gable-end attic louver vents were constructed according to the 1935 drawings. They are presently blocked with plywood at the interior, presumably to prevent the

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<sup>46</sup> Shirley Wolf to Bruce Bitz, unpagged notes, (January 1989).

<sup>47</sup> John Hannan in survey prepared by Laura Johnson, (1997), 2.

<sup>48</sup> Shirley Wolf to Bruce Bitz, unpagged notes, (January 1989).

<sup>49</sup> Memorandum to Area Manager, JECA from Chief, Branch of Historic Preservation, Division of Cultural

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Resources, Rocky Mountain Region, (3 December, 1986). Hand notes on a 1980 field survey report attached to the memorandum.

entrance of animals. Vanes on the north vent have been knocked out of place perhaps by animals.

Two vent openings for the kitchen cooling and storage room are detailed in the construction drawings and show in two images taken during or soon after construction of the cabin (Figures 6 and 7). The vents were blocked at the exterior since at least the early 1950s (see Kitchen Appliances for further discussion on the cooling closet).<sup>50</sup> Because interior shelf construction conceals the vent wall, it is unknown at this time if the louvers are in place.

### **Exterior Doors**

The two doors servicing the cabin proper consist of two solid layered boards. The thick frame interior wall constructed in 1982 prevents the front door 101-D1 from opening to its full potential. All historic lock sets have been replaced with standard NPS mortise knob sets. Dutchmen and pressure points on the interior and exterior surfaces of doors 101-D1 and 102-D3 give some evidence that there were much more decorative lock sets on these doors in the past. At this time there are no photographs showing the historic lock sets. A single interior window stop on kitchen door 102-D3 does not match the surrounding profile. Overall the doors are in very good condition.

The wooden screen doors are in good condition, although the screening is rather ragged.

### **Chimney**

That portion of the chimney stack above the roof line is constructed of coursed limestone in apparently good condition. Two fired

clay flue liners have been added to presumably promote a better draw. According to historic photographs, the round kitchen flue extender was installed sometime during the 1950s (Figure 16), followed by the square fireplace flue extender around the 1960s (Figure 19). The round flue is cracked length-wise. According to the 1935 construction drawings both flues were to be furnished with fired clay liners.

Mastic or roofing tar has been smeared over some of the stone surface in an inappropriate attempt to flash the chimney to the roof. During the building inspection water was seen dripping at the north chimney face in the attic.

### **Interior**

#### **Partition Framing**

Most, if not all, of the board furring placed against the log walls in 1935 appears to have been removed and replaced with full two by four framing in 1981.<sup>51</sup> Partition framing was mostly left in place at that time, but the walls were thickened through the installation of nominally-sized stud framing. The historic partition framing consisted of odd-sized studs (1<sup>5</sup>/<sub>8</sub> inches by 2<sup>3</sup>/<sub>4</sub> inches) which can be easily differentiated from the newer framing.

Some partitions have been moved or removed. The cabin bathroom was enlarged in 1982 through removal and relocation of the east wall. A shared plumb wall partition between the two public restrooms was completely removed during early the 1980s, and redesigned and constructed in 1984 to accommodate a new partition with a janitor's closet.

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<sup>50</sup> Joseph L. Orr in survey prepared by Laura Johnson, (1996), 2.

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<sup>51</sup> Blaine Foss in survey prepared by Laura Johnson, (1997), see floor plan note. "We left the furring but removed the Celotex wallboards."

## Finishes

The 1935 construction drawings indicate that walls and ceilings were to be covered with “wall board,” a generic term that could apply to a number of materials available at that time. Oral accounts and bits of physical evidence indicate that original finishes consisted of fiberboard. Photographic evidence suggests that finishes were not installed until 1938, possibly to allow the logs to season and shrink before finish work was initiated.<sup>52</sup> In Figure 2620 what is believed to be a sheet of fiberboard is seen leaning against the interior face of the living windows, leading to a supposition that fiberboard finishes were being temporarily stored there in preparation for installation.<sup>53</sup>

Nearly all historic interior wall and ceiling finishes were removed and replaced in 1981 with inexpensive hardboard paneling, acoustical ceiling panels, and gypsum wall board.<sup>54</sup> Much of the 1981 finishes were removed in 1997 during preliminary removal work and physical investigations.

There are enough physical remains to determine the historic character of the interior wall and ceiling finishes. For most historic and contemporary finishes walls and ceilings are presented with a relatively smooth, flush, and unbroken surfaces through the application of plaster and gypsum wall board. Nail heads are never seen. However, the nature of the finish

material historically used in the cabin presents quite a different feel.

Within the storage room (102A), the kitchen cabinet at the southwest corner, and the bathroom ceiling are the remains of fiberboard finishes that covered all walls and ceilings within the ranger cabin. Commonly referred to by such trade names as Upson Board, Beaver Board, and Homasote, fiberboard was first made available to the retail market during the early twentieth century as an inexpensive interior finish material. Fiberboard is typically manufactured from wood waste resulting from lumber milling operations.

Fiberboard found in the cabin was first manufactured in 1921 by the Celotex Company, and marketed under the trade name Celotex.<sup>55</sup> The material was, and still is, manufactured from fibrous waste resulting from the process of sugar cane.<sup>56</sup> The cane waste renders the board with a fibrous surface texture and natural beige color. The material is still manufactured in the same process, with the same material, and in the same thickness and sheet size as was done decades ago.

Celotex is a soft, light-weight material that can be sawn and nailed relatively quickly. The material does have disadvantages in that it can be easily broken or scared by impact, and the fiberboard tends to soak up paint like a sponge. In some cases the fiberboard is readily combustible, but fiberboard manufactured of sugar cane waste has a low flame spread rating than that made of wood

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<sup>52</sup> Log joint daubing was not initiated until about this same time. See Structure, Walls.

<sup>53</sup> A four by eight foot sheet of fiberboard laid on its side would reach that point on the windows in the photograph.

<sup>54</sup> Blaine Foss in survey prepared by Laura Johnson, (1997), 7. Foss indicated that cabin work was initiated as it had become infested with rodents and the electrical system was a safety hazard.

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<sup>55</sup> Carol S. Gould et al, “Fiber-Board,” in Thomas C. Jester (editor), *Twentieth Century Building Materials, History and Conservation*, (McGraw-Hill Companies, 1995), 122.

<sup>56</sup> *Home Owners' Catalogs*, (New York: F.W. Dodge Corporation, 1937), Celotex Corp. cut sheets.

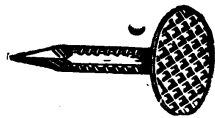
fiber.<sup>57</sup> Because of these reasons, most fiberboard products were used for thermal insulation and sound control, concealed behind other more formal and durable finishes. Sometimes a thin plaster coat was applied to the material to present a flush surface, but the durability of that system is quite low. Normally, exposed fiberboard finishes were relegated to seldom-occupied spaces such as attics and closets.

Typically, common nails were used to fasten low density fiberboard to wall framing. But sometimes broad-headed roofing nails were used. Roofing nails could not be driven through the material as easily as small-head **Figure 23.** Checker head roofing nails, like those used in the Ranger Cabin, were available through the 1960s. From *Drake*

## ROOFING NAILS

### AMERICAN IDEAL

Large  
Flat  
Checker  
Head.



Long  
Diamond  
Point.

For all kinds of smooth, grit surfaced and asbestos roll roofing and asphalt and asbestos shingles. Well centered head.

**Galvanized; ½ in. Head, No. 11 Gauge**

<b>Length, in. . . . .</b>	<b>¾</b>	<b>7/8</b>	<b>1</b>	<b>1 1/8</b>
App. No. to lb. . . .	234	210	195	180
Ad. over base. . . .	\$4.60	4.30	4.25	4.05

<b>Length, in. . . . .</b>	<b>1 1/4</b>	<b>1 1/2</b>	<b>1 3/4</b>	<b>2</b>
App. No. to lb. . . .	168	135	128	118
Ad. over base. . . .	\$4.00	3.95	3.90	3.90

100 pounds in a keg.

*Hardware Company General Catalog No. 36, Burlington, Iowa: Drake Hardware Co., (1936), 201.*

nails, and they gave more support to the board system especially at the ceiling. Nail heads were exposed to view unless thin

<sup>57</sup> According to recent Celotex Corporation materials data information, the flame spread index for cane-based fiberboard manufactured at its Louisiana mill is 62, for a Class II fire rating.

wooden battens were installed to conceal the nails and sheet joints from direct view.

When the ranger cabin was initially constructed raw sheets of Celotex with exposed joints and nail heads were used throughout.<sup>58</sup> Exposed nail heads and sheet joints imparted a rough quality to cabin interior finish work. However, there was some thought given to the selection and spacing of nails that rendered a decorative, almost machined look to wall and ceiling surfaces. Remaining physical evidence on original framing members indicates that small-headed box nails were used in the living room, and galvanized checker-head roofing nails used in all other spaces (Figure 24).<sup>59</sup> Because the living room also functioned as visitor contact, the designer or builder may have wanted a more formal appearance in that room, and chose nails with a diminutive head in comparison to the roofing nails. Living room nails had a tighter spacing than the remainder of cabin finishes, five inches on center and six inches on center respectively. This may have been a matter of function rather than decoration as the box nails provided less support than the larger-headed roofing nails. Therefore, the spacing was reduced to impart greater holding strength. Where sheets of Celotex joined at a single framing member, a double row of nails, side by side, was the prevailing nail pattern.

Physical evidence and oral accounts indicate that a shallow soffit was constructed around

<sup>58</sup> Don Lytle to Alan O'Bright, (12 February, 1999). Lytle, an employee of the park since 1965, recalled that there were no battens on fiberboard butt joints and no inside-corner trim between. The absence of secondary nail holes on framing members bears this out.

<sup>59</sup> Checker head nails had a waffle or checker board texture forged into the head surface. These nails may no longer be manufactured.

the living room ceiling perimeter.<sup>60</sup> From wooden nailers still present in the ceiling, the soffit extended twelve inches away from the wall and extended down one and one half inch. Physical evidence suggests the entire soffit was finished with Celotex and fastened with box nails.<sup>61</sup>

Apparently, the raw, rugged look of the unfinished fiberboard did not suit early cabin residents' tastes. Around 1941 interior surfaces were painted a "sick pink" when the occupants grew tired of the dismal Celotex color.<sup>62</sup> Sometime after, the walls and ceilings were painted a cream color, and then painted over again at least a couple of times. There are no longer any painted wall finishes remaining, so no formal paint analysis can be done. However, a painted ceiling sample of fiberboard removed from the living room showed an initial beige coat followed by a single coat of off-white.<sup>63</sup> A kitchen ceiling sample taken near the southwest corner cabinet begins with an initial beige, followed by a pastel bluish green, and topped with another coat of beige.<sup>64</sup> Ceiling finishes remain in the small bathroom/closet off the bedroom, but no in situ analysis has been made of it at this writing. Bits of paint on salvaged interior trim may yield clues to other room colors, but the provenience of those trim pieces is unknown.<sup>65</sup>

<sup>60</sup> Don Lytle to Alan O'Bright, (12 February, 1999).

<sup>61</sup> Don Lytle to Alan O'Bright, (12 February, 1999). Lytle recalled that there was no ceiling wood trim.

<sup>62</sup> Shirley Wolf to Bruce Bitz, unpagged interview notes, (January 1989). The paint was supplied from Wind Cave National Park.

<sup>63</sup> *Munsell Book of Color, Glossy Finish Collection*. (Baltimore, Maryland: MacBeth color and Photometry Division, 1966), (hereafter cited as *Munsell*), reference 5Y 8.5/2 and N9.5/90.0%R.

<sup>64</sup> *Munsell*, reference 5Y 8.5/2, 10GY 8/2, and 5Y 8.5/4 respectively.

<sup>65</sup> Laura Johnson, "Interior Millwork & Finishes Inventory, Ranger Station (HS-1)," (9 October,

One interesting feature with regard to the cooler and food storage closet (102A), remains at least partially intact. At the east wall hardware cloth, or window screen, was fastened to wall framing prior to installation of Celotex finishes. This feature would normally be concealed from view were it not that living room finishes have been removed. It is believed that the screen acted as a rodent barrier to protect food stuffs within the closet. Indeed the 1935 drawings detailing the cooler indicate that mesh was to be placed around the closet perimeter "as rat proofing." Screen was also to have been placed between the sub and finish floors according to the drawings.

Finishes within the public restrooms were specified as "wall board," or presumably Celotex, according to the 1935 drawings. By the 1960s these room finishes consisted of plaster over lath.<sup>66</sup> It is unknown if the plaster replaced the less durable Celotex, or if plaster had been initially applied counter to the drawings. These two rooms were totally renovated in the 1980s with gypsum wall board.

### Interior Trim

All interior wooden trim was removed during the 1981 interior renovation work. Bits of historic trim were reincorporated into the new finishes that were removed in 1996 for investigative purposes. None of the salvaged pieces can be used for restoration work. Some of the salvaged trim was reversed to expose the unfinished side, an act that concealed and protected the original finish. Original trim consisted of three

1996), (hereafter cited as Johnson, "Finish Inventory"), sample 104-BB-N. Johnson's notes indicate "trace of grey, sick pink, green & yellow paint on top."

<sup>66</sup> Don Lytle to Alan O'Bright, (12 February, 1999).

quarter inch thick pine, with a varnished dark reddish brown stain. Baseboards, and window and door casing were of squared, nominal one by four inch ( $\frac{3}{4}$ " by  $3\frac{1}{2}$ ") pine.<sup>67</sup> The only profiled moulding found in the cabin, a cove mould ( $\frac{3}{4}$  by  $\frac{7}{8}$ " ), is believed to have trimmed out around the kitchen cabinets.<sup>68</sup> Window mullion casing from between the paired windows was also simple squared stock, wide enough to span from jamb frame to jamb frame.<sup>69</sup>

### Floors

Practically all floors were originally finished with nominal one by four inch tongue and groove pine laid over a diagonal board subfloor. The small cabin bathroom and the public restroom floors are of painted concrete slab over grade at present. It is unknown if the bathroom (104) concrete floor was poured in 1935, or replaced a wood frame floor when the small closet space may have been converted to a bathroom. The floor plan and detail A-A in the 1935 construction drawings show the present bathroom as a closet with, presumably, a wood frame floor. A "cement floor" is called out for the public restrooms on the drawings.

The earliest account of the floors indicates that all floors were wood except for the linoleum-covered kitchen floor.<sup>70</sup> Most of the floor surfaces were covered with nine inch by nine inch asbestos floor tile probably during the late 1950s. The tiles were, in turn, covered with wall-to-wall

carpet or vinyl sheet in 1981.<sup>71</sup> Floor tiles were arranged in checkerboard, border, and partial checkerboard patterns in the bedroom, living room, and kitchen respectively.<sup>72</sup> Tile removal from the living room and kitchen in 1997 left a mottled, lumpy layer of black mastic bonded to the wooden floor surface. The bedroom yet retains its off white and pastel green tiles. The floor tiles contain asbestos.<sup>73</sup>

The only section of 1935 floor that remains untouched is within the southern half of the cooler and food storage room. Here the floor hints at a finish application of varnish over a stain. According to a park schematic floor plan, the northern half of the floor is apparently concrete.<sup>74</sup>

### Interior Doors

Interior single panel doors consist of a thin plywood panel set within solid lumber rails and styles. Door finish matches that of the trim mentioned above. Although all casing has been lost, the original jambs remain. The small bathroom/closet door, 103-D1, was moved during the 1982 renovation work, but all components, except the casings, are intact. Door knob sets feature an Art Deco escutcheon motif. All remaining door and hardware are in good condition.

<sup>67</sup> Johnson, "Finish Inventory," (9 October, 1996), samples 104-BB-N & 104-BB-W.

<sup>68</sup> Johnson, "Finish Inventory," (9 October, 1996), samples 102-CT-1, 2, 3 & 4, 102-CV-1 & 2, and 102-TR-6.

<sup>69</sup> Johnson, "Finish Inventory," (9 October, 1996), samples 101-W2-CA-CN-IN & 103-W1-CA-CN-IN.

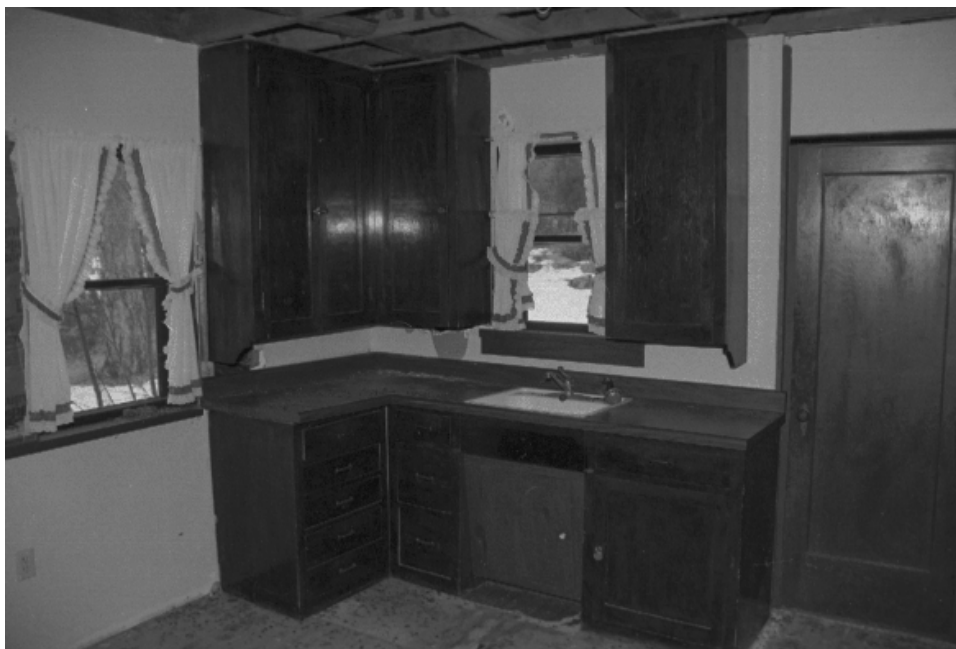
<sup>70</sup> Shirley Wolf to Bruce Bitz, unpaginated interview notes, (January 1989).

<sup>71</sup> Blaine Foss in survey by Laura Johnson, (1997), 7.

<sup>72</sup> Laura Johnson, field drawings, (1 October, 1996).

<sup>73</sup> ATC Environmental Inc., "Bulk Sample Analysis Report, Jewel Cave," (December 1996). Existing green tiles contain 10% chrysotile asbestos.

<sup>74</sup> JECA maintenance files, untitled sketch crawlspace plan of ranger cabin mechanical and electrical service entrances, date unrecorded.



**Figure 24.** Cabinets within the Ranger Cabin kitchen (102). The cabinet door beneath the sink was added in the 1980s, but the single-bowl sink may date to construction of the cabin. Photo by the author.

### Cabinets

The only intact cabinets that remain since the initial construction of the cabin are in the kitchen (Figure 25). A cabinet unit within the cooling and food storage room (102A) was removed prior to the 1982 work.<sup>75</sup> It doubtful that other built-in furniture and shelves were constructed beyond what is shown in the 1935 construction drawings.<sup>76</sup>

Fortunately, the kitchen cabinets were salvaged during the 1982 renovation. They are certainly a character-defining element

<sup>75</sup> Don Lytle to Alan O’Bright, (12 February, 1999).

<sup>76</sup> Joseph L. Orr, and John Hannan in survey prepared by Laura Johnson, (1997), 4-5 and 4 respectively, and Shirley Wolf to Bruce Bitz, unpaginated interview notes, January 1989. Orr could remember no shelving in the bedroom or bathroom during the early 1950s. Hannan recalled that the living room /office had no built in shelves during a similar time period. Wolf only described moveable furniture, that the bedroom had no closet which prompted her husband to construct a clothes tree.

within the kitchen, and have remained virtually intact since their 1935 installation. Except for the southwest corner cabinet, the cabinets may have been removed during the 1982 work and replaced. They were removed again during 1996 investigation work, but reinstalled in preparation for visitors.

Comparison of the existing millwork with the 1935 cabinet detail drawings indicates that they were built to specifications down to the metal-lined bread drawers. The pine millwork features plywood-paneled doors with the familiar varnished, dark brown stained finish.

Changes to the cabinets include the addition of a cabinet door skirt beneath the sink and complete replacement of the countertop. The 1935 drawings specifically indicate that the area beneath the sink be left open; it is believed that the skirt was added in 1982.



The existing countertop is of moulded plastic laminate over hardboard. According to an eye witness account, the previous counter consisted of wide, unfinished boards with tight joints, covered with linoleum. The edges of the counter were trimmed with a ribbed metal strip. There may have been a wooden splashback also covered with the linoleum. Unfortunately, the color and pattern of the linoleum is unknown.<sup>77</sup>

The kitchen sink may date to the 1935 construction.<sup>78</sup> The existing white porcelain-enameled, cast iron, single basin sink very closely matches dimensions indicated in the 1935 drawings. All plumbing fixtures associated with the sink are of contemporary make however.

As stated above, the southwest closet cabinet has never been removed from its original position. It yet retains the unpainted Celotex wall and ceiling finishes installed in 1935. It currently houses a large-capacity water heater and safe.

Although the cooler and food storage closet shelves are no longer extant, the 1935 construction drawings fortunately detail the millwork. A set of cabinet, wood panel doors within the closet were, no doubt, detailed and finished similar to that of the kitchen cabinets. Additional open shelving consisted of three quarter inch thick boards set over wall ledgers.

### **Fire place**

The fireplace is certainly one of the most important features in the cabin, not only in terms of it being a centerpiece within the living room, but also as an occasional supplemental heat source for rangers

occupying the structure year-round. The reason for its occasional use may have been because it drew air badly as evidenced by smoke stains on the masonry and the flue extender.<sup>79</sup> The fireplace was frequently used as the only heat source in recent years to take the chill out of the air during cold early and late season mornings.

Cabin room layout probably necessitated the cornered form for the fireplace, providing easy access to the kitchen flue. Its internalized, massive masonry construction provided residual heat for occupants during cold winter nights, even after the fire had abated. The heavy, hewn mantle supported by peeled logs cantilevered from the masonry face, compliments the rustic masonry. Joints between the mantle and logs are covered with bits of copper sheet metal, presumably to ward off sparks.

The fireplace is constructed of limestone of a specie and shape similar to that of the stone foundation. Stone is laid up with a dense, gray, Portland cement mortar. According to the 1935 drawings, the massive-portion is founded on a substantial shallow stone footing, and the hearth by a poured concrete footing. Brick is used above the mantel level until the stone chimney is reached above the roof line. The stack houses two fire clay lined flues, servicing the fireplace and a kitchen thimble. The thimble opening is still in place but blocked with brick and mortar. Firebrick lines the firebox.

Overall the fireplace is in good condition. There is a masonry crack that extends up from the firebox opening at mid-span, but the heavy steel lintel appears to be sound. The damper may be inoperative judging by a

<sup>77</sup> Don Lytle to Alan O'Bright, (12 February, 1999).

<sup>78</sup> Don Lytle to Alan O'Bright, (12 February, 1999). This same sink was in use during the 1960s.

<sup>79</sup> Blaine Foss in survey prepared by Laura Johnson, (1997), 4.

steel pipe propping it closed during the off season. Moderate smoke stains on the masonry above the firebox attest to the use the unit has endured over time.

### **Plumbing Systems**

#### **Water Supply**

Since construction of the cabin, water has been supplied from a natural spring located north of the cabin.<sup>80</sup> On a rise just north of the cabin is an underground, 3,000 gallon cistern that supplied slightly pressurized water prior to the system being placed on a pump full time. The cistern is now abandoned. At least until the 1950s a hand pump was apparently located above the cistern for the connivance of thirsty visitors. During the 1960s a drinking fountain was located at the northeast corner of the front porch.

Water from the spring is fed through a four inch pipe. A 1½" pipe, installed in 1972, tees from that pipe within a manhole at the base of the north asphalt trail leading to the cabin.<sup>81</sup> The 1½" water supply line is buried between two and four feet beneath the ground surface in most places, and follows the north trail up to the cabin. The pipe enters the cabin at the north side of the kitchen from a yard hydrant north of the structure. A branch line also extends from the hydrant, routes west of the west exterior cabin elevation, and enters the public restrooms.<sup>82</sup> Water is frequently quality-tested by the park. There is a hydrant north of the cabin for use by visitors seeking to fill containers.

<sup>80</sup> Shirley Wolf to Bruce Bitz, unpagged interview notes, (August 1988). Water came from a well just outside, and there was indoor plumbing.

<sup>81</sup> Dennis Mehlhaff in survey prepared by Laura Johnson, (1997), 7.

<sup>82</sup> JECA maintenance files, "Residence #1," sketch plan of water supply line, no date.

Water is supplied to the kitchen, cabin bathroom, and public restrooms. Most of the supply lines within the cabin are of soldered copper and date to the 1980s. All of the exposed sections appear to be in good condition.

#### **Sanitary Sewer System**

Effluent is handled by a septic tank system located south of the cabin, past the end of the service road. The tank is believed to have been constructed in 1936 of cast-in-place reinforced concrete.<sup>83</sup> Effluent is routed to the septic system via fired clay pipe laid one foot below grade on top of the bed rock. The pipe exits the building at the south elevation near the midpoint of the public restroom wing. According to the park, the pipe is scheduled for replacement with polyvinyl chloride pipe in 1999 as sections of the clay pipe have collapsed. There are no reported problems with internal cabin pipe systems or the septic tank.

#### **Plumbing Fixtures**

All plumbing fixtures that may have dated to the 1935 construction were demolished during 1984 and 1987 renovation work, except perhaps for the porcelain kitchen sink (see *Cabinets*).<sup>84</sup> Oral accounts are the only evidence for what may have been used in bathrooms and the bedroom during the historic period. The following information provided by Don Lytle gives clues as to the character of the missing fixtures:

<sup>83</sup> "Septic Tank and Filter Trench Sewage Disposal Plant, Jewel Cave National Monument," Drawing Number NM-JC-9001, (14 November, 1935). Copy in JECA drawing archives.

<sup>84</sup> "Restroom Rehabilitation Old Area Cabin #1," (1984), project progress report, memorandum from JECA maintenance leader Larry Dilts, and untitled and undated project list, JECA maintenance files. Public restroom fixtures were removed in 1984, and a shower head and toilet were installed in the cabin bathroom in 1987.

The cabin bathroom sported a toilet at the north wall and a shower at the south end of the space. The toilet had a tank raised slightly above the stool. A goose-neck brass pipe connected the tank to the stool. During the 1960s the shower stall walls were of very rough plaster applied by hand to lath fastened to the walls, and may have been an afterthought construction. Later a shower enclosure consisting of steel walls and floor was installed, but removed around 1982. Along the west bedroom wall was a sink, although the appearance and precise location are unknown. The public restrooms shared a common plumbing partition. The toilets may have been similar to that found in the cabin bathroom.<sup>85</sup>



**Figure 25.** Plumbing supplier's cut sheet for the type of toilet that may have been in the cabin. From *Drake Hardware Company General Catalog No. 36*, Burlington, Iowa: Drake Hardware Co., (1936), 243.

<sup>85</sup> Don Lytle to Alan O'Bright, (12 February, 1999), and in interview notes found in Laura Johnson project file, 7 June, 1995.

From Lytle's account it appears that at least the cabin bathroom toilet may have had a distinctive wall-mount tank, a style typical for the 1920 through 1940s time period. The bathroom may have started as a closet, but reverted to a private bathroom early since the shower appeared to have been a home-built afterthought. Early cabin occupants may have tired of the routine of washing from a pan and decided to add a shower. Likewise, a toilet within the confines of the cabin, but inaccessible to the private quarters may have been inconvenient to the ranger and his family.

The bedroom sink may have been wall-mounted lavatory rather than a vanity. It is speculated that the sink may have been located north of the bathroom door to prevent collision between an open door and the sink. A physical investigation during future construction work may provide the needed clues. However, a personal account indicates that there was no sink in the bathroom and bedroom during the early 1940s, and that the kitchen sink had to be used.<sup>86</sup>

The tiny private bathroom had only a toilet and a shower during the early 1940s, but it had the luxury of running water.<sup>87</sup> It is unknown if this bathroom was created from the closet designed in the 1935 construction drawings, or if a last-minute revision was made to include a private bathroom.

The 1935 drawings indicate lavatories for the public restrooms, perhaps similar to the bedroom lavatory. The drawings provide no clue as to the type of restroom toilets, but confirm the shared partition. One early

<sup>86</sup> Shirley Wolf to Bruce Bitz, unpaginated interview notes, (January 1989).

<sup>87</sup> Shirley Wolf to Bruce Bitz, unpaginated interview notes, (January 1989).

account indicates that there may have been no running water in the public restrooms.<sup>88</sup> The public restrooms now include contemporary fixtures arranged against the north wall.

The early drawings also indicate that three hose bids were to be installed at three elevations of the cabin. It is unknown if any of these were installed.

### **Accessories**

A toilet paper holder may date to the 1935 construction. The cast iron base plate bears a plumbing contractor's identification "J.H. Gillespie & Co. Plumbers & Steamfitters, Hot Springs, SO. DAK." No other accessories from the historic period were identified.

### **Heating System**

Early space heating was provided by a wood and coal-burning kitchen range and sometimes the fireplace.<sup>89</sup> Succeeding kitchen ranges and the fireplace provided heat until quite recently.<sup>90</sup> The 1935 construction drawings provide no information on appliances, but one oral account gives some information on the range. The kitchen range in place during the 1960s included a stove with an integral heater fueled by a propane tank.<sup>91</sup> During the early 1980s the tank had a 250 gallon

capacity and was placed outside, although the location is unknown.<sup>92</sup> The range was located against the east kitchen wall to tie it to the chimney flue. Recent supplementary space heating has been provided by portable, plug-in baseboard heaters.

### **Electrical System**

#### **Power Supply & Distribution**

Although the cabin was furnished with an electrical and lighting systems, no provisions were made to include the cabin on a public power system. Around 1941 power was supplied from a small generator purchased by the ranger occupant.<sup>93</sup> Camping lanterns were typically the only light source within the cabin.<sup>94</sup> A more formal gasoline-powered generator and small, accompanying structure were constructed west of the cabin in 1952.<sup>95</sup> By 1981 the electrical system was a safety hazard and slated for replacement.<sup>96</sup>

Existing 200 ampere service is via underground lines. The service line enters the cabin from the south near the rear door stoop. A recent circuit breaker panel is located at the south kitchen wall. All secondary conductors are concealed within walls, floors and ceilings with no conduit. A 220 volt receptacle at the kitchen east wall indicates that an electric range may have been stationed there.

<sup>88</sup> Shirley Wolf to Bruce Bitz, unpaginated interview notes, (January 1989). Bitz personally notes that the toilets may have been pit style, but this is doubtful due to the close proximity of the restrooms to the occupied cabin.

<sup>89</sup> Shirley Wolf to Bruce Bitz., unpaginated interview notes, (August 1988). During the early 1940s Wolf's husband chose not to use the fireplace.

<sup>90</sup> Dennis Mehlhoff in survey prepared by Laura Johnson, (1997), 7. During the 1970s only the kitchen range was used for heat.

<sup>91</sup> Don Lytle to Alan O'Bright, (12 February, 1999), and former JECA seasonal ranger John Hanna in survey prepared by Laura Johnson, (1997).

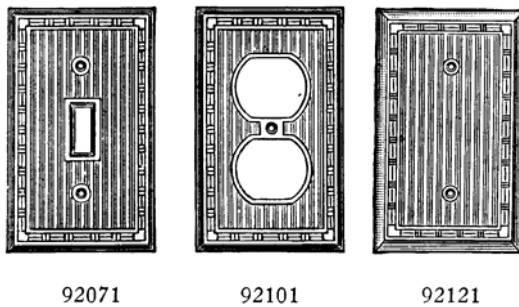
<sup>92</sup> Steve Riley in survey prepared by Laura Johnson, (1997), 5.

<sup>93</sup> Shirley Wolf to Bruce Bitz, unpaginated interview notes, (January 1989).

<sup>94</sup> Shirley Wolf to Bruce Bitz, unpaginated interview notes, (August 1988).

<sup>95</sup> Joseph L. Orr in survey prepared by Laura Johnson, (1997), 2. Orr referred to the generator as a "light plant," and also states that lanterns were used as a light source prior to generator installation.

<sup>96</sup> Blaine Foss in survey prepared by Laura Johnson, (1997), 7.



**Figure 26.** Switch and receptacle plates of a design that may have been in the Ranger Cabin. From oral accounts the plates were of brown Bakelite. From *Sterling Buyers Guide of Electrical Supplies, Catalog No. 53*, Minneapolis, Minnesota: Sterling Electric Co., (1952), 73.

### *Fixtures and Devices*

Practically all electrical boxes, device plates and light fixtures dating from the initial construction of the cabin were removed and discarded during the 1981 interior renovation work. Only three fixtures remain in situ from the 1935 construction; two exterior porch sconce lamps and a ceiling socket in the cabin restroom. These fixtures correspond in location of fixtures in the 1935 construction drawings. The front porch fixture features a pendent-type, clear glass, cylindrical cover. The rear porch fixture is missing its cover. The bathroom fixture is a plain ceramic, pull chain socket. Device plates may have been of dark brown Bakelite with a lined pattern on the surface (Figure 27).<sup>97</sup>

Physical evidence locates the living room ceiling fixture at the center of the ceiling. A pair of screw holes separated ten inches apart, are at between-joint blocking. The 1935 drawings indicate that the fixture was to have been 150 watts. Speculation is that the fixture was a simple oval, painted steel fixture with a pair of bare incandescent

bulbs similar to what was found in a CCC-constructed building at Wind Cave National Park (Figure 28).<sup>98</sup> Scant physical evidence also shows that there was a fixture in the kitchen ceiling as indicated by the 1935 construction drawings.

Two sconces flanking the fireplace are noted in the 1935 drawings. According to an oral account the fixtures were of simple design. No other physical evidence was found for other light fixtures.



**Figure 27.** Ceiling fixture at CCC structure, Wind Cave National Park. A similar fixture may have been in the Ranger Cabin. Photo by Laura Johnson, 1997.

### *Communication & Security Systems*

Initially, no phone service was provided to the cabin, and it is unknown when the service began.<sup>99</sup> Nothing remains of a door bell seen in the 1935 construction drawings. The bell located above the bedroom door in the kitchen, with the button at the front door. An underground telephone line approaches

<sup>98</sup> Blaine Foss in survey prepared by Laura Johnson, (1997), 4. By 1980 this fixture had "frosted glass shades - circular I believe." It is possible that the fixture had been changed by then.

<sup>99</sup> Shirley Wolf to Bruce Bitz, unpaginated interview notes, (August 1988). The nearest phone was six miles away at a ranger station.

<sup>97</sup> Don Lytle to Alan O'Bright, (12 February, 1999).

the cabin from the north a rises just outside of the cooler and food storage room before entering the structure to service a single telephone. A land surface line runs from the cabin west to the cave entrance to furnish a telephone there. In 1999 the park installed a cave entrance security system using the cave phone line. There are no fire detection and security systems in the cabin.

### ***Kitchen Appliances***

There are only scant references to the type of early kitchen appliances; all of them have been removed and replaced a number of times over. Early accounts indicate that a wood and coal-burning range was used in the kitchen, and that an ice box sat out on the rear porch (Figure 29).<sup>100</sup> A Coleman camping stove was favored over the wood-burning stove during the early 1940s. The camping stove was probably much cooler and easier to use than the wood burning range, especially during the summer.<sup>101</sup>

Around 1960 the wood-burning stove was replaced by a propane-fueled range. Remaining evidence suggests that the gas range was replaced by an electric one probably during the early 1980s.

The cooling and food storage room may have been intended for use as an ice box.<sup>102</sup> However, its inefficient thermal performance may have prompted later occupants to

acquire a separate ice box.<sup>103</sup> The ice box was replaced with an electric refrigerator probably when reliable electrical service was supplied to the cabin. Ice was available from Custer, although it frequently melted by the time the rangers got it to the cabin.<sup>104</sup> The cramped kitchen provided only a couple places for the refrigerator during the 1970s, against the south wall east of the rear door, and adjacent to the range at the east wall.



**Figure 28.** Wood and coal burning range of the type that was in the Ranger Cabin during the 1940s and 1950s. This model was available in green or tan and ivory, or cream and black porcelain finish, complete with a water-heating reservoir. From *Drake Hardware Company General Catalog No. 36*, Burlington, Iowa: Drake Hardware Co., (1936), 601.

It is unknown how, or if, water was historically heated as the 1935 drawings divulge nothing of the sort. Water may have been heated directly within containers on, or

<sup>100</sup> Joseph L. Orr in survey prepared by Laura Johnson, (1997), 5, and Shirley Wolf to Bruce Bitz, unpagued interview notes, (January 1989).

<sup>101</sup> Shirley Wolf to Bruce Bitz, unpagued interview notes, (January 1989).

<sup>102</sup> Shirley Wolf to Bruce Bitz, unpagued interview notes, (January 1989). It is unclear if Wolf referred to the built-in cooling and food storage room or an ice box outside of the kitchen.

<sup>103</sup> Joseph L. Orr in survey prepared by Laura Johnson, (1996). The louver vents to this room were concealed before Orr occupied the cabin in 1952.

<sup>104</sup> Shirley Wolf to Bruce Bitz, unpagued interview notes, (August 1988).

within, a tank compartment on the early wood-burning kitchen range.<sup>105</sup> A water heater was placed against the south kitchen wall east of the rear door for a time during the 1970s.<sup>106</sup> Presently, there is a 52 gallon, electric heater located within the kitchen southwest cabinet.

### ***Furnishings***

Scant oral accounts of interior furnishings are too general with which to make specific comment about size and style. However, it does appear that early, government-supplied furniture was simple and utilitarian. It is doubtful that rustic furniture typically found in concessionaire cabins of the period, as the Ranger Cabin was supplied for use as a government-employee home and not available as a vacation cabin for the general public.<sup>107</sup> The 1935 construction drawings shed no light on the subject. An oral account-inventory of early 1940s furnishings includes in the office: a small desk, chair, cash register, and perhaps a small metal filing cabinet; for the kitchen a small kitchen table with two directors chairs, and an ice box; and for the bedroom a double bed and night table. One early photograph seems to confirm at least the directors chairs. Figure 10 shows two such chairs on the front porch occupied by two women.

### ***Accessibility Assessment***

Barrier-free circulation is believed to exist between the parking lot area and the fire ring used as a meeting place for visitors preparing to tour the historic cave entrance. However, routes to the historic cave

entrance and the Ranger Cabin are not accessible due to natural steep land forms.

There are two path routes to the cabin. The north route emanates at the parking area and follows a very steep incline along the service road to the cabin front porch. This path is of rough asphalt averaging about three feet wide. The second path begins at the fire ring and traces a route straight away up a hill with an average incline of one foot rise to ten feet of run. This path is paved with a 42 inch wide concrete sidewalk. There are no handrails on either of the paths.

Only one cabin door opening is wide enough to be deemed accessible. The front door off the porch is wide enough to satisfy current accessibility standards, but there is no ramp from grade to the porch, and from the porch to the first floor level. Once inside the building, none of the present historic doors are wide enough to accommodate wheelchairs.

Neither of the existing public restrooms are accessible. Each door way is at least five inches too narrow, and there are no ramps up the flagstone steps. The restrooms do not have the minimum turning radius or accessible fixtures required by existing standards, and there are no grab bars around the stools.

### ***Life Safety Evaluation***

According to the building code prevailing in South Dakota, the *Uniform Building Code* (UBC), the Ranger Cabin is classified as an assembly occupation (Group A, Division 3)(3031.1). The maximum occupancy load for 380 square feet of occupiable area within the private quarters of the cabin is 54 persons (Table 10-A). Accordingly, two primary exits are required for the building.

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<sup>105</sup> Shirley Wolf to Bruce Bitz, unpagged interview notes, (January 1989). Bitz's notes indicate that the kitchen range had a water jacket boiler.

<sup>106</sup> Dennis and Penny Knuckles in survey prepared by Laura Johnson, (1997), floor plan notes.

<sup>107</sup> See Albert Good, *Park and Recreation Structures*, (Boulder, Colorado: Greybooks, 1990), pp. 99-107 for examples of lodge and cabin rustic furniture.

The front and back doors satisfy this requirement, although they do not open outward as required by code (1004.2).

According to the UBC new Ranger Cabin interior wall and ceiling finishes shall have a flame-spread classification of II (Table 8-B).

Wood shingles or shakes are permitted under the code (Table 15-A).



## **PART TWO: TREATMENT AND USE**



## TREATMENT ALTERNATIVES

It is clear that the Ranger Cabin will be restored and repaired to its circa 1940 appearance. Therefore no alternatives regarding overall treatment will be discussed here. There are however a couple of issues that require discussion and presentation of alternatives, accessibility and fire suppression.

### *Accessibility*

Few physically disabled visitors visit the park for cave tours according to the park, although there are no statistics. Disabled visitors can take the elevator down to the visitor center cave entrance, but cannot explore the cave beyond the immediate elevator lobby area.

Within the historic cave entrance area the cave cannot be reached due to steep and stepped pathways. The Ranger Cabin and pathways to the structure are not accessible according to present accessibility standards. The rough, steep terrain surrounding the cabin excludes the use of natural land forms to access the cabin and its public restrooms.

### *Alternative 1*

#### *Accessible Site & Cabin*

This alternative would involve the installation of a new or modified path from the fire ring area to the cabin, and making all of the cabin accessible. A new paved path constructed without handrails would require a minimum slope ratio of 1:20. According to available site maps the south-borne path would need to be approximately 170 feet long to reach the cabin. Although no detailed topographic site maps exist for the area, it is anticipated that there would be extensive soil and rock grading, and removal of established trees. A shorter path with

slope ratio of between 1:12 and 1:20 would require a minimum path length of about 75 feet with handrails at both sides of the path.

Public restrooms would require extensive work to make them accessible. According to Uniform Federal Accessibility Standards, the area of the cabin now occupied by two restrooms would need to be combined to create a single unisex restroom as there is not enough space to accommodate both a barrier-free restroom and an inaccessible restroom. The interior partition and closet would be removed and the fixtures located as far away from the door as possible to attain the minimum turning diameter of 60 inches for wheelchairs. The concrete floor would need to be removed to relocate sanitary sewer pipes for the new fixture locations. Grab bars and accessible fixtures would be installed. It is recommended that the men's room door be used as the primary entrance; the woman's room door would be locked at all times to prevent access. Using the men's room entrance would give more flexibility in the design of a ramp.

The men's room door would be widened to the required minimum of 32 inches, resulting in the destruction of historic fabric. Six inches would need to be cut from the west jamb logs and a new, wider door emulating the historic door would be fabricated. The jamb frame and casing would be reused, but a new head casing would need to be fabricated. It is unknown if removal of a portion of the logs will result in structural instability at the southwest corner of the restroom. Since the historic "men" and "woman" signs would remain in place, additional signage may be required to

direct visitors to the proper unisex restroom entrance.

A ramp would need to be constructed at the restroom entrance. With handrails to either side the ramp could be a minimum of twelve feet in length. Without handrails the ramp could be a maximum of twenty feet in length. Additional work to the path leading up to the ramp would also be required.

A ramp would be required to access the front porch and front door of the cabin, the only accessible entrance. The rear door could be made accessible, but extensive cutting of the logs, a new door, screen door and frame, and ramp would be required. The porch ramp could be routed from higher grade to the north, with a platform constructed over the north end of the stair treads. Another alternative is to remove the historic rustic railing at the north porch elevation to accommodate a ramp without a platform at the stairs. The ramp would be about twenty feet in length with handrails, and a minimum of about 35 feet in length without handrails not including a platform.

While the front door exceeds accessibility standards for width, a small ramp would be built to negotiate the door sill rise. The threshold would need to be replaced with one abiding by standards. This will leave the bottom rail of the door short of reaching the threshold and necessitate the installation of a deep door sweep to seal the gap between the door bottom and threshold.

The two principle historic interior doors, are not wide enough by present day accessibility standards. To make the kitchen and bedroom accessible would require the doors to be widened, necessitating the reconstruction of the historic doors and frames.

Implementation of this alternative would disrupt the historic setting and physical integrity of the Ranger Cabin. Removal of the historic logs may compromise the structural integrity. Since the interior doors are one of only three major historic elements that remain in the interior (the fireplace and kitchen cabinets are the other two elements), their replacement reduces the overall historic integrity of the structure even more.

Alternative 1 cost estimate: \$16,300

#### *Alternative 2*

##### *Accessible Restroom at Parking Lot Level*

This alternative satisfies the issue of providing accessible restroom facilities at the historic site, but the cabin and present pathways to the cabin would remain inaccessible. Public restrooms at the cabin would remain functional in their present state. A vault toilet would be constructed at the parking lot/fire pit level to accommodate accessibility standards. The toilet enclosure would be designed in a rustic manner to blend with surrounding environment and cabin site. A path may need to be constructed from the parking area to the toilet.

Disabled visitors would have access to a toilet, but be unable to tour the cabin. Since site soils are very thin, extensive investigation would be necessary to determine the feasibility of siting and constructing a vault toilet within the historic area.

Alternative 2 cost estimate: \$13,300  
(not including feasibility study)

#### *Alternative 3*

##### *Accessible Cabin, Inaccessible Restrooms*

With this alternative new accessible paths and ramps indicated in Alternative 1 would

be constructed. The cabin interior would also be made accessible, but the present restrooms would remain inaccessible in their present state. Disabled persons would have access to the visitor center restrooms two miles distant from the cabin.

Alternative 3 cost estimate: \$11,000

#### *Alternative 4*

##### *Accessible Restrooms, Inaccessible Cabin*

This alternative provides a single accessible restroom at the cabin, but does not allow for accessibility to the cabin interior. As in Alternative 1, new paths to the cabin, a ramp to the restroom would need to be constructed, and the logs modified to accommodate a new, wider restroom door.

Alternative 4 cost estimate: \$13,800

#### *Alternative 5*

##### *Inaccessible Cabin*

With this alternative the existing paths would remain in their present configuration, and the cabin would be restored with no accessibility accommodation. Cabin public restrooms would remain in their current state, serving ambulatory visitors. Should disabled visitors choose to accompany, but not attend, a cave tour, they would have access to the parking area, road, and fire pit area.

Alternative 5 cost estimate: \$0

### ***Fire Suppression***

Except for fire extinguishers there is no fire suppression system in the Ranger Cabin. Since the Ranger Cabin is the only historic structure within Jewel Cave National Monument, and a key element along the historic cave interpretive program tour, it is recommended that a permanent fire suppression system be evaluated for interior

protection. Although a fire detection system will be installed, it is doubtful that emergency crews could be called into action soon enough to extinguish a blaze at that remote of a site. Should an external structural fire develop as a result of a lightning strike or forest fire, no amount of interior fire suppression could stem the blaze. For this analysis only self-contained suppression systems are evaluated due to the remote nature of the building, and the absence of a reliable water supply.

#### *Alternative 1*

##### *Tanked Water System*

With this alternative a self-contained water tank with a typical sprinkler head distribution system would be installed. Commercially-available water systems can be sized to fit through narrow doors and within small rooms such as closets. Tanks are sized according to designed demand capacity. A space within the cabin must be provided that will allow installation and maintenance of the tank(s) and equipment. Doors must be over 24 inches clear opening to move the equipment into place.

Possible space for placement of this equipment within the cabin would be within the public restrooms. These spaces have the added advantages of a concrete floor to support tank loads, and water supply and drainage sources. Disadvantages for use of these spaces is that one or both of the public restrooms would be closed to use.

Because the cabin is subjected to cold winter temperatures, glycol, or antifreeze, would need to be mixed with the water to prevent pipes from freezing and bursting. If the system were to be activated by accident or emergency use, glycol would flow through joints to the crawlspace dirt floor. It is believed that the water/glycol solution

would reach the cave directly beneath the cabin within three days and adversely affect the cave environment.<sup>108</sup> Most of the solution can be collected at the crawlspace level by installing an impervious membrane at the crawlspace floor. The crawlspace floor would need to be cleaned of sharp objects in preparation for membrane installation. The membrane would be drawn up and fastened to the interior foundation wall. All membrane laps would need to be sealed. Installing the membrane would be a challenge given the tight working quarters within the crawlspace area. However, it is believed that most of the glycol solution would be captured and drained to an area beneath the crawlspace hatch at the cooling and food storage closet (102A).

An alternative to capturing glycol is to ensure that fire suppression tanks and pipes remain above freezing. This would eliminate the glycol additive, but pose design challenges elsewhere. Pipes would need to be passively heated within cabin spaces or actively heated themselves. Year-round space heating to around forty degrees would be required even when the structure was not used during the off-season. Heating would also allow cabin spaces to remain dry. The pipes could be exposed within the heated spaces at the ceiling, or routed from the crawlspace to wall-mount sprinkler heads. Another alternative is to place pipes within heated spaces, exposing them to view. However, this may be an unattractive solution given that the interior is to be restored. Pipes located within the attic to supply ceiling sprinkler heads could be wrapped with electric resistance tape to keep them from freezing, but operation of the tape is dependent upon a constant power supply and difficult to monitor.

Yet another alternative to explore is the adaptability of commercially-available fire suppression systems to accept a dry pipe distribution system, and heat the room sheltering the water tank to completely eliminate the use of antifreeze solutions.

#### *Alternative 2*

##### *Chemical Systems*

Several chemical and gaseous-type suppression have been made available in response to discontinuation of Halon (halogenated hydrocarbons). Performance of recently-developed chemical suppression systems remains unclear at this time. For gaseous systems to perform well, the subject structure is required to be tight to the escape of the tanked gas, typically a mixture of nitrogen and argon. This requirement cannot be met by the loose construction of the Ranger Cabin, and the possibility that windows may be open during occupation. There is also uncertainty as to whether a gaseous system can extinguish a smoldering fire, such as occurs with electrical fires.<sup>109</sup>

#### *Alternative 3*

##### *Install No Fire Suppression System*

This alternative acknowledges no action with regard to fire protection, other than hand-held fire extinguishers, should the above alternatives be deemed technically and/or environmentally infeasible. No permanent fire suppression system would be installed to protect the interior especially while the structure is unoccupied. The major disadvantage is that should an internal fire develop when the structure is unoccupied, chances are great that the major portion of the cabin and contents would be damaged and destroyed.

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<sup>108</sup> Mike Wiles to Alan O'Bright, (9 February, 1999).

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<sup>109</sup> Brian Olson, NPS Denver Service Center, to Alan O'Bright, (23 April, 1999).

## ULTIMATE TREATMENT AND USE

### *Program Use*

The Ranger Cabin is able to accommodate the programmed interpretation of the exterior and interior to its circa 1940 appearance. It is believed that there is enough physical information to restore the interior to its circa 1940s appearance, even though most interior finishes and fixtures have been lost to 1980s renovation work.

The cabin exterior requires log and other cosmetic repairs to ensure its weather-tightness. Beyond these repairs few changes are required at the exterior to bring it to a circa 1940 appearance with minor conjecture save for light fixture and kitchen appliance appearance. However, these missing elements can be replaced with reproductions or originals from the target construction period.

The private bathroom could be restored to its 1940 appearance. Portions of the original ceiling and a ceiling light fixture remain intact, and it is known that a wall-mount tank toilet was against the north wall. However, it is unknown how the shower may have looked if indeed there was a shower at this time.

The two public restrooms should be adapted to shelter fire suppression equipment, and detection and electrical panels. Public sanitary facilities could be located elsewhere on the site under a separate construction project.

### *Accessibility*

Accessible routes to and within the Ranger Cabin would adversely affect the historic integrity and appearance of the site and structure. Since the historic cave entrance is

not accessible, and the cabin is seen as a small part of the proposed cave tour route, few, if any, disabled visitors will attend the tour solely to seek out the cabin. To make the cabin interior code-accessible would entail the loss of historic fabric, and degradation of historic character. Logs would need to be cut and much of the affected door millwork would need to be replaced to provide accessible doorways. Long ramps would need to be constructed for the front door and restroom entrance. Landscaping would be adversely affected through the removal of trees and construction of a new long path from the parking area to the cabin. Removal of bedrock may be required to construct a new path.

If deemed necessary, a new, accessible public restroom can be constructed at the parking lot level. The restroom can be a pit-type toilet, and should be of a rustic design to compliment, but not compete with, the Ranger Cabin.

### *Fire Suppression*

The Ranger Cabin should be protected with a water-based fire suppression system. The equipment associated with the designed system should be located within either one or both of the public restrooms depending upon equipment clearance requirements. Public restrooms will have to be accommodated elsewhere near the site. Because restroom doors are narrow, custom tanks may need to be constructed. A heated space will be required for the tank to alleviate the requirement for antifreeze additives. Temperatures within the space need only be several degrees above freezing. Prospective systems should be evaluated for

their ability to be adapted for a dry-pipe system, eliminating the need to fill pipes with antifreeze and the need to lay a membrane within the crawlspace. Any fire suppressant additives should be evaluated for its possible effect on the cave environment.

### ***Site Features***

- Remove samplings at northern corners of buildings.
- Regrade at northwest to provide positive slope away from building.
- Fabricate and install a half-round log bench set in front of the cabin.

### ***Structure***

- Repair or replace decayed logs ends as necessary. Use an epoxy formulated for wood restoration.
- Replace bottom log tread at front porch steps.
- Repair or replace faux ridge logs.
- Stain all replacement logs to color of surrounding historic logs.
- Install lead coated copper or sheet lead flashing at top surface of exposed log crowns.

### ***Exterior Envelope***

- Replace wood shake roof. Locate, if possible, 26 inch long shake shingles and install at 11 inch exposure. Install zinc metal strips to control moss growth.
- If encountered, replace deteriorated roof sheathing with in kind board material.
- Replace deteriorated copper flashing as required.
- Install new ridge log to 1935 construction drawing details.
- Install new copper, half-round gutters and smooth round downspouts at all eaves. The gutters

should be suspended from roof sheathing.

- Consider installation of sub-surface drain pipes to channel roof drainage away from building. This will prevent roof drainage from ponding at the base of the foundation.
- Reglaze window sash and replace cracked glass.
- Construct new wooden screen windows.
- If possible, research the availability and replacement of storm sash hangers and door buttons.
- Repair gable-end vents and restore cooling cabinet louvered vents. Install bronze hardware cloth and heavy screening at the interior side of vents to control insect and rodent entrance.
- Install new bronze hardware cloth on screen doors.
- Remove clay flue extenders from chimney and cap flues with removable cap.
- Clean roofing tar from chimney masonry surface and reflash with copper sheet metal set in reglets.

### ***Interior***

- Selectively remove finishes and most framing installed in 1981. Leave in place previously identified historic light fixtures, cabinets, doors, and finishes.
- Remove floor tile from bedroom in accordance with applicable standards for asbestos removal and disposal.
- Construct new wood frame partitions and log wall furring where necessary. New partition framing should match the depth of the historic.
- Insulate ceilings with batt or other insulation, and walls with



- compressed fiberglass insulation barrier that would trap water vapor during the cold-weather months.
- Install new Celotex wall and ceiling finishes. Use plane box nails in the Office and roofing nails elsewhere. If possible, find a source of checker-head roofing nails to emulate the old-style nails. Generally, nail the Office finishes at five inches on center, and all other finishes at six inches on center.
- Restore all interior millwork with ponderosa pine to historic dimensions and profiles. Stain and varnish exposed surfaces to match remaining historic samples. Use countersunk finish nails, filled.
- Restore cooling and food storage closet to details indicated in 1935 construction drawings.
- Restore kitchen counter top and splashback using plywood or boards underlayment, with linoleum surface and metal edging. Select a period linoleum color and pattern.
- Remove tile mastic from wooden floors with a method that will not damage floor surfaces. Refinish floors using intact sample areas as a standard for color and glaze.
- between furring. Install no vapor
- Install new fire suppression system. If necessary, place membrane on crawlspace floor to retain suppressant chemicals should the system discharge.
- Install new plumbing as required to kitchen sink. Select appropriate period fixtures on kitchen sink.
- Install new electrical system. Service panel box can be located within the bathroom. Place outlet, light switch and light boxes in historic locations. Select and install period light fixtures and device plates.
- Install electric resistance baseboard heat in the three primary rooms on a timed thermostat.
- Install new fire and intrusion detection and alarm systems. Tie intrusion system to historic cave entrance system.
- If possible, locate reproduction or reconditioned wood-burning kitchen range. Install range to flue thimble with stove pipe.
- Specifying furniture for the cabin is beyond the scope of this document. A furnishings study should be initiated.

*Ultimate Treatment Cost Estimate*

The following summarizes Class C construction cost estimates associated with restoration of the Ranger Cabin to its early 1940s appearance. All construction estimates reflect work conducted in 1999 by contract labor.

## Construction Costs

Site Work (clear trees, subsurface drains)	\$1,900
Log Work (replacement & epoxy repair)	\$13,000
Roof Work (replace shingles, flashing & ridge logs)	\$9,300
Doors & Windows (new screens, repairs windows & vents)	\$1,600
Interior Fabric (demolition, framing, finishes, floors cabinets)	\$19,000
Plumbing (kitchen, bathroom)	\$900
Fire Suppression (tanked system, crawlspace membrane)	\$8,600
Electrical (baseboard heat, detection system, electrical system)	\$9,700
Subtotal	\$64,000

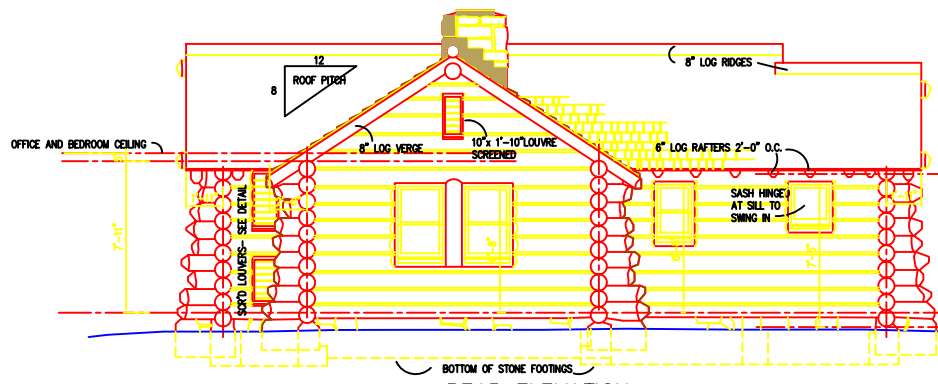
## Design Costs

A/E Title I & II Design Services (estimated)	\$22,000
A/E Title III Design Services (inspection, estimated)	\$5,000
NPS Historical Architect (site visits, photography)	\$3,500
Printing HSR (40 copies)	\$800
Subtotal	\$31,300
<b>Total Project Construction Costs</b>	<b>\$95,300</b>

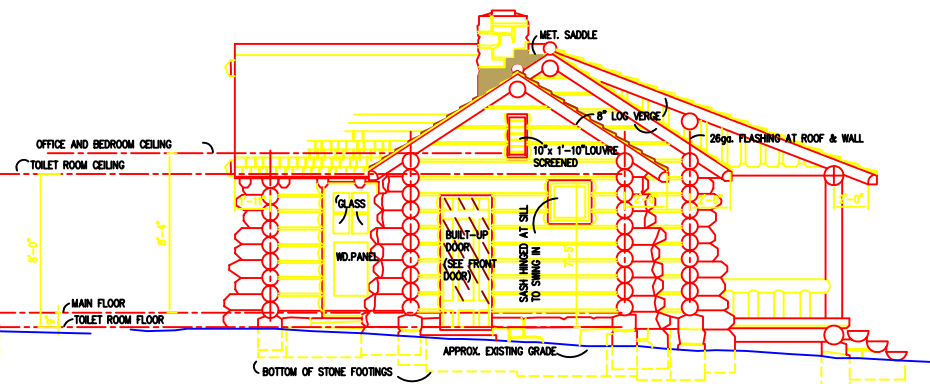
## **APPENDIX A – 1935 DRAWING**

The 1935 construction drawing for the Ranger Cabin was scanned and vectorized to AutoCAD drawing format in 1999. The copy shown here is presented in less than half-size due to the unconventional, oversized drawing paper format used in 1935.

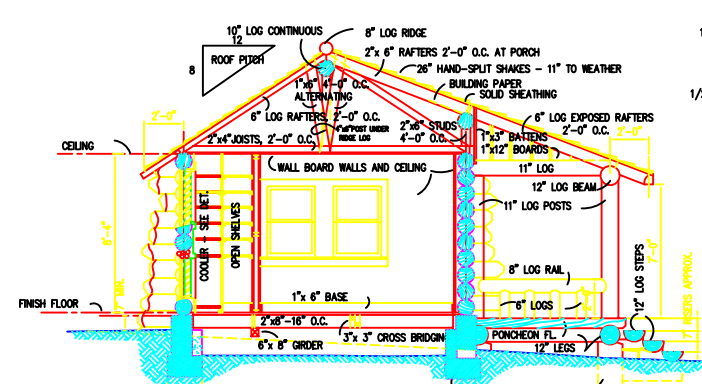




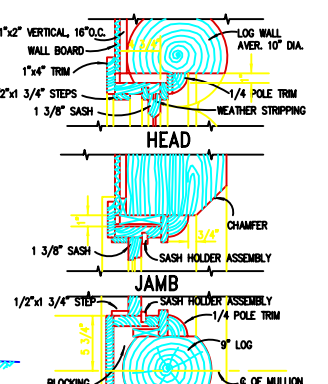
REAR ELEVATION  
SCALE: 1/4" = 1'-0"



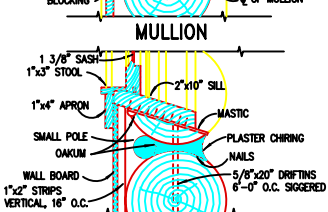
LEFT SIDE ELEVATION  
SCALE: 1/4" = 1'-0"



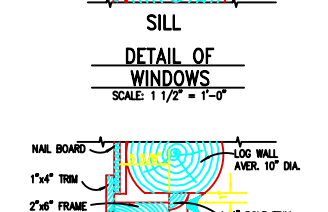
SECTION X-X  
SCALE: 1/4" = 1'-0"



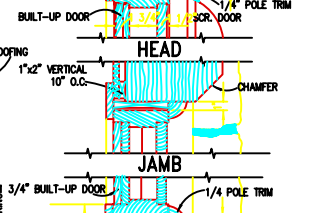
HEAD



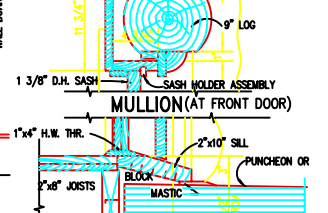
JAMB



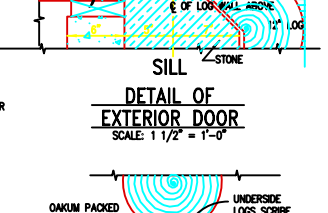
MULLION



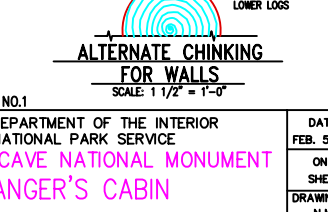
SILL



HEAD



JAMB



MULLION (AT FRONT DOOR)

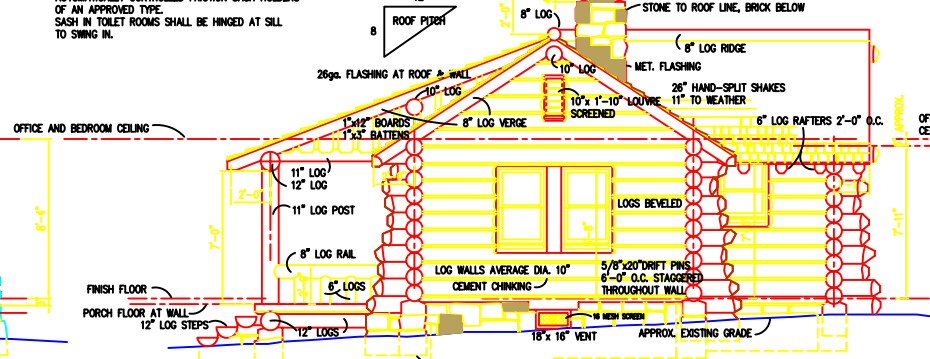


DETAIL OF EXTERIOR DOOR

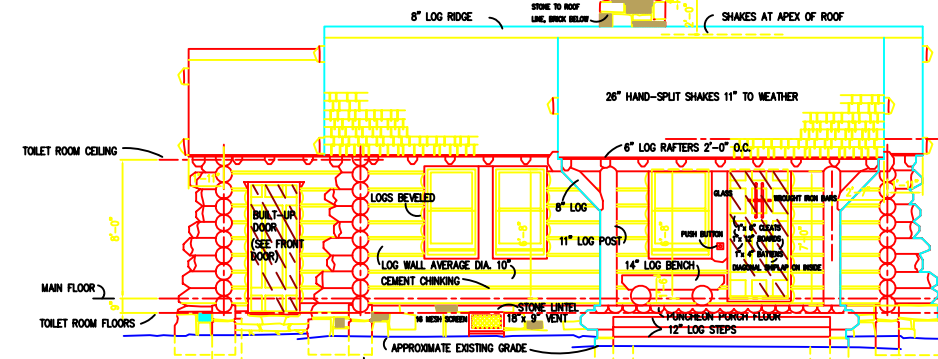


ALTERNATE CHINKING FOR WALLS

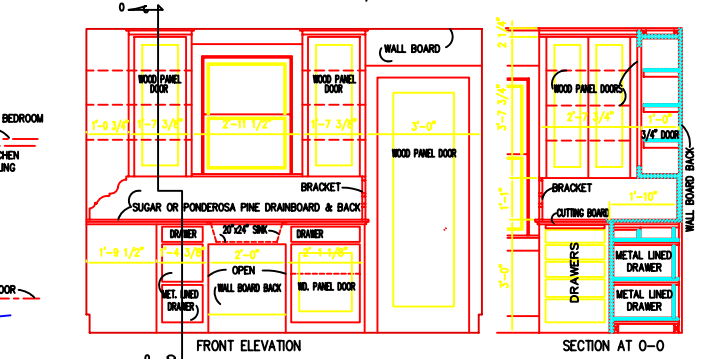
NOTES  
ALL SASH EXCEPT IN TOILET ROOMS ARE DOUBLE HUNG.  
ALL DOUBLE HUNG SASH SHALL BE FURNISHED WITH AUTOMATICALLY CONTROLLED FRICTION SASH HOLDERS OF AN APPROVED TYPE.  
SASH IN TOILET ROOMS SHALL BE HINGED AT SILL TO SWING IN.



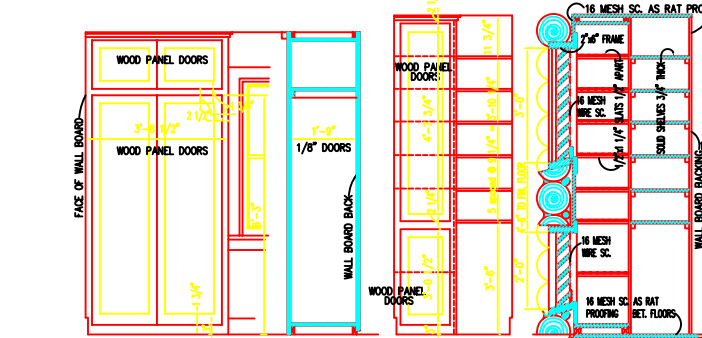
RIGHT SIDE ELEVATION  
SCALE: 1/4" = 1'-0"



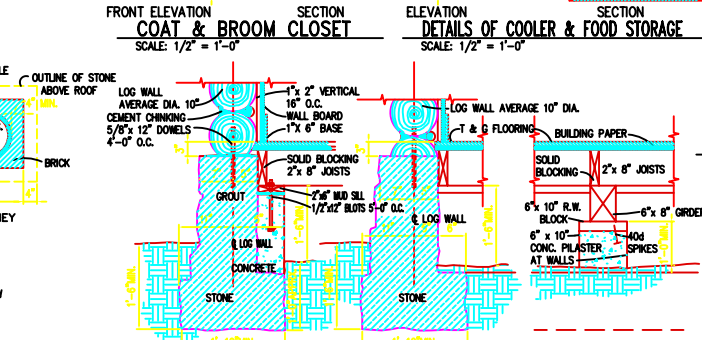
FRONT ELEVATION  
SCALE: 1/4" = 1'-0"



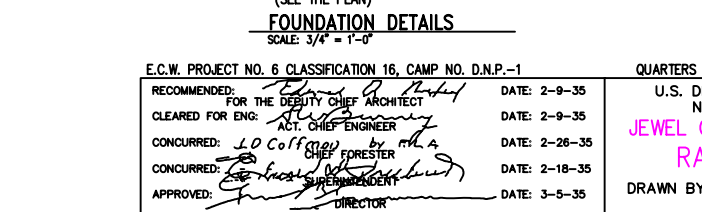
FRONT ELEVATION  
SCALE: 1/2" = 1'-0"



SECTION AT O-O  
SCALE: 1/2" = 1'-0"



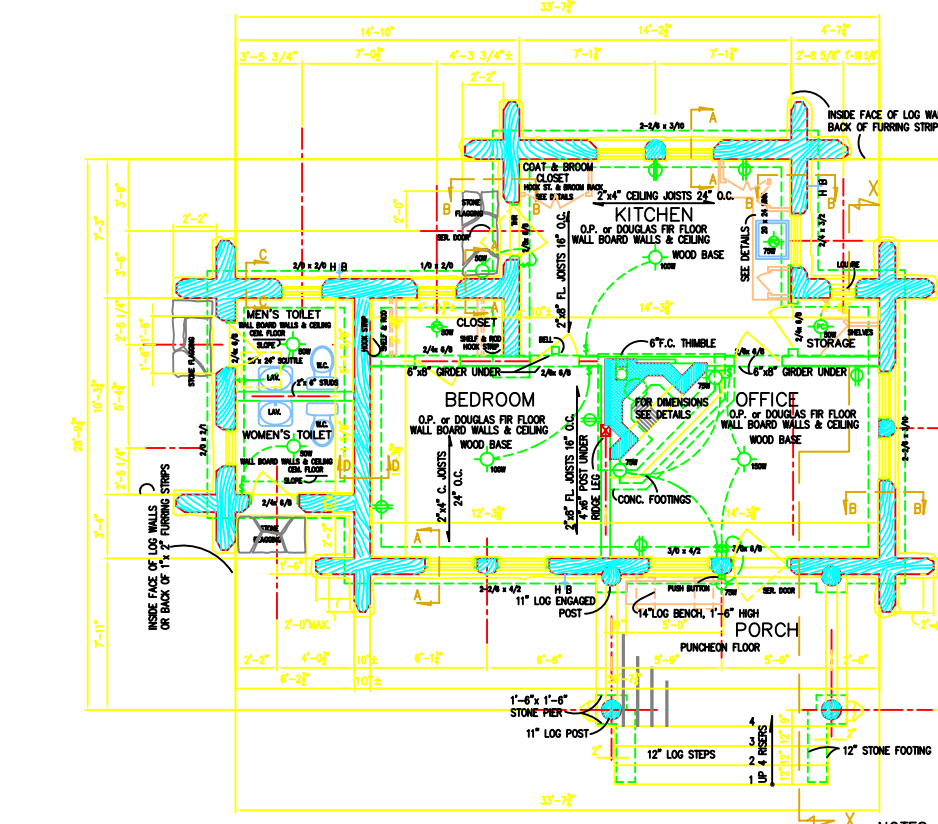
ELEVATION  
SCALE: 1/2" = 1'-0"



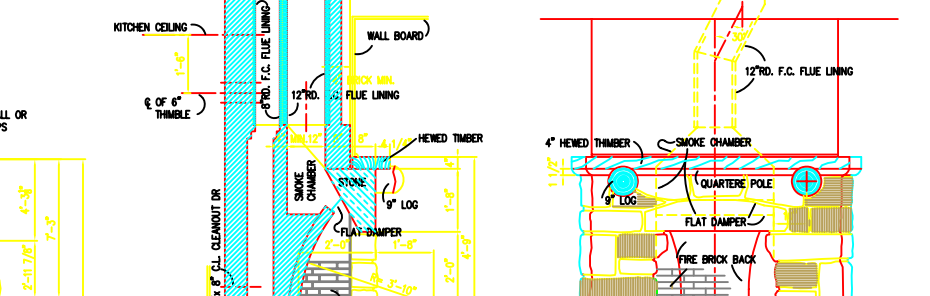
SECTION AT A-A  
SCALE: 3/4" = 1'-0"



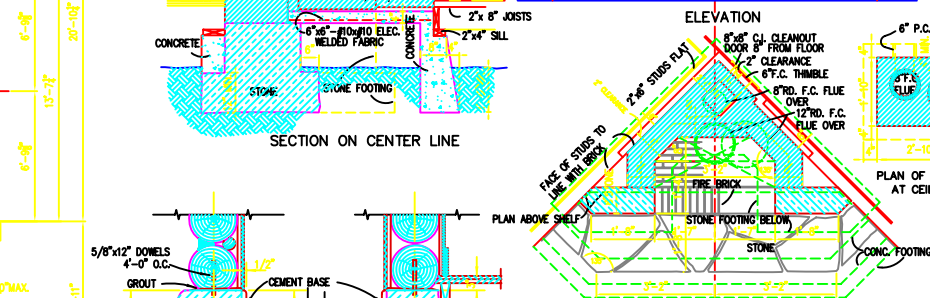
SECTION AT B-B  
SCALE: 3/4" = 1'-0"



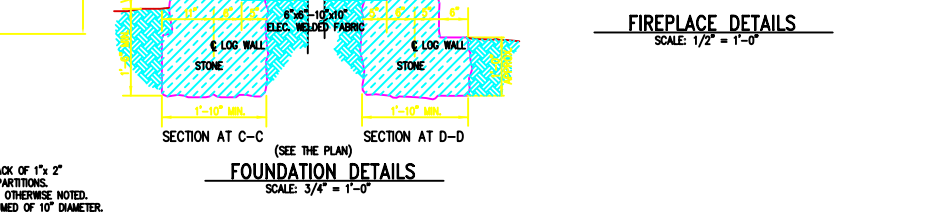
THE PLAN  
SCALE: 1/4" = 1'-0"



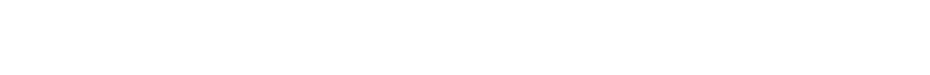
SECTION ON CENTER LINE



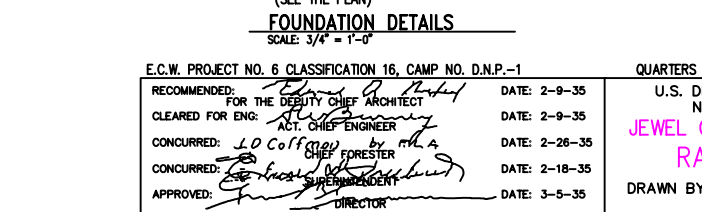
FOUNDATION DETAILS  
SCALE: 3/4" = 1'-0"



FIREPLACE DETAILS  
SCALE: 1/2" = 1'-0"



CENTER LINE PLAN



DETAILS OF KITCHEN CABINET  
SCALE: 1/2" = 1'-0"



DETAILS OF COOLER & FOOD STORAGE  
SCALE: 1/2" = 1'-0"

NOTES  
DIMENSIONS ARE TO FACE OF LOG WALL OR BACK OF 1" x 2" FURRING STRIPS & TO CENTER LINE OF STUD PARTITIONS.  
ALL PARTITIONS ARE OF 2" x 4" STUDS UNLESS OTHERWISE NOTED.  
IN DIMENSIONING OF PLAN ALL LOGS ARE ASSUMED OF 10" DIAMETER.

E.C.W. PROJECT NO. 6 CAMP NO. D.N.P.-1  
RECOMMENDED: [Signature] DATE: 2-9-35  
FOR THE DEPUTY CHIEF ARCHITECT  
ACT. CHIEF ENGINEER DATE: 2-9-35  
CONCURRED: L.D. Coffey DATE: 2-26-35  
CONCURRED: [Signature] DATE: 2-18-35  
APPROVED: [Signature] DATE: 3-5-35  
DIRECTOR

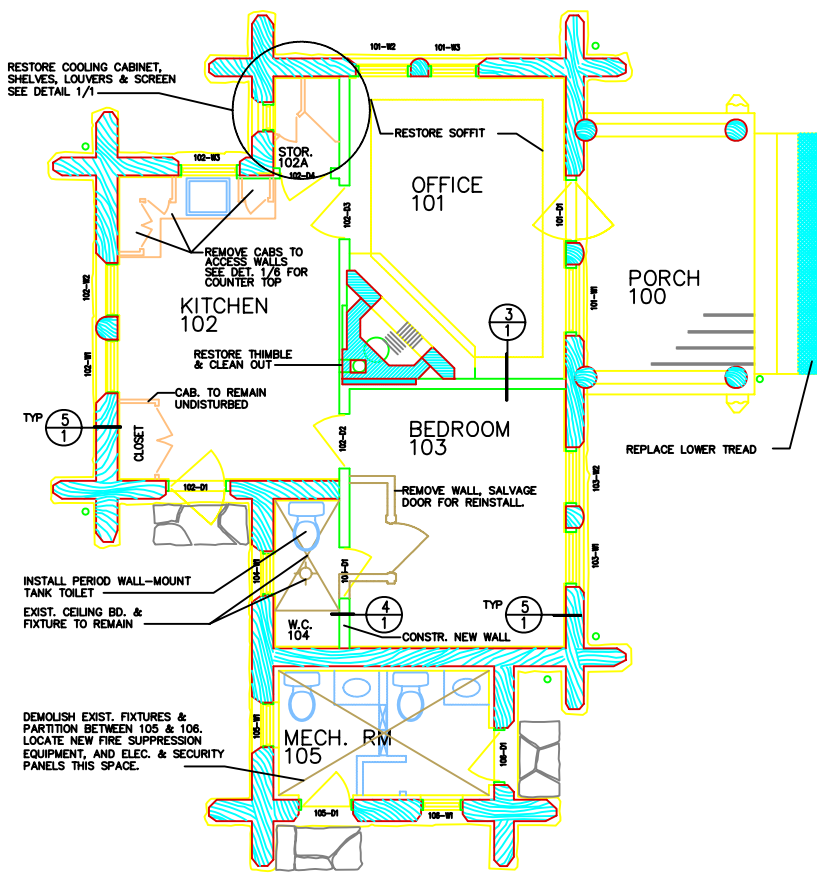
QUARTERS NO. 1  
U.S. DEPARTMENT OF THE INTERIOR  
NATIONAL PARK SERVICE  
JEWEL CAVE NATIONAL MONUMENT  
RANGER'S CABIN  
DRAWN BY BRANCH OF PLANS AND DESIGN

DATE: FEB. 5, 1935  
ONE SHEET  
DRAWING NO. N.M.  
J.C. 3001A

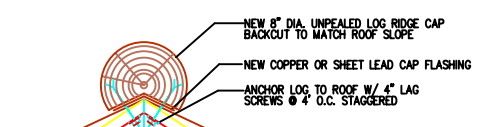
## **APPENDIX B – RESTORATION DRAWING**

The following drawing was completed in 1999 to graphically indicate changes necessary to restore the Ranger Cabin to its 1940 appearance.

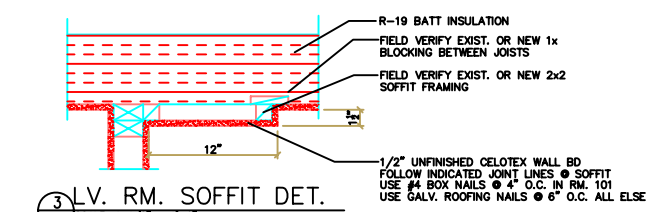




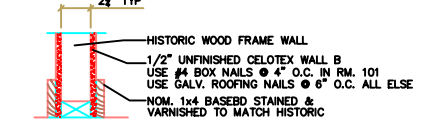
FIRST FLOOR PLAN  
SCALE: 1/4" = 1'-0"



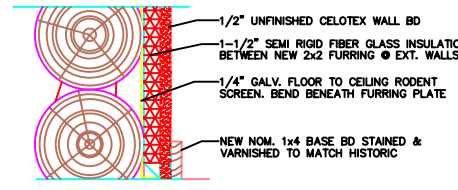
RIDGE CAP DETAIL  
SCALE: 1-1/2" = 1'-0"



LV. RM. SOFFIT DET.  
SCALE: 1-1/2" = 1'-0"



TYP. INT. WALL DET.  
SCALE: 1-1/2" = 1'-0"



EXT. WALL DET.  
SCALE: 1-1/2" = 1'-0"

EXTERIOR NOTES

- SITE**
1. REMOVE TREES FROM NORTH ELEVATION CORNERS
  2. EXCAVATE TO INSTALL NEW GUTTER DRAINAGE SYSTEM
- ROOF**
3. REMOVE EXIST. WOOD SHINGLES & DEFECTIVE FLASHING
  4. REMOVE EXIST. GUTTERS & DOWNSPOUTS
  5. REMOVE FLASHING, TAR & FLUE EXTENDERS FROM CHIMNEY
  6. REPLACE BOARD SHEATHING WHERE REQUIRED
  7. REPAIR/REPLACE FAUX RIDGE CROWNS AS REQUIRED
  8. INSTALL COPPER FLASHING @ 1/0 FAUX RIDGE CROWNS
  9. INSTALL 24" WOOD SHAKE SHINGLES W/ 11" EXPOSURE & TRIPLE STARTER COURSE.
  10. INSTALL NEW 16 OUNCE COPPER STEP, VALLEY & CHIMNEY FLASHING AS REQUIRED.
  11. INSTALL NEW 5" HALF-ROUND, STRAP-MOUNTED GUTTERS, & 3-1/2" SMOOTH ROUND DOWNSPOUTS.
- WINDOWS & VENTS**
12. REGLAZE ALL DBL. HUNG WINDOWS
  13. REPLACE BROKEN GLASS
  14. CONSTRUCT NEW WOODEN SCREEN WINDOWS
  15. REPLACE DOOR SCREENING W/ BRONZE HARDWARE CLOTH
  16. REPAIR GABLE END VENTS, & BACK W/ SCREEN & MESH
  17. REPAIR/RESTORE COOLING CABINET VENTS

INTERIOR NOTES

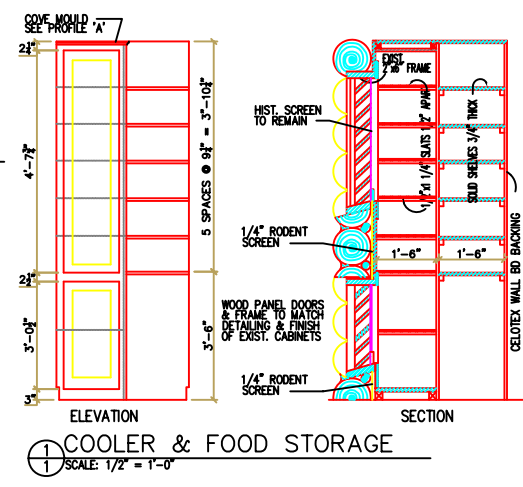
1. REMOVE NON-HISTORIC FINISHES, PARTITIONS, FRAMING ELECTRICAL SYSTEM
2. REMOVE ASBESTOS TILE FROM RM 103
3. INSTALL NEW 2x FURRING AGAINST LOG WALLS
4. INSTALL NEW SEMI-RIGID FIBERGLASS INSULATION BETWEEN FURRING
5. INSTALL CELOTEX FIBERBOARD WALLS & CEILINGS WITH BOX NAILS @ RM 101 & ROOFING NAILS ELSEWHERE
6. INSTALL NEW PINE TRIM, BASEBOARDS & CASINGS STAINED TO MATCH HISTORIC SAMPLES & DETAIL DRAWINGS
7. REMOVE MASTIC FROM FLOORS & REFINISH
8. INSTALL NEW FIRE SUPPRESSION SYSTEM
9. INSTALL NEW ELECTRICAL SYSTEM, PLACE OUTLETS & FIXTURES @ HISTORIC LOCATIONS
10. INSTALL NEW BASEBOARD HEATING @ EA. ROOM
11. INSTALL FIRE & INTRUSION DETECTION SYSTEMS

LOG REPAIR NOTES

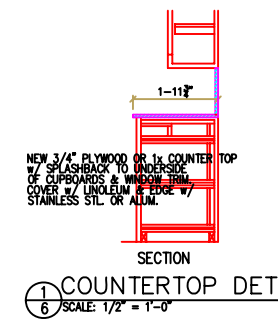
1. REPLACE CROWNS W/ PONDEROSA PINE OF SAME DIAMETER
2. SELECT EPOXY SYSTEM SUITABLE FOR LOG RESTORATION
3. ALL METAL FASTENERS TO BE STAINLESS STEEL
4. LOG C-10: REPACK SADDLE JOINT W/ OAKUM & DAUBING
5. LOG K-6: RESECURE PREVIOUS LOG REPLACEMENT
6. INSTALL COPPER FLASHING @ TOP-COURSE LOGS

LOG REPAIR LEGEND

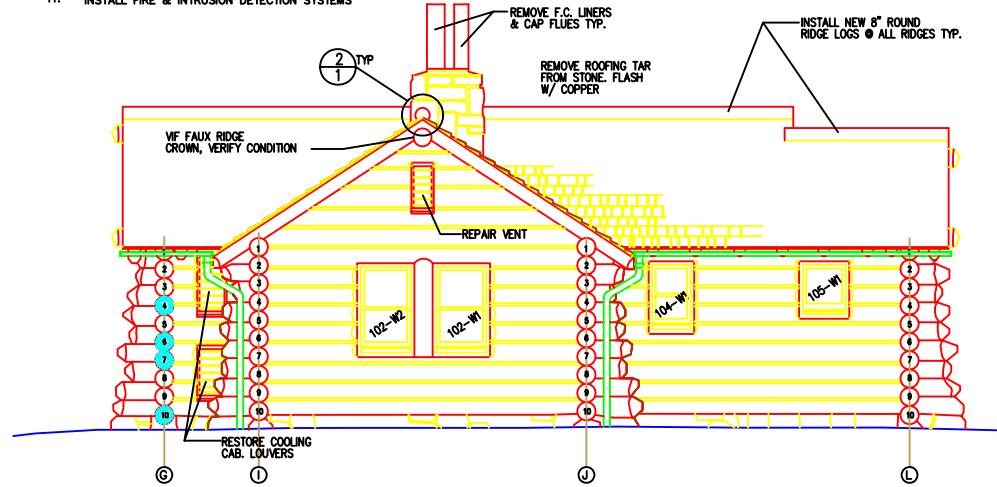
- EPOXY REPAIR LOG CROWN
- REPLACE LOG CROWN
- LOG CROWN REF. NO.
- ⓪ LOG CROWN GROUP NO.



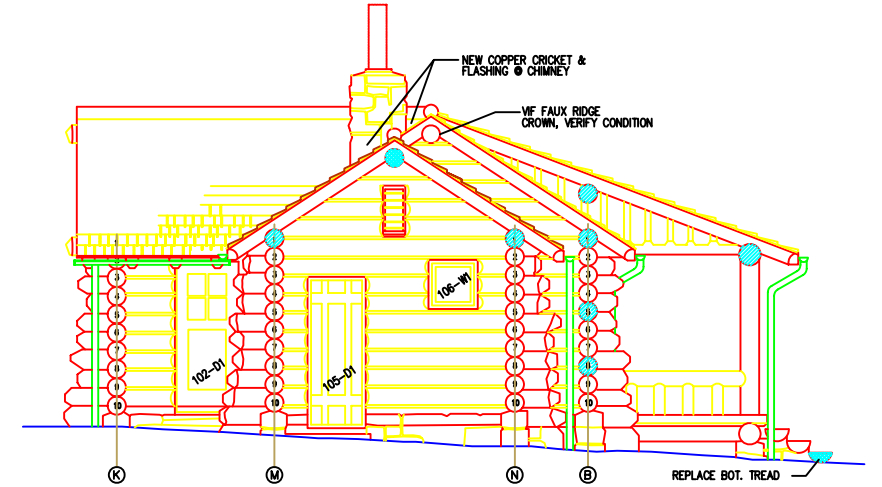
COOLER & FOOD STORAGE  
SCALE: 1/2" = 1'-0"



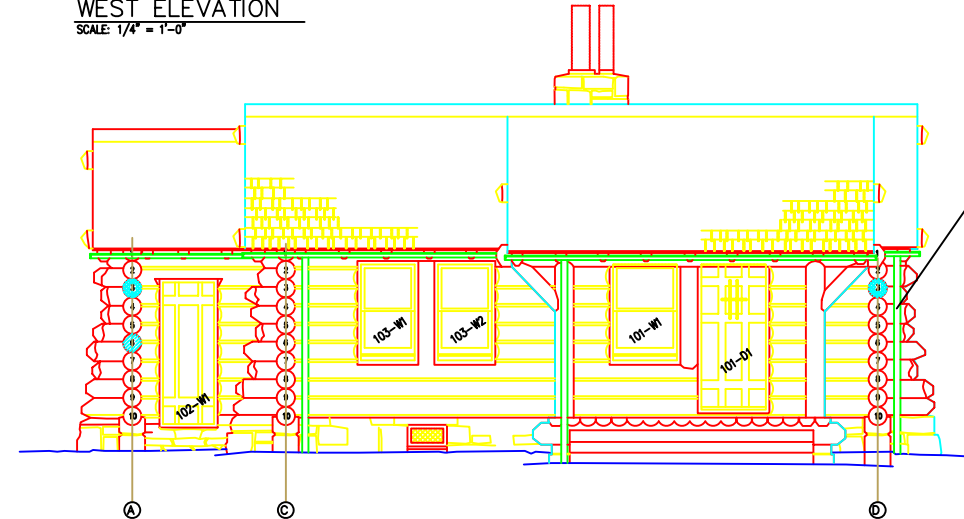
COUNTERTOP DET.  
SCALE: 1/2" = 1'-0"



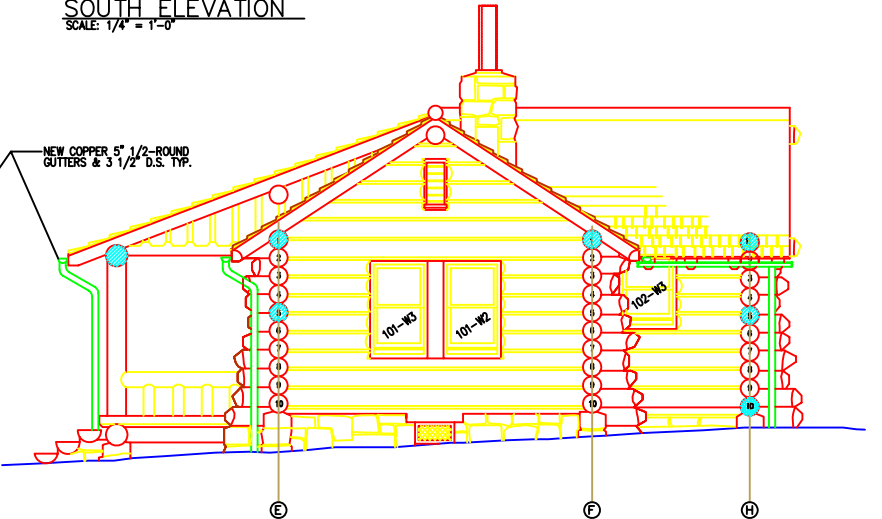
WEST ELEVATION  
SCALE: 1/4" = 1'-0"



SOUTH ELEVATION  
SCALE: 1/4" = 1'-0"



EAST ELEVATION  
SCALE: 1/4" = 1'-0"



NORTH ELEVATION  
SCALE: 1/4" = 1'-0"

REVISED DATE: 6/28/2001 INITIAL: AWO		PREPARED A. O'BRIGHT DESIGNED A. O'BRIGHT DRAWN CHECKED JULY 16, 1999 DATE		RECOMMENDED PARK SUPERINTENDENT _____ DATE _____ CONCURRED WMSO SUPERINTENDENT _____ DATE _____ APPROVED MNR DIRECTOR _____ DATE _____		UNITED STATES DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE REGIONAL DIRECTOR'S OFFICE RESTORE RANGER CABIN (HS-1) JEWEL CAVE NATIONAL MONUMENT CUSTER, SOUTH DAKOTA		DRAWING NO. 146/80031 CADD NO. 146-80031-1 SHEET 1 OF 1	
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### *Sources Uncited*

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*Home Owners' Catalogs.* New York: F.W. Dodge Corporation, 1938.

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### *Interviews Cited*

Shirley Wolf to JNEM Bruce Bitz, August 1988 and 13 January, 1989. Unpaginated notes in Jewel Cave National Monument files. Wolf and

her ranger husband, Elwood, lived in the Ranger Cabin from 1941 through 1943.

Don Lytle, Jewel Cave National Monument Maintenance Worker, to NPS Historical Architect Alan O'Bright, 12 February, 1999.

Mike Wiles, Jewel Cave national Monument resource manager, to NPS Historical Architect Alan O'Bright, 9 February, 1999.

#### ***Survey - Cited***

The following individuals, with dates of Ranger Station contact, returned written information from a survey prepared by NPS Historical Architect Laura Johnson in 1996, and are cited in this document:

Blaine Foss, Jewel Cave National Monument maintenance worker 1977 to 1981.

John Hannan, Jewel Cave National Monument seasonal ranger 1954 through 1964. Resided in cabin 1960 and 1961.

Dennis and Penny Knuckles, Jewel Cave National Monument cave guides 1970 through 1971.

Dennis Mehlhaff, Jewel Cave National Monument maintenance worker during summers of 1971 through 1976. Resided in cabin summer 1972.

Joseph L. Orr, Jewel Cave National Monument ranger naturalist 1952.

Steve Riley, Jewel Cave National Monument maintenance supervisor 1980 through 1983.

Mary Jo Silbernagle, wife of Jewel Cave National Monument seasonal ranger Michael Silbernagle, lived in cabin during the summers of 1971 through 1973.

#### ***Survey - Uncited***

The following individuals, with dates of Ranger Station contact, returned written information from a survey prepared by NPS Historical Architect Laura Johnson in 1996, but are not cited in this document:

John Culberson, Jewel Cave National Monument ranger, summers of 1972 and 1973.

William A. Fassbender, Jewel Cave National Monument ranger-naturalist, summers of 1962 through 1966.

Jan Fedora, Jewel Cave National Monument naturalist aide, summers of 1971 and 1972.

Sandy Magnuson, Jewel Cave National Monument ranger, summer 1972.

Robert S. Peterson, Jewel Cave National Monument custodian, five months during 1972.

Nancy Scholl, wife of Jewel Cave National Monument ranger, 1970-1972.

#### ***Drawings***

“Historic Administration Building Preservation, jewel Cave national

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Monument,” Drawing Number 146/80006, 19 April, 1982.	<i>Project Notes &amp; Files</i> Laura Johnson, “Interior Millwork & Finishes Inventory, Ranger Station (HS-1),” 9 October, 1996.
“Jewel Cave National Monument Ranger’s Cabin,” Drawing Number NM-JC- 3001A, 5 March, 1935.	
“Septic Tank and Filter Trench Sewage Disposal Plant, Jewel Cave National Monument,” Drawing Number NM- JC-9001, 14 November, 1935. Copy in Jewel Cave National Monument drawing archives.	<i>Files &amp; Collections</i> Jewel Cave national Monument, Ranger Cabin maintenance files  Jewel Cave National Monument photographic collection.