IPC-E-93-10

Nov. 28, 2003

Updated Testimony / Exhibits of Jerry D. Nielson for Idaho Power

BEFORE THE IDAHO PUBLIC UTILITIES COMMISSION

IDAHO POWER COMPANY, Petitioner, vs. THE NEW VILLAGER CONDOMINIUM ASSOCIATION, INC., A NON-PROFIT IDAHO CORPORATION AND ITS MEMBERS, INDIVIDUALLY, Respondents.	)	CASE NO. IPC-E-93-10

IDAHO POWER COMPANY

DIRECT TESTIMONY

OF

JERRY D. NIELSON

Q. Please state your name and business address.

A. My name is Jerry D. Nielson, my business address is 1221 West Idaho, Boise, Idaho.

Q. By whom are you employed and in what capacity?

A. I am the General Manager, Engineering & Construction, in Idaho Power Company's delivery business unit.

Q. What are your job responsibilities?

A. I am responsible for the engineering and construction of large projects for transmission and distribution lines and substations throughout Idaho Power.

Q. Please describe your educational background.

A. I graduated from the University of Idaho in 1970, with a Bachelor of Science and Electrical Engineering Degree. I received a Masters in Business Administration from the University of Missouri in 1974.

Q. Please provide your employment background.

A. After serving four years in the U.S. Air Force, from 1970 to 1974, I began working for Idaho Power Company. I have been with Idaho Power continuously since then. I started with Idaho Power at the Blackfoot District Office, where I spent about a year and half. In 1976, I relocated to Payette as an engineering leader. In 1977, I went to Twin Falls serving as an assistant electrical

superintendent. In 1980, I became the electrical superintendent at Twin Falls. In 1983, I transferred to Boise as electrical superintendent. In 1985, I became the manager for transmission and distribution. In 1991, I became the general manager of distribution operations. Since 1995, because of Company reorganization I have had various short assignments with various managerial responsibilities., I was named the East Region General Manager in 1997 and assumed my present position in January 2002. My employment has been primarily in the transmission-distribution functions of Idaho Power Company.

Q. Please provide a general history of underground distribution facilities.

A. The reasons for the institution of residential underground distribution facilities were largely due to visual impact. The public did not want to see poles and wires in the air. Originally even the transformers were installed below ground. Utilities placed overhead power pole transformers inside underground enclosures.

Q. Were alternatives to placing the transformers below ground developed?

A. Yes, as residential underground service developed the industry developed the pad mounted transformer. This was a transformer designed for electrical and mechanical functions such as safety, accessibility,

mobility, ventilation, ease of operations, reliability, etc.

Q. Is there a safety problem with transformers placed below ground?

A. We consider it a problem. There are ways it can be mitigated that are expensive relative to our conventional methods. Placing transformers below ground level is not an economically feasible investment for most of our customers, compared with the ease of operations for pad mounted facilities.

Q. Before we get into the specifics of the present situation, why did Idaho Power begin phasing out transformers it had placed underground?

A. Initially, the primary reason was the safety problem in having our people operate and maintain those systems. If a person wanted to de-energize a transformer located underground, he would have to lift a grate or a vault lid off the vault which encloses the transformer. The grate may be extremely heavy. For example, if the grate was in a driveway, it had to be substantial enough to support the weight of automobiles. If it was not in a driveway it would be a mesh grate that could be lifted. But it still would be a heavy grate which is directly over an energized transformer. We fear that a person may lose their grip on this grate and it could drag across the transformer and cause damage to the equipment itself or cause an

electrical flash. Workers are looking into these units usually after a problem has developed, and they are not certain of the condition of the equipment. Thus, a dangerous condition exists before a worker ever accesses the vault with the transformer as currently designed.

Also, once the grate was off, then the worker had to operate the equipment to de-energize it. The person would use an insulated tool to reach down and grab hold of the energized conductor and remove it from the transformer. This process required the worker to stand over the vault as the energized conductor was removed. The vault is a hostile environment for the transformer. As a result the worker would not know the condition of the transformer or connecting conductor cable. For these reasons working on a transformer placed underground is risky.

Moreover, we have had violent failures of equipment without workers present. Transformers occasionally explode, which could present a danger to the public. Customers have reported violent failures. It could be very dangerous if children or anyone else is in the vicinity when that happens.

Q. Did Idaho Power have other concerns beside these safety concerns when phasing out the transformers placed underground?

A. Locating transformers underground increase

our costs. We have to train people to be aware of these special transformers and the process of how to find them. We have additional carrying costs for inventory in order to maintain spare units and the ancillary equipment we use in those situations.

Q. Has Idaho Power Company ceased placing transformers underground?

A. Yes. Idaho Power ceased offering transformers placed underground, even before I became an employee of Idaho Power. Idaho Power has never offered underground transformers service to any residential users while I have been an employee.

Q. Is Idaho Power phasing out existing transformers underground?

A. Yes. Whenever we remove a transformer that fails, or if there is any system reconstruction that occurs at a location where there is a transformer underground, Idaho Power removes those facilities and installs a pad mounted transformer at grade. This is a result of our decision to no longer offer that type service. Most of the remaining underground transformers have since been removed to reduce the risk to employees when operating the equipment during outage events.

Q. Why are transformers located underground not the optimal method for use in residential subdivisions?

A. A conventional transformer in an underground vault is in a hostile environment. Depending upon the outside environment, you may have water entering the vault, and in many cases completely submerging the transformers. Water in contact with transformers causes corrosion over time. If the water contains fertilizers, road salts or minerals from the soil, the water is even more corrosive. Transformers create electric fields and charges which in an environment like we are describing contribute to corrosion. High-voltage cable develops electric stress on its insulation. Electric stress can cause insulation failure. The underground environment of vaults can contribute to early cable failure. This environment of corrosion and cable faults results in shortened life span for transformers.

Internally, the transformer is in an oil environment. A short circuit, which is basically a high-intensity arc, can create flammable gasses which may ignite inside the transformer causing it to explode. Corrosion and electric stress are the two worst parts of the environment. Corrosion is best dealt with by placing transformers in the friendlier above ground environment. The stress element remains the same, but in an above ground environment operations and maintenance are obviously enhanced.

Idaho Power must deal with operating problems

resulting from adverse weather conditions. In the Ketchum area there is a lot of snow. Transformers placed below ground can be completely buried under the snow. Occasionally employees have to perform switching on the system, meaning to de-energize and isolate part of the system so we can work on the de-energized portion. With two or three feet of snow on the ground we have difficulty even locating the transformers. Idaho Power is concerned for its customers over the prospect of prolonged outages as a result of these adverse weather conditions. Customers have also been known to "hide" vault locations under sod, in plantings and other landscaping improvements.

Q. Would the electric distribution system serving the New Villager Condominium Association currently fall under your area of responsibility.

A. Yes, from a redesign perspective.

Q. Let's talk specifically about the dispute between New Villager Condominium Association, Inc. and Idaho Power Company. Could you provide the Commission with a brief description of the history and nature of the dispute between these two parties?

A. Idaho Power laid underground line and placed transformers underground at New Villager in 1969. The construction was consistent with technology and standard methods of that time.

In 1985, pursuant to the procedure I previously referenced, Idaho Power further recognized the potential safety risks for employees and the public and removed the below ground transformers from the vaults. These were replaced with at grade pad mounted transformers. The pad mounted transformers were dark green in color, approximately thirty-three inches wide, thirty inches long and twenty-four inches high.

On May 1, 1987, New Villager Condominium Association, Inc. filed a Complaint in district court alleging among other issues that Idaho Power lacked a proper easement to move the transformers aboveground.

On January 10 and 11, 1989, the matter was tried before Judge May in Hailey, Idaho. Judge May issued his Decision dismissing Plaintiffs' Complaints on the grounds that Idaho Power had a lawful easement to move the transformers above ground. The Associations appealed.

On March 24, 1992, the Idaho Supreme Court reversed Judge May's ruling and remanded the case to the District Court. That case is reported as Villager Condominium Association, Inc. v. Idaho Power Company, 121 Idaho 986, 829 P.2d 1335 (1992) (Villager I). In a split, three-two, decision the Idaho Supreme Court ruled that Judge May was incorrect. Specifically, the Idaho Supreme Court concluded that moving the transformers above ground was an

"unauthorized" expansion of the easement.

On May 12, 1993, Idaho Power filed its petition in this case before the Commission. The Company requested that new Villager Condominium Association Inc. be required as a condition of obtaining electric service to provide Idaho Power with an easement permitting above ground transformers pursuant to Idaho Code § 61-203 and General Rule 13. In the meantime the District Court required Idaho Power to replace the transformers back in their vaults underground since the Company did not have an easement for above ground transformers.

Idaho Power Company appealed from the decision requiring Idaho Power to place the transformers back under ground. In that appeal, the Condominium Associations argued that the transformers must always remain under ground in their present condition. The Condominium Associations argued that the District Court's decision in requiring Idaho Power Company to replace the transformers under ground was in the nature of a "permanent injunction" thus precluding this action before the Idaho Public Utilities Commission.

The Idaho Supreme Court expressly rejected the Condominium Associations' argument that the Commission was precluded from addressing the issue of requiring an appropriate easement for pad mounted transformers as a

condition of providing electric service.

Q. Could you provide a description and the location of the transformers at New Villager Condominium Association, Inc?

A. Yes. That is illustrated in a document marked as "Exhibit 1."

Q. How are transformer inspections performed in the Idaho Power service area?

A. As a matter of course, when we work on our system our employees are trained to recognize parts of the system that are in a failure mode. The problem with transformers that are underground is they are in a very confined environment and you can't really tell much just by lifting the lid off. The only thing you can really do if you want to do an inspection is probably de-energize the transformer and lift it out of the ground and inspect it. Even then, however, all you are looking at is the outside of the transformer, you are not able to determine what the inside of the transformer looks like. Its very difficult and costly to have meaningful inspections. The inspection idea would be disruptive to continuous customer service.

Q. Would inspection improve reliability of the existing underground transformers?

A. No, it would be nice to be able to inspect more because of the hostile environment, but because of the

previous statement, it is my opinion that the cure of the inspection is worse than the problem. The best course of action is to replace the underground transformer with pad mounted transformers. Merely instituting a rigorous inspection program would aggravate the situation. Visual inspection is very difficult as opposed to the pad mounted or the overhead transformer.

Q. In your opinion, is it in the public interest for the Commission to require that New Villagers provide an easement for the installation of pad mounted transformers?

A. Yes.

Q. If the Commission were to require the installation of below ground transformers can Idaho Power develop a system with transformers placed under ground which is safe for residential subdivisions?

A. Not absolutely safe, no. Safe is a relative term. Assuming you mean as safe as our existing overhead system or our pad mounted transformer systems, the answer is yes. Idaho Power will require additional equipment, different styles of transformers than those that are presently located underground and vaults adequate for switching and safety. The new system would be expensive compared to what we provide in other residential subdivisions in Idaho Power's service area.

The new design would be a single vault that

is four feet in depth and four feet by perhaps six feet on the surface. That vault then would have an internally attached bus on one wall connecting the high-voltage cables: one cable being connected to the source, one cable connected to load further out on the circuit, and a third bus position cabled to the energized transformer inside the vault. As far as safety goes, we would be able to de-energize that single transformer from a position at the edge of the vault through an open access lid.

The transformer itself would be a new design to our system. It would have a tank with a solid dielectric filled in around the transformer core and coils. Without any oil as the dielectric the unit is much less susceptible to violent failure. With the three position bus on the vault wall, other sections of the circuit will not be interrupted to change out a failed transformer. We view this installation as no more hazardous than what would be found at pad mount transformer locations.

Q. Has the Company developed an underground transformer diagram?

A. Yes. That diagram is "Exhibit 2."

Q. Does Exhibit 2 illustrate the basic footprint for the vault?

A. Yes. The footprint is, as I stated, four feet by six feet. The vault has an access lid on top of it

which would be roughly thirty-three inches square.

Q. Does this vault design address all safety concerns that you previously talked about?

A. Yes it does. We feel that the transformer would be much less inclined to violent failure. The new access lids on top of the vault are not as open to the environment and as a result materials are less likely to flow into the vault. The public is less likely to poke sticks or papers or materials of any sort in there.

Q. Please describe the diagram marked as "Exhibit 3."

A. "Exhibit 3" is a diagram of an illustrated example of a pad mount transformer. That diagram shows that we have primary conductor coming in and/or attached to a high voltage terminal on the transformer. The diagram displays low voltage secondary or service cables going to various locations in the subdivision. All these cables enter into the transformer environment underground through the concrete pad that it is sitting on. This diagram fails to show the lid associated with the transformer. It has been left off just for illustration purposes. The lid is roughly the same size as the box that is above the concrete pad that is seen there. It is just hinged and would fit over all these wires that are exposed in the picture and it would be fastened by a tamper proof device.

Q. The difference between these two diagrams does not necessarily address the hostile environment issue that we have discussed concerning transformers below ground. Could you address that?

A. The new vault design has a much more limited ability for foreign materials to flow into it. However, it is not waterproof, but the cable material has been designed to withstand water. The transformer with its solid dielectric will be relatively impervious to corrosive elements. These two factors diminish our environmental concerns.

Q. Have you prepared a cost estimate for the installation of below ground transformers on the property owned by the New Villager Condominium Association?

A. Yes, "Exhibit 4" is that estimate.

Q. Does this diagram incorporate any anticipated costs for maintaining inventory for the submersible transformers?

A. Yes, in order to minimize costs we have set forth this standard design in which we would need to only own one extra transformer in our emergency inventory. If we ever needed more than one spare at a time we would have to use a pad mount as a back-up replacing the underground unit. The pad mounted transformer would be placed directly on top of the vault as a temporary measure until another

underground transformer could be ordered and placed in the vault. If the Commission were to require the installation of below-ground transformers, the Commission should require that the New Villagers Condominium Association give Idaho Power an easement that permits a pad-mounted transformer on a temporary/emergency basis.

Q. What is the total cost estimate for transformers installed below ground for New Villager Condominium Association Inc?

A. As reflected on "Exhibit 4," the estimate is $58,995.00.

Q. That Exhibit has a footnote which states "Landscaping and site restoration to be provided by the New Villager Condominium Association, Inc. at no cost to Idaho Power Company."

A. Yes. In my opinion, it is more reasonable to have the New Villagers Condominium Association, Inc. provide for the site restoration and landscaping once the new underground transformers are installed.

Q. This diagram does not discuss any special training for personnel.

A. Any lineman that is qualified to do work on our pad mounted transformers would be qualified to do the technical aspects of working on these transformers. There would be a burden on personnel responsible for working in

the area as to the locations of the vaults since their placement underground will be difficult to find in adverse weather or landscaping conditions.

Q. In researching Idaho Power's ability to obtain below ground transformers, did you locate any manufacturers of this specific type of transformers we have discussed so far?

A. Yes, all but one produce transformers with oil as the dielectric. We first approached most of our normal vendors for transformers. The larger producers of oil filled transformers ceased manufacturing underground transformers. We have found three other suppliers, one Canadian, two domestics. The two domestics produce other transformers although, they are not major players, so we consider the sources for the submersible oil filled transformers to be from specialty transformer suppliers. The solid dielectric design we have chosen is from a large vendor with a proven track record.

Q. Does this conclude your testimony?

A. Yes.

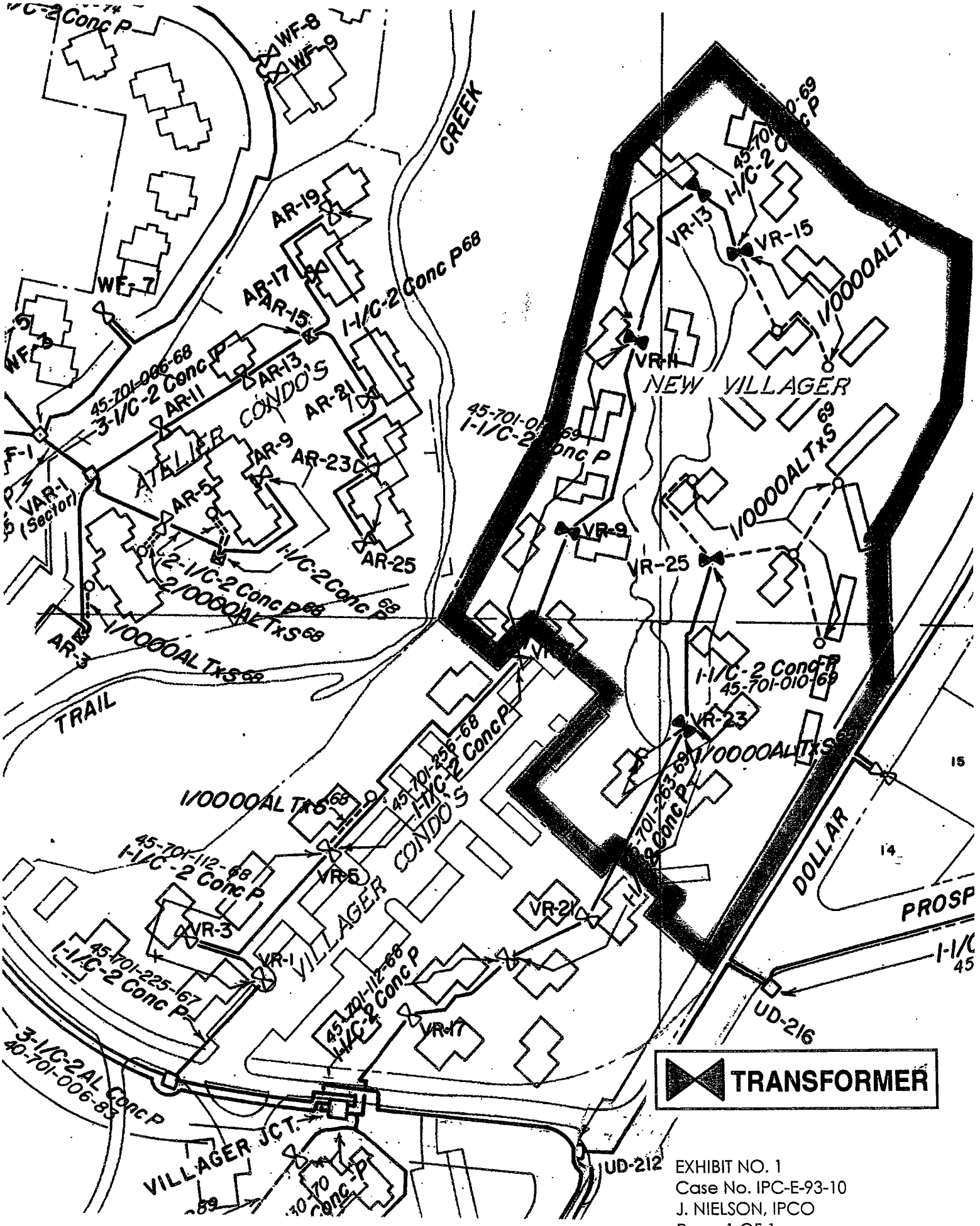

EXHIBIT NO. 1
Case No. IPC-E-93-10
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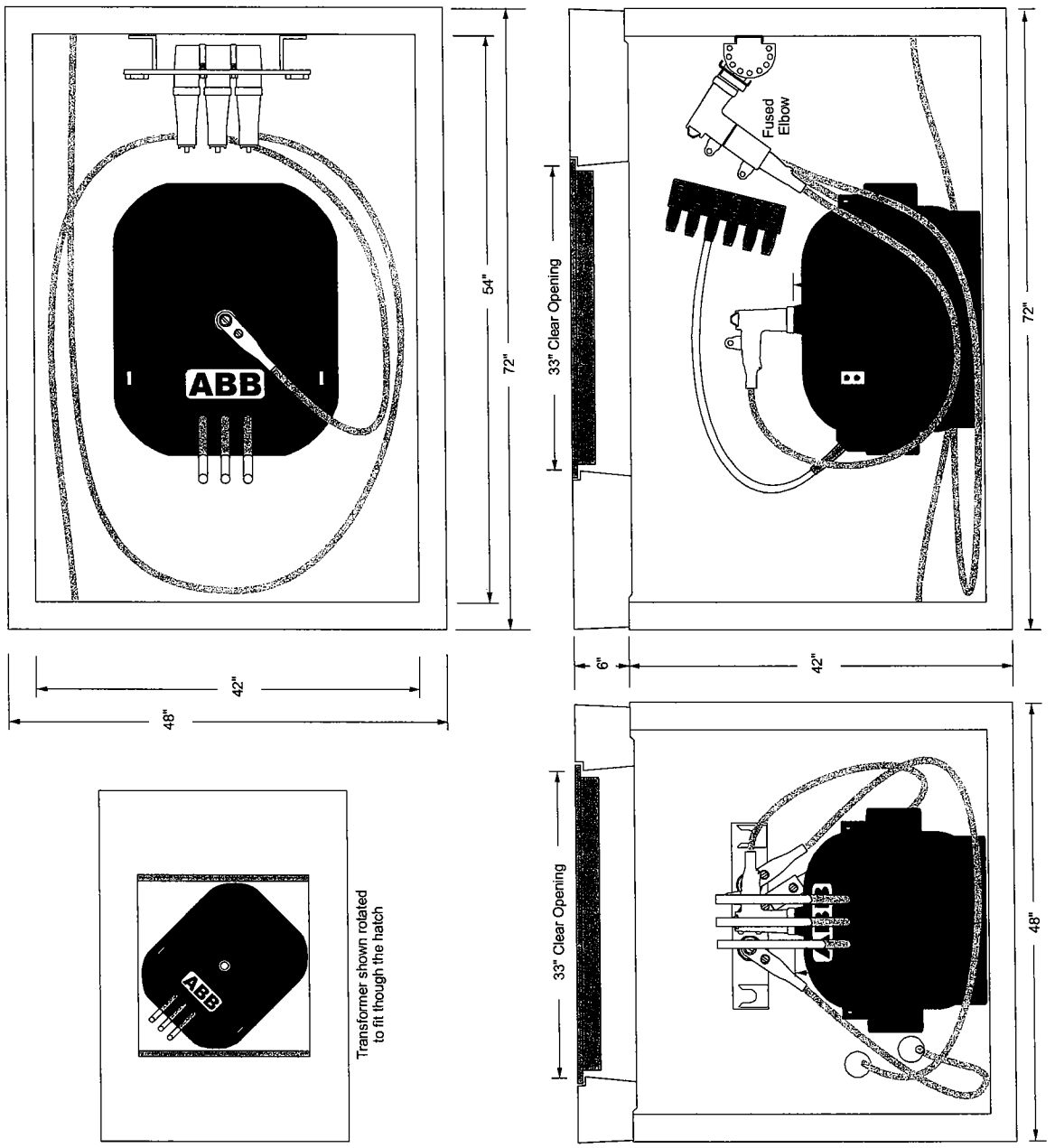
IDAHO POWER

1-Ø BELOW GROUND TRANSFORMER INSTALLED IN A 464 VAULT



EXIBIT NO. 2
CASE NO. IPC-E-93-10
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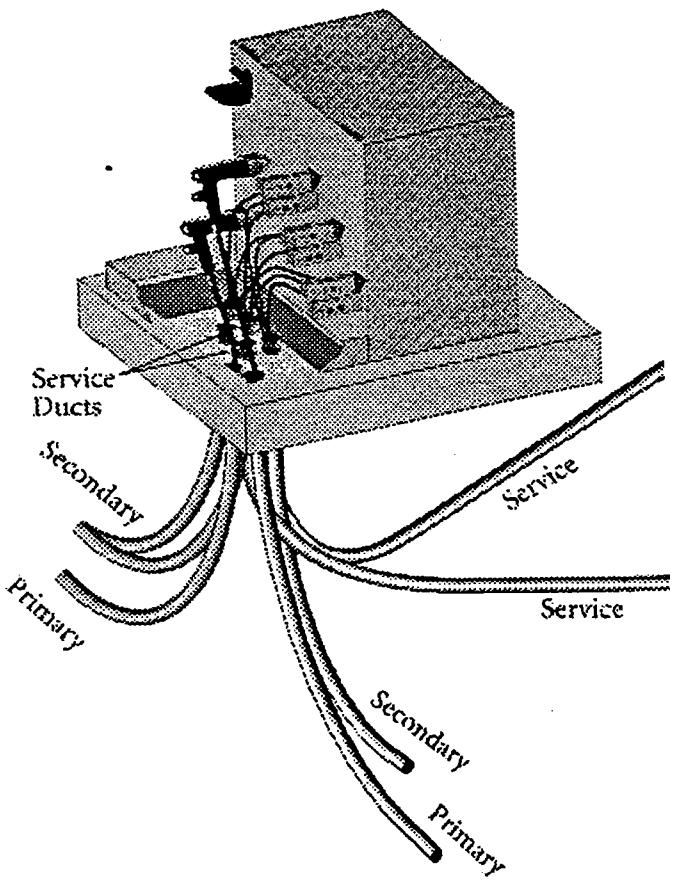
Pad-Mounted Transformer Installation



EXIBIT NO. 3
CASE NO. IPC-E-93-10
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Estimated Cost for Idaho Power Company to Install New Below-Ground Transformers at New Villager Condominium Association, Inc.

(Cost Does Not Include Removing the Vaults and Transformers)

Estimated Installed Cost for Each Below-Ground Transformer

Quantity	Description		Cost
1 ea	Vault and cover	$	1,075.00
1 ea	75 kVA ABB transformer	$	4,782.00
4 ea	Primary cable elbow terminations	$	110.00
1 ea	3-way LBC junction	$	210.00
1 set	Secondary cable connectors	$	280.00
1 set	Miscellaneous materials	$	805.00
	Sub-Total for Materials	**$**	**7.262.00**
	6% Idaho sales tax	$	436.00
22 hrs	Installation labor (1)	$	1,210.00
	Total Estimated Installed Cost per Transformer	**$**	**8,908.00**

Estimated Cost to Purchase and Inventory One Spare Transformer

Quantity	Description		Cost
1 ea	100 kVA transformer	$	4782.00
	6% Idaho sales tax	$	287.00
	Transformer inventory expense	$	478.00
	Total Estimated Cost for One Spare Transformer	**$**	**5,547.00**

Total Estimated Cost for Six Below-Ground Transformers

Quantity	Description		Cost
6 ea	Installed transformers @ $8,908.00	$	53,448.00
1 ea	Spare transformer	$	5,547.00
	Total Estimated Cost for Six Transformers and One Spare	**$**	**58,995.00**

(1) Landscaping and site restoration to be provided by the New Villager Condominium Association, Inc. at no cost to Idaho Power Company.

EXHIBIT NO. 4
CASE NO. IPC-E-93-10
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