

Development of Website-Based Contribution Receivable Data Processing and Monitoring Services at BPJS of Employment East Nusa Tenggara

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Abstract

BPJS of Employment East Nusa Tenggara faces challenges in managing contribution receivable data due to a manual system that is slow and prone to errors. This study developed a web-based system to streamline, accelerate, and improve the accuracy of receivable management using the Waterfall method. The system includes features such as data management across various receivable categories, Excel file uploads, graphical monitoring, tiered verification, and multi-user access. Implementation results show the system functions effectively, providing real-time information and enhancing work efficiency. Noted limitations include the absence of automated notifications and central system integration. This system is expected to support the digital transformation of public services in the social security sector.

Keywords: *BPJS of Employment, contribution receivables, information system, data verification, waterfall method, web-based monitoring*

1. Introduction

The growth of information technology has increased human needs in various aspects of life, including in the financial sector. The use of technology such as computers provides convenience in managing various financial aspects, such as recording payment data, company financial management, and storing data in a more organized and systematic manner [1].

One important aspect of finance is receivables. According to Agus Sartono, receivables management involves monitoring delayed payments and minimizing the risk of uncollectible receivables, which can negatively impact a company's cash flow and financial stability. To support financial management, including receivables, the use of technology such as websites can be an effective solution [2].

A website is an interactive medium with interconnected pages (hyperlinks) that presents information in various forms. Connected via URLs on the World Wide Web, websites can help companies manage financial data efficiently and in a structured manner [3][4].

BPJS (Social Security Administrator) for Employment is an Indonesian government agency that plays a crucial role in providing protection and social security for workers in Indonesia. BPJS Employment carries out important tasks in managing various documents, including participant data, claims, contracts, and other administrative documents [5]. One of its specific responsibilities in the field of supervision and inspection is managing contribution receivable data related to social security programs. This aims to maintain the sustainability and integrity of the services provided by BPJS Employment to all participants[6]. However, the data processing and monitoring of contribution receivables at BPJS Employment branch offices are still done manually, making the system inefficient. This manual process tends to be time-consuming, prone to calculation errors in the receivables monitoring graphs, and makes it difficult for the supervision and inspection body (Wasrik) to perform effective monitoring.

The expected outcome of this research is to help address the issues faced and assist the supervision and inspection body (Wasrik) in monitoring and improving the accuracy of total receivables graph calculations, as well as in managing receivable documents to obtain accurate and real-time data.

2. Methodology

This study employs the Waterfall model as the chosen software development framework, a method originally introduced by Winston Royce during the 1970s. Initially derived from hardware engineering processes, this approach emerged due to the absence of a standardized methodology for software development at that time. The Waterfall model is characterized by its linear sequence of phases, which include requirement analysis, system design, coding and testing, implementation, and ongoing maintenance [7].

The system development process follows the Waterfall methodology, which consists of five sequential stages. The Requirement phase involves conducting interviews with staff from the supervision and inspection division to gather the system’s needs and expectations. In the Design phase, the system is structured based on user requirements, including data structures, system architecture, user interface design, and algorithm planning. The Implementation stage involves programmers translating the design into functional code, ensuring the system operates according to the specified requirements. During the Verification phase, the system undergoes testing to ensure that all functions and logic run correctly and to minimize potential errors. Lastly, the Maintenance phase focuses on fixing any issues that may arise after deployment and ensuring the system continues to perform optimally over time [8].

3. Result and Discussion

3.1. Analysis system

The system is designed to meet the specific needs of users, as identified through interviews and direct observations. It was concluded that the system must include features that effectively support users in managing and monitoring contribution receivables. Key features required include monitoring for various receivable categories such as “TK Nol,” “One-Time of payment,” “The Bad Debt receivables”, and “The Large Receivables”. Additionally, the system must provide data verification capabilities and allow users to manage receivable data, including submitting requests for corrections, modifications, or deletions in the event of errors[9].

The system outputs include monitoring graphs, verification forms, and data tables to facilitate efficient receivable management. To ensure smooth operation, users such as super admins, admins, and general users are expected to have basic computer skills and be proficient in using web-based applications.

3.2. Design

3.2.1. Use case diagram

A use case diagram depicts how various actors engage with the system's functions, highlighting the system's anticipated operations from the user's point of view. These use cases are grouped according to the system's functional capabilities. The system can be accessed by different types of users, including the admin (as the supervision officer), the super admin, and the user (acting as the inspector). Each actor is granted distinct access privileges tailored to their role within the system [10].

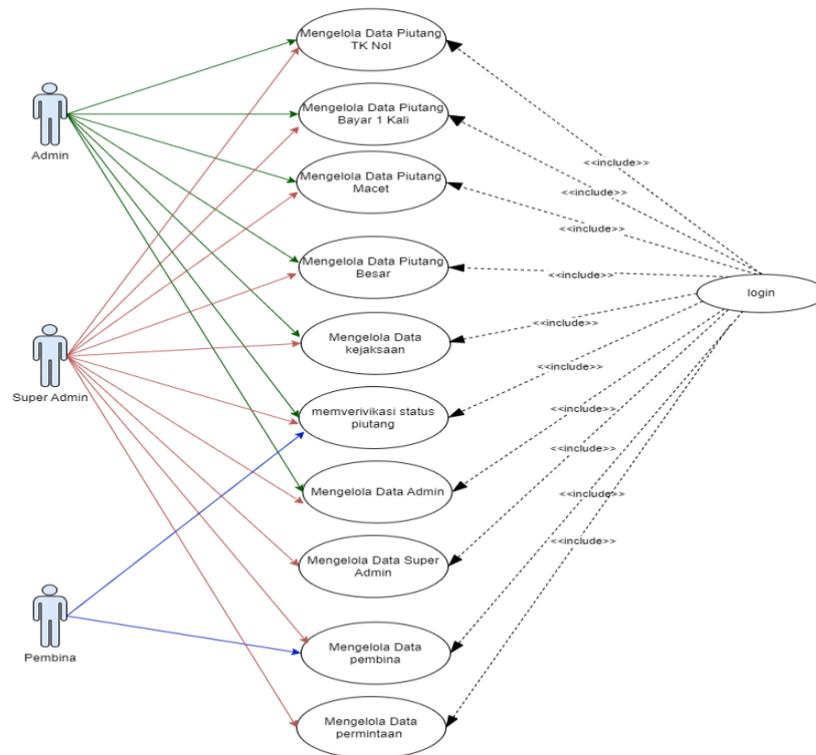


Fig 1 : Congregation use case diagram

3.2.2. Entity relation diagram

Entity Relationship Diagram (ERD) is a crucial data modeling method in the field of databases and information systems. ERDs facilitate the visualization of complex structures and relationships between entities, helping developers and stakeholders understand data flow, identify requirements, and optimize database design for greater efficiency. Organizations use ERDs to ensure that the data structure aligns with their needs, enhances integration across departments, and minimizes the risk of errors, thereby enabling more effective data processing.

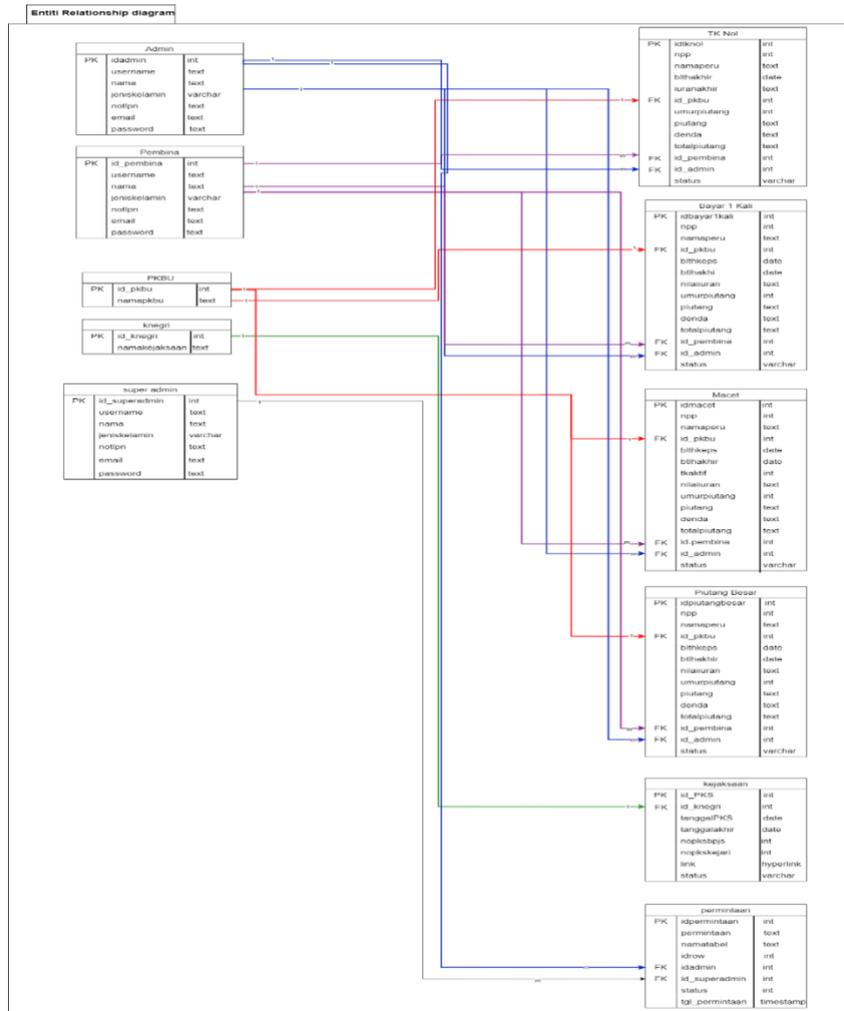


Fig 2 : Entity relation diagram

3.3. System Implementation

System implementation refers to the stage where the system design is transformed into a working solution capable of delivering outputs aligned with the objectives identified during earlier analysis. This phase encompasses building, installing, and setting up essential components such as hardware, software, and the supporting network infrastructure to ensure the system functions efficiently. The website was created using the PHP programming language and utilizes a MySQL database. The interface of the website is illustrated in the image below.

1. User Landing Page

This is the landing page of the SONAR (Supervision Monitoring System) website. It is designed to allow users to select their login role (Inspector, Admin, or Super Admin) before accessing the system. This page only displays operational hours and a brief welcome message.



Fig 3 : User Landing Page

2. Display of the login page for one of the actors (Super Admin)

The contribution receivable data processing and monitoring system involves three user roles: super admin, admin, and inspector. Access to the system begins at the login page, which acts as the primary entry point and ensures that only verified users can interact with receivable records and associated data.

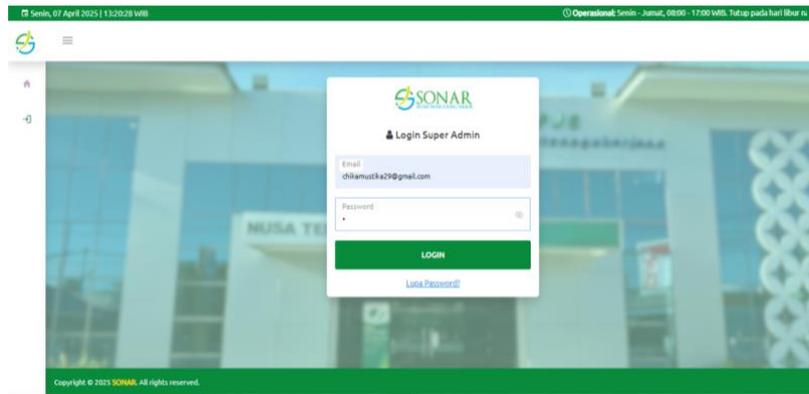


Fig 4 : Display of the login page for one of the actors (Super Admin)

3. Main page for monitoring TK Nol receivables

Once the Super Admin logs in successfully, the system displays the TK Nol receivables monitoring dashboard. This interface presents key data, including a visual chart showing the status of TK Nol inspectors, total receivables, the cumulative number of TK Nol NPPs, and details about the duration of cooperation agreements. The layout is structured to enable the Super Admin to efficiently track TK Nol receivables in real time and access relevant information in an organized way.

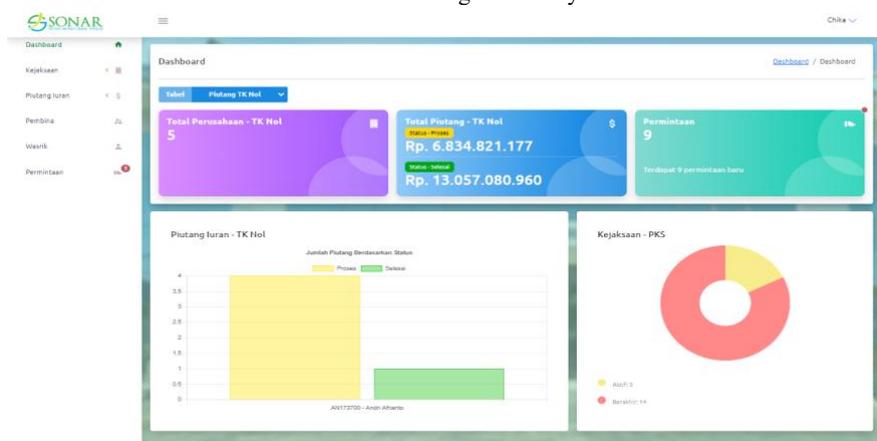


Fig 5 : Main page for monitoring TK Nol receivables

4. Display of the One-Time Payment Receivables Monitoring Page

The One-Time Payment receivables monitoring page is a feature available on the website that becomes accessible once the Super Admin logs in. Acting as an alternative monitoring tool, this page displays key information such as the total number of inspectors, graphical representations of receivables, the overall count of NPPs or companies, and the cumulative value of receivables.

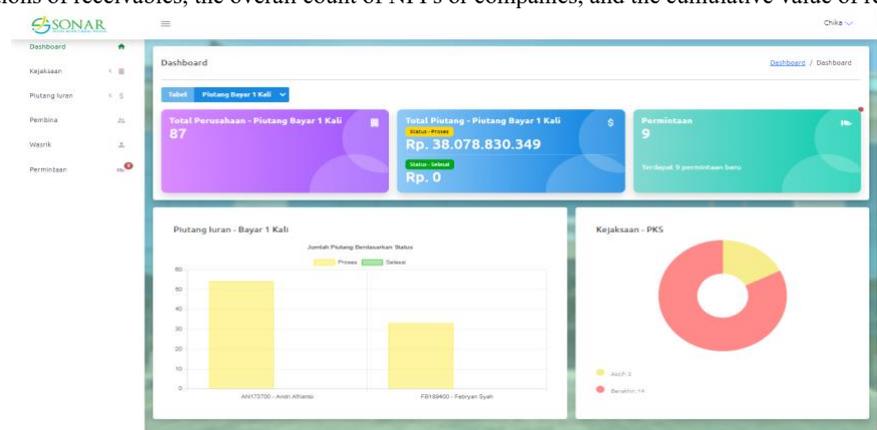


Fig 6 : Display of the “One-Time Payment” Receivables Monitoring Page

5. Display of the Bad Debt Receivables Monitoring Page

The Bad Debt receivables monitoring page is a feature used to monitor problematic receivables. It is the third option accessible after the Super Admin enters the Dashboard. On this page, the Super Admin can view the number of inspectors, receivables diagrams, total NPPs/companies, and the total amount of bad debt receivables. With a clear and informative layout, this page supports decision-making related to the resolution of bad debt cases.

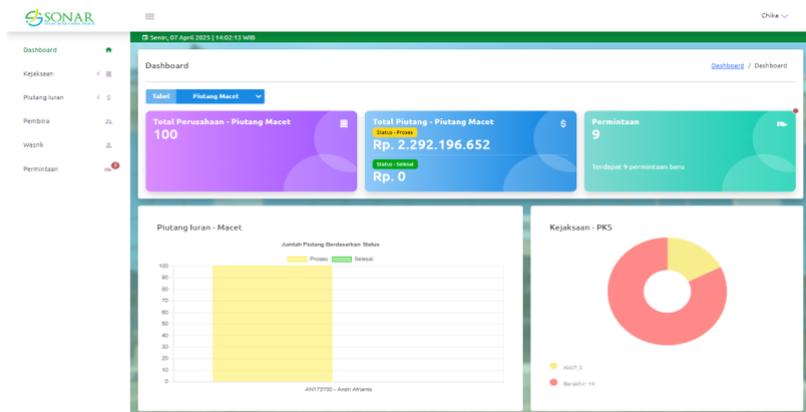


Fig 7 :Display of the “Bad Debt” Receivables Monitoring Page

6. Display of the Large Receivables Monitoring Page

The Large Receivables monitoring page is the fourth option accessible after the Super Admin logs into the Dashboard. This page presents key information such as the number of inspectors, receivables diagrams, total NPPs/companies, and the total amount of high-value receivables. With a clear and user-friendly interface, this page assists the Super Admin in monitoring and managing large receivables, making the supervision and decision-making processes more effective.

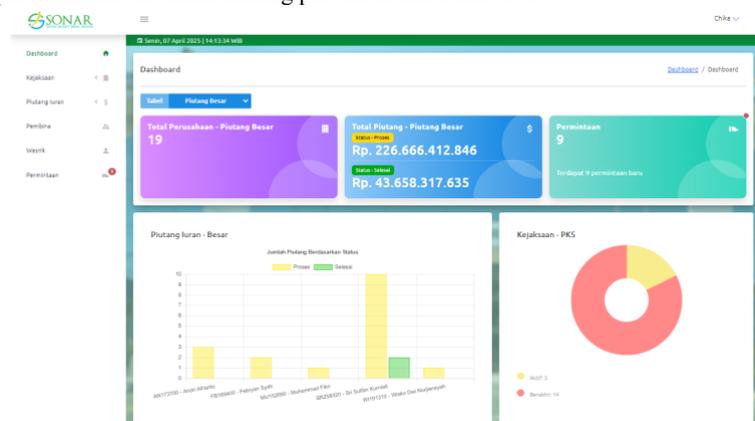


Fig 8 : Display of the Large Receivables Monitoring Page

7. Display of TK Nol Receivables Data Page

The TK Nol receivables data page displays contribution receivables data categorized as TK Nol, where the Super Admin can manage the data by adding, editing, deleting, searching, and verifying the status of the receivables and their follow-up actions.

No	NPP	Nama Perusahaan	Umur Piutang	Total	Status	Aksi
1	16003220	MITRA HALJU MAKHLUR	62 Bulan	Rp. 6.216.305.640,00	Proses	[Edit] [Hapus] [Detail]
2	16063639	PANCA KONGSTRUKSI	13 Bulan	Rp. 95.809.327,00	Proses	[Edit] [Hapus] [Detail]
3	21022993	APE TETUS	58 Bulan	Rp. 414.348.490,00	Proses	[Edit] [Hapus] [Detail]
4	17037016	KONCRECASI SUSTER - SUSTER WAJAH KUDUS	52 Bulan	Rp. 114.366.720,00	Proses	[Edit] [Hapus] [Detail]
5	15038711	SANDHY PUTRA MAKHLUR (PANNI BANK)	68 Bulan	Rp. 13.057.080.960,00	Proses	[Edit] [Hapus] [Detail]

Fig 9 :6. Display of TK Nol Receivables Data Page

8. Display of the Add TK Nol Receivables Data Form

The Add TK Nol Data page displays a form used to input new data related to TK Nol contribution receivables. The Super Admin can fill in the required fields according to the data input format, including NPP, company name, final BLTH ITRF, final contribution, receivables, penalty, total receivables, PKBU classification, receivables age, inspector, supervisor, and status.

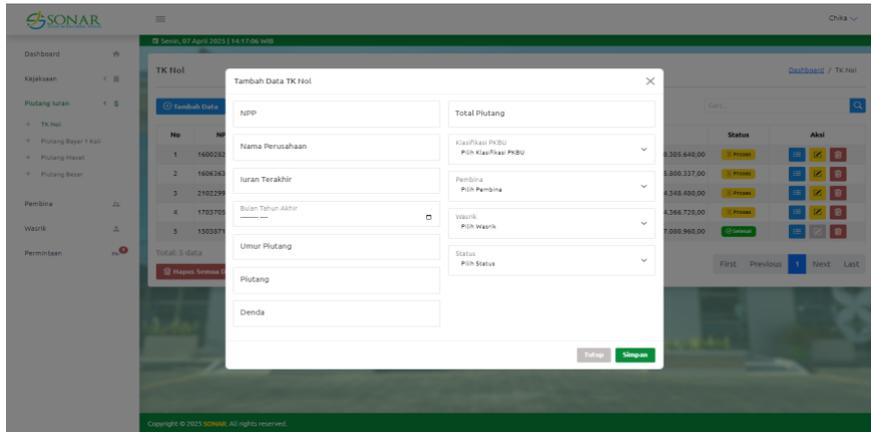


Fig 10 : Display of the Add TK Nol Receivables Data Form

9. Display of One-Time Payment Receivables Data Page

The One-Time Payment receivables data page displays contribution receivables categorized under one-time payments. On this page, the Super Admin can manage the data by adding, editing, deleting, searching, and verifying the status of the receivables and their follow-up actions.

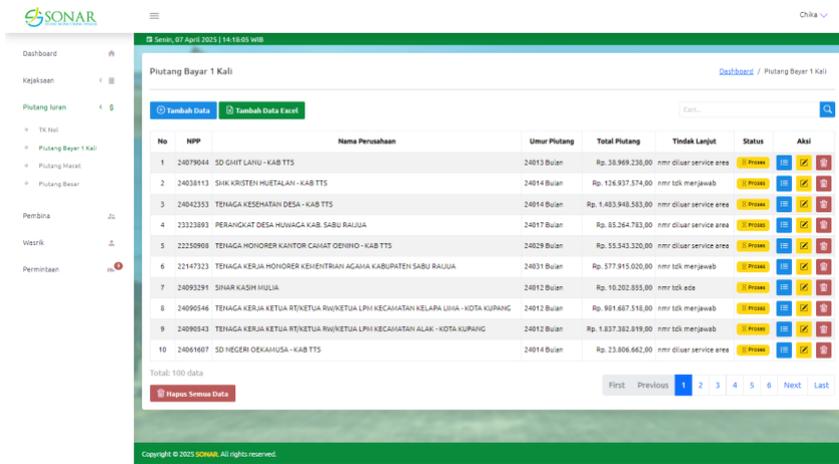


Fig 11 : Display of One-Time Payment Receivables Data Page

10. Display of the Add One-Time Payment Receivables Data Form

The Add One-Time Payment Receivables Data page displays a form for entering data related to one-time payment contribution receivables. The Super Admin can fill in the data according to the input format, including NPP, company name, PKBU classification, BLTH KEPS, final BLTH ITRF, contribution amount, follow-up action, receivables age, receivables amount, penalty, total receivables, inspector, supervisor, and status.

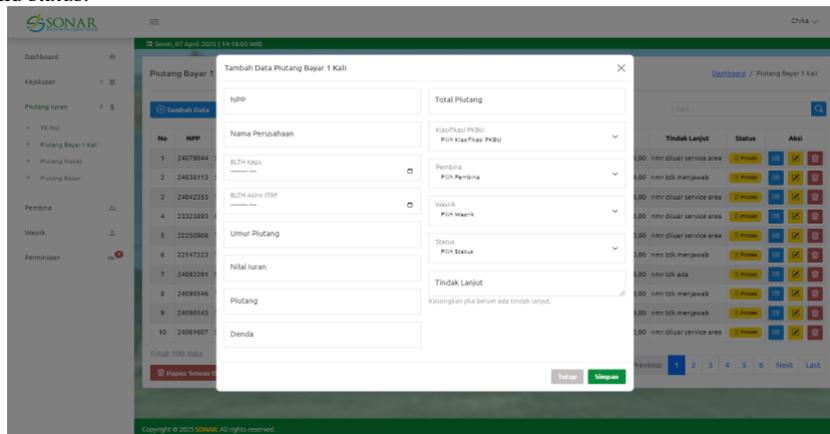


Fig 12 : Display of the Add One-Time Payment Receivables Data Form

11. Display of Bad Debt Receivables Data Page

The Bad Debt Receivables Data page displays information related to overdue contribution receivables. On this page, the Super Admin can manage the data by adding, editing, deleting, searching, and verifying the status of the receivables and their follow-up actions.

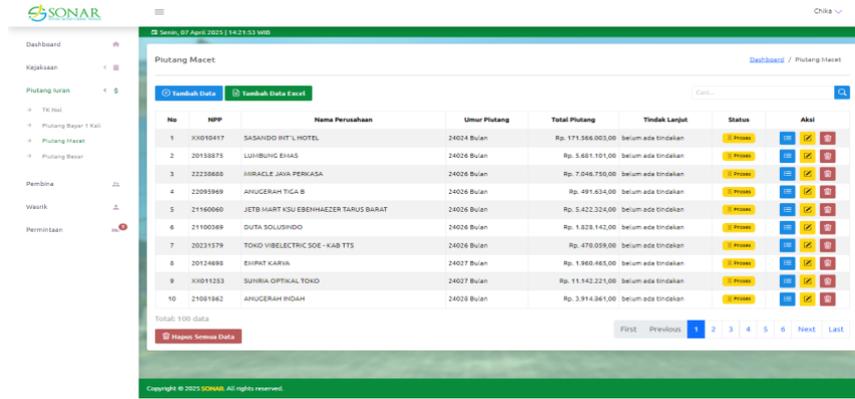


Fig 13 : Display of Bad Debt Receivables Data Page

12. Display of the Add Bad Debt Receivables Data Form

The Add Bad Debt Receivables Data page displays a form for entering data related to bad debt receivables. The Super Admin can fill in the data according to the specified format, including NPP, company name, final BLTH ITRF, final BLTH, active TK, contribution amount, penalty, follow-up action, receivables amount, total receivables, PKBU classification, receivables age, inspector, supervisor, and status.

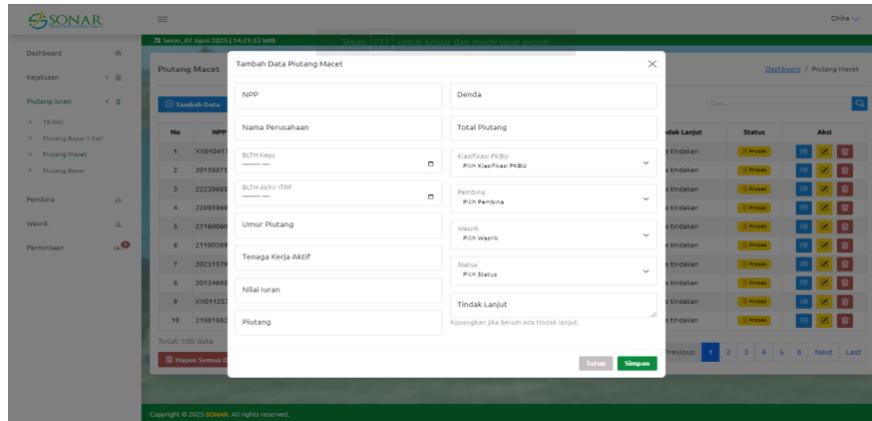


Fig 14 : Display of the Add Bad Debt Receivables Data Form

13. Display of Large Receivables Data Page

The Large Receivables Data page displays information related to high-value contribution receivables. On this page, the Super Admin can manage the data by adding, editing, deleting, searching, and verifying the status of the receivables.

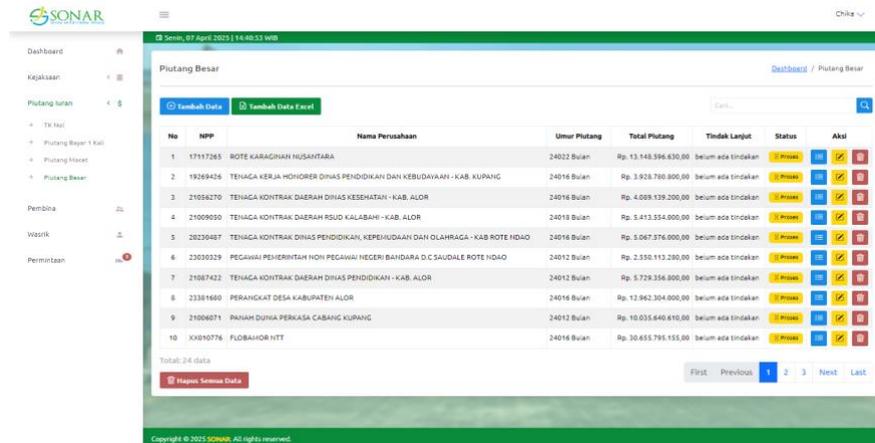


Fig 15 : Display of Large Receivables Data Page

14. Display of the Add Large Receivables Data Form

The Add Large Receivables Data page displays a form for entering data related to large receivables. The Super Admin can fill in the data according to the input format, including NPP, company name, PKBU classification, BLTH KEPS, final BLTH, contribution amount, receivables age, receivables amount, penalty, total receivables, inspector, supervisor, status, and follow-up action.

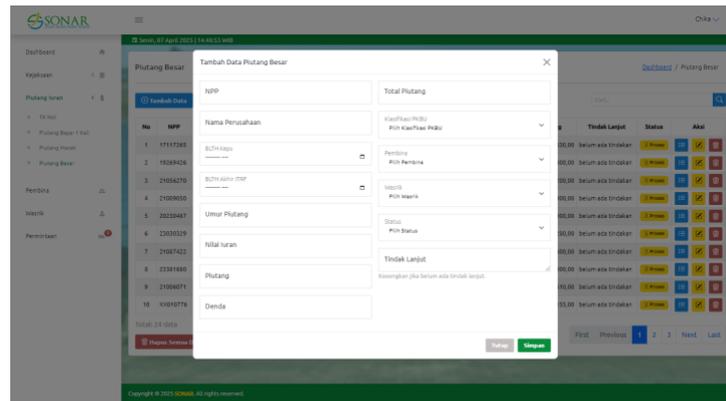


Fig 16 : Display of the Add Large Receivables Data Form

15. Display of the One-Time Payment Receivables Verification Form

This verification form page is used by inspectors to verify the status of one-time payment contribution receivables

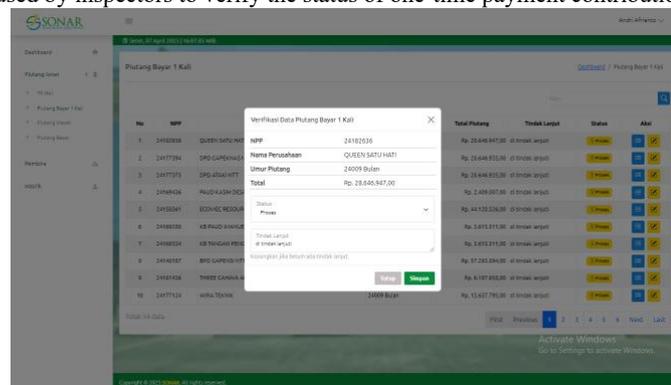


Fig 17 : Display of the One-Time Payment Receivables Verification Form

4. Conclusion

This study successfully developed a web-based system for managing and monitoring contribution receivables at the BPJS of Employment, East Nusa Tenggara Branch, utilizing the Waterfall methodology. The development process followed a structured sequence comprising requirement analysis, system design, implementation, and systematic testing. The resulting system includes essential functionalities such as data visualization through monitoring charts, multi-level verification for data accuracy, and role-based access for different user types, including super admin, admin (supervisory officer), and inspector (advisor). These features collectively enhance the efficiency of receivables management, offering significant improvements over the previously manual approach. By delivering accurate, real-time, and well-organized data handling, the system effectively resolves issues related to inefficiencies, calculation inaccuracies, and restricted monitoring capabilities. Furthermore, it streamlines verification, oversight, and evaluation activities for relevant users, while serving as a reliable record of receivables tracking—supporting both transparency and informed strategic planning.

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